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Ethics, science and technology *

Ivan Domingues

PhD. in Philosophy from Sorbonne, Paris I. Departamento de Filosofia da Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, Brazil (Federal University of Minas Gerais)

ABSTRACT

The article aims at thinking the relation between ethics, science and technology, emphasising the problem of their re-linking, after the split into judgements of fact and judgements of value, which happened in the beginning of modern times. Once the warlike Aristocracy's ethics and the saint man's moral are examined, one tries to outline the way by taking as a reference the ethics of responsibility, whose prototype is the wise man`s moral, which disappeared in the course of modern times, due to the fragmentation of knowing and the advent of the specialist. At the end of the study, the relation between ethics and metaphysics is discussed, aiming at adjusting the anthropological question to the cosmological perspective, as well as at providing the bases of a new humanism, objectifying the humanising of technique and the generation of a new man, literate at science, technology and the humanities.

Key words: ethics, science, technology, nihilism.

The backdrop of our remarks on the relation between ethics, science and technology, is the concern with the humanising of technique, after it had acquired autonomy in the course of modernity, and in relation to the fact that, presently, with biotechnology and the genetic manipulations, it shows itself with the power to transform man, generating a genetically modified man, regardless if it is for the good or for the evil.

By situating the problem, we will analyse the opinions of some famous philosophers on the subject, opinions which deeply influenced the modern and contemporary cultures, though diverging on more than one aspect on their evaluation of the technique and the science to which they are linked. Next, we are going to give an idea of these opinions, and, in the end, put the ethical question, when we will evaluate if it is possible to re-link ethics, science and technology, after the big split that happened in the beginning of modern times. Once the ethical question is put, we can ask, concluding the reflections, for the bases and conditions of the rise of a new humanism in the near future. The bases will be searched for in a new re-articulation between science, technology and humanities, and will give the opportunity for the formation of a new man, defined no longer as a tool and object of the techno-sciences, but as a subject and foundation of the whole process.

Having said that, we shall move on to the first point: some philosophers' opinions on techno-sciences and their analyses of reality and the power they set up throughout modernity.

In the beginning of modern age, the XVI-XVII centuries, Descartes and Bacon worked out what would become the great technique motto in modern times, having been current even today, namely: in Descartes' words, the idea that, through science and technique, man will change himself and become the master and owner of nature (we can find something similar in Bacon, who also worked out a famous saying, namely: knowing is power).

This view of science and technique as a tool or means for power was adopted in the course of the XVIII century by the thinkers of the Enlightenment, who associated such view to the idea of progress, to the liberating role of knowledge (to free men from the darkness of ignorance and superstition), and to the project of reform of humanity, planning the generation of a new man: autonomous, rational and free.[1]

Around the second half of the XIX century, Karl Marx followed the same direction of Bacon, Descartes and the thinkers of the Enlightenment. Keeping the idea of science and technique as a tool or instrument, he finds something new or even pervert in its use in the modern world: when they integrate themselves into the productive forces of the economy (more precisely into the capitalist

1 The opposition is Rousseau who, in his article awarded by the Academy of Dijon (cf. References), moves away from this view of things, arguing that the material progress generated by science and technique is not translated into moral progress (improvement of habits), or into the perfection of human kind.

economy, where they stand themselves to serve both the capital and the increase of wealth), instead of allowing the domination of nature and increasing man's freedom, science and technique convert themselves into man's instrument of domination by man, and install the harshest tyranny, which is the yoke of the capital, to which the bourgeoisie itself is subjected.

