

José Gaos, Eduardo Nicol, and the criticism of cybernetics in Mexico

José Manuel Iglesias Granda
Philosophy Institute, Spanish National Research Council
josemanuel.i.granda@csic.es
(+34) 916022798

Albasanz Street 26-28, 28037 Madrid

Antolín Sánchez Cuervo
Philosophy Institute, Spanish National Research Council
antolin.scuervo@cchs.csic.es
(+34) 916022308

ABSTRACT

Based on published works and unpublished materials, this article analyses how cybernetics was received by two Spanish thinkers exiled in Mexico: José Gaos (1900-1969) and Eduardo Nicol (1907-1990). This reception is particularly intriguing especially when considering the substantial presence and social impact that Norbert Wiener had in Mexican society because of his friendship with Arturo Rosenblueth. Gaos and Nicol are the first philosophers to develop a complex and original diagnosis of cybernetics in Mexico. It will be shown how the exiled thinkers take on the philosophical implications of this science in the light of their respective theoretical projects, and finally, it will be defended how the critical perspective they develop is particularly significant for Mexico's political and academic context since it illuminates some negative aspects of cybernetics that Wiener did not foresee and that had not been reported there until then.

KEYWORDS

Cybernetics, Gaos, Mexico, Nicol, Spanish Republican Exile

1. Introduction

José Gaos and Eduardo Nicol are two examples of the many European intellectuals who had to leave their countries because of the war during the 20th century. These two Spanish philosophers settled in Mexico thanks to Lázaro Cardenas' reception policies. Gaos and Nicol developed practically their entire careers in this country and produced important corpuses whose influence is still alive in the Mexican philosophical sphere. Their works are multifaceted and deal with a wide range of subjects, from metaphysics to philosophy of technology. This article will focus on defending the relevance of their ideas on cybernetics in the Mexican context since they provide the first critical and original diagnosis of the issue to be developed in Mexico, a country especially connected with the origin of cybernetics.

The connection that Mexico had with the emergence and development of cybernetics often goes largely unnoticed. This science was born with the publication of *Cybernetics or Control of the Animal and the Machine* (1948), which was written during one of the many stays that Norbert Wiener made in Mexico as a result of his close friendship with Arturo Rosenblueth. Rosenblueth was an important researcher and a highlighted promoter of the development of Mexican science; he was educated in Paris and worked at *Massachusetts Institute of Technology* where he got to know Wiener. Rosenblueth was a brilliant-minded scientist with a great humanistic impetus and the political and institutional ability to consolidate leading educational and research institutions. It was his multidisciplinary and critical spirit that brought him together with Wiener to whom would be related until the end of his life.

The scientific work of Rosenblueth and Wiener was warmly welcomed by the Mexican government, due to the developmental policies in force since the end of the Lázaro Cárdenas times. Rosenblueth played a key role in the *National Polytechnic Institute* (IPN) and developed practically his entire career in this institution. However, Rosenblueth and Wiener had practically no contact with the *National Autonomous University* (UNAM) due to the enormous distance between this institution and the IPN, which was characterised by a more technical and engineering spirit. This lack of bridges between the UNAM's Faculty of Philosophy -the main Faculty of Philosophy of the country- and the IPN meant that the philosophical reception of cybernetics was very late and critical. The

philosophical repercussions of cybernetics were not addressed by Mexican philosophers until the mid-sixties when Gaos and Nicol took up the subject. Gaos and Nicol developed opposing philosophical projects that led them to argue several times; however, both coincided in their critical position regarding cybernetics. This article will try to highlight the ideas of Gaos and Nicol not only for the high level of the original diagnosis they provide but also because they are the first philosophical receptions of cybernetics developed in Mexico and because this critical diagnosis is especially symptomatic of the Mexican social and academic atmosphere.

We will proceed as follows: first, we will give a brief overview of the general context of the problem of cybernetics in Mexico; we will take up the figure of Rosenblueth, his friendship with Wiener, and their great impact on Mexican society. We then turn to the reading of the authors in question, we will highlight Gaos and Nicol's proposals by offering an overview of their thought and context, and then analysing in detail how this particular problem of cybernetics was received in the context of their works. Finally, we will compare the two readings to highlight their complementarity in offering a critical response to the question of cybernetics posed by Wiener and we will also ponder on the significance of these proposals in the Mexican context.

2. Wiener and Rosenblueth in the Mexican Context

Mexico's unknown involvement with cybernetics is mainly due to the fortuitous intertwining of two prominent careers at *MIT* in Massachusetts in the 1930s. Rosenblueth was a brilliant and ingenious young man with few resources who had come to the United States thanks to a *Guggenheim Fellowship* after training in Paris with the financial support of his brother. His theoretical concerns were wide-ranging and he had a special interest in the methodology and philosophy of science. Wiener, for his part, was the prodigious son of an American professor of philology who had also been educated in Europe and who had a special transdisciplinary and humanist vocation. The friendship quickly sprouted between them in the form of a rich and solid collaboration, despite the disparity of opinions and points of view. They were united by a scientific vocation with a strong humanist component that translated into common interests such as the scientific method or the transformative and regenerative potential of science and education in modern society¹.

This enriching relationship was not disrupted by World War II and the policies pursued by the American government thereafter, which eventually made Rosenblueth leave the country because he could not find a permanent job there without having previously adopted American nationality². The situation of science in Mexico was very different to the United States, but Rosenblueth found academic and institutional support to develop his research work and to set up a scientific institution that would take in intellectuals with similar problems to his own in the United States, thus relaunching Mexican science³. Manuel Sandoval Vallarta was Rosenblueth's main ally in this endeavor, and he was who precisely first invited Wiener to Mexico in 1944⁴. The American scientist's contact with the country was very satisfactory, and he ended up settling there for a time given the uncomfortable situation he was also experiencing in his own country.

So it was that Rosenblueth and Wiener once again shared a workspace, this time in Mexico. During this time, Wiener wrote *Cybernetics, or the control of the Animal and the Machine* (1948), and developed his most humanistic side in this book. For his part, Rosenblueth⁵ developed these same ideals by working for Mexican science as an instrument for the transformation and regeneration of the country⁶. Thus, the idea of cybernetics was forged in Mexico, in a flat in the Hipódromo Condesa colony from which the volcanoes could be seen⁷. The dedication of this important book to Rosenblueth is the perennial trace of its unknown Mexican history.

It should be borne in mind that the developmental policy that emerged at the end of Lázaro Cárdenas' government, which saw science as an important factor in the industrial and economic development of the country, was present at this time. This policy meant a strong optimism regarding the potential of science and technology for the development and strengthening of the country and, consequently, the founding of many of the central institutions for the development of science. In addition to this, public support for science got progressively consolidated⁸.

On the other hand, Wiener's ideas on cybernetics cannot be understood in isolation from the context of the civilisational pessimism that pervaded the intellectual community after the Second World War. Pessimism which encouraged distrust of science and technology in the wake of their use in war and, specifically, in the atomic bomb. In contrast to many critical intellectuals, Wiener strove to find a way to use science and technology for clearly

humanistic purposes, an enterprise that was materialised in *Cybernetics or control of the animal and the machine*.

Wiener understands that just as an organism is efficient and survives when it is capable of managing the information provided by the environment; society will be efficient as long as it is capable of an efficient management of the information generated in its daily life. Both biological and social processes involve working to maintain a certain order in the face of the natural tendency towards entropy and information plays an important role in maintaining order and thus in the survival of the system. Wiener believes that the most effective way to manage information involves its codification and subsequent organisation. This codification would take place through the application of mathematics to human communication processes, in which the information that gives meaning to social life is generated and exchanged. Cybernetics would be precisely the science in charge of this task, in such a way that it would allow the optimisation of social processes based on the mathematization of all aspects of life⁹.

In other words, Wiener is convinced that by applying mathematics to social life, many of the problems that concern humanity can be solved. Proper conservation and management of information would not only help to better plan the use of resources, business operations, and public policies, but would also prevent conflicts that often arise due to distortions of information. However, the American also points out that this application must be guided by a kind of practical wisdom capable of determining social goals and aims, which is why he defends the need for a hybridisation between the humanities and the sciences¹⁰. However, his theory is based on the assumption that human culture and communication processes can be reduced to quantifiable messages that can be translated into mathematical language.

These ideas have huge implications. Actually, this book made Wiener a world celebrity since it generated a very rich debate in many areas of culture. Cybernetics was already an established working tool in medicine, biology, engineering, sociology, etc. in the early 1960s and its main risks and consequences were discussed at the *International Philosophical Congress in Royaumont, Paris* in 1962¹¹.

Wiener returned to the United States and traveled to many places in the world from there, although he continued visiting Mexico periodically thanks to funding from the Rockefeller Foundation, which also allowed Rosenblueth to travel to the United States.

