

A reflection on the philosophy of technology: where is the human of technique?

ABSTRACT

Carl Mitcham developed a classification of the philosophy of technology by dividing the authors' work into two traditions. The first, pioneering the use of the expression philosophy of technology, was the tradition of engineers. The second, founded in the XX century, was the humanist tradition. On the one hand, the engineers' tradition sees itself as humanist, but produces a philosophy that reconstructs the world based on technological standards. On the other hand, the humanist tradition develops an interpretation of the technological phenomenon where the relationship between the human and the technique is obscure. Based on this interpretation, an issue remains, namely, is there humanity from the philosophy of technology? Is it possible to identify the human aspects in the technique? This work aims to reflect on what is human in the philosophy of technology. The methodology includes a critical analysis of the thought of philosophers linked to the tradition of engineers and the humanist tradition carried out under the perspective of Álvaro Vieira Pinto's dialectical perspective. It appears that the engineers' tradition creates a separation between man and technique, ignoring a social and historical view of the technical phenomenon. The humanist tradition also makes a separation between man and technique, however, conferring on technique a transcendental power capable of subordinating man to its domination project. Both traditions exclude technique as a way of organizing social relations of production. From this perspective, humans produce their own existence and articulate themselves in a community to extract from the culture the knowledge that will provide opportunities for the realization of society's purposes. By taking possession of a critical awareness, humans go beyond and begin to understand their position of dominance in the sphere of production. In this condition, they can glimpse strategies to profoundly transform their own reality and make themselves free.

KEYWORDS: Philosophy of technology. Carl Mitcham. Álvaro Vieira Pinto.

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INTRODUCTION

According to Carl Mitcham, there are differences regarding the meanings of technique and technology. For that author, technique might mean a set of procedures organized to reach a specific result. In such case, the human action is emphasized. Technique would be the gathering of rules and conscious procedures articulated aiming at certain achievement. When it comes to technology, however, greater emphasis is placed on the artifact and the modern science view as the basis for its construction. Technology has a broader meaning than that of the technique, which leads that author to state that within the philosophy of technology there is a philosophy of technique.

The explanation put forward by Álvaro Vieira Pinto shows technique and technology as intrinsically linked. Technique is an ordered series of organized operations taking advantage of the laws of natural phenomena to transform the raw material and meet a certain target. Technology is characterized as an epistemology of technique, which implies the existence of a technique science. That author defends the existence of a broad set of knowledge, not only from physics, but also from sociology and philosophy, to explain such phenomenon. According to him, the perspective of a critical awareness provides humans with a new understanding of the relationship between technique and technology. Thus, the technique epistemology creates a new relation, which is not that of human beings and nature, but rather one between human beings and their peers. In this way, technique goes beyond the understanding of the natural body's properties and becomes an understanding of the how humans organize their production social relations.

Referring to Mitcham (1989) again, the philosophical reflection upon technology is historically late. The classical Greek tradition presented reflections regarding technology-related themes which, however, did not constitute a scheme of the knowledge about this theme. The interest in and the creation of a more organized study on technology started in the mid XIX century, assuming a link with the increased importance of techniques in the development of the modern industrial society. Those studies were classified as the philosophy of engineering. Such tradition was addressed by several thinkers, most of them engineers or physicists, who highlighted the importance of the development of technology for society organization and the human condition development.

However, the early XX century presented relevant challenges due to the sharp growth of the technological development and the importance of technique in the individuals' daily life organization. In such context, the humanist tradition emerged, proposing an ideal of contemplative awareness originated in the Plato-Aristotle tradition. Such tradition became indifferent to the technical knowledge, understanding it as dependent on other more relevant knowledge.

According to Mitcham (1989), the engineering and the humanist traditions are twins, but reveal unavoidable conflicts. The engineering tradition authors consider themselves "humanists", however, this is not the same as developing "humanistic" actions. Their view of their profession is that of a "humanizing" activity. One could advocate that those authors' action conveys some human being conception. However, this understanding of the human being is acquired data accepted uncritically. The engineering tradition does not question or judge issues raised by others on the theme as disturbing or unreasonable. As a result, an impulse of

translating the phenomena in its own language is noticed, one that presents a world view in technological terms.

Mitcham (1989) pointed out that the representatives of the humanist tradition contact new or different languages without the intention of translating them into a clearer language, but rather seeking to learn, interpret, and understand them. The translation, even the most sophisticated one, always leaves a residue of meaning untranslated and which cannot be translated. Aspects of the human reality and other realities are obscured and reduced. On the other hand, the humanist tradition avoids the fact that the commonsense relation with the technological knowledge might characterize a sufficiently solid base to understand the technology meaning. Finally, such behavior tends to overshadow the technology and technique relations with other aspects of humanities, in both their human and extra-human concerns.