Later on, and now in the XX century, after the second World War and quite close to us, the German philosopher Theodor Adorno, who belonged to the Frankfurt School as Marx's heir (he was a neo-Marxist), was worried about the modern technique destiny, in which he saw something ambiguous, after the Nazism disaster. This is what comes out of a lecture published as an article with the title "Education after Auschwitz"[2], in which the Frankfurter, fearing the repetition of Auschwitz, therefore with an attitude of concern and resistance, brings out a new aspect of science and technique which - after himself, Adorno, and his colleagues from the Frankfurt School - has become wide currency. This new aspect is not so much related to the use of science and technique simply as an instrument of production or as a productive force, already dealt with by Marx, but - one can say, by bringing the technique close to the marxian theme of the goods fetishism - is related to its use as a cultural value and its function as an ideology or ideological weapon, and, as such, once more, as a man's instrument of domination by man (Adorno talks about man's *objectual* love for the technological articles, attested by the English expression "I like nice equipment" = "I like pieces of equipment, beautiful instruments", "irrespective of", according to him, "the pieces of equipment at stake"[3]). It is in this context that the philosopher links science and technique to the Luckacsian problems of the reified consciousness, talks about the bewitching of technique, points out the manipulative character of the relations it produced (manipulation of nature and man), and shows the kind of man required by the technological civilisation: the *technology-like* individual (Adorno talks about the “technological persons”), whose psychic energy and way of acting are in perfect harmony with the technological power generated by science. It is in this context, after Adorno and before giving up Marxism, that Habermas will talk about science and technology as ideology, in his famous book, though without adding greater novelties to Adorno’s remarks.

In this varying picture, drew in the course of a long and winding process - where we started from Bacon, Descartes and the thinkers of the Enlightenments’ optimistic view, passing by Marx's

2 Cf. ADORNO. "Education after Auschwitz". About Adorno and the technique issue, see GIACOIA JUNIOR'S article, "Ethics, technique, education", which provided us with valuable elements about the subject. It must be pointed out that the technique issue is punctual in the Frankfurter's article, appearing together with the idea of "administered society" and other known *tópoi* of his thought, whose larger scope is the theme of education, aimed at from different points of view, including the psychological and political ones.

critical view, though ambivalent, until we arrived at Adorno's pessimistic view - we noticed, however, a common point between them which we would like to point out. The point is that all of them, in higher or lower degree, either to oppose, or to support, talk about science and technique from the same position or point of view, and based on the same parameter: the position is man and the point of view is man; the parameter is science and technique as an instrument and means of power, and as such, linked to man and his actions, to free him and to offer him a new home, or to manipulate him and to subject him. Such man's position and such parameter of instrument are clearly present even in Adorno who, despite his hyper-critical bias and constant talk about bewitching and manipulation, assumes, however, that science and technique are at the service of part of humanity, and that there is a wizard who produces and controls the spell (man), and that science and technique are an object or instrument at men's disposal. To convince ourselves of that, it would be enough to observe a passage from "Education after Auschwitz" in which Adorno notices the existence of something "exaggerated, irrational, pathogenic" in the current relation of man with technique, and underlines that this is linked to the "technological veil", which is – as we were saying – an ideological veil that covers it entirely: "Men – writes the philosopher – tend to consider technique as something in itself, an end in itself, a force of its own, forgetting that it is man`s arm extension. The means – and technique is a concept of means directed to the self-conservation of human kind – are covered and disconnected from the persons` consciousness", and this is so because, as Giacoia remarks, "the ends – a decent human life – are hidden and subtracted from men's consciousness".[4] Therefore, if science and technique are thought of as an instrument and placed in the extension of the hand, men's hand, they will generate the image of something liable to domestication, to which its user associates the idea of comfort, so that he can imagine that he will be able to control and finish the game, if he wants it and if the spell threatens to turn itself against the wizard.

Note that it is exactly this comfortable idea of the technique as an object or instrument at the human beings' hands which will be deeply questioned by Heidegger.[5] Such questioning happened when, after having allied himself with the Nazism and their new man's ideal (*The Worker*, by Jünger), immediately after the disaster of national-socialist experience, he decides to alter the ways in which

3 Cf. ADORNO, op. cit., p. 133 .
4 Cf. ADORNO, op.cit., p. 132-133. Cf. GIACOIA JR., op.cit, p.52.
5 From Heidegger we will emphasize, even without quoting them explicitly, "The Technique Question", the "The Overcome of Metaphysics" and the interview given to *Spiegel* magazine, where he returns to the subject, and which can be considered as an important part of his legacy. About Heidegger and the technique, cf. Oswaldo Giacoia Junior's article quoted above, as well as the text "Notes on technique in Heidegger's thought", published by the magazine *Veritas,* v.43, n. 1, mar. 1998, p. 97-108, which we followed closely in

the problem was traditionally set, proposing, then, another point of view that could turn the Descartes, Marx and Adorno's perspectives inside out.