The joint work of the two scientists had a very important impact on Mexican science and their presence was a real event for the people of Mexico City between the 1940s and the 1960s¹². Their ideas regarding science and innovation were widely recognised and Rosenblueth was part of one of the most prestigious cultural institutions of Mexico: *El Colegio Nacional*. He gave many lectures at *El Colegio Nacional*, many of them stemming from dialogues with Wiener¹³. On the other hand, Rosenblueth developed an important institutional work at IPN throughout this time as well, which finally crystallised in the *Centro de Investigación y de Estudios Avanzados* (CINVESTAV), an open and tolerant scientific community focused on the primacy of human creativity and interdisciplinary dialogue, interspersing educational and research work¹⁴. Its initial mission was to develop frontier scientific and technological research, to train leaders in science and technology for the country, and to develop technology to solve problems of national interest¹⁵. CINVESTAV was a pioneer in the research and application of cybernetics and Wiener himself was thought to come to this very center for a course on cybernetics but he died just before he visited Mexico on 18 March 1964¹⁶.

Together with CINVESTAV, multiple initiatives emerged that tried to link cybernetics with emancipation throughout Latin America. It is worth mentioning the proposals for computerized administration of the national economy in Jacabo Arbez's developmental project in Guatemala; all the Manuel Sadosky and Oscar Varsavsky's initiatives designed for Argentina, Peru, Chile, and Venezuela and the creation of the Cuban Institute of Cybernetics in 1970 as well¹⁷.

However, the common lack of institutional bridges between sciences and humanities meant that the very rich scientific work of Wiener and Rosenblueth hardly penetrated the philosophical circuits of the UNAM, the most highlighted Faculty of Philosophy. It is important to consider the rivalry between UNAM and the National Polytechnic Institute, the two main academic institutions of the country. While UNAM always had an identity more focused on comprehensive and humanistic research, the Polytechnic stood out from the beginning for its technical and engineering orientation. In this sense, there is hardly any record of the question being addressed in the UNAM's Faculty of Philosophy in the 1950s. Therefore, Mexican philosophers took up the ideas of cybernetics with some delay and, quite possibly, after the aforementioned 1962 Congress had taken place.

The only link between Wiener and Rosenblueth and academic philosophy was through the *Seminario de Problemas Científicos y Filosóficos*¹⁸ promoted by the Marxian philosopher Eli de Gortari¹⁹. Rosenblueth participated in that seminar and Wiener's texts were published in the collections promoted by it. However, de Gortari was practically an outsider in the Mexican academy and his connections with other philosophers were rather scarce²⁰, except the exiled philosopher Adolfo Sánchez Vázquez²¹. In fact, Sánchez Vázquez devoted a psychology course precisely to address the philosophical implications of cybernetics²². Unfortunately, there is no trace of that course in the mid-1950s beyond the mention Sánchez Vázquez himself makes in an interview. On the other hand, there are also some references to cybernetics in Samuel Ramos' archive. However, they are merely notes from a response to a presentation by Rosenblueth at the *Seminario de Problemas Científicos y Filosóficos*²³.

José Gaos and Eduardo Nicol are the ones who do take up the question of cybernetics during the 1960s, although there is no evidence that they had any contact with Rosenblueth, much less with Wiener. Both authors carry out an in-depth diagnosis of some implications of cybernetics that Wiener overlooked. In this way, they are the first to address the issue philosophically in Mexico and offer a critical reading that reflects the institutional distance between IPN and UNAM and also contrasts with the institutional support that cybernetics has had. In the following pages, we will analyse Gaos and Nicol's ideas in detail, highlighting the context of their works.

3. José Gaos and his criticism of cybernetics

3.1. Gaos' Thought and Context

José Gaos (1900-1969) was a multifaceted intellectual, specialising in phenomenology, he stood out as the main disciple of Ortega y Gasset in the context of the 'Escuela de Madrid' and ended up being one of the main philosophers of the Spanish Republican Exile in Mexico. Gaos was a fervent promoter of Mexican and Latin American philosophy and also the author of many translations of relevant philosophical works such as *Sein und Zeit*²⁴. However, the key to his intellectual project lies in his attempt to articulate an anthropology and a philosophy of philosophy along the lines of the 'raciovitalism' of his teacher Ortega y Gasset.

Gaos developed his ideas on cybernetics in *Historia de nuestra idea del mundo*²⁵. They must be understood in the broader context of his concern about technology and its

detrimental effects on human beings that have its origin in the times of the Second World War when multiple seminars were organized in Mexico to understand the events that were taking place in the world²⁶. Gaos then concentrated on articulating an ontology of the present in order to shed light on the origins of totalitarianism²⁷ and its relationship with technocracy²⁸.

The Asturian philosopher adopts a sort of critical or dialectical approach that tries to give a reason for contemporary barbarism by investigating the roots of Western culture²⁹. His aim is to protect humanity and try to safeguard '*lo exclusivo humano*' (the human condition), which modern techno-scientific reason tends to degrade and debase.

These ideas become clearer and more precise in *Historia de nuestra idea del mundo* because this work not only reflects the circumstances of the war but also takes on board the harmful and dehumanizing dynamics existing in the demo-liberal societies consolidated after the world conflict³⁰ and, in a special way, of the transformation and industrialisation of Mexico City that Gaos witnessed between the forties and sixties of the twentieth century. Gaos witnessed the consequences of the developmentalist policies of those years and experienced with suspicion the consequences of the use of technology and industrialisation in the city³¹. Cybernetics is of the most disturbing aspects of these dynamics in Gaos' eyes. Gaos understands it as the direct consequence of the modern tendency towards mechanization which would end up leading to a radical impoverishment of human experience.

However, Gaos' point of view is not an isolated case in contemporary philosophy. Criticisms of the quantification and mechanization of human experience are present in many authors of the time -such as Adorno (1944), Arendt (1958) or Marcuse (1964), to name but a few - who also share theoretical sources with Gaos, among which one of the most significant is Georg Simmel. Simmel was a very popular thinker among Western philosophers of Gaos' generation and, moreover, was widely translated into Spanish in the framework of the *Revista de Occidente*³². Simmel tackles two relevant topics also developed by Gaos: 1) he deals with the question of the quantification of human life in his *Philosophie des Geldes* and 2) he studies the relations between technological development and urban life in *Die Grossstädte und das Gesitleben*³³. On the other hand, Georg Lukács is also a very relevant influence on the authors of this generation, especially his ideas about reification³⁴.

Regarding Wiener, Gaos quotes him in *Historia de Nuestra del Mundo* and refers to three works: *Cybernetics: Or Control and Communication in the Animal and the Machine*, *The Human Use of Human Beings* and *God & Golem, Inc*. Gaos' pupil Andres Lira was asked to bring the original version of *God & Golem, Inc* from the U.S.A. This book never reached Gaos though, Andrés Lira confirms that the philosopher was in the process of reading Wiener at the time of his death³⁵.

Therefore, Gaos moves theoretically between the philosophy of history and the philosophy of culture, in the wake of the German philosophy of the first half of the twentieth century. A philosophy especially critical of the scientific-technological development from modernity onwards and its implications for human life.

3.2. *Cybernetics and meccanisation of mind*

Going to Gaos' ideas, his approaches to cybernetics stem from his critical reading of the tendency towards mechanisation in modern culture. Gaos sees cybernetics as the ultimate consequence of this cultural dynamic, which would be based on an ultimately reductionist conception of the human being.

In the second part of this *Historia de nuestra idea del mundo*, one of his 'systematical books', Gaos develops a critical interpretation of modern reason based on the reduction of knowledge to the natural-scientific paradigm as outlined by Galileo and Machiavelli. According to this paradigm, reality consists only of that which can be formulated mathematically from physical phenomena³⁶, in other words that which can be reduced to mechanical movement, whose laws will be the cornerstone of a new conception of the world. Obviously, this is not the only interpretation of Modernity that our author offers in his book; he also studies other trends related to the affirmation of autonomy, moral will, and human perfectibility, such as those which pervade the Enlightenment or idealism. However, this 'significant pair of Italians' —as Gaos refers to Galileo and Machiavelli—will have special relevance for him as the basis of a conception of modern technology understood as a means of dominating nature and, subsequently, mankind. Machiavellianism, building on the Galilean conception of nature, will become, therefore, the first great expression of a new historical type of human being: modern man. This new kind of man would be disruptive in the sense that he shows an unprecedented and radical desire for power over the natural and human world while, moreover, paying little heed to any transcendent dimension³⁷³⁸.

Technology and technocracy are, in any case, features which are deeply rooted in modern thought and highly characteristic of modern life. They are evident in the way artefacts come to replace man and in the predominance of the former both quantitatively and qualitatively. Briefly, for Gaos, the predominance of artefacts is due to the modern reduction of all aspects of human life to the movement of material bodies in space (mechanical movement). Omnipresent artefacts—even those that nobody would expect—have for him a *vehicular mission*³⁹, increasing the efficiency of the organs of human body. They are, therefore, an evident crystallization of a culture that has turned quality into quantity and that, subsequently, confuses the acceleration of processes with qualitative perfection.