Although the engineering tradition views itself as humanist, it produces a philosophy that rebuilds the world by employing technological patterns. This theoretical background presents something human, however, it does not provide a suitable reflection. Conversely, the humanist tradition develops an interpretation of the technological phenomenon without clarifying with accuracy the relationship between what is human and what is technique. Based on such interpretation, the remaining issue is whether there is humanity in the technology philosophy, and whether it is possible to identify human aspects in the technique. This study aimed to develop some reflections upon the human in the philosophy of technology enlightened by Álvaro Vieira Pinto's thought and his view of science and technology (VIEIRA PINTO, 2005a, b).

SCIENTIFIC AND TECHNOLOGICAL KNOWLEDGE, BUT NOT ONLY THAT

When addressing technological education, Bordin e Bazzo (2018) proposed a relevant reflection upon the technologists' lack of interest in philosophy and, at the same time, the philosophers' lack of interest in technology. In fact, low appreciation of the philosophical culture by the technologists limits their curiosity toward the theme. On the other hand, indifference and many times hatred observed in the philosophers, prevents the creation of any type of empathy toward technology. However, the technological research, as any other rational investigation has philosophical principles. When considering the philosophers' general behavior, one could remind them that the technology raises many philosophical problems. The benefits of an approximation between philosophers and technologists would be invaluable and enrich both fields whenever they were willing to contribute to the debate. Understanding more about this phenomenon and motivating the creation of bridges seem to be positive strategies to open the mind of both technologists and philosophers.

Technologists tend to criticize philosophy due to the conceptions widely disseminated in our society. Such conceptions see philosophy as vague speculation without a target. However, philosophy can question paradigms motivating a view of constant exercise of questioning, challenging assumptions, versions, and purposes of the scientific knowledge. All these resources might, as opposed to the commonsense, improve the mastering of ideas in their eternal confrontation with reality. The presence of philosophy in the investigation of several dimensions of

the human life is justified beyond the contemplative abstraction, it can be observed in the exercise of reasoning, as an instrument of appropriation of the concrete (VIEIRA PINTO, 1960).

Amaral Filho and Juk (2018) defended that philosophy is useful to rethink the concrete reality of education in face of changes in the *status quo*, which appears as an obstacle to the holistic technical education in a perspective of human emancipation. According to those authors, philosophy can motivate the exposure of technocracy and specialization as hurdles in the holistic technical education since they promote a state of alienation and individualism. In such perspective, the learner in technical education is surrounded by a technicist determinism that does not allow the understanding of deep meanings related to their profession or even the collective construction. It is necessary to seek the construction of critical knowledge able to help individuals to develop independent and reflective reasoning.

Technological education is inserted in a broader context, which cannot be understood when we focus solely on the phenomenon of teaching technological and scientific aspects. When raising the question “What is science?”, Crispino (2002) explained that the solution to this puzzle is not limited to the use of methods and ideas. The search for historical, philosophical, and sociological knowledge is required. That is, a view that is affected by technical or positivist constraints must be overcome, but it cannot be achieved by just observing the phenomenon in isolation. It must be taken into consideration along with the whole environment around it.

Seeking a renewed technical education in agreement with the objectives emerging from current times requires an observation based on broader knowledge than that offered by science. In fact, it requires a new view. At this point, the awareness problem appears. Álvaro Vieira Pinto defended that naive awareness values theoretical aspects strictly, while critical awareness considers that every theory must be evaluated based on its determinations imposed by reality.

The studies by Martins (2007) and Silvia and Marcondes (2015) demonstrated the difficulty teachers have to transmit scientific and technological knowledge found in textbooks in their classrooms. This shows the level of difficulty to adapt to the science, technology, and society (*Ciência, Tecnologia e Sociedade - CTS* in Portuguese) focus in the transition from the traditional education to a different and unconventional model. According to Rodrigues and Del Pino (2019), overcoming the kind of education that is seen as the mechanical application of content is fundamental so that the *CTS* education has a future. Those authors pointed out the need for rebuilding teachers’ identity so that they can innovate and produce the transformations needed to achieve a concrete scientific literacy. When talking about rebuilding identities, we mean that it is necessary to discuss awareness.

According to Correa and Bazzo (2017), teaching based on “technology for the sake of technology” does not cater for a society that requires “human beings” rather than “technicians”. As regards the philosophy of technology, the requirements cannot be different. It is necessary to search for the human side of philosophy to enlighten the existing knowledge by evaluating its inaccuracies, falsifications, deviations, or omissions.

This study aims to propose a reflection about the human side of technique present in the philosophy of technology. The process is based on the categories proposed by Mitcham (1989) referred to in the light of the Brazilian author's critique. Initially, we present those categories, namely, the engineering tradition and the humanist tradition. Next, each category is analyzed and criticized from Álvaro Vieira Pinto's standpoint and considering the main authors on the theme, as follows: Ernst Kapp, Gilbert Simondon, Mario Bunge, Friedrich Dessauer, Lewis Mumford, and Martin Heidegger.

