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Scientific Journals as Narrative Objects of the Sciences

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Abstract

Using a referential framework that integrates the hermeneutic philosophy of Hans-Georg Gadamer and Paul Ricœur, the critical theory of Herbert Marcuse and Jürgen Habermas, and the traditions of the history of the book and reading with the works of Roger Chartier and Martyn Lyons, among others, this essay aims to understand scientific journals as *narrative objects of the sciences*. These journals bring together communities that share common ways of interpreting the world and shape agreed-upon forms of narrating that common understanding. From this perspective, scientific journals interlace the rationality present in the conversations that occur in the narrative dimension with the conversations of their social environment. These conversations mutually influence one other, and in that dynamic converge both macro-social actions related to political, technical, economic, cultural, and/or religious dimensions, as well a series of mediating practices that operate at the micro-social level, linked to editorial knowledge, formal and informal channels of circulation, collaborative networks, and operational capacities, with the potential to legitimize, delegitimize, or even nullify the circulation of certain conversations.

Keywords: Scientific Journals; Written Culture; Hermeneutic Philosophy; Critical Theory.

Introduction

Since the emergence of modern science in the 17th century, scientific journals have been the central communicative device of a communication system created by scientific communities themselves. Although these communities did not possess a univocal notion of science, but rather were based on diverse presumptions, practices, and interests, studies focusing on scientific journals often approach them in isolation from the scientific rationality and interests of the social environments that put them into circulation. This dissociation, in addition to creating a rupture between the history of science and the history of scientific publishing, isolates the editorial apparatus from the lattice of thought

and the multiple mediating practices that drive the circulation and legitimization of certain public scientific conversations. How, then, can we move beyond the materiality of the object and capture this relational nature of an apparatus that was created to set in motion the communication system of the sciences and, at the same time, is an expression of the interests of its environment?

In order to recover this relational dimension and understand the relevance of scientific journals, this article proposes a framework of reference that draws on three major schools of thought: the hermeneutic philosophy of the second half of the 20th century, through the works of Hans-Georg Gadamer[1–3] and Paul Ricœur[4–7]; the critical theory of the Frankfurt School, particularly the works of Herbert Marcuse[8,9] and Jürgen Habermas,[10–12] related to the technical rationality of the sciences; and historiographical productions that, from the history of the book, reading, and written culture, draw upon these philosophical schools and propose a rupture with the certainties of historical objectivism, such as the works of Roger Chartier,[13–17] Martyn Lyons,[18] Guglielmo Cavallo,[19] and Armando Petrucci.[20] As historian Gabrielle Spiegel points out:

> "Throughout the 1980s, the growing attention to language and discursive structures challenged the causal model of the old social history and tended to substitute discursive models of culture that claimed to demonstrate [...] the culturally (i.e. linguistically) constructed nature of society and the individual's experience of the world."[21]

Given the turn that the linguistic nature of the interpretive experience of the world implied, the history of reading, examining the book as an editorial object based on the circulation of textual objects, allows us to identify, in the terms of Stanley Fish,[22] various "interpretive communities." This centrality of interpretation reverses the classical perspective of the history of the book, which related differences in reading practices to certain social oppositions constructed *a priori*:

> "The problem is that cultural differentiation is not necessarily organized according to the one grid of social status as the controlling factor in an unequal distribution of objects or variations in practices. We must reverse this way of looking at the question and begin by noting milieus or communities that share a relation with writing."[19]

The idea of avoiding the attribution of uses and practices to predefined social groups in order to identify the "communities that share a relation with writing"[19] is precisely the point of connection linking this new history of reading with the new notions of *text*, *agreement*, and *shared interpretation of the world* present in the hermeneutic philosophy of Gadamer and Ricœur. These notions allow us to incorporate scientific journals into the rationality and actions of their social environment.

Within this referential framework, we understand scientific journals as *narrative objects of the sciences* that bring together communities sharing common ways of interpreting the world and shape agreed-upon forms of narrating that common understanding. From this perspective, scientific journals interlace the rationality present in the conversations that occur in the narrative dimension with the conversations of their social environment. These conversations mutually influence one other, and in that dynamic converge both macro-social actions related to political, technical, economic, cultural, and/or religious dimensions, as well a series of mediating practices that operate at the micro-social level, linked to editorial knowledge, formal and informal channels of circulation, collaborative networks, and operational capacities, with the potential to legitimize, delegitimize, or even nullify the circulation of certain conversations.