One knows that Heidegger is a difficult thinker. He is hermetic, in constant care and struggle with the words, without, however, telling us everything to make our reading easier. His reasoning concerning technique had terrifying consequences, although they have never been completely revealed. It was approximately the following: what if technique, instead of being an object at man's disposal, was a subject and submitted human individuals to its purposes, for it would become autonomous and work as a real demiurge that produced a new world and manufactured man himself?

It is in this context, for the purpose of pointing out the constituting action of technique and its capacity to produce things, that Heidegger invokes the concept of *framework* (*Gestell* , in German). Having it in mind, he shows that technology is neither an instrument nor a means, but a connecting element and a kind of *armour* that models and sets up man according to its measure and necessity (the technician or the technological individual), and at the same time establishes reality as an instrument (of accumulation) and as a *stock* (for consumption). The result is the so-called planetary technique which, in its unbridled action during modernity, led to the devastation of earth, and, instead of promoting Nietzsche's superman or the achievement of the Promethean ideal of the *Worker* imagined by Jünger during the Nazism period, it led to the success of the techno-bureaucrat capable of extracting, with his calculations and devices, the maximum profit from each sector of the enormous technological production chain. In this picture, in which Heidegger introduces a real *pirouette* in the traditional reflection, the technique can not be seen as a potential development of man's hands anymore, but something different, like a potency or an autonomous power, to which man is nothing but a means or an instrument, and in which, he is captured as an object or raw material when he sets himself up in the network of the technological production of the real.[6]

In a prophetic text published in 1954, in which he announces the genetic engineering of our days, and named "*Overcoming Metaphysics*", Heidegger paints with strong colours the picture that is drawn when the planetary technique, after it had subdued the external nature, turns itself to subdue the internal nature so that to produce man: "Once man is the most important raw material, one can tell that, based on the current chemical researches, some factories will be installed some day for the

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our remarks on the German philosopher.

[6] In fact, Heidegger puts the root of technique in the Metaphysics, with which, not without some exaggeration,

production of artificial human material. The chemist Khun's researches, awarded the Goethe prise of the city of Frankfurt this year, already open the possibility, in a planned out way and according to the needs, of directing the production of the male and female living beings."[7]

Since then, the opened perspective is much more serious than what Adorno referred to as the bewitching of technique, which was ideological and stayed in the plan of ideas: rather, it is a matter of a real power of producing things and man himself, before which the impotent humanity yields to this power, when it surrenders to its empire, unconditionally submitted to its ends and purposes. Conclusion: as science and technique become autonomous, generating the predominance of the techno-sciences, the technique could not be dominated by men; then, the spell turns itself against the wizard, and the devil - being then a decayed angel, powerful but helpless to install its kingdom in our world - will show himself (we have added this) as the great winner and will install its kingdom on the devastated earth, amidst docile and domesticated human individuals.

One asks, then, how to think the humanising of technique and the possibility of returning its power and the devil's power to men today, once the situation, after Heidegger, has been worsened. This is so, principally when, with the genetic engineering, the techno-sciences, more than clones or replicas, will be able to produce mutant and powerful super-individuals, according to the needs of the planetary technique, as well as that they will have the means to produce intelligent robots, more powerful than men themselves, tough still situated in the enormous chain of technological production. We are asking it because we believe that the choice does not lie between the total surrender to the technique empire, which pleases the techno-bureaucrats, and Heidegger's solution, which pleases the philosophers. In fact, Heidegger rejects both the technician's surrender and the common man's (the consumer) surrender, seeing behind it man's wandering and the action of nihilism. He opposes to this surrender the philosopher's serene meditation, and proposes his escape from town to the country, where he can take good care of things, in a direct relation to nature, as he did it himself when he took refuge in his cottage in the Black Forest. However, now that it has been a long time since Heidegger's death, the persons do not want to think anymore, and simply there are no more woods or nature where to take refuge. Then, today, what should we do to humanise technique?