A COMMON POINT BETWEEN ERNST KAPP'S AND ÁLVARO VIEIRA PINTO'S THOUGHTS

Ernst Kapp developed the concept of organ projection. According to that author, the manufacture of artifacts was the beginning of the human history. Animals notice the world around them without understanding it. Human beings understand their surroundings while they handle them. Animals are involved by the surrounding environment in a chaotic way and are forced to suffer and tolerate it to survive. When human beings understand their reality, they start to interact with the phenomena using their perception to find details, shape, weight, etc. The artifact manufacture occurs when the human understanding reaches self-knowledge (MITCHAM, 1989, p. 30). At this point, humans relate to physical phenomena creating ways of controlling, dominating, and predicting them. By manipulation, human beings gain elements to reflect upon and improve their hand work.

Projection is the ability to explain internal attributes to the exterior. A sculpture or a painting are representations to the extent that they are the result of projection of subjective images oriented to the material support. Projection allows human beings to express their interior by cultivating their ability to transform the matter. Despite the relation between representation and projection, the latter is more relevant. Projection allows the exteriorization of cognitive faculties imprinting a specific identity on the artistic objects. Regarding artifact creation, that author identifies the existence of organic production whenever the human beings project the function of their organs in the solid matter. The human hand was the first organ/tool that inspired the hammer, which was the first artificial organ/tool. From then onwards, several organ projections produced gradually a gigantic collection of tools. Thus, the hand as an innate universal organ/tool was the prototype for other artificial organs/tools developed worldwide (ESPOSITO, 2019).

Vieira Pinto (2005a) verified that human beings outstand in the natural world due to their ability to project. Animals absorb whatever they need from nature without the possibility of transforming it. Therefore, they adapt to it without resolving their contradiction with the environment. Human beings were able to solve this contradiction by managing to transform nature and produce their own existence. According to that author, human beings project their 'being' upon their ability to create "transformations of the material reality, becoming the other being that they project since they create for themselves different life conditions and establish new productive links with nature's forces and products" (VIEIRA PINTO, 2005a, pp. 54–55). Thus, the project means the human ability to transform enabled

by the transition from one stage to a superior one. Therefore, while they produce, they are also produced and, by improving their existence, they reach humanness.

The ideas of projection and project found in Ernst Kapp's and Álvaro Vieira Pinto's thoughts, respectively, keep many similarities. Both the projection and the project are elements that differentiate human beings from animals for offering means of transforming their reality. In both cases, human beings use their intellectual abilities to understand how to handle and improve their results. Vieira Pinto (2005a) referred to a deepening of the existential issue, in which that author put some effort to create a more concrete theoretical understanding than that of the existentialist philosophers criticized in his work. The possibility of projecting and creating interactions with the physical environment producing better results produces humanness. By humanizing themselves, human beings move from lack of awareness to awareness, and obtain the possibility of projecting. They acquire the ability to lead to practice, by the action that their bodies and minds perform. Such action is conditioned by the projected idea (VIEIRA PINTO, 2005a, p. 57). By producing, they create better conditions of making, feeling, and living, ameliorating their circumstances of projecting, which results in qualitative transformations in their lives and their surroundings, thus improving their existence.

Regarding Kapp's organ projection, artifacts become "epistemic devices", which are able to generate understanding (ESPOSITO, 2019). That author tends to place technologies in the center of analysis where they are transformed into a paradigm for the human beings' understanding. Vieira Pinto (2005a) agreed with Kapp and explained that human beings transfer to the instruments the design and properties of their organic structure. Each new action of human beings when transferring such properties to a machine is another step in the natural way to transfer the functions of resolution of the contradiction between human beings and nature. That author thinks it is valid to accept that between calculators and the human brain, for example, there are isomorphic similarities. Since they do not motivate the unproductive sport of comparison, the relations between technology and human organs might result in benefits. The author also presents cybernetics and the human being investigation as an example of how helpful models are and how easy calculations are processed by machines.

THE TECHNIQUE NATURE IN GILBERT SIMONDON AND MARIO BUNGE AND DIALECTICS

The French philosopher Gilbert Simondon developed his reflection upon technical objects and explained that they do not have a static nature, but rather an evolutionary character. At first, these objects associate with one another in a disorganized way and without a defined articulation. When the system is perfected, a convergence between the parts occurs aiming at a joint and better functioning. In the initial phase, objects are abstract since their functioning is dependent on external elements. While the set of objects improves, greater internal coherence is observed, reducing the harming or superfluous effects that occur in each action. Thus, technical objects evolve toward technical species that are fewer than the uses demanded by human beings (CUPANI, 2011, p. 61). For example, that author considers a piston one part of a technical species due to its

varied use. Such evolution responds to a logic or intrinsic need in the search for the consolidation and maintenance of productive systems.

The philosopher Mario Bunge developed a similar understanding when structuring his theory of technology. That author presented the idea of an artifact that shows broader characteristics than those of the technical object (CUPANI, 2011, p. 94). An artifact can be, for example, something social such as the organization of a sports team or the result of a service such as taking care of patients. To build up an artifact, a minimum plan based on technique and technology is necessary. The technique might rely on common knowledge, which might be based on scientific knowledge that is still ignored as so. Technology is mainly based on scientific knowledge. Both the technique and the technology follow certain rules to carry out a certain number of acts in a given order to reach certain aim. Those rules must seek efficiency observing the most economic means.