This text aims to address the theoretical foundations of two central categories. First, it examines the category *conversations of the sciences in the narrative dimension*, disaggregated into four dimensions of analysis, in which the types of hermeneutic conversations that are present in the narrative objects of the sciences are outlined. Second, the category of *conversations of the sciences in social environments* addresses the multiple relational processes that mark the conversations of the sciences in the narrative dimension as they reach the public sphere, where they interact with what Habermas refers to as the "interests of the life-world."[12]

Conversations of the sciences in the narrative dimension

One of the central postulates of the first analytical category is that scientific journals bring together *conversations* in the narrative dimension. Now, who participates in these conversations? With *conversation* we refer to the "hermeneutic conversation" described by Gadamer,[2] which does not occur solely between two individuals but is present in every interpretive process characterized by the dialectic of question and answer. Thus, it

can take place between someone seeking to interpret the world and that which they seek to understand, or between someone seeking to interpret a text and the text itself, among many other interpretive relationships. In the words of Gadamer:

> "The understanding of a text has not begun at all as long as the text remains mute. But a text can begin to speak [...] When it does begin to speak, however, it does not simply speak its word, always the same, in lifeless rigidity, but gives ever new answers to the person who questions it and poses ever new questions to him who answers it. To understand a text is to come to understand oneself in a kind of dialogue. This contention is confirmed by the fact that the concrete dealing with a text yields understanding only when what is said in the text begins to find expression in the interpreter's own language."[3]

Just as in conversations held between people, in hermeneutic conversation both parties are united by a subject in common. Indeed, every understanding and agreement requires a common "thing" to be understood and agreed upon. An agreement regarding the subject necessarily means that, in the dialectic of question and answer inherent to conversation, a common language is developed. However, this agreement does not imply a consensus regarding all possible postulates and perspectives – the agreement necessary for understanding is one in which we agree that we are talking about a particular topic and not something else. For Gadamer:

> “Hermeneutical analysis must clearly eliminate a false model of understanding and agreement. In an agreement, moreover, difference is never melded into identification. When it is said that there is agreement about something, it does not mean that one has the same opinion as the other. There is co-incidence, as the term beautifully expresses.”[3]

Among the multiple potential dialogues enabled by the hermeneutical experience of the world, scientific rationality manifests itself in the narrative dimension in four types of conversations proposed in this article as dimensions of analysis. The first is produced between the person interpreting the world scientifically and the environment that person wishes to understand. The second occurs between the person interpreting the world scientifically and the preexisting written tradition with which that person engages. The

third takes places between the person interpreting the world scientifically and the text in which the person translates this interpretation of the world in dialogue with the tradition from which they are interpreting. The fourth occurs when the text, after a number of mediating processes, enters the public sphere and acquires meaning through the person interpreting it.

The first hermeneutical conversation: "The scientific interpretation of the world"

This first analytical dimension focuses on Gadamer's notion of forms of "access to the world,"[3] which opens the door to an understanding of how the sciences have historically conceived the ways of comprehending reality. Philosophical hermeneutics, by characterizing interpretation as the "realization of the act of understanding,"[2] situates language as the primary action by which the world is accessed, thereby challenging the objective and unmediated access declared by the sciences until the mid-20th century:

> "Over against the illusion of self-consciousness as well as the naïveté of a positive concept of facts, the midworld of language has proven itself to be the true dimension of that which is given."[3]

According to Gadamer, modern science, born in the 17th century, was grounded in a mathematical conception of nature, asserting a universal experience of scientific access to the world sustained in a methodological guarantee and the notion of progress as an expression of domination over the resources of nature and of the social world. And "this connection between the new science and the ideal of method was also the thing that put it at a distance, so to speak, from the phenomenon of understanding,"[3] as the hermeneutical experience of understanding only materializes to the extent that the methodological ideal of the researcher does not stifle their interrogative capacity, thereby voiding the dialectic of question and answer that enables reflective interpretation of the world. Consequently, for Gadamer, this domination over the world founded on method, as posited by certain scientific rationalities, tends to supplant the interrogative dialectic of hermeneutical conversation with technical knowledge.

From the perspective of this work, this first type of conversation – between the person interpreting the world scientifically and the natural, social, or technological environment they wish to understand – is a central analytical dimension for comprehending the close relationship between the legitimization of scientific journals and the legitimization of the

scientific rationalities these journals put into circulation, rationalities that will be bolstered or attenuated by the actions and operational capabilities exercised within their social contexts. Moreover, this analytical dimension underscores that disciplinary and thematic frameworks do not suffice to understand the interpretive communities that dialogue and come together around a scientific journal. What brings an interpretive community together around a journal is a shared way of interpreting the world scientifically, which extends to certain interests and values shared within the primary life-world.

Contemplating the diverse conceptions inherent in this first type of hermeneutical conversation affords us the opportunity to analyze how these rationalities operate in the different spheres of social life, in this case, in the circulation and legitimization of scientific dialogues in the narrative dimension.