Calculators are the main exponent of this vehicular mission of artefacts. Since they are designed to accelerate the processes of the human mind, they also represent a much more special manifestation of this quantification of existence. José Gaos establishes a link between calculators and cybernetics and emphasizes that cybernetics also responds to the vehicular nature of artefacts. However, whilst artefacts imply the quantification of the corporal dimensions of the human being, cybernetics goes beyond doing the same with communicative or mental processes. The principles of cybernetics—the communication of messages and the regulation and control of communication through messages of regulation—involve the mechanization of human communication and its consequent degradation. Human communication processes become impersonal at the point when all of their particular manifestations are classified according to pre-established artificial languages, dispensing thus with the singularity of each message. A few years after, in 1968, Habermas⁴⁰ began to diagnose this problem as an erosion of the social—communicative action, interaction among people, expressions and social systems, intentional language, practical, moral, and politic knowledge—under pressure from the technological—domination over nature, instrumental action, physicalist language, technological-strategic knowledge—. In other words, as a devaluation of the communicative links in an information society in which the only relevant thing is the schematized and more or less homogeneous circulation of information. In short, the informatization of human relationships and the progressive omission of human expression.

Cybernetics have a very important politic dimension for José Gaos, as suggested by the etymology of the term which is closely related to ‘govern’ and ‘governmental’ from the

Greek 'kybernétés' (the pilot of a boat) and 'kybernán' (to pilot a boat). The regulation of messages according to pre-established techniques and dialogues affects not only the individual sphere of life but also the collective, social relationships and their political organization. If information encompasses the whole of culture, cybernetics can therefore be defined as a discipline of universal domination. What will this lead to? What is its goal?⁴¹. Gaos discerns a possible response in Wiener's essay *Cybernetics or Control and Communication in the Animal and the Machine* (1948). The American mathematician points to the potential of this new science to manage, in a presumably rational way, all human processes, even to the point of working as a 'machine of government' capable of making up for the patent insufficiency of regular political machinery and agents⁴².

In line with Wiener's essay, Gaos highlights the technocratic vocation of cybernetics and its unexplicit aim of eroding and annulling the space of political decision-making. In some way, our thinker diagnoses the imminence of present-day technological globalization as a catastrophic realization of modern universalism. In that sense, he suggests an examination of the demo-liberalism established after World War II to reveal its increasing instrumentalization, its post-totalitarian condition, and its connection with meaning in relation to the spectacle in the context of the most recent technical advances in cinema and television, which he studies in a section of *Historia de nuestra idea del mundo*⁴³. In that sense, there are some similarities between Gaos' analysis and other actual theses like Paul Virilio's - not only those focused on the critique of speed but also those with greater political significance, specifically, his thesis on 'polar inertia', 'chronopolitics', the 'globalitarian' world and 'necropolitics'.⁴⁴

Gaos's critical intuitions are profound and connect with many of the contemporary challenges related to artificial intelligence and data capitalism. However, it should be noted that the severity with which he treats Wiener's arguments makes him misunderstand the scientist's intentions. Gaos's argument seems to point to Wiener as someone who designs cybernetics with the intention of generating a tool for the manipulation and alienation of the citizenry. This is not the case in any sense. It is true that Wiener's proposals may hide very obvious reductionist ontological and anthropological presuppositions, but Wiener always sought to apply cybernetics to humanistic ends. This is reflected in Wiener's defense of a know-how capable of guiding technological advances and science itself.

4. Eduardo Nicol and his critique of cybernetics

4.1. Nicol's thought and context

Eduardo Nicol developed an extensive philosophical work that matured around a main thread: an original reconsideration of the phenomenological method inspired by the expressive evidence of intersubjective knowledge. Nicol works from the premise of the failure of Western logos and sets himself on the ambitious goal of restoring it⁴⁵.

Nicol is one of the first Spanish-speaking thinkers to develop a systematic critique of techno-scientific reason. His interest in technology comes precisely from the core of his intellectual project since he understands technological rationality as a threat to the philosophical vocation in the rigorous sense in which he understands it⁴⁶. The comparison between this conception of philosophy and technoscience is present in different ways in his published work since *Los principios de la ciencia* and, in his archive, there is evidence that Nicol has been reflecting systematically on this question since the late 1950s in his Metaphysics Seminar⁴⁷.

However, the concern goes back much further. Nicol already published some press articles at the time of the Second World War - 'Public Meditations, the Man Without Truth'; 'The Stupendous Future'; 'The Thirst for Knowledge'; 'The Supreme Ambition of Science'; 'The Two Realms of Chance'; 'If Man is to Rule' and 'Extravagant Science' - in which he explores the irruption of a new political science closely related to technoscience. This would be the root of a new system of hatred and hostility driven by a new kind of rationality based on purely utilitarian criteria⁴⁸.

All these reflections are systematised in *El porvenir de la filosofía* (1972). This work is the first result of a long process of reflection oriented towards thinking about the topic of 'the reform of philosophy' that took place in Nicol's Metaphysics Seminar between the late fifties and early seventies. Nicol and his pupils focused on thinking rigorously about the ruts of the crisis of philosophy and the possibility of its reform. The group would elaborate on a profound diagnosis of modernity as the origin of a civilisational crisis that could lead to the collapse and extinction of human life. *El porvenir de la filosofía* contains a systematic exposition of the key concept of Nicol's diagnosis: the concept of 'force majeure reason'. A kind of substantive, blind and anonymous rationality that would leave no room for freedom and reduce human life to mere subsistence, put at risk by a situation of civilisational collapse due to resource depletion and population growth.

Moreover, its publication date is very significant as it coincides with the year of publication of the report *The Limits of Growth*⁴⁹. This report was commissioned by the Club of Rome from MIT and concludes by pointing out that the continued growth of the world's population together with industrialisation and pollution would eventually make the idea of unlimited growth unfeasible in the foreseeable future. In other words, the report warned that the dynamics of unlimited growth were unsustainable on a limited planet. Its impact and social significance were so great that *The Limits of Growth* became a key reference shortly after its publication and inspired the *Stockholm Declaration*⁵⁰, the ultimate outcome of the United Nations Conference on the Environment.

All this must also be understood in the context of the shift in environmental awareness that took place in the 1960s, which highlighted the danger of human extinction for the first time. Human survival became the main concern in a context of crisis, urgency, and environmental catastrophe. This inflection was accompanied by a large number of counter-cultural movements characterised by criticism of Western science and technology and the myth of progress. Herbert Marcuse's lecture *Das Ende der Utopie*⁵¹ played an important role in this inflection since it was delivered in the context of the 1968 student movement and was widely disseminated around the world. Marcuse's ideas were present in the Mexican student movement, although ecological consciousness began to consolidate in Mexico sometime later⁵².

Thus, *El Porvenir de la filosofía* and its key idea of the 'force majeure reason' appears at a very relevant moment for the creation and consolidation of ecological consciousness⁵³. The concept of 'force majeure' has a particular interest to us because it connects directly with the Nicolian diagnosis of cybernetics. The term cybernetics appears in the proceedings of the Seminar from 1970 onwards, just the year of Rosenblueth's death, when multiple tributes and publications about his life and work took place⁵⁴. However, there is no allusion to him or to Norbert Wiener either in the archival notes or in the books. On the other hand, Juliana González - his main disciple - has no evidence of Nicol having met or conversed with Rosenblueth and Wiener⁵⁵.

Nicol makes a very negative reading of cybernetics. Our philosopher argues that the environmental threat prevents the development of those cultural activities that involved human freedom and creativity. Life would be reduced solely to the struggle for survival and all of humanity's cultural advances would have to focus on the intelligent

management and use of resources. Nicol argues that the 'regime of force majeure reason' is paradoxical in the sense that it can only respond to the existential threat caused by the development of science and technology with the same science and technology. Cybernetics would thus be the most effective tool of management but at the high price of doing away with the human freedom that previously manifested itself in politics, philosophy, art, and culture in general. Specifically, Nicol's idea is a clear response to Wiener who, for his part, argues that the only way to deal with the crisis affecting humanity is to organise and manage it on the basis of cybernetics as a form of effective organisation of life based on science and technology.

Nicol never quotes Wiener, nor does he quote almost any other author in his books or in his seminar sessions. Nevertheless, we can show more or less convincingly that he read him in the sense that some paragraphs of *El porvenir de la filosofía* seem to be a literal gloss on other paragraphs of Wiener's *The human use of human beings*. It could be shown, therefore, that *El porvenir de la filosofía* is very much a response to Wiener. As an example, let us look at the following paragraph by the American mathematician.

No, the way to survival does not lie backward. Our fathers have tasted of the tree of knowledge, and even though its fruit is bitter in our mouths, the angel with the flaming sword stands behind us. We must continue to invent and to earn bread, not merely by the sweat of our brows, but by the metabolism of our brains.