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he credits all the evils and dangers of the techno-sciences.

[7] *Apud* GIACOIA JR. "Ethics, technique and education", *op.cit*, p.57. We have worked on the French edition (cf. References), which especially mentions that the referred prise was awarded to the famous chemist in 1951.

One might think that, before such picture and facing such question, art would give both the way out and the answer, for its sensitivity and detachment could humanise science and technique, which would serve man, and work for the development of a new humanism. Moreover, Heidegger sympathised with the solution through art, especially literature, and more particularly poetry (one should remember that Heidegger had the help of Hölderlin's poems when he tried to find a solution for the evils of our time. He found in those poems the ways to formulate the doctrine of quadrate and think man's re-connection with things, gods, his fellow-men and himself). The problem is that art itself became nihilist and strange to man in the course of the XX century, as it is shown in literature by Kafka, Camus, Musil and others. One asks, then, how could art help, and even more, succeed where, before, philosophy, humanities and sciences failed and simply lost?

Having arrived at this point, where we have found out that the way out is not and will not be easy, it is time to ask what happened when the techno-sciences, with their dominating power, stopped being an instrument and a means of power to serve men and converted themselves into an autonomous subject and power, cunningly converting man into an object and instrument to serve their ends.

One will say, concerning technology history, that there are three important moments throughout modern age, having as prototypes 1st the steam machine, 2nd the internal-combustion engine, 3rd the transistor. Note that both the steam machine and the internal-combustion engine can be seen as means or devices to serve man, who keeps an instrumental relation with them. The turn happens in the third moment driven by the transistor, which will later be replaced by the *chip.* The *chip* is in the origin of both the electro-electronics industry and the wide telecommunications networks, allowing the appearance of information technology, the genetic engineering and other bio-technology sectors. It was, then, that technology, so far restricted to the material things, showed the power of extending itself to man himself, and of taking him as the object of its processes.

Enlarging the perspective and adjusting the focus of the analysis, we would say that what lies at the root of this state of things is a double split. It happened in the beginning of modern times, and was deepened throughout the three centuries that followed it, reached its peak in the course of the XX century, until it arrived at the XXI century. On the one side, there is the split between ethics and science, founded on the separation between the judgement of fact and the judgement of value, whose formulation we can find in Hume, and whose development leads us to Kant's dualism, making one give science a blank cheque, preventing its products and results from being *moralised*, differently from the medieval and ancient times. On the other side, the split between science and

technology, due to the fact that technology has become autonomous, revealing itself with the power to reassure the very destiny of science, since, in the course of the process, science has become more and more dependent of the set of technologies that it has generated. In fact, this double split has happened and is a well established factual truth; however, it gives us a partial idea of the problem or half of the picture in which science and technology are inserted. This is so because, together with this double split, a deep re-directing of science and technique happened in modern times, when they got into the market and submitted themselves to the *business* imperatives and to the interests of powerful groups. It was then that the blind forces of the market, the regulations of politics and the pressures of the reason of State (including the ones with war purposes), interposed and imposed themselves upon the ends and ideals of the techno-sciences. It was then that there was the sacrifice of the scientist's intellectual curiosity and freedom to think, and the end of the technologist or techno-bureaucrat's apparent autonomy, mentioned by Heidegger, once his capacity for creation and his power to really do things do not belong to him, the technologist, but to the capital and its multiple agents. The result is a third split: the split between science and technology in face of society as a whole, when they are submitted to groups of interest, and are privatised by the market forces, when the sciences - that had generated technology, which is appropriated by the market, together with technology - showed themselves entirely impotent, without the slightest possibility of reversing this state of things.[8]