By the latter third of the 19th century, the forms of scientific interpretation of the world were no longer associated with rational understanding, but rather with *techne*.[1] According to Habermas, even by the 18th century the philosophy of history articulated by Condorcet in his work *Esquisse d'un tableau historique des progrès de l'esprit humain* – published in 1794 and revisited in the 19th century through evolutionist theories of society – formulated a model of rationality grounded in observation, experimentation, and calculation, in which physics "becomes a paradigm for knowledge in general because it follows a method that raises the knowledge of nature above the scholastic debates of philosophers and reduces all previous philosophy to the status of mere opinion."(10)

Yet, as Habermas underscores, this mode of thought not only diminishes philosophy to mere opinion, but also relegates all "forms of experience in which a truth cannot be verified by the means at the disposal of scientific methodology."(2) This notion of *truth*, ascribed by modern sciences to the scientific method, akin to a univocal language for accessing the world, finds expression, for instance, in Lamarckism, Thomas Malthus' demographic theories, Comte's positivist philosophy, and the evolutionary theories of Darwin and Spencer. These interpretations framed the progress of civilization as the evolution of organic systems. "The paradigm for the interpretation of cumulative changes

[1]Gadamer draws upon the Greek concept of *techne*, "an art, skill, craftmanship" (Gadamer, 2006, p. 158), including the artisan's knowledge of how to make certain things as well as the doing itself as a process that involved the choice of the adequate methods and material and the execution of the phases of work required.

was no longer the theoretical progress of science,"[10] but rather social evolution and progress become intertwined with the development of production techniques, transforming the sciences into productive forces.

Towards the close of the 19th century, according to Habermas, this evolutionary tendency would gain increasing force, with late capitalism characterized by the phenomenon of "the scientization of technology":

> "The institutional pressure to augment the productivity of labor through the introduction of new technology has always existed under capitalism. But innovations depended on sporadic inventions which, while economically motivated, were still fortuitous in character. This changed as technical development entered into a feedback relation with the progress of modern sciences. With the advent of large-scale industrial research, science, technology and industrial utilization were fused into a system. Since then, industrial research has been linked up with research under government contract, which primarily promotes scientific and technical progress [...] Thus technology and science become a leading productive force."[12]

Scientific and technical progress, connected to technical-industrial development and the reproduction of capital, justify the success of modern sciences, tending to accentuate conditions of methodology and abstraction that block any possibility for interrogation and put in the forefront the language of facts and data as the true dimension of reality.

According to Habermas, it is not possible to divorce the sciences from the interests of the primary life-world. Indeed, certain notions structuring a significant portion of the scientific-technological rationality that propelled the expansion of capitalism and the industrialization of the sciences, connected to progress as an expression of domination over the resources of nature and the social world, are ascribed a truth value greater than that of other scientific rationalities. This truth value is then transposed onto the narrative objects of the sciences that put that rationality into circulation. However, in our understanding, the process of industrialization of the sciences described by Habermas was not the only path taken by the sciences. Not all industrialized settings instrumentalize the

scientific method and its communicative devices, just as not all non-industrialized settings favor more interrogative, reflective, or critical sciences.

Therefore, it is possible to find scientific journals that bring together more instrumental or more reflective perspectives, regardless of the degree of industrialization, disciplinary context, or field of knowledge in which they are situated. We might then ask ourselves: Do different scientific rationalities coexist within the same device? How aligned are the rationalities present within a scientific journal with the actions and interests of its social environment and interpretive communities?

The second hermeneutical conversation: "Dialogue with the tradition"

One of the distinguishing features of the narrative structure of the sciences is the dialogue with other written productions, whether recent or from distant times. Regardless of the discipline or theoretical perspective from which the world is interpreted, the starting point is a dialogue – be it implicit or explicit – with the written legacy to either uphold or relegate the existing dialogue within the tradition.

Examining the traditions with which texts engage and how they articulate that connection provides insight not only into certain traits of different scientific rationalities but also into the complex arrangements by which certain traditions are revisited or exalted while others are disregarded or obliterated. As Lucien Polastron[23] reminds us, history has witnessed the public burning of entire collections of books or the silent destruction of certain written legacies, a means of erasing the existence of specific social groups, of particular ways of thought, as if they had never existed. In this sense, the choice of a tradition, of the texts with which one chooses to converse – whether from recent or more temporally distant written sources – is not confined solely to the discipline or the subject of interest; rather, the expression of this dialogue in the narrative dimension shapes and reaffirms ways of interpreting the world scientifically.