(...) To replace it, we need a range of thought that will really unite the different sciences, shared among a group of men who are thoroughly trained, each in his own field, but who also possess a competent knowledge of adjoining fields. No, size is not enough. We need to cultivate fertility of thought as we have cultivated efficiency in administration. We need to find some mechanism by which an invention of interest to the public may effectively be dedicated to the public.

(...) If man is to continue to exist, he must not be an afterthought to business. That one attempt to realize this has bogged down in the present ruthless phase of the totalitarianism of Russia should not blind us to the fact that these problems exist, and that if we do not answer them, we shall perish as individuals, and perish as a race. Give us the freedom to face the facts as they are! We need not expect that the race will survive forever, any more than that we shall survive forever as individuals, but we may then hope that both as individuals and as a race we may live long enough to bring into the open those potentialities which lie in us⁵⁶.

And now let's look at this paragraph from Nicol.

The technical means by which the number of living beings has increased and the span of their lives prolonged, are now insufficient to maintain them, not only at the maximum level of existence, but at the minimum or primary level of subsistence. The pressing need to further increase these technical resources does not, however, confer on intelligence (p. 74) a new eminence in the human being, a kind of historical headship. Its new function is less historical than before, even if it is vital, very vital. Technification is rather denaturing practical intelligence. Its productivity is accelerated because it is no longer free.

But global excess and penury, on which the common destiny depends, are not embodied in haves and have-nots. The problem of this contrast goes beyond us, as historical subjects; it is the discordance between the possibilities of a higher life, to which technology has contributed, and the

insufficiency of this same technology, and of natural resources, to guarantee primary subsistence in a regime of life established by the sovereign rational will of man. This leads to a technology that loses its cultural vitality in its own accentuation.

This situation does not yet prevent us from acting. Understanding it should not inhibit us. On the contrary. To understand is not to despair. Inhibition would be the contradiction of a voluntary renunciation of freedom; freedom can only be lost by force majeure. The defence of the just, in every concrete instance, is now more existentially profitable than ever: it takes on the character, which it never had before, of a defence of the general human being, as a historical subject. It is an affirmation of being that everyone can insist on every day, even in the knowledge that the distribution of technical and natural resources, if achieved, would perhaps establish human equity at the level of what is necessary, but would raise the quota of excess, standardising cultural and natural hardship in the world at the same time, compressing that very freedom that sought equalisation. Freedom (meaning the freedom to be) could be defeated by its own success. Hidden from the common gaze, a force acts in us that guides us towards an end that is not equity among all and for each one, but the elementary survival of a whole in which no one in particular counts⁵⁷.

4.2. Cybernetics and ‘force majeure reason’

Going to the analysis of Nicol ideas, he highlighted that cybernetics must be understood as the last consequence of a process triggered in Modernity which would lead to the progressive decline of what Nicol considered human vocations. All those aspects related to freedom, such as culture, politics, or science would be in danger because of the modern way of life. This modern way of life would have altered the relationships between humanity and nature, generating a potential risk for the survival of the human species. Consequently, Nicol highlights that a force similar to those of nature could emerge and subsume all historical processes under nature again⁵⁸; what is more, this kind of natural force would turn all cultural advances —mainly technology— into instruments for its only goal: the survival of the species. Cybernetics would be, from his perspective, the major instrument of this force. The following excerpt from the proceedings of the Nicol Seminar makes it very clear what the author's own conception of science is, a knowledge always distanced from necessity, which differs radically from cybernetics, which would be determined by pure necessity in his eyes.

We would say that the primary asceticism, which is essential to the philosophical vocation, considers fear and utility the most representative aspects of man's 'natural attitude'. It is therefore not the sensible appearance that must be suspended, but necessity. Science is unnecessary and useless. Science is free.

Hence there is no technified science. Cybernetics is not science because it is absolutely technified. It is constituted as a sine qua non condition⁵⁹.

In order to go into detail about this situation, our philosopher develops an intriguing genealogy of the modern age in which he does not hesitate to judge some of the pillars of emancipatory modern discourse⁶⁰. Principally, Nicol focuses on two aspects 1) the individualism inherent in modern contractualism and 2) the primacy of instrumental knowledge.

On the one hand, Nicol considers individualism as an abstraction that ignores the historical dimension of human nature. From his point of view, it sets aside the key role that intersubjectivity and communitarian reciprocity play in the formation of the individual. Therefore, since the formation of both society and the individual are simultaneous historical processes, social contract theory is wrong to presuppose an abstract individual that deliberately gives form to society by means of a social contract. The consequences of this are not trivial. For Nicol, the devaluation of these communitarian ties means the beginning of uniform and generalized violence, where self-interest and greed turn one's neighbor into the enemy⁶¹.

On the other hand, Nicol points to Francis Bacon as the first thinker to link knowledge to utility, giving rise to the instrumental turn taken by philosophy and knowledge in general. Despite his emancipatory aim, Bacon would finally make knowledge lose its disinterested nature. For Nicol, this would have great transcendence as knowledge becomes not only an instrument of power but also an instrument for the exploitation of nature⁶².

In brief, our philosopher highlights the fact that both modern liberalism and utilitarianism meant the interference of a kind of principle of power in two fields in which it had not previously made an appearance. Power would become increasingly influential in all aspects which would generate the reification and standardization of human existence. Previous values related to communitarian life, disinterested actions, or contemplative knowledge would be progressively suppressed⁶³. At the same time, the foundations of a new culture where 'everything is permanently mobilised and focus to victory'⁶⁴ would be laid⁶⁵. In a sense, Nicol draws a pessimistic horizon that could be related to a new form of totalitarianism or barbarism, similar to that of the 1940s.

So, from Nicol's point of view, Modernity means a transmutation of the relationships between humanity and nature, and also between man and his fellow beings. This transmutation would lead to an unprecedented imbalance between nature and culture that could endanger the survival of the human species⁶⁶. Technological reason, which functioned as an instrument for human adaptation to the environment, becomes an instrument for the lucrative exploitation and devastation of nature. In this context, Nicol diagnoses a paradoxical situation: the same technological reason that has altered the natural environment —making it almost unlivable— comes to be the only solution that humanity has for its very survival⁶⁷.

From my point of view, Nicol's criticism of Wiener lies precisely in this point. While the American scientist appeals to the need for a science capable of effectively governing humanity in a situation of existential crisis, Nicol denies the techno-scientific rationality that he believes has led us to the current situation and implicitly points to Wiener's solution as the ultimate epigone of the dehumanising drift inherent in the modern project. 'Scientists and technologists, with no horizon, try to save humanity, unaware that they cannot save freedom in this way'⁶⁸. The Baconian ideal of life leads to a regime of necessity in which all space for free human inventiveness disappears and everything must be entrusted to cybernetics as a system for the efficient management of resources and populations⁶⁹. Cybernetics is related to biological necessity and opposed to the freedom and creativity inherent in philosophy and other free vocations. For this reason, Wiener's solution is a false solution; it is nothing more than the ultimate consequence of the vocational confusion of modern rationality that ultimately leads to the imposition of necessity over freedom. In other words, cybernetics is not a solution resulting from human creativity but the imposition of need over freedom. Mankind has no alternative but to turn to cybernetics to efficiently manage both scarce resources and political and social processes.

For the first time, the possibility of the end is the subject of theoretical consideration. The necessity factor increasingly predominates. Cybernetics is a biological fact. Defence of the organism, not free creation of the spirit. The human march towards the biological impossibility of freedom⁷⁰.

Our thinker addresses this question through a key concept in his work: 'force majeure reason'. Nicol defines this as a reason that sets aside both the configuration of a practical horizon of vital possibilities and the disinterested knowledge of Being, with the sole aim being the exploitation and utilitarian use of natural resources. Thus, Eduardo Nicol confronts us with a paradoxical, irrational reason, a kind of 'second nature' that becomes substantive, blind, anonymous, uniform, and purely biological and that has no aim other than survival. In short, for our philosopher, the genealogical itinerary of Modernity coincides with the appearance of this impersonal, necessary, and unconscious force that transforms communitarian reciprocity into a 'struggle for life', social order into biological interdependence, and universality into uniformity. The following dialogue with one of his students, which was transcribed in the proceedings of his seminar, is very illuminating of his thinking since it reflects the nicolian diagnosis of the irruption of need over freedom and culture.

Guadelupe: Is the process irreversible, irremediable? If Bacon is finished, could the Socratic attitude be resumed, could nature itself recover...?

Answer: I don't know: I make diagnoses, not prognoses. I only say that if things continue as they are, in progressive accentuation... etc.

The process is as strong as it is because it is not voluntary, there are no guilty parties. We are re-entering the order of necessity and what free capacity we have left is used for necessities and freedom is constrained to operate exclusively in the practical order; this is not remedied by the will, there is no reaction of the free spirit to prevent the advance of this process. If Socrates is finished, it is because it is no longer impossible to transform the world by transforming man.