The engineering tradition seeks to overcome the lack of understanding of the technological world by part of the culture (CUPANI, 2011, p. 58). Simondon pointed out that high culture tends to ignore the reality of technical objects resulting in the human beings' alienation in relation to the machine. Such unbalance in culture, according to that author, leads to the development of unfavorable attitudes toward the technological world, ascribing hostile intentions to technical objects in relation to the human life. A philosophy developed by engineers would be the fundamental instrument to expose a correct view of the industrial production and the meaning of its functioning for the community wellbeing.

According to Simondon, in the evolution of technical objects, technical causes are mixed with economic causes, which in turn are mixed to social motivations. For the evolution of objects to occur satisfactorily, social motivations cannot be mixed with economic causes (CUPANI, 2011, p. 61). That author also pointed out that greater advances tend to occur in the areas that are essentially controlled by the economic power such as aviation and warfare equipment. The sectors that are most sensitive to social motivations do not present continuous technical development. The author exemplifies it by drawing attention to the interest in superfluous changes such as luxury cars, which do not contribute to the technical evolution of society. Bunge also considers social factors as process limiting factors. Technique does not present dynamism due to social inertia since it was overcome by technology that accelerated the human progress. According to Bunge, praxis must follow scientific research, otherwise, it is limited and conservative (CUPANI, 2011, p. 95). Technology is the field of knowledge responsible for the design and planning of artifacts in the light of scientific knowledge.

Those authors ascribe the substrate of technological advances to the relations between technical objects and scientific learning generated by these relations. When promoting such reflection, those authors exclude the social character of the technical phenomenon. However, objects are immersed in culture, thus, they are built up based on the knowledge and instruments that are available in certain society in a specific historical moment. Since the technical object is the basis of the production social mode, its nature can only be understood through a gaze on the way human beings produce in communities. Vieira Pinto (2005a) defended that many technology philosophers neglected the role of the production social relations. Those philosophers tend to question the development of the technique itself and its ability to interfere in the relation between technical objects. According to Vieira Pinto (2005a), the different question that has to be asked is "What is the

role played by technique in the process of material production of the human beings' existence by themselves?"

Vieira Pinto (2005a) thought that human beings' purposes are linked to their existential possibilities in a given moment through the knowledge and instruments available. These are the ones to be followed in the technique development. Human beings develop their technical activities by cultivating knowledge and constituting practices. In this process, intentions linked to certain purposes appear and articulate toward a broader way, which is society's purposes. That author also pointed out that "technique has always been a human way of solving contradictions between human beings and the objective reality, and this function that defines it has to remain the future technique characteristic" (VIEIRA PINTO, 2005a, p. 167). Thus, technique allows human beings to produce due to their abilities, their time, and the existing social relations, achieving their aims and, in a broader sense, those of society.

Another relevant point to be analyzed in the engineering tradition is the evaluation of concepts of concrete and abstract. The abstract technical object is in a stage of instability and imperfection characteristic of an artisanal condition. Industrialization transforms such objects conferring them stability and accuracy of parameters, providing them with a condition of concrete objects. In the artisanal phase, the correlation between scientific knowledge and technical reproduction is low, while in the industrial phase it is high, which means that the constructive intention and the scientific look converged.

Such theoretical structure ascribes the scientific knowledge a central role in the evolution of technical systems. Science improvement and the constant development of technical systems lead to stability and accuracy promoting the appearance of new technological standards. The choice of such characteristics as objectives of the technical evolution does not agree with the dialectical logic present in Álvaro Vieira Pinto's thought. Progress results in contradictory situations that cannot be explained only by balance and accuracy. Transformations generate diverse characteristics at different levels of accuracy and imperfection. Over time, technique goes through processes which due to the dialectical nature of reality, lead to new changes and, finally, to more adapted situations. However, this apparent balance hides other contradictory aspects.

The technological process has historical characteristics and cannot be taken as a continuous phenomenon. Naïve awareness considers that the identification of the usefulness of specific resources and the creation of clear rules lead to efficiency. Critical knowledge realizes that the course of history must be understood dialectically. While the scientific development enabled technical improvement, it also presented limitations that cannot be clearly seen in one moment, but that are clarified by the amelioration of reflections combined with the accumulation of knowledge generating advancements and new technical objects. Thus, technique is not an entity that advances linearly, but rather a human action that presents certain expression as a function of the determinations of society at a given historical time.

According to Vieira Pinto (2005a), the separation of human beings and technique creates great distortions. Such separation results in the idea that the technique is a natural entity equipped with an internal regulation. Human beings, however, preceded the technique since it is one of the products of their ability to

think. In fact, the technique is never free of their power, and thus, translates into actions their ability to project based on the knowledge available at the time, allowing the kind of production that responds to social demands. Moreover, the human technique historicity logic appears since only human beings can historicize time. Human beings separate qualitatively world phenomena into different moments, which results in the general historicity and in a specific classification in periods. Thus, techniques do not become more suitable or better due to the means that provide them, but rather due to the human action and improvement of the humankind world knowledge (VIEIRA PINTO, 2005a, p. 159).