When we speak of a *tradition*, we are referring to the written heritage, to the inherited dialogue that the sciences have carried out in the narrative dimension that, as Ricœur suggests, is not "the inert transmission of some already dead deposit of material but the living transmission of an innovation always capable of being reactivated."[6] And how does this written legacy from the past stay alive, and in a state of constant innovation and reactivation? While the essence of tradition, according to Gadamer,[2] is to transmit that

which has already been transmitted, hermeneutical consciousness posits the necessity of generating new questions in the present that challenge that tradition, thus, all that has been transmitted takes on a different meaning in each new present:

> "Every age has to understand a transmitted text in its own way, for the text belongs to the whole tradition whose content interests the age and in which it seeks to understand itself. The real meaning of a text, as it speaks to the interpreter, does not depend on the contingencies of the author and his original audience. It certainly is not identical with them, for it is always co-determined also by the historical situation of the interpreter and hence by the totality of the objective course of history."[(2)]

To paraphrase Ricœur,[(5)] it could be stated that the meaning of the world remains in suspense, awaiting new interpretations to decide its significance. Therefore, significant events are continually open to being reread through new *praxis*.

This perspective regarding the reinterpretation of written tradition provides an avenue for analyzing alternative ways of understanding the access to the past and the connection with tradition. As Gadamer expresses,[(1)] from Aristotelian comprehensiveness to modern empirical science, a process of isolation of both the "object" and knowledge of that object has taken place: if an experience is only valid when confirmed, this principle necessitates focusing on a method that allows for reproducibility. And it is in this objectification of experience, alongside the methodical isolation of the object, that a methodical isolation of knowledge, detached from its own historicity, is produced:

> "They purchase the certitude and controllability of their knowledge and the secure path of their progressing by renouncing comprehensive knowledge […] Inasmuch as it subjected what is observable to the quantifying methods of mathematics, empirical science discovered a new notion of natural law and it moved forward to scientific knowledge in all directions by means of experiment and hypothesis."[(1)]

This same process of isolating the "object" of study to generate a controlled study domain begins to expand to other realms of the sciences, for example, the objectivism of various historiographical currents of thought that claim that the compilation of data, dates, personalities, places, and institutions can compose an "exact" description of events, as if

the historian could access the events of the past directly and as if a linear relationship existed between the events, the narrative created, and the univocal reading of that text. This direct access to the past, free from interference, as if subsequent readings of those events and the historical process itself did not create meanings, forms part of the *historical consciousness* posited by Wilhelm Dilthey in the 19th century, in which he develops a sense of history aimed at precisely isolating the "object" of study from the interferences of history's unfolding.

There are also other forms of understanding tradition. According to Gadamer, 19th-century Romanticism particularly emphasized tradition as a form of authority: from the Romantic perspective, "that which has been sanctioned by tradition and custom has an authority that is nameless" whose "validity does not require any reasons but conditions us without our questioning it."(2) This notion of authority historically took shape through a delimited canon of readings, used as a mechanism of indoctrination:

> "Indeed, at the base of this universal choice, common to all Governments and powers, was something else: the awareness that, prior to the arrival of television, reading was the most suitable means for determining the dissemination of values and ideologies and, moreover, the one that could most easily be regulated once the processes of production, distribution, and preservation of texts had been controlled. […] For this to work, it is necessary only that readings […] be oriented toward a certain corpus of works and not toward others, toward a fixed canon that can be more or less extensive, more liberal or more restrictive, but which is imposed precisely as a canon; that is, as an unquestionable value that must be assumed as such."(19)

The manner in which texts express their connection with traditions enables us to identify characteristics of the distinct scientific rationalities present not only within the texts published in a journal but also within the communities engaging with these texts, and even within the social contexts driving the circulation of these journals.

Both those who write a text and those who interpret and understand themselves in relation to it share certain expectations of meaning that bring people together in interpretative communities, not only because they share a similar relationship with the subject matter addressed in the text, but also because they partake in a common tradition: "the anticipation of meaning that governs our understanding of a text is not an act of

subjectivity, but proceeds from the commonality that binds us to the tradition."[2] Therefore, tradition is not an individual and subjective construction but rather a collective act by which every text is inserted into a community and participates in a tradition. From this standpoint, what conception of tradition is present in the texts published by scientific journals? Is it possible to identify a tradition in consonance with the social contexts of the sciences in every era?

The third hermeneutical conversation: "Agreements in the narrative dimension"

The third type of *conversation* addressed in this study occurs between those who translate their interpretation of the world and tradition into a narrative framework, thereby engaging in a reflective dialogue with the text not only to capture, understand, and translate a particular facet of reality but also to adapt it to a narrative structure. This structure is not a creative individual endeavor but rests upon terminological and structural agreements among those who share certain ways of interpreting the world scientifically. In Gadamer's terms, if the writer is cognizant of the issue of something fixing something in writing[3], they will always consider the intended recipient, who in the case of scientific journals is a member of the same peer community.