What Bacon did was, in fact, to transform consciences; this is what is also coming to an end. Bacon and Marx have been possible because Socrates was alive; they were doing philosophy. The process is not unilateral because it has many sides: the economy ends, politics ends, because politics is a game of freedoms.

How can nature give us back our freedom? (...) We have the impression that we are still free because we have the capacity for inventiveness; we believe that there is progress, but in fact there is a regression of humanity as a human community; forced to use its capacity for defensive purposes of the species⁷¹.

Jorge Linares⁷² distinguishes in a systematic and precise way the five main characteristics that define 'force majeure reason'. Firstly, it is not a theoretical reason; that is to say, science loses its status as a free vocation to be reduced to the exercise of a productive and mechanized technique. Secondly, this new type of reason does not have a political dimension, since politics implies for Nicol a cultural and existential possibility that is utterly absent in 'force majeure reason'. Thirdly, it is neither self-aware nor self-critical; 'force majeure reason' is a blind rationality that mediates cultural advances to focus only on the species' survival. Fourthly, it is totally indifferent to Being and, finally, it is neither expressive nor communicative as it does not lie within the human being, is not a form of thought, and does not need a subject for its realization.

Nicol announces a future in which need displaces practical reason and pure subsistence displaces existence. Utilitarian reason would substitute for free vocations and cybernetics would appear as the main ally of 'force majeure reason'. That is, for Nicol, the most paradigmatic conjunction of sophisticated rationality and the need to survive, a type of rationality that cultivates everything in order to satisfy the human being, but which leaves him unsatisfied because it has not cultivated him⁷³.

For Eduardo Nicol, this new rationality marginalizes human freedom. Technology becomes a mere instrument of the need to survive and generates an increasing uniformization that destroys all free forms of existence that had been possible until that moment. Briefly, we could say that, for our thinker, the survival imperative and the uniformization of the human being as *homo faber* converge. In this way, humanity is discounted and all aspects of its existence become quantifiable⁷⁴. The production and exploitation of resources monopolize human action and the legal frameworks that

guaranteed justice disappear; humanity becomes, therefore, a mass where the personal dimension is subsumed by the collective and is excluded consequently from the processes of decision-making and government.

Nicol understands cybernetics as the tool of self-management of a species in which individuals have become simple specimens that are susceptible to being controlled and dominated. 'Force majeure reason' absorbs the individual sovereignty which is characteristic of demo-liberal regimes; and technology, as its main ally, assumes the leadership of all civic and political processes⁷⁵. All of this takes place to the detriment of both communitarian ties and genuine human praxis which, for Nicol, is the basis of historicity. This praxis loses its place and mankind becomes a mere link in a giant chain of mechanized activity⁷⁶.

In this situation, mankind becomes an insignificant being with no space within which to search for truth and freedom⁷⁷. Mankind becomes a human resource to be governed by a cybernetic system of management that penetrates all areas of society and the private sphere⁷⁸. It is a system that goes beyond any traditional sense of politics in the way that it aims to be absolute, controlling, and defining of the whole of life without respecting either human vocations or the spaces of creation and self-creation of individuals and communities⁷⁹. At this point, there is a convergence of Nicol's critique of technology and cybernetics and his analysis of the totalitarian social dynamics which arose after World War II.

5. Gaos and Nicol: opposite but complementary thinkers in the criticism of cybernetics.

Despite the great impact of Wiener and Rosenblueth on Mexican society, there was no philosophical response to cybernetics until Gaos and Nicol took up the subject. They were the only academic philosophers who took up the issue most prominently, and they did so from a position of radical critique. This is particularly significant as well because it implies that two of the main figures in the Faculty of Philosophy at UNAM coincided in rejecting a science that enjoyed great political and institutional support in the country.

Gaos and Nicol radically agree that under no circumstances can cybernetics constitute a tool for the development of society. Its implementation would entail not only the risk of the degradation of the communicative dimension of human existence and the subsequent

consolidation of totalitarian political regimes, but even the consolidation of a regime of necessity (force majeure regime) that would block any kind of free activity beyond the cybernetical management of resources and populations.

This critical discourse becomes especially significant for the institutional support that Rosenblueth's ideas enjoyed in Mexican institutions such as the IPN and the Colegio Nacional. As we have said, Rosenblueth's ideas were warmly welcomed within the developmental policy on science and technology framework that had been implemented in Mexico since the end of Lázaro Cárdenas' times. This policy allowed the development and consolidation of institutions such as CINEVESTAV as well as the industrialisation and modernisation of the country. On the other hand, Gaos' ideas also reflect the institutional distance of the UNAM to the scientific and engineering spirit of the IPN. All this makes Gaos and Nicol's reflections highly symptomatic of their time and context.

Moreover, it is important to consider that Gaos and Nicol developed parallel and to some extent conflicting careers. Their opposition ended up with the consolidation of two heterogeneous works that tried to respond to the great problems of twentieth-century continental philosophy⁸⁰. This theoretical antagonism between Gaos and Nicol becomes especially valuable when it comes to analysing their arguments against cybernetics since both authors offer a rich and plural argumentation as a result of the different approaches that stem from their different theoretical projects.

From the philosophy of culture, Gaos argues against the dehumanizing consequences of the quantification and reification of human life consolidated since modernity. And he understands cybernetics as the ultimate consequence of these dynamics of modern culture. Gaos warns about degradation of interpersonal communication and political and community ties and points out that human communication is a much more complex process than a mere exchange of messages. Finally, he conceives that applying these reductionist theses prevents human beings from developing their freedom, will, and creativity.

The Asturian philosopher also perceives that this quantification of human life can hide political intentions. In other words, he realises that cybernetics can become a very effective instrument of power. The control of information implies the control of people's thoughts and, therefore, a capacity to exercise dominion over the population in an

unprecedented way. This is why Gaos speaks of technocracy or the omnipresent power of technology over human beings that determines everybody's life⁸¹.

From his historical-ontological approach, Nicol questions whether science - in the form of cybernetics - can take up the challenges caused by its own action, beyond offering a sophisticated but unreflective response to a situation of need and existential crisis. Therefore, Nicol insists that modern science implies a historical transmutation that ends up generating harmful relations between man and the environment. Nicol points out that modern science is the result of a 'vocational confusion' that gives primacy to utilitarianism and the control of nature over the initial disinterest in scientific knowledge. This primacy of utilitarianism - reflected in the Baconian ideal of science - has direct consequences for human beings, as ends up being unsustainable and destroying the planet to the point of endangering the survival of the human species. Nicol is one of the first philosophers to point out that the modern ideal of science and technology can lead to the collapse of civilisation. And he points out that this threat prevents mankind from any free action beyond mere survival.

In this line, it could be said that Nicol's diagnosis is even more pessimistic than Gaos' since it connects cybernetics with a long-standing historical process that could hardly be subverted. Cybernetics is the ultimate consequence of a degradation of the environment that makes human life unviable unless it is reduced to basic survival and efficient and effective management of resources. Nicol argues that the threat of civilisational collapse will generate a biopolitical regime based primarily on cybernetics as a tool for managing populations and resources.

Nicol thus adds an interesting nuance to Gaos's argument by pointing out that the cybernetics that Wiener proposes as a solution for humanity is nothing more than the result of necessity. Cybernetics is not the fruit of an 'uncontrolled will to power' or a Machiavellian plan to control the human race but the consequence of a regime of necessity that arises because the human species is in danger and forced to organise its life and resources as efficiently as possible. Nicol points out that the reductionism to which Gaos appeals is the result of the fact that there is no room for the 'waste' that freedom implies. The threat of extinction implies a maximum saving of resources and energies, and this saving can only be achieved through cybernetics.

While Gaos' critique focuses on exposing the reductionist anthropological assumptions that cybernetics conceals and analysing their consequences, Nicol sees cybernetics as the only possible response that the human species can offer to the threat of a civilisational collapse that would end its existence. Both agree that this response implies a reduction and impoverishment of the human; however, Nicol places us in a much cruder way at a point of no return before the decline of our civilisation.

In conclusion, the relevance of Gaos and Nicol's ideas lies not only in the depth and originality of their diagnoses, but also in the clear answer they give to the great impact of cybernetics on the country's developmental policies and its presence in leading institutions such as IPN-CINVESTAV. The ideas of both authors thus constitute a significant critical corpus that also reflects the distance and intellectual rivalry between UNAM and the IPN.

5. Conclusions

This paper has tried to show how the reception of cybernetics by the exiled philosophers Gaos and Nicol made a valuable contribution to Mexican philosophy. Despite the distance between them, these philosophers rigorously confronted the philosophical implications of the ideas of Wiener and Rosenblueth, which had an important impact on Mexican developmental policies and in institutions such as IPN. Therefore, the importance of these reflections lies not only in the depth and originality of their diagnoses but also in the fact that they are the first philosophical readings of cybernetics to be carried out in a context where this science had had a considerable impact. Moreover, Gaos and Nicol's ideas also reflect the institutional distance between UNAM and IPN and the heterogeneity of the approaches of the two universities.