Thus, the paradox of a science and a technology with their extraordinary potential of redeeming humanity, due to their countless revolutions (the industrial revolution, which increased, in an incredible scale, the capacity of production of humanity; the information technology and telecommunications revolution, which deeply modified the services, accelerated the circulation of information and brought the four corners of the planet closer; the green revolution, with the virtual capacity of eliminating hunger and poverty from the face of the planet), and at the same time the limits of this potential on the same scale. The limitation appeared when, together with the ideal of technical progress sponsored by the capitalist economy, the economic, social and political barriers of all kinds got on stage and avoided the diffusion of its liberating powers, spreading hunger and poverty, exposing whole peoples to the boots of the invaders, producing new and immense *apartheid* from one corner to another of the planet. Therefore, there is this feeling of impotence and the enquire about what can be done, if there is anything that can be done in this gloomy state of things.

8 The complaints of the scientists and technologists are symptomatic: the scientists complain that technology (the engineer) has succeeded; the engineer complains that the market has succeeded - therefore, the

To try a way out for this situation, we will say that the solution is related to the three splits commented before, for they are in the origin of the problem and demand an answer to it, or otherwise we run the risk of giving reason to Nietzsche and be forced to say, one day, that, indeed, man is an animal that has not come out right.

We shall, then, begin with the re-linking between ethics and science (and extending it to technology): when we propose the re-linking, in fact we do not mean that there is not any ethics to be linked to science; on the contrary, there is ethics, that is, the ethics of pragmatism, aimed here not as a philosophical current, but as a way of life, founded in instrumental values, which approve of gain and success, as well as of the victory of egoism and of the low instincts, as Saint Augustin and the geographer Milton Santos said. Therefore, this is the successful ethics of modern times, the pragmatistic ethics, as a result of the fusion between utilitarianism and hedonism. It was generated at a moment which, after cleaving the judgement of fact and the judgement of value, directed them, by re-approaching them, both to the pure sanctifying of facts and to the deifying of the means and processes that originated them, connected in a way or another to action: on things and persons - thus, the term *pragmata*. Against this ethics, one must ask which one should be generated to replace it, allowing a new link between moral and science.

We would say that such ethics could not be the aristocratic ethics of the best persons, like the ethics of the warlike aristocracy (in the case of the warlike-scientist), for it implies that its protagonist is, somehow, above good and evil, leading to the worship of the winner, who will be deified like a hero or a semi-god, like Pasteur or Newton: the problem is that the Western world has lost its virility, and science, today, is a collective business, not something individual.

Neither could it be the ethics of duty or absolute ends, referred to by Max Weber when he mentioned the moral of the saint, which can not be applied to the things of this world, and even if it could, the good intentions and the absolute ends of the individual, alone, would not guarantee anything: in the sphere of collectivity - which is, today, the sphere of science, science that has not been, since a long time ago, an exclusive business of the scientist in his backyard - the ends and the results of the activities extrapolate the intentions of the good soul and the very actions of the individuals, however much saint they are, and can not, therefore, be the parameter (this is what suggests to us this well known saying: "the road to hell is paved with good intentions", as well as

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conclusion is that both have failed.

what Max Weber himself suggests when he talks about the paradox of the consequences, showing that the results of the actions break loose from the agents' intentions, so that the right intention has no power to sanctify the acts of the individual, much less their effects or results.

If it is neither one nor another, such ethics would well be the prudential ethics or the ethics of the *phrónimos*, mentioned by Aristotle when he referred to the virtuous male, and which is, closer to us, re-taken by Max Weber and Hans Jonas, both of them proposing the ethics of responsibility, having as a prototype - this we have added - the wise man, and not exactly the scientist.[9] In fact, such ethics may be the one we are looking for, at a time when there is not the wise man anymore, due to the fragmentation of knowing and to the scientist's moral disengagement. As a condition, we should not forget that the individual, however much prudent and responsible he is, calculating his acts and weighing the results of his actions, he will never be able - by simply considering the consequences of his acts - to sanctify his actions and make their results ethical. This is so, one more time, by the simple reason that science is a collective enterprise, and the collective actions must be contextualised and weighed, implying the risk - because it takes the context, the exceptions and the cases too much into account - of eliminating moral, and ethics may convert itself into a casuistry. Hence the need to redefine the moral of responsibility or the moral of the *phónimos*, this becoming not the competence of the individual, as Weber believed, but of the collectivity, as a subject and responsibility of a collective intelligence, which is only the scientists corps working and deciding collectively.