Despite the attempt to reunite technological culture and the general culture, the authors in the engineering tradition created a philosophy that results in a greater distance between these types of culture. The search for a view that aims to explain industrial production in an intrinsic way creates the kind of isolation that does not expose the determinations that condition the technique development in a concrete way. According to Vieira Pinto (2005a), to understand the technique phenomenon authentically, one cannot separate processes from social relations. The technique is guided by the demands arising from society's aims. In such direction, instruments, social forms of organizing production, and the knowledge available are gathered to build up technical objects. The configuration of this phenomenon is historical since specific aspects of these elements depend on the determinations that each time presents.

FRIEDRICH DESSAUER'S THOUGHT AND HANDINESS

According to Aristotle, technique is the concept of work without matter. That philosopher explained that heat and cold can change the contour and structure of a sword. However, what makes it a relevant instrument for the human action is the movement employed in its production. Aristotle considered technique a way of being specific to human beings that allowed the development of concepts and specialization of reasoning, producing a project to be turned into reality. Therefore, technique is born as the exclusive human action on the matter, which is transformed by it. Vieira Pinto (2005a) considered Aristotle's reflection extremely relevant since it identified that the movements producing the sword are born in the human action, which is the principle of technique. The technique extracts from experience the essence for the creation of universal rules applicable to other similar cases. Experience dictates what the object 'is', while technique allows human beings to know the 'why' of the cause through knowledge resulting from practice (VIEIRA PINTO, 2005a, p. 138).

Despite its bonds with the aesthetic and ethics connotations, Aristotle's concept of technique reveals some concern with understanding rationally its origin in aspects of the human production. In Kant, it is possible to identify a more intense attempt to deepen the reflection on this theme. That author's thought gathers elements that present a new view of the technical activity, in a world that overcame slavery, a relevant phenomenon in Aristotle's considerations, and reached a new stage in the technological development. Kant discussed whether the connections between certain action with specific purposes can generate causality. In the development of such reflection, the author defines two types of technique, namely, the *technica naturalis* and the *technica intentionalis*. The nature technique (unintentional) is built up from the mechanics laws, conditioned

to aspects of time, heat, moist, and pressure, able to transform the matter by means of its own mechanisms. On the other hand, the human technique (intentional) limited by the rules of the natural world can transform nature from certain destination and some awareness.

Vieira Pinto (2005a) defended that Kant offered great contribution by recognizing not only the technical character of the faculty of judgement, but also the understanding that nature has a technique since it carries out deeds by employing its own mechanisms. That author verified this merit despite his idealism biased by the notion of final causes. Vieira Pinto (2005a) identified a critical point in Kant's theory: human beings' exclusion as the main piece in the process and carrier of its purposes. According to that author, objects do not present a technical meaning in themselves as proposed by Kant. Human beings technicize nature ascribing it a technical meaning by the obedience to the determinations of the physical world. Thus, natural knowledge accumulated by the existing culture and associated with scientific knowledge creates technical procedures, and each novelty produced offers ingredients for new technical processes *ad infinitum*.

Technique, therefore, provides human beings with ways to project according to their own purposes without the limited notion of final causes. However, the habit of operating technically might organize the perceptive and logical apparatus of world understanding in a way that favors the technical meaning view. Vieira Pinto (2005a) believed that through this habit, the given objective, body, or phenomenon, might reach human beings disguised as technical virtue. This process might be the origin of impressionist theories that started to occupy some space in the academic debate around technology.

Friedrich Dessauer used Kant's perspective in which the scientific knowledge is necessarily limited to the appearance world (phenomenal world) not presenting a direct contact with things (noumenon) (MITCHAM, 1989, p. 46). That author suggested that the 'making', particularly in the case of inventing, might establish a precise contact with things. Thus, the essence of technology does not reside in the industrial manufacture or in the products, but rather in the technical creation action. Such action reveals the presence of a kind of harmony between nature laws and the instances of the human purpose. However, this association is not enough to explain the existence of invention. Certain elaboration joining the inventor's mind with the fourth realm is needed, fruit of a critique to be added to the three realms put forward by Kant. Such fourth realm, the realm of pre-set solutions to solve technical problems, arises from the technological activity critique.

Dessauer defended that elaboration is the factor offering possibilities for the invention to be made concrete. The schemes and dynamics of thought that are made concrete in a technical gadget constitute a realm of pre-set shapes. This condition must not be understood as a world of archetypical ideas, but rather in the meaning it already corresponds and, therefore, is anticipated by schemes and dynamics of thought. Thus, the creative mind acquires the ability to mobilize a wide variety of ideas articulating them on the schemes of thought, anticipating the solution in the object invented. A technical problem does not present discretionary or arbitrary solutions since in the ideal way there is only one perfect solution. Thus, Dessauer claimed that an invention is the result of mental elaboration and manual work on solutions that had already been built in one's mind.