Gaos and Nicol agreed in identifying some important ontological and anthropological reductionist assumptions underlying cybernetics, warning of its possible dehumanising drifts and the political risks it could entail. But not only that. Both Gaos and Nicol integrated cybernetics into the framework of their thoughtful diagnoses of modernity and contemporaneity, articulating complex and original theoretical proposals capable of putting on the table challenges such as the erosion of communication and politics by technology, the connection of technology with totalitarianism or the threat of a civilisational collapse and the extinction of the human species. While Wiener –and Rosenblueth- optimistically saw cybernetics as an ally for human progress that could be

guided by practical wisdom, our thinkers distrusted the ability of human beings to take charge of a technological system of such complexity and pointed out those human characteristics that cannot be reduced to the scientific rationality.

Thus, the professors of the UNAM made an important contribution to the Mexican intellectual landscape by offering the first and foremost critical diagnosis of cybernetics. An original and novel critical diagnosis that becomes especially significant when taking into consideration the social and institutional support that cybernetics had in Mexican developmental policies and the intellectual distance existing between the applied and technical spirit of IPN and the humanistic one of the UNAM.

6. Acknowledgments

Our acknowledgement to César de Rosas for his feedback and orientation with regard to the Mexican archives. Our acknowledgement to Astrid Dzul for her feedback as well.

Thank you very much to Francis Lough who helped us with the language.

7. Disclosure statement

There is no potential conflict of interest to report.

8. Funding

FPU studentship from the Spanish Minister of Education and Science (FPU19/01772).

9. Notes

¹ Susana Quintanilla, 'Arturo Rosenblueth y Norbert Wiener: dos científicos en la historiografía de la educación contemporánea', *Revista Mexicana de Investigación Educativa*, 15, 2002, 308.

² Norbert Wiener, *Soy un matemático* (México: Consejo Nacional de Ciencia y Tecnología, 1982).

³ Susana Quintanilla, 'Arturo Rosenblueth y Norbert Wiener...', 311.

⁴ Manuel Sandoval Vallarta, *Manuel Sandoval Vallarta: obra científica*. (México: UNAM, 1978).

⁵ Rosenblueth had a great influence on Mexican society. His ideas regarding science and innovation were widely recognised and he was part of one of the most prestigious cultural institutions of Mexico: *El Colegio Nacional*. He gave many lectures at *El Colegio Nacional*, many of them stemming from dialogues with Wiener. For more information about his ideas:

Arturo Rosenblueth. 'La investigación científica y la tecnología'. *Pensamiento político*, 7, 1969, 307-317.

⁶ At the time, Mexico had a developmentalist policy that saw science as the main engine of the country's development. This policy obviously greatly benefited Rosenblueth's initiatives. For more information:

Juan José Saldaña, *Física y metafísica del espacio y el tiempo. La filosofía en el laboratorio*. México: Fondo de Cultura Económica, 2011, 10.

⁷ Wiener, *Soy un matemático*.

⁸ Elsa M. Gracida, *El desarrollismo*. (México: Servicio de Publicaciones UNAM, 2018).

⁹ Norbert Wiener, *Cybernetics or control and communication in the animal and the machine*. (Cambridge: MIT Press, 1961).

¹⁰ Wiener, Norbert, *The human use of human beings*, (Cambridge: Houghton Mifflin Company, 1950)

¹¹ Susana Quintanilla, 'Arturo Rosenblueth y Norbert Wiener...', 320.

¹² Susana Quintanilla, 'Arturo Rosenblueth y Norbert Wiener...', 322.

¹³ For more information about his ideas:

Arturo Rosenblueth. 'La investigación científica y la tecnología'. *Pensamiento político*, 7, 1969, 307-317.

¹⁴ Rosenblueth developed his ideas regarding science and education in the following text:

Arturo Rosenblueth, 'La investigación científica y la educación científica y tecnológica'. *Acta Politécnica Mexicana*, vol. II, 9.

¹⁵ María del Jesús Rosales, 'El Cinvestav: del origen hasta hoy. Un breve recorrido', *Boletín de la Sociedad Química de México*, 2010, 4.

¹⁶ Susana Quintanilla, *Recordar hacia el mañana: creación y primeros años del Cinvestav*, (México: CINVESTAV, 2003).

¹⁷ David Maulén, "Primero que nada y antes del neoliberalismo. Entorno de la biopolítica de la cibernética latinoamericana". *Cuadernos de Beauchef*, 5, 1, 2021.

¹⁸ This Seminar is an important initiative in the Mexican philosophy of science. Its main purpose was to build bridges between science, technology, and philosophy; however, it had hardly any followers among the professors and students of the UNAM's Faculty of Philosophy. Its meetings took place at the Faculty of Science and the UNAM never accepted the consolidation of the master's degree in Philosophy of Science. This master's degree was initially founded at the Polytechnic Institute and later at the Autonomous University of Mexico (UAM).

For more information: Ángel Chávez Mancilla, 'Entre ciencia y filosofía. La labor editorial del Seminario de Problemas Científicos y Filosóficos (1955-1960)'. *Saberes. Revista de historia de las ciencias y las humanidades*, 8, 2020.

¹⁹ Eli de Gortari was an important Mexican engineer and Marxist philosopher. He specialised in the philosophy of science and played a very important role in the study of the philosophy and history of science in Mexico. He was one of the main promoters of the *Seminario de Problemas Científicos y Filosóficos*.

²⁰ Gabriel Vargas Lozano, *Esbozo histórico de la filosofía en México*, (México: FFyL-UANL-Consejo para la cultura y las Artes de NL, 2005): 98-99.

²¹ Adolfo Sánchez Vázquez was an important Marxist philosopher. Coming from the Spanish Republican exile, he actively collaborated with Eli de Gortari in his early days as a professor at the Faculty of Philosophy.

²² I found this interview in the Archive Adolfo Sánchez Vázquez (folder 19, page 165). There is no trace of the course on *Cybernetics* in the archive. The interview is also online: <https://marxismocritico.com/2013/05/03/entrevista-a-adolfo-sanchez-vazquez/>

²³ Samuel Ramos Archive, IIFS-UNAM, folder 2, pp. 85-87.

²⁴ The Gaos' translation of *Sein und Zeit* into Spanish is the first translation of Heidegger's *Opus Majus* into an occidental language. That let us understand the importance of the philosophical work developed in the context of the 'Escuela de Madrid'.

²⁵ Gaos did not write so much about technology, but there are some texts about question. Some of them are the articles 'Sobre la técnica', 'Crítica del tiempo', 'La vida intelectual: el tapiz por el revés' They were compiled in José Gaos, *Obras Completas XV. Discurso de filosofía. De antropología e historiografía. El siglo de esplendor en México* (México: UNAM, 2009).

Moreover, Gaos also addressed the question of technology in his book *Del hombre*. José Gaos, *Obras completas XIII. Del hombre*, (México: UNAM, 1992).

It is important to highlight his unedited text *Curso de metafísica de 1944* as well. Besides, there are multiple drafts in his personal archive, dated in the 1940s. Both the course and the drafts have been recently edited in the 18th volume of the Complete Works.

José Gaos, *Obras Completas XVIII* (México: UNAM, 2023).

We have focused on the texts of *Historia de nuestra idea del mundo* because we consider that his ideas are more precisely and systematically developed there.

²⁶ Aurelia Valero has pointed that Gaos had been studying technocracy since the 1930's. However, the publication of *Meditación sobre la técnica* made him lose any hope of having the primacy in the discussion.

Aurelia Valero, *José Gaos en México: una biografía intelectual*, (México: El Colegio de México, 2015), p. 217.

²⁷ Sergio Sevilla elaborates an accurate analysis of this still unedited text in the article 'Gaos interpreter of the crisis of Modernity as totalitarianism'. Moreover, the article 'The political thought of José Gaos, the criticism of totalitarianism' by Antolín Sánchez Cuervo should be also taken into consideration.

Sergio Sevilla, 'Gaos, intérprete de la modernidad como totalitarismo', *Bajo Palabra: Revista de filosofía* 13 (2017): 47-59. Antolín Sánchez Cuervo, 'El pensamiento político de José Gaos, la crítica del totalitarismo' *Pensamiento* 72 (272 extra) (2016): 691-714.

²⁸ It is worth mentioning the kind of controversy that Gaos had with José Medina Echevarría when the last one published *Sociología: Teoría y Técnica* (1941). Medina defended the application of scientific tools to study the individual and society. Gaos considered that this way of thinking was the basis of totalitarianism since it tries to control and manage mankind as it does with nature. This controversy reflects the point of view of Gaos. Point of view that he will be developing in the next years.

José Gaos, 'Carta de J. Gaos a J. Medina Echevarría', *Cuadernos americanos*, vol. II, num. 2, 1942, pp. 104-109. Valero, Aurelia, *José Gaos en México: 1938-1969: una biografía intelectual*. (Tesis doctoral, México: El Colegio de México, 2012).