As for the re-linking between science and technology, it will demand the scientist to be actively engaged with technology, and he, together with the technologist, beyond the market forces and the world of business, will be responsible for defining the courses of technique and science themselves. In the same way of the scientist, the technologist will also have to adopt the ethics of responsibility or the moral of *phrónimos*, as a subject of a social body or collective grouping. However, the

9 In fact, Weber talks about the ethics of responsibility in the context of politics, not of science, where the principle of the axiological neutrality prevails. As for science and technique, besides the known theme of the experimental ratio, the sociologist refers, in the end of the Ethics, to the "iron cage", resulted from the association between the techno-sciences, the juridical-bureaucratic ratio and the capitalist economy, after the latter had given up the foundations of the economic *éthos* of the ascetic Protestantism - figure seen by many as the greatest metaphor of late modernity and that keeps more than one parallelism with Heidegger, Adorno, Jonas and H. Arendt. It may be pointed out that Jonas, on the course of the techno-sciences realm, up to date with the modern Prometheus's revenge, will talk about (not without certain exaggeration) the victory of the *Homo Faber* over the the *Homo Sapiens*, while H. Arendt will refer to the prevalence of the *vita activa* over the *vita contemplativa* in the new times. Our effort, having Heidegger at the back, will exactly consist of thinking the ethics of responsibility on the ground of science and technique, putting Weber and Jonas side by side.

problem is that the alliance between the scientist and the technologist is not enough, for they may be run over in their clash with the groups of interest and the blind forces of the market, which are more powerful. Hence the need to extend the alliance to the society, which, beyond the groups and the market, will have to take possession of science and technology, having them at their disposal. It is then that the ethics of science and technology will reveal itself as the ethics of society, giving opportunity to a community-like ethics, founded in socially shared values, like freedom, justice and responsibility (such ethics, though referring to the collective, according to Hans Jonas, will have to be anchored in the individual, being prone to lead to totalitarianism).

Nevertheless, other difficulties will not take long to appear. Before anything, society is the ground of absolute diversity, the groups and the individuals struggle all the time, the ethical consensus is impossible and each group or individual, as Weber saw it, will soon choose their god or their moral devil, breaking out the gods' wars and setting up the anarchy of values. Hence the conclusion that ethics, alone, will not be able to cope with its mission of humanising science and technology, being unable to rule the actions, having, for such, to be helped by other instances or social spheres, like Law, the State and politics, with its pressures, armed arm and power over the individuals. Hence the impression that the ethics of *phrónimos* or of the virtuous male , seen as the ethics of the social responsibility, suffers from a moral deficit from birth, having no power to moralise the economy, the Law and the politics, and having to be supplemented by Law, the State and politics in its attempt of control society, following the example of the economy and the blind forces of the market, which will only be dominated and socially re-directed under the force of the strongest pressures - a theme of the State departments, the Law instances and the world of politics. But, what will the State, the Law and politics do morally if they, initially, are not ethically defined and do not propose themselves as forces or moral agents of society? The solution will be in their conversion into ethical instances or moral forces. Hence the impression of a vicious circle, circle that will have to be broken somewhere, depending, as a last resort, on the individual - who either is a moral Being or not - and of his choice.

Living in a nihilistic time like ours, marked by the value crisis and by the increasing moral misery, on account of the victory of the hedonist ethics, or better, pragmatistic - which puts on the divinity altar the success and the well being of the individual, and only worries about the advantage and the benefit - we have recently started seeing the demand for ethics in everything: ethics in politics, ethics in economy, ethics in science and ethics in the inter-personal relations. We understand that, hypothetically, the demand is just, and everything will have to be done, somehow, to answer it

before it is too late, the planet is destroyed, and the devastation reaches, mercilessly, men's world, leaving no stones unturned. The problem, however, is that, when we think these things, ethics can do very little without the help of other instances or social spheres, on the supra-individual ground. We will certainly be destined to big frustrations if we do not know how to evaluate our demands, as well as how to weigh the ethical base or its scope of action.