Just as in live dialogue, where one strives to use the right words and accompany them with appropriate emphasis and gestures to ensure comprehensibility for the other participants of the conversation, a “horizon of interpretation and understanding must be open in writing the text itself, one that the reader must fill out. Writing is more than a repetition in print of something spoken.”[3] The writer endeavors to communicate, and this implies taking into account the interpreter, "with whom one shares presuppositions and upon whose understanding one relies."[3] This shared language, essential for understanding on the interpreter's part, extends beyond a common "topic"; rather, that shared language is continually transforming within narrative communities that are explicitly or implicitly inscribed within one of the numerous traditions participating in that great epistemic conversation that the sciences have maintained throughout history. As Habermas notes:

> "With a formal world concept an actor becomes involved in suppositions of commonality that, from his perspective [...] claim to be valid for outside interpreters as well.” [10]

This "formal world concept" mentioned by Habermas expresses the rationality that narrative communities of sciences put in play when they develop written narratives of their interpretive experience of the world. Although scientific communication is published, it is not intended for all people; rather, it "only tries to be comprehensible for one who is well acquainted with the level and language of research."[3] This language is shaped among those who share a *shared interpretation of the world*, marked by agreements not only in narrative and lexical terms but also regarding the ways of conceptualizing scientific access to the world – rationalities, epistemes, values, methodological notions for grasping and comprehending both nature and the social world.

While orality is an essential part of transmitting scientific knowledge, present both in formal education and in the presentation of new ideas and formulations to peers, it is not spoken language upon which modern sciences since the 17th century have shaped their diverse ways of interpreting the world:

> “A written tradition is not a fragment of a past world [...] It is not this document, as a piece of the past, that is the bearer of tradition, but the continuity of memory. [...] Where we have a written tradition, we are not just told a particular thing; a past humanity itself becomes present to us in its general relation to the world.”[2]

Nor is it in the manuscript of the private sphere where these lexical and structural agreements established by the sciences in its conversations are shaped. Rather, these agreements are produced in the *narrative objects of the sciences* that circulate within the public sphere, that is, in the narrative object that has been edited, published and put into dialogue with its interpretive community. These agreements generated within the public sphere of the sciences relate to Mikhail Bakhtin's concept of "speech genre,"[24] which enables us to understand the sciences as one of the many spheres of human praxis, whose statements reflect specific conditions "not only through their content (thematic) and linguistic style, that is, the selection of the lexical, phraseological, and grammatical resources of the language, but above all through their compositional structure."[24] Thus, the speech genre is understood not as an ideal type or a series of technical laws, but rather as a more intricate cultural communication, the product of a specific praxis. This speech genre is put into action within the narrative framework, within the work as a totality of meaning that transcends the sum of its fragments or sentences.

As David Carr highlights,[25] the world does not present itself in structured narratives; rather, narration imposes upon events a narrative form that the events themselves do not possess. In this sense, the narrative form becomes a synthesis of the heterogeneous in which disparate elements of the world are brought together. In the realm of sciences, the process of discourse fixation is not an individual undertaking or creation, but rather diverse interpretative communities come to agree upon certain narrative structures as valid. These structures are distinct to the sciences and differ from other non-fictional narrative structures with truth claims, produced by other discourse communities, such as legal, legislative, or journalistic narratives. In this light, the term "narrativity" or "narrative" is understood as the capacity to "mark, organize, and clarify temporal experience" in discursive units longer than sentences, called *texts*.[5]

From our perspective, all scientific texts make some type of use of narrative given that, like other human experiences, the sciences are permeated by the act of narrating their interpretive experience of the world in written form, mediated by language.[3] However, unlike fictional narratives found in novels or poetry, or narrative modalities employing other languages such as photography, visual arts, or even music, the sciences compose narratives with a "truth claim."[5] This notion of truth is understood in two senses: in its relation to reality and as a property of certain statements.

Within the sense of *truth* that links the text to reality, Ricœur posits the notion of reference or referential relation, which encompasses both the "truth value" of a text and “its claim to reach reality."[5] In an oral conversation, referential relation forms within the shared spatiotemporal presence, where truth value and the connection with reality of the spoken world and the *here* and *now* are given by the circumstantial reality surrounding that discursive instance. However, as Ricœur asks, "What happens to reference when discourse becomes a text?"[5] Writing fractures the referential relation – there is no longer a shared situation between the writer and the reader who will appropriate the text, hence scientific narration requires the reconstitution of the reference, the construction of a "here and now," and the establishment of truth value and the link with reality inherent in scientific discourse.