²⁹ A more detailed analysis of these ideas can be found in: José Manuel Iglesias Granda, 'José Gaos: crítico de la tecnocracia, la aceleración y la cibernética', *Razón y fe* 285, 1456, pp. 189-202

³⁰ In her recent book, María Antonia González Valerio offers an interesting approach to Gaos philosophy of technology. She considers that these ideas must be understood in the context a reflection about the Mexican circumstance and, concretely, about the modernization processes that Mexico lived in the 1960s.

María Antonia González Valerio, 'Introducción', In: José Gaos, *Filosofía de la técnica*, María Antonia González Valerio (ed.), (México: Herder, 2022).

³¹ María Antonia González Valerio, 'Introducción', In: José Gaos, *Filosofía de la técnica*, María Antonia González Valerio (ed.), (México: Herder, 2022).

³² *Revista de Occidente* was an important cultural Enterprise promoted by Ortega y Gasset. For more information: Evelyn López Campillo. *La Revista de Occidente y la formación de minorías*, (Madrid: Taurus, 1972).

³³ In that sense, it is worth taking into consideration the recent book *La filosofía de la técnica de José Gaos*. An edition of the main texts of Gaos about the topic. The editor, María Antonia González Valerio, adds a really interesting introductory study that analyzes precisely the philosophy of technology of Gaos and connects it with his experience as an inhabitant of Mexico City. González Valerio highlights that Gaos experiences a decisive moment in the transformation of Mexico and that this experience is reflected in his texts about technology. From González Valerio's point of view, Gaos' concern about what he calls 'vehicular existence' and acceleration is closely related to the moods of life in a city where technology is playing a role bigger and bigger transforming, so, the way of life of everybody. Moreover, Gaos' ideas about 'meccanization' also can be contextualized in this moment of increasing modernization and industrialization that is taking place in México.

José Gaos, *Filosofía de la técnica*, María Antonia González Valerio y Nicole C. Karafyllis (ed.), (México: Herder, 2022).

³⁴ Francisco Gil Villegas provides an interesting analysis of the 'zeitgeist' of early twentieth-century Germany in which Ortega and Lukács were trained. This study allows us to intuit how there is a strong common atmosphere that links Gaos, a disciple of Ortega, with Lukács. This can also help us to understand the origin of Gaos' ideas.

Francisco Gil Villegas, *Los profetas y el mesías: Lukács y Ortega como precursores de Heidegger en el Zeitgeist de la modernidad (1900-1929)*. (México: COLMEX-FCE, 1996).

³⁵ Andrés Lira was interviewed at his home in Coyoacan the 2nd february 2023.

³⁶ Gaos, *Obras completas XIV*, 445

³⁷ From Gaos point of view, Modernity implied the secularization of the religious ideas of the other world and eternal life. In this sense, modern man tries to become himself a god subsuming everything under his will and also tries to generate some kind of eternity by the way of accelerating processes and carrying out a constant activity.

³⁸ Gaos, *Obras completas XIV*, 447

³⁹ *Ibid.*, 664

⁴⁰ Jürgen Habermas, *Technik und Wissenschaft als 'ideologie'* (Frankfurt: Suhrkamp Verlag, 2020).

⁴¹ Gaos, *Obras completas XIV*, 669

⁴² *Ibid.*, p. 670

⁴³ Gaos, *Obras completas XIV*, 757-770

⁴⁴ For Gaos (1994, p. 674), mechanization and cybernetics meant reducing the living organism to nonliving mechanism, life's movement to the movement of mere matter, in a kind of return to inert matter.

⁴⁵ For a more detailed explanation: Juliana González, *La metafísica dialéctica de Eduardo Nicol*, (México D.F.: UNAM, 1981).

⁴⁶ Antolín Sánchez Cuervo has addressed this question in several texts:

Antolín Sánchez Cuervo, 'Eduardo Nicol y la crítica de la razón instrumental'. In: *Eduardo Nicol (1907-2007) Homenaje*, R. Horneffer, comp., (México D.F.: UNAM, 2009), pp. 121-141. Antolín Sánchez Cuervo, 'Dos críticos de la técnica en el exilio: José Gaos y Eduardo Nicol'. In: *Estudios y testimonios sobre el exilio español en México*, Armando Pavón, Clara Ramírez y Ambrosio Velasco, coords., (México D.F.: CONACYT, 2016), pp. 176 y ss.

⁴⁷ We will take into consideration archival sources in this paper. Concretely, we have studied the proceedings of the Mataphysics Seminar of Nicol. These proceedings have not been studied until now and provide important nuances to the ideas that Nicol develops in his books.

⁴⁸ Arturo Aguirre analyzes these texts in: Arturo Aguirre, 'Humanidad doliente: la violencia contemporánea en la obra de Eduardo Nicol', *Daimon: Revista internacional de filosofía*, in press, <https://revistas.um.es/daimon/libraryFiles/downloadPublic/4951>

⁴⁹ Dennis Meadows, Donella Meadows, Jorgen Randers, Willian W. Beherens III, *The limits to Growth*, (New York: Universe Books, 1972) <https://donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf>

⁵⁰ This declaration is the result of the 1972 United Nations Conference on the Environment. This was the first world conference to make de environment a major issue. The participants adopted a series of principles for sound management of the environment including the Stockholm Declaration and Action Plan for Human Environment an several resolutions.

⁵¹ From Marcuse's point of view, occidental civilization was fast destroying the world, using science and technology to make it unlivable... or literally, making it a hell.

Herbert Marcuse, *Das Ende der Utopie*, (Berlin: Verlag Neue Kritik, 1980).

⁵² For more information: Alfonso González, 'Ecologismo en acción: las luchas ecológico-sociales en México: ¿Hacia donde?', *Ecología política*, 3, 1972, pp. 35-50

⁵³ I would like to remark that I have not found any reference of Nicol to the mentioned report. Anyway, the arguments of the book show that Nicol was aware of the debate that involved it and that was extremely current in the 1970s.

⁵⁴ Susana Quintanilla, 'Arturo Rosenblueth y Norbert Wiener...'

⁵⁵ Juliana González was interviewed on the 24th february 2023 in her house in Tepoztlan.

⁵⁶ Wiener, Norbert, *The human use of human beings*, (Cambridge: Houghton Mifflin Company, 1950), 57-58.

⁵⁷ Eduardo Nicol, *El porvenir de la filosofía*, (México: FCE, 1972), 74-75.

⁵⁸ Eduardo Nicol, *La primera teoría de la praxis*, (México: UNAM, 1978), 22.

⁵⁹ Archive Eduardo Nicol Franciscá, Folder 10, pages 01345, *UNAM Historical Archive*).

⁶⁰ Eduardo Nicol, *La reforma de la filosofía*, (México: FCE, 1980) 28-32

⁶¹ Eduardo Nicol, *El porvenir de la filosofía*, (México: FCE, 1972) 52.

⁶² Eduardo Nicol, *La reforma...* 52

⁶³ Eduardo Nicol, *Los principios de la ciencia*, (México: FCE, 1965) 225

⁶⁴ Perhaps this culture had been well expressed in two works of the philosopher Ernst Jünger: *Die totale Mobilmachung* (1931) and *Der Arbeiter: Herrschaft und Gestalt* (2013).

⁶⁵ Nicol, *El porvenir...* 52

⁶⁶ *Ibid.*, 64-66

⁶⁷ Nicol, *El porvenir...* 169.

⁶⁸ Archive Eduardo Nicol Franciscá, Folder 12, pages 01645, *UNAM Historical Archive*).

⁶⁹ 'This new conception of philosophy that began with Bacon is a free act; what is alarming about it is that it changes the vocational sign: the love of power. This, which is the difference between Socrates and Bacon, is already serious in itself, but what is more serious is that it fails; because this conception has not prevented us from continuing to philosophise in the Socratic way; it was an act of free decision and could have coexisted with the other.

But the mastery of nature has failed: nature has mastered us. What Bacon sought now has to be devoted to the rudimentary end of subsistence. It was called 'philanthropy' because philanthropy was still there. Bacon has failed... even logical empiricism and even logistics. The vocation is over. Politics is the first victim, before philosophy'

Archive Eduardo Nicol Franciscá, Folder 12, pages 01656, *UNAM Historical Archive*

⁷⁰ Archive Eduardo Nicol Franciscá, Folder 10, pages 01334-01335, *UNAM Historical Archive*).

⁷¹ Archive Eduardo Nicol Franciscá, Folder 12, pages 01654-01655, *UNAM Historical Archive*).