As for the relation between ethics, science and technology, there are two problems. On the side of ethics, the problem is how to make it generate a moral according to the needs of science and technology, considering that all ethics implies sanctions and interdiction; and science and technology themselves, in their internal logic, are not, initially, willing to accept prohibitions and to sacrifice freedom to know and to generate. On the side of science and technology, the problem is that, as Tolstoy saw it concerning the former, they are helpless to generate values, which will have to be sought and generated somewhere else, in other spheres of society and culture. Furthermore, contrarily to what Bacon imagined, that is, that knowledge, or better, science, besides generating technique, should be the norm of the moral action, science and technology are not able to set up such norm, taking into account their inability to answer the two questions that, according to Tolstoy, are the most interesting in our lives: what should we do and how should we live? - perhaps because these questions are not related to facts but to values, and values are something else more than some cognition, and they depend on traditions, affections and feelings. Hence the task to adjust ethics, science and technology is not easy. And there is also our fear that a greater and more insistent demand for more ethics, asking to have ethics in everything, generates a great and irremediable frustration.

We shall now turn back to the question of the moral coming together with the need to *prohibit*. One knows that society itself, since immemorial times, has been founded on a prohibition: the famous law of the incest interdiction. One knows that life in society is unthinkable without norms, sanctions and the interdiction of Law. However, the interdiction comes together with the transgressions, which, in their turn, demand their repression and the inevitable punishments. Concerning that, transgression is not an evil in itself, and it is by transgressing the law of the parents that a child grows up and becomes an adult. One can also say that prohibition can be translated positively into good, depending on the context and the circumstances. However, whoever wants and demands, willingly, to be prohibited? One can say, fearlessly of committing a mistake, nobody. Therefore, moral is controversial matter, for it many times deals with unequal and conflicting values, before which each one of us should choose his God and his devil, in the lack of the universal norm, which

in fact has not established itself anywhere (not even the Jewish-Christian Decalogue had the power to set up the Norm). Such is the case, concerning science and technology, of biotechnology. Now, for a lot of people biotechnology is related to the devil. The problem is that the devil, as Faust said, is not so ugly, as one believes it. The Italian philosopher Gianni Vattimo showed that recently in an interview for the national newspaper *Folha de São Paulo,* in the section "Mais!", on the 02/06/2002 issue. We shall now see what the philosopher said on that occasion, when he was asked about what he thought of biotechnology and bio-ethics:

Bio-ethics represents man's vocation for fully assuming responsibility for himself. Biotechnology puts us before the undeniable fact that more and more life depends on us, but not on dark powers or some divinity that decides, without our understanding, the moments of birth and death. It is not a sacrilege to determine the sex or hair colour of the children we produce, but something that puts man in front of the fullest responsibility. Things do not move naturally anymore, we must deliberate on them. And how to deliberate? Based on a purely arbitrary position or according to others?

As I do not have faith in eternal moral principles, I prefer to live in a world where there are interlocutors. We must assume all responsibility for our existence, without taking refuge in the belief in natural needs; the more the objective natural limits decrease, the more we recognise the importance of the inter-subjective limits. It is possible to solve all our ethical problems based on the respect for the effectively appealable subject's freedom.