The delimitation of a "here and now," which can be temporally distant or contemporary, requires the creation of a space-time in which the problem is formulated, and in reestablishing the connection of that problem with reality – which is lost through the act

of writing – an explicit or implicit truth value is expressed. In other words, this reinstatement of the referential relation can express either a notion of truth that critiques the objectivity of the method and regards it as a "naïve belief"[3] or, conversely, one that rests upon the method as truth. Regardless of the truth value present in the text, all scientific discourse distinguishes itself from fictional literature by recreating this referential relation, in which the three hermeneutical conversations addressed in the previous sections come into play.

Now, what happens to the referential relation when the *truth* value is associated with the property of certain statements, namely when the legitimacy of the statement itself translates to an "objective" reading of reality? As Gadamer expresses, this is the notion of truth that the modern positivist sciences historically assigned to method. When the application of method erases creative capacity and impedes the dialogical structure of question and answer present in hermeneutical conversations, understanding as a hermeneutic experience is annulled, and "the midworld of language is left out of consideration."[3] It is worth clarifying that Gadamer is not challenging the method itself but rather the annulment of the experience of understanding.

By erasing the capacity for reflection and interrogation, technical progress becomes unreflective, and the scientific narrative created within these rationalities begins to instrumentalize itself to the point of losing contact with the tradition, the text becoming increasingly standardized. This process, connected with the great machinery of technical-industrial development and the reproduction of capital, attributes itself a truth value greater than that of other scientific rationalities. In this regard, how instrumentalized and standardized are the texts that scientific journals put into circulation? How connected are they to the machinery of technical-industrial development?

The Fourth Hermeneutic Conversation: "Interpretative Communities"

The agreements present in the three preceding types of conversation extend to the fourth hermeneutic conversation that occurs when a text, after undergoing multiple processes of mediation, enters the public sphere and acquires meaning through its interpreter. Ricœur proposes that what is given in interpreting a text is no longer an understanding of the psychological intentions of the writer, concealed *behind* the text, but rather understanding a text is "understand oneself as one confronts the text,"[5] finding in the text the answers

to the questions that the text itself has prompted and engaging in an interpretive dialectic of question and answer that leads us to understanding the text and understanding ourselves in relation to the text.

For philosophical hermeneutics, the true meaning of a text is not derived from an understanding of the author's intentions. Rather, the textual work exists in and of itself and regains meaning with each new reading, with each new present. The dialectic of question and answer allows comprehension to manifest in a manner akin to a conversation, albeit one functioning in a single direction, on the part of the person who attempts to understand, the person who questions and questions oneself and strives to hear the text's response. It is true that a text does not speak to us as a person would: "We who are attempting to understand must ourselves make it speak."(2)

However, not all rationalities within the sciences hold the same relationship to the text. When the sciences privilege technique and impede the dialectic of question and answer, the text is flattened, other dimensions are negated, and the from text emerges solely the descriptive language of facts:

> "We would be taking an artificially narrow perspective if we viewed the task of interpreting texts through the prejudices of modern scientific theory and the criterion of scientificity. The interpreter’s task *in concreto* is never merely a logical-technical transmission of the sense of some discourse, where the question of the truth of what is says is completely disregarded. Any attempt to understand the sense of a text means taking up the challenge that it presents."(3)

From this viewpoint, interpretative communities are formed among those who share common ways of understanding themselves in relation to certain texts, with this shared experience of comprehension transcending the boundaries of the discipline or topic. In this sense we can ask ourselves: Who makes it possible for these conversations to influence one another and shape communities of dialogue?

These four hermeneutical conversations are integrated into all writing processes, given that the narrative translation of the scientific interpretation of the world requires a dialogue with the text being constructed, which also engages in dialogue with other texts

that make up the tradition upon which all scientific writing is founded. The articulation is such that scientific rationalities manifest forcefully in all four conversations simultaneously: each way of understanding scientific access to the world will construct a type of relationship with tradition, with narrative structure, and with the ways of appropriating texts.

Conversations of the sciences in their social contexts

In exploring this selection of possible conversations of the sciences in the narrative dimension, the close ties between this process of formation of different scientific rationalities and the social world become apparent. The process by which the numerous interpretive communities interpret the world scientifically shows us that the connection between the sciences and society runs much deeper. Neither external forces subject the sciences to practices that go beyond scientific interests, nor scientific communities autonomously impose their worldview. Instead, it is precisely this pre-scientific agreement about ways of understanding and engaging with the world that brings different social actors together around more industrial or more artisanal scientific practices, from more humanized to more instrumental perspectives.