Álvaro Vieira Pinto's disagreement with Friedrich Dessauer's idealism becomes apparent in the comparison between the concepts of elaboration and handiness. Vieira Pinto (2020) explained that the character of handiness consists in the awareness occurred when handy objects are seen as objects ready for action. While the human beings' faculty of apprehension progresses, constituted by the pressure to "grab with their hands" everything around them, they become more human, more capable (VIEIRA PINTO, 2020, p. 80). That author pointed out that although it has been explored in a metaphysical way by existential phenomenologists, the concept of handiness is very useful for the philosophy of underdeveloped countries. The relation between handiness and work can motivate explanations about the nature of production. The demystification of the work invariability might, according to that author, prevent the alienation of workers from their existential condition.

The character of handiness is not seen as a univocal property. The same material demands different ways of handling due to its state or construction. That author gave an example about mud, which requires different ways of handling, either in the action of disturbing its surface, or in the action of holding it and taking it to one's mouth when used as a container for water, or even in the action of holding the container to observe the drawings on it. In each of the cases, the worker's operation imprints on the original gross substance, properties that set the different possibilities of handling it. The naïve awareness believes that the world presents itself to the human beings as a given thing, while for the critical awareness, great part of the world is presented as something made. This implies to say that, first, it is made by work and, second, it is historical. That author also explained that "objectivity is filled up with an existential meaning, the thing is the human being making it materially" (VIEIRA PINTO, 2020, p. 82).

Therefore, handiness provides the transformation of matter, which for being made by human beings, extracts from nature elements in the form of ideas, perfecting the material by the presence of rationality in the concrete reality. Things that are made have their own time, therefore, they have their own duration when made concrete. This duration depends on the characteristics of the material and the possibilities, action, and knowledge, which are employed in the development of the work. The creation of objects is a phenomenon that reflects human characteristics and the human beings' time. For this reason, solutions might contain anticipations since there is an ability to project. However, the project is made concrete when nature responds to the human touch. Such process configures or reconfigures when the human beings do it right, wrong, or redefine their actions. The realization time is also altered, it might shrink or expand, reflecting aspects of the human beings' dynamics.

Although human beings can anticipate, ideas and mental creation require the approval of reality whose laws define which human choices might become concrete. Thus, according to Álvaro Vieira Pinto, there is not a set of pre-set solutions, but they are rather established immediately in the idiosyncratic encounter between human beings and matter. Solutions will be found when reason is tested in real situations and finds the best ways to solve human problems. Such encounters confront handiness with the potentialities and traps embedded in reality, finding ways of perfecting and increasing its degree of maturity.

THE HUMANIST TRADITION AND THE CRITICAL AWARENESS

According to Mitcham (1989), the humanist tradition seeks to penetrate the technology meaning through human and extra-human aspects such as arts, literature, ethics, politics, and religion. Some effort is employed in this practice that seeks to reinforce the construction of a philosophy distant from the dominance of technological knowledge. Interpretation plays a central role in this tradition. Unlike the engineering tradition, the humanist thought problematizes the terms attempting translate and understand them in a deep way.

The American historian Lewis Mumford developed the concepts of polytechnic and monotechnic. The former comprises a wide variety of techniques and artifacts belonging to the neolithic period (from 8000 to 3500 a.c.). That author explained that they did not provide mental development, but rather expressed the possibilities of the human intellect. The ancient community employed several techniques such as harvesting, hunting, and domesticating animals. That time also witnessed the creation of arrow and bow, potter's wheel, boats, and canals. That stage of the human development was positive regarding stability, communication, and cooperation. However, human beings also faced lack of technical specialization, which made their lives harder at the time. (CUPANI, 2011, p. 87). The capitalism emergence and the start of the industrial society resulted in the monotechnic, which was based on scientific intelligence and quantitative production. It was mainly directed toward economic expansion, material fulfilment, and military superiority, which replaced polytechnic.

According to Mumford, such transformation was intensified with an increased effort to satisfy human needs by increasing material wealth, an obsessive impulse to conquer nature and control life. With that, the "pentagon of power" is formed by the alliance between power, property, productivity, profit, and publicity (CUPANI, 2011, p. 90). The appearance of such 'institution' motivated the creation of a society in which human beings set some clear objectives: conquering nature, mastering space and time, accelerating processes, speeding the transport growth, reducing distances, and substituting natural with artificial.

The German philosopher Martin Heidegger's work was based on language investigation and aspects of the Greek culture and resulted in a highly interpretive work. That author approached the idea that technique subverted the natural order of things distancing human beings from simplicity. The old technique sought something hidden, creating movement in the search for revelation and disclosure (CUPANI, 2011, p. 41). The modern technique, on the other hand, is more offensive and challenges nature. Natural resources must be available to the human beings and nothing else. In addition, it puts nature in the situation of offering maximum benefit with minimum expenditure, enabling human beings the illimited power of transformation, storage, and distribution of natural resources in a controlled and safe way. Ancient techniques harmonized with the environment and provided benefits for society without the possibility of accumulation for later commercialization. New techniques produce definite transformations, which appear and occupy the natural landscape, as a hydroelectric plant, for example, which occupies the space in an imposing manner.