⁷² Jorge Linares, *Ética y mundo tecnológico* (México: FCE, 2008) 284

⁷³ Nicol, *El porvenir...* 40

⁷⁴ Nicol, *El porvenir*, 89

⁷⁵ *Ibid.*, 90

⁷⁶ *Ibid.*, 306

⁷⁷ Eduardo Nicol, *Las ideas y los días: artículos inéditos* (México: Afinita, 2008)

⁷⁸ *Ibid.*, 58

⁷⁹ Eduardo Nicol, *La vocación humana* (México: El Colegio de México, 1953) 29-30

⁸⁰ Gaos and Nicol explicitly polemicized after the publication of *Historicism and Existentialism*, which provoked a rejoinder from Gaos and a counter-rejoinder from Nicol himself.

Eduardo Nicol, *Historicismo y existencialismo*, (México: FCE, 1981).

José Gaos, *Obras Completas IX. Sobre Ortega y Gasset y otros trabajos de historia de las ideas en España y la América española*, (México: UNAM, 1992).

⁸¹ Antolín Sánchez Cuervo, op. cit. 'Dos críticos de la técnica en el exilio'

10. References

Archival References

Archive Eduardo Nicol Franciscá, *UNAM Historical Archive*.

Archive Adolfo Sánchez Vázquez, *Philosophical Research Institute UNAM*.

Archive Samuel Ramos, *Philosophical Research Institute UNAM*.

Bibliographical references

Aguirre, Arturo. 'Humanidad doliente: la violencia contemporánea en la obra de Eduardo Nicol', *Daimon: Revista internacional de filosofía*, in press, <https://revistas.um.es/daimon/libraryFiles/downloadPublic/4951>

Chávez Mancilla, Ángel. 'Entre ciencia y filosofía. La labor editorial del Seminario de Problemas Científicos y Filosóficos (1955-1960)'. *Saberes. Revista de historia de las ciencias y las humanidades*, 8, 2020.

Gaos, José. 'Carta de J. Gaos a J. Medina Echevarría', *Cuadernos americanos*, vol. II, num. 2, 1942, pp. 104-109.

Gaos, José. *Obras completas XIV. Historia de nuestra idea del mundo*. México: UNAM, 1994.

Gaos, José. *Obras completas XV. Discurso de filosofía. De antropología e historiografía. El siglo de esplendor en México*. México: UNAM, 2009.

Gaos, José. *Filosofía de la técnica*, María Antonia González Valerio y Nicole C. Karafyllis (ed.), (México: Herder, 2022).

Gaos, José. *Obras Completas XVIII* (México: UNAM, 2023).

Gil Villegas, Francisco. *Los profetas y el mesías: Lukács y Ortega como precursores de Heidegger en el Zeitgeist de la modernidad (1900-1929)*. (México: COLMEX-FCE, 1996).

González, Alfonso. 'Ecologismo en acción: las luchas ecológico-sociales en México: ¿Hacia dónde?', *Ecología política*, 3, 1972, pp. 35-50

González Calleja, Eduardo; Ribagorda, Álvaro eds.: *La Universidad Central durante la Segunda República: las Ciencias Humanas y Sociales y la vida universitaria*. Madrid: Universidad Carlos III, 2013.

González Valerio, María Antonia. 'Introducción', In: José Gaos, *Filosofía de la técnica*, María Antonia González Valerio (ed.), (México: Herder, 2022).

Gracida, Elsa M. *El desarrollismo*. México: Servicio de Publicaciones UNAM, 2018.

Habermas, Jürgen. *Technik und Wissenschaft als "ideologie"*. Frankfurt: Suhrkamp Verlag, 2020.

Iglesias Granda, José Manuel. 'José Gaos: crítico de la tecnocracia, la aceleración y la cibernética', *Razón y fe* 285, 1456, pp. 189-202

Linares, Jorge. *Ética y mundo tecnológico*. México: Fondo de Cultura Económica, 2008

López Campillo, Evelyne. *La Revista de Occidente y la formación de minorías*, (Madrid: Taurus, 1972).

Marcuse, Herbert. *Das Ende der Utopie*, (Berlin: Verlag Neue Kritik, 1980).

Maulén, David. "Primero que nada y antes del neoliberalismo. Entorno de la biopolítica de la cibernética latinoamericana". *Cuadernos de Beauchef*, 5, 1, 2021.

Dennis Meadows, Donella Meadows, Jorgen Randers, Willian W. Beherens III, *The limits to Growth*, (New York: Universe Books, 1972) <https://donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf>

Nicol, Eduardo. (1953). *La vocación humana*. México: El Colegio de México, 1953.

Nicol, Eduardo. *Metafísica de la expresión*. México: Fondo de Cultura Económica, 1957.

Nicol, Eduardo. *Psicología de las situaciones vitales*. México: Fondo de Cultura Económica, 1963.

Nicol, Eduardo. *Los principios de la ciencia*. México: Fondo de Cultura Económica, 1965.

Nicol, Eduardo. *El porvenir de la filosofía*. México: Fondo de Cultura Económica, 1972.

Nicol, Eduardo. *La primera teoría de la praxis*. México: Universidad Nacional Autónoma de México, 1978.

Nicol, Eduardo. *La reforma de la filosofía*. México: Fondo de Cultura Económica, 1980.

Nicol, Eduardo. *Crítica de la razón simbólica*. México: Fondo de Cultura Económica, 1982.

Nicol, Eduardo. *El problema de la filosofía hispánica*. México: Fondo de Cultura Económica, 1968.

-
- Nicol, Eduardo *Historicismo y existencialismo*, México: FCE, 1981.
- Nicol, Eduardo. *Las ideas y los días: artículos inéditos*. México: Afinita, 2008.
- Quintanilla, Susana. ‘Arturo Rosenblueth y Norbert Wiener: dos científicos en la historiografía de la educación contemporánea’, *Revista Mexicana de Investigación Educativa*, 15, 2002, 308.
- Quintanilla, Susana. *Recordar hacia el mañana: creación y primeros años del Cinvestav*, México: CINVESTAV, 2003.
- Rosales, María del Jesús. ‘El Cinvestav: del origen hasta hoy. Un breve recorrido’, *Boletín de la Sociedad Química de México*, 2010, 4.
- Rosenblueth, Arturo. ‘La investigación científica y la educación científica y tecnológica’. *Acta Politécnica Mexicana*, vol. II, 9, 1960.
- Rosenblueth, Arturo. ‘La investigación científica y la tecnología’. *Pensamiento político*, 7, 1969, 307-317.
- Saldaña, Juan José. *Física y metafísica del espacio y el tiempo. La filosofía en el laboratorio*. México: Fondo de Cultura Económica, 2011, 10.
- Sánchez Cuervo, Antolín. ‘Pensar a la intemperie, el exilio de la filosofía y la crítica de occidente’. In *Las huellas del exilio, expresiones de la España peregrina*, Sánchez Cuervo, A. coord.. Madrid: Tebar, 2008.
- Sánchez Cuervo, Antolín. ‘Eduardo Nicol y la crítica de la razón instrumental’. In: *Eduardo Nicol (1907-2007) Homenaje* Horneffer, R. Coord. México: Facultad de Filosofía y Letras UNAM, 2009.
- Sánchez Cuervo, Antolín. (2016). ‘El pensamiento político de José Gaos. La crítica del totalitarismo’. *Pensamiento: revista de investigación de información filosófica* 72 (272 extra) (2016) 691-714. <https://doi.org/10.14422/pen.v72.i272.y2016.012>
- Sánchez Cuervo, Antolín. ‘Filosofía de la ciencia y de la técnica en el exilio’. In: *Arte, ciencia y pensamiento del exilio republicano español de 1939*. Cabañas Bravo, M., Puig-Samper, M.A., Sánchez Cuervo, A. Eds. Ministerio de la presencia, relaciones con las cortes y memoria democrática. https://www.mpr.gob.es/servicios/publicaciones/Documents/Arte_ciencia_y_pensamiento_accesible_BAJA.pdf
- Sánchez Vázquez, Adolfo. *Ensayos marxistas sobre filosofía e ideología*. México: Océano, 1983.
- Sandoval Vallarta, Manuel. *Manuel Sandoval Vallarta: obra científica*. (México: UNAM, 1978).
- Sevilla, Sergio. ‘Gaos, intérprete de la modernidad como totalitarismo’. *Bajo Palabra: revista de filosofía* 13, (2018) 47-59. <https://revistas.uam.es/bajopalabra/article/view/8009>

Valero, Aurelia. *José Gaos en México: Una biografía intelectual (1938-1969)*. México: El Colegio de México, 2015.

Vargas Lozano, Gabriel. *Esbozo histórico de la filosofía en México*, (México: FFyL-UANL-Consejo para la cultura y las Artes de NL, 2005): 98-99.

Virilio, Paul. *Vitesse et politique*. París: Galilée.

Wiener, Norbert. *Cybernetics or control and communication in the animal and the machine*. (Cambridge: MIT Press, 1961).

Wiener, Norbert. *The human use of human beings*, (Cambridge: Houghton Mifflin Company, 1950)

Wiener, Norbert. *Soy un matemático* (México: Consejo Nacional de Ciencia y Tecnología, 1982).

BORRADOR