According to Habermas, this " knowledge of the apparently objective world of facts has its transcendental basis in the prescientific world."[12] In other words, those who engage in scientific interpretation of the world build upon objects that are already symbolically structured within the social world, given that the relationship existing between different interpretative models, the formulation of problems, and the theoretical description of those facts configured by each society in historical terms "calls for a stage 1 of interpretation that confronts all sciences with structurally *similar* tasks."[10]

Now, if scientific rationalities are associated with the interests of the social world, is it possible for these rationalities to be disconnected from the interests associated with the public circulation of scientific conversations in the narrative dimension? From our perspective, it is not. The scientific journal, by delineating not only a specific theme but also a referential framework for interpretation, unites the parts, generating a linguistic consensus that presupposes an agreement that goes beyond thematic, methodological, or disciplinary choices.

The interpretative communities that form around each scientific journal share a common way of "understanding themselves" in relation to the texts that a journal puts into circulation. However, this way of understanding oneself in relation to the texts transcends disciplinary boundaries. It is not the disciplinary or thematic focus that creates an interpretative community around a journal; rather, it is a *shared interpretation of the world*, and this common agreement extends beyond the realm of sciences and reaches into the interests of the life-world. In fact, certain notions that structured a significant portion of the scientific-technological rationality driving the expansion of capitalism and the industrialization of sciences fueled a social process in which the sciences were just one piece within a more complex apparatus made up of the State and the industrial sector. In these contexts, where progress is tied to the domination over natural resources and the social world, this domination spills over into other spheres, giving rise to a truth value placed above other scientific rationalities. This truth value then transfers to the *narrative objects of sciences* that put this rationality into circulation. This process of expanding certain scientific rationalities does not occur by inertia; rather, it is driven by a *social environment* in which numerous actors form part of a social framework, choosing strategies, implementing technologies, and allocating resources based on certain interests.

Social environments of the sciences

As previously mentioned, it is not in the private realm of the manuscript where the agreements that sciences establish in their various conversations are shaped. The diverse traditions and theoretical schools of the sciences historically dialogue with one another and are established through the *narrative objects of sciences* circulating in the public sphere – texts that are edited and published and put into dialogue with an interpretive community through editorial devices such as books or scientific journals. As Cavallo and Chartier suggest:

> "Rejecting the notion that the text exists in itself, separate form any material manifestation (an idea elaborated by literature itself that the mor quantitively inclined history of the book have taken over) we should keep in mind that no text exists outside of the physical support that offers it for reading (or hearing) or outside of the circumstance in which it is read (or hearing) or outside of the

> circumstance in which it is read (or heard). Authors do not write books; they write texts that become written objects."[19]

However, making a text public is not synonymous with it entering into a conversation. The narrative object is not *per se* a communication device; instead, what makes it possible for a text to be drawn upon by an interpretive community and inserted into a tradition is the complex relational processes and actions of the network of actors that put that narrative object into circulation. These actions, carried out by those who constitute the various *social environments of the sciences*, have the potential to amplify or limit certain scientific rationalities, expand or restrict their geographic scope. Therefore, we understand that the rationalities framing the conversations of sciences in the narrative dimension should not be analytically isolated from the mediating actions that put these conversations into public circulation, as both feed into one other.

From this perspective, the *social environments of sciences* are formed through mediating actions, and these actions link various scientific rationalities with the interests of the social life-world, generating complex processes that pull towards a greater instrumentalization or humanization of sciences, regardless of the industrial or artisanal nature of their practices.

From this perspective, the development of the sciences is not exclusively connected to the development of the productive forces – as Boris Hessen suggested in the 1930s[26] – or technological development – as Henryk Grossmal affirmed in 1935[27] – or religion – as Robert Merton proposed in 1949 in a rereading of the works of Max Weber[28] – but rather we hold to the conception that the sciences are ontologically immersed in the social world.

It is here where macro-social actions related to political, technological, economic, cultural, and/or religious processes converge with a series of actions operating at the micro-social level – organizational forms, editorial knowledge, operational capacities for technical and technological appropriation, formal and informal channels of circulation, and so on. Both macro- and micro-social processes shape environments with the potential to expand or limit the circulation of certain conversations.

When these complex mediating processes are omitted from analysis across different disciplinary areas, the interests and strategies designed to widen the circulation of these

textual objects in the public sphere are overlooked, generating a certain notion of linearity between the formulation of an idea, its publication, and its circulation. This mechanism produces several conceptual effects: firstly, the idea that dominant conversations within sciences gain a broader reach based on their intrinsic weight and social recognition, rather than as a product of specific actions and strategies undertaken for that purpose; secondly, the idea that works with greater circulation or that have survived to the present represent the entire universe of interpretations of an era, hiding the existence of other possible interpretations that had more limited circulation or were intentionally destroyed.