According to Heidegger, one of the relevant aspects of the new technique, which agrees with Mumford's thought, is the use of modern science. The mathematics-based experimental science enables the modern technique to have

an imposing character (CUPANI, 2011, p. 44). Physics provides the opportunity for nature to be translated into calculations, remaining ready to be accessed whenever needed. Technique, thus, presents characteristics of an entity that does not depend on human action. For being a kind of “displacement”, although the technique occurs in the realms of human effort, it does not occur in human beings or through them.

According to Vieira Pinto (2005a), technique cannot be understood as a hidden force or a natural power. It does not transcend human beings to own them. Technique is only human beings’ conscious and intentional expression in their humanization process. In such perspective, technology becomes de consolidation of the technical human being’s ability to master nature.

The technology conception as human being’s achievement results from the initial proposition of the human being existence problem on the unique rational base possible, that is, common sense, which shows us the necessary relationship between human beings, nature and society in the form of contradictions, resistance, opposed obstacles that are solved by the emerging intelligence and, afterwards in continuous progressive evolution to be substituted by others whenever the previous ones were defeated (VIEIRA PINTO, 2005a, p. 293).

Vieira Pinto (2005a) developed a severe critique to Martin Heidegger’s thought. According to him, Heidegger produced an ingenious manipulation work when speculating about the meaning of the word technique. When investigating the original composition of the Greek word *alétheia*, that philosopher reaches the meaning ‘bringing light’, that is, revealing or disclosing. However, he avoids the plebeian, material and indignant meaning ‘making’. Considering technique as an aspect of the human beings’ manifestation of truth, the German philosopher lacks objectivity, getting away from the legitimate concept of being understood as an expression of the world material unity (VIEIRA PINTO, 2005a, p. 153). Heidegger defended that the modern technique lies on the device, the collection, the idea of things organized in sets or gathered (*Gestell*). In this perspective, the disclosure mode does not have a technical character and represents a threat to human beings of “losing the possibility of original disclosure and claiming the initial truth” (VIEIRA PINTO, 2005a, p. 152). According to Vieira Pinto (2005a), this strategy aims to separate the human from the technique, excluding the whole existential representation, which is in fact the human beings’ truth.

Technique representing the solution to the objective contradiction of a difficulty that human beings face means, at first, enrichment and improvement of the species when using it to achieve higher productivity. However, when the human beings’ autonomy is denied in the context of the technique creation, it is necessary to blame the groups that take advantage of the production instruments to benefit from the authentic value of most of the human beings (VIEIRA PINTO, 2005a, p. 167). Workers know that the technique they use is what enables the production of goods, corresponding to a critical awareness in its elementary stage. However, deeper reflection would reveal that human beings are the only real agents in the whole productive process and, therefore, they should have great power considering their existential role. Thus, an idealist deviation is observed, conducted by a kind of alienation, which transforms the understanding of technique into ideology by the progressive detachment of its material bases. In such perspective, “technology is converted into the machine theology, in which,

by imitating classical cases of other forms of alienation, human beings, technicians, or workers are alienated, making perpetual vows of devotion” (VIEIRA PINTO, 2005a, p. 291). From that point onwards, human beings start to ascribe the machine a transcendental value that was previously inherent in their own personal reality. They forget their own role as machine creators and are possessed by technology.

According to Vieira Pinto (2005a), technique does not hide the human character. The problem is in the ideology of technology and in the alienation imposed by schemes that manipulate human beings and prevent them from recognizing themselves as subjects and, consequently, beings that can change their trajectory. Considering developing countries, professionals that use highly complex technology ignore that the knowledge and practice they acquired have high existential relevance and could be the means of transformation of the national reality. In this condition, they remain submissive and obedient to foreign technological dictates. Instead of seeing technique in a negative way, it is necessary to see its potential for change. If workers developed an advanced stage of critical awareness, they would be able to realize their own power for owning the technique. These workers would identify the achievement and mastering of natural forces to reach their targets and promote new coexistence relations. Thus, technique would result in freedom rather than coercion and promote a new time of triumph by means of self-awareness.

FINAL CONSIDERATIONS

It is necessary to recognize that human beings have obtained extraordinary achievements by using reasoning. Theories, treaties, and other academic products raised production conditions, providing means for the society to reach higher degrees of development. However, theoretical input must be considered in its proper place. Social values and culture must be taken into consideration in opposition to Bunge’s and Simondon’s claims. Handiness must be considered in opposition to Dessauer’s thought. The importance of practice for the scientific work must be considered in opposition to the propositions put forward by Mumford and Heidegger. In other words, the value of rationality and its deeds reside in being a product of the humankind.