We would say Vattimo is right when he, optimistically, shows that biotechnology increases man's freedom, man who, after all, finds himself free from the natural conditioning. We would also say that Vattimo is right when he specifies that biotechnology allows a greater autonomy in the literal sense, namely: it allows the subject to give himself the law according to which he is going to act, what, in its turn, increases his responsibility in relation to his acts and fellow men. We would finally say that Vattimo is right when he says that the release of the conditioning from the natural processes has as a counterpart the recognition of the inter-subjective limits, within which our actions develop. Now, the big problem of Vattimo's reflection appears in the last sentence, where he asserts that "It is possible to solve all our ethical problems based on the respect for the effectively appealable subject's freedom". Vattimo does not say it, but such ethically and effectively appealable subject, so it seems, must be the adult. However, the whole bio-ethics problem - something that Vattimo does not take into account - is exactly to think biotechnology also from the the non-appealable position, like the future children, who, without any freedom or any power, will be subdued to the parents'

judgement and will. So, considering such undoubtedly controversial matter, other scientists and thinkers will adopt moral positions very different from Vattimo's. This is the case of the French geneticist Axel Kahn, when he underlines that beyond the freedom of choice, freedom as power simply, it is necessary to include other values, like the human person dignity, including the children's.[10] He understands such dignity as the right of all human beings to be free from the total domination and control of the other, as it is shown by the story, narrated by *Época*, a Brazilian national weekly magazine, of a lesbian American couple who, born deaf, decide to have two children, also deaf; and they do it through artificial insemination - this, in the name of the moral value of *family harmony*.

Such considerations and this example show us two things. First, how difficult ethics is, making us deal with complex and controversial matters, giving reason to Aristotle when he said that ethics is something for those who are over thirty years old - that is, more than fifty, in our time. Second, how the praise of science and technique - when the real power and the extraordinary potential of the techno-sciences were recognised - arrived together with, if it did not provoke it, the so called ethical collapse, by paradoxically increasing the room for man's action, and at the same time not generating the instruments to establish a moral on the same level of science and technology, giving reason to those who think that we are still ethically inferior beings.

Hence the need to think the connection between ethics, science and technology, so that we can save us from ourselves, from our power and weaknesses; we that have learnt to play god with physics and biology; and without knowing it we may make a pact with the devil, like Dr. Faustus. We say that it is necessary to save us from ourselves, even if we are at the edge of an abyss, because the gap between the promises, the techno-sciences power and our indigence and moral misery has been deepened, demanding that ethics reinvent man, and that Nietzsche's words, that man is an animal that did not come out right, be denied.

In short, the way we propose is the following: if we can not moralise science, nor elaborate a scientific ethics based on it, so that ethics must be with philosophy, if not with theology (moral theology), we can moralise the scientist and think the ethics of science, which is the ethics of responsibility. As for this point, we know that the Americans, who are more rapid and pragmatic, did it very wisely: to face the urgency of the moral question, which became very complicated due to

10 Cf. KAHN. *Et l'homme dans tout ça?*, especially chapter 4, in the item "Les bases de la dignité", and also chapter 11, in full.

the complexity of the techno-sciences, they, the Americans, created a new speciality or profession, having as field of action the committees of scientific magazines, hospitals, universities and research institutes, namely, the profession of an "ethicist". We understand that this is too little, and something more daring will have to be done, if we do not want to see, in the next decades, the success of the re-engineered man 2.0, together with the striking expansion of the techno-sciences, propelled by the blind forces of the economy. It is the very human community and a new disposition of the knowing system - correlating science, technology and humanities, being philosophy included in the latter - which will have to deal with the alteration of this state of things and open a new horizon for the anthropological question. As Hans Jonas has seen it, this new horizon will demand the decentralisation of man in favour of a broader approach that includes nature and the ecological question. We will add that the limit of the anthropological question - something that Jonas did not see - has a cosmological order, requiring the replacement of the metaphysical question, though on other bases: the cosmos is going to get cold, the sun - after changing itself into a giant red star - is going to explode in seven billion years, life on earth and man himself are going to disappear quite before, in five hundred million years, or less. Therefore, one day everything is going to end; and worse: if we do not do anything, it is going to end before, and even quite before, by the action of our hands and minds. We have, then, to be strong, and even stronger than the Renaissance men, when they found out that the world was infinite. Now, having re-discovered that the world is finite, we are going to need a new moral to rule our lives, earlier than the adventure of existence comes to an end. But, then, we will not need ethics, nor science, nor technology.

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