According to Correa and Bazzo (2017), teaching based on “technology for the sake of technology” does not account for a society that needs “human beings” rather than “technicians”. In philosophy, how can we face the same problem? By identifying the human ability, creating theories, and understanding them dialectically. Understanding that processes are permeated by contradictions, which might not be visible at first. A reflection upon the totality and its relationship with its parts requires sophisticated abilities of analysis that challenge thought. Slavery led to imprisonment and dehumanization of thousands of people. However, this practice was the only alternative for the development of society at that time. Although nuclear energy represents a gigantic destruction ability, its properties might be essential for a society that faces huge energy dilemmas. A dialectical view prevents the development of sectary positions, helping complex decision making for an analysis based on a linear conception.

Humankind is in progress; however, such transformations are not given. They are the result of contradictions that, in the inside of society, continuously promote conflicts and resolutions. Therefore, the idea of a science that develops inside an ivory tower is fantasy. The development of history has posed dilemmas, shocks between social forces, and power disputes that opened paths, raising questions, explanations, and answers. Thus, technical objects are on the table and the theory and the hands that will assemble them are affected by a wide variety of social, cultural, political, and economic aspects. Mario Bunge believed that it is necessary to separate scientific practice from social values. However, this practice was already social and historical before the scientists could open the first page of their projects.

Idealist conceptions such as those we criticized are found in technological teaching. They appear in the routine of technical schools and colleges. Crispino (2002) defended contextualized scientific knowledge as a daily routine. The contextualization is interdisciplinary and transdisciplinary and refers to the ability to establish relations between political, philosophical, sociological, and economic aspects, while making it part of the school routine refers to the learner's doing. The author explained that practice must be the broadest possible so that the routine does not limit the context. In other words, practice is extremely relevant for the students' reflection and theoretical improvement. When using Álvaro Vieira Pinto's understanding to reflect upon technological education, we observed that the main problem resides in the work culture valuation and how to (re)balance values destined to theoretical development and work.

Human action meets barriers, contradictions, and opportunities in the complex activity of operating materiality and reflecting upon the determinations that prevent it from succeeding and those that promote its success. The view of technique that disregards social and historical aspects offers obstacles for the holistic thought and some approximation to the concrete reality. Deepening the limitations of the technology philosophy might raise topics that enlighten the exercise of philosophy. On the other hand, opportunities of presenting new ways for the reflection upon technique and technology are observed, by understanding the importance of raising questions regarding the human practice and rationality.

UMA REFLEXÃO SOBRE A FILOSOFIA DA TECNOLOGIA: ONDE ESTÁ O HUMANO DA TÉCNICA

RESUMO

Carl Mitcham desenvolveu uma classificação acerca da filosofia da técnica dividindo a atuação dos autores em duas tradições. A primeira, pioneira quanto ao uso da expressão filosofia da tecnologia, foi a tradição dos engenheiros. A segunda, fundada já no século XX, foi a tradição humanista. Por um lado, a tradição dos engenheiros se enxerga como humanista, mas produz uma filosofia que reconstrói o mundo baseada nos padrões tecnológicos. Por outro, a tradição humanista desenvolve uma interpretação do fenômeno tecnológico onde a relação entre o humano e a técnica não é nítida. Seguindo essa interpretação, existe humanidade da filosofia da tecnologia? É possível identificar os aspectos humanos na técnica? O presente trabalho tem como objetivo realizar uma reflexão acerca do que há de humano na filosofia da tecnologia. Como percurso metodológico foi realizada uma análise crítica do pensamento dos filósofos vinculados à tradição dos engenheiros e à tradição humanista sob o enfoque da perspectiva dialética de Álvaro Vieira Pinto. Verifica-se que a tradição dos engenheiros cria uma separação entre o homem e a técnica, ignorando uma visão social e histórica acerca do fenômeno técnico. A tradição humanista também realiza uma separação entre o homem e a técnica, porém, conferindo à técnica um poder transcendental capaz de subordinar o homem ao seu projeto de dominação. As duas tradições excluem da técnica como forma de organizar as relações sociais de produção. Nessa perspectiva, o homem produz sua própria existência e se articula em comunidade para extrair da cultura os conhecimentos que vão oportunizar a realização dos fins da sociedade. Ao se apoderar de uma consciência crítica, o homem vai além e passa a entender sua posição de domínio no âmbito da produção. Nessa condição pode vislumbrar estratégias para transformar profundamente a realidade e libertar-se.

PALAVRAS-CHAVE: Filosofia da tecnologia. Carl Mitcham. Álvaro Vieira Pinto.

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Received: Apr. 5th, 2021.

Approved: Oct. 17th, 2022.

DOI: 10.3895/rbect.v16n1.14483

How to cite: OLIVEIRA, M. P. A reflection on the philosophy of technology: where is the human of technique?. *Brazilian Journal of Science Teaching and Technology*, Ponta Grossa, v.16, p. 1-19, 2023. Available at: <<https://periodicos.utfpr.edu.br/rbect/article/view/14483>>. Access on: XXX.

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