In the case of Latin America, the Aztec codices, the sacred books of the Toltecs and Mayans, the "libraries" of the Incan Temple of the Sun, and ancient writings from Guatemala, Honduras, and Nicaragua have mostly disappeared. The same fate befell the great libraries built by the Jesuits throughout the Americas: "Books from California to Chile ended up confiscated or forgotten or left to rot, burned or stolen, sent back to Europe, or sold as wrapping paper."[23] By analytically obfuscating the mediating processes, a scenario based on institutionalized thought is established, with a cancelling effect on expressions that do not align with the hegemonic scientific perspective or that were expressly destroyed.

This mechanism of obfuscating in analytical terms these mediating practices, when translated into the realm action, can lead certain editorial teams to believe that their work in a scientific journal ends with the publication of a manuscript, ignoring and underestimating the importance of actions related to the appropriation of that text. This inaction impedes the circulation of certain texts, preventing their entry into a conversation. When this analytical annulment is transferred to the realm of action, a "rationalization of the conditions life" occurs,[12] in which technical rationality extends to ways of understanding social actions, undermining the political potential of action.

According to Habermas, what technical rationality actually does "it removes the total social framework of interests in which strategies are chosen, technologies applied, and systems established,"[12] and these decisions crystallize as technical domination over the social realm. This rationalization of life involves "the institutionalization of a form of domination whose political character becomes unrecognizable,"[12] and by nullifying not only the political reason of scientific practice but also the critical analysis of those

practices, technical rationality itself becomes the rationality of social action linked to the sciences.

Therefore, placing at the forefront the complex mediating processes that drive or limit a text's access to the public sphere and expand its circulation implies rethinking certain established notions and restoring the "social fabric of interests" of which Habermas speaks, not from the perspective of individual action but from the perspective of action proposed by Ricœur:

> "An action is a social phenomenon not only because it is done by several agents in such a way that the role of each of them cannot be distinguished from the role of others [...]. An action leaves a 'trace,' it makes its 'mark' when it contributes to the emergence of such patterns, which become the *documents* of human action."[5] (italics in original)

Macro-social actions

We understand *macro-social actions* as those *traces*, in Ricœur's terms,[5] that manifest as national policies or decisions made by individuals within institutional frameworks with the capacity to influence the development, expansion, and consolidation of certain conversations of the sciences in the narrative dimension.

In *The Social Function of Science*, John Bernal[29] describes the social environment of sciences in late 19th-century United Kingdom, highlighting that independent and individual scientific practice, so crucial in previous eras, had nearly disappeared, giving way to a type of scientific research driven by "three different administrative spheres"[29]: universities, the Government services, and industry. Scientific societies, responsible for managing scientific journals and putting them into circulation, often coordinated projects funded by the State and, to a lesser extent, by other organizations. According to Bernal,[29] these three spheres (university, State, and industry) did not operate independently. The areas of universities involved in scientific research increasingly depended on subsidies from the State and industrial sector. In fact, a significant proportion of those engaged in scientific research at universities were funded by the State or by industry, and many of those leading the scientific work funded by industry and the State held university positions. State-funded research was also closely tied to industry. In the UK, an example of this connection could be seen in research related to coal, especially the production of

liquid fuels from coal. Although the British State financed the research into the method of coal hydrogenation, the production of gasoline using this method and its commercialization were handed over to the British company Imperial Chemical Industries, which was even exempted from paying the taxes that constituted a significant portion of its selling price.[29]

This interdependence of the "three administrative spheres" described by Bernal is the same process that, according to Habermas, occurred in industrialized countries starting in the second half of the 19th century and that began to produce “a growing interdependence of research and technology, which has turned the sciences into the leading productive force."[12] This process demanded an interaction between the State and the sciences, requiring a "*translation of practical questions* into problems posed scientifically and the *retroactive translation of scientific information* into solutions to practical questions.”[12] (italics in original).

To understand the different dynamics of social environments, one might ask: What macro-social actions contribute to the consolidation and amplification of certain scientific conversations in the narrative dimension? What kind of dynamics exist among the "three administrative spheres" proposed by Bernal? What other agents and institutions are part of these macro-social actions?

Micro-social actions

The conversations that come into play in the narrative dimension are driven or relegated not only by the action or inaction operating at the macro-social level but also by the action or inaction of the network of actors that transform a manuscript inscribed in the private sphere into a *narrative object* that circulates in the public sphere – a text that is edited, published and printed in a communicative device that has the ability to engage in dialogue with an interpretive community.

We approach both levels of action not as operating hierarchically but rather as mutually reinforcing, intersecting and overlapping.[30] As Robert Darnton explains when analyzing the multiple influences on each phase of the circuit of the communication of books, just as "authors, publishers, printers, booksellers, librarians, and readers constantly modified their behavior in response to the pressure of the State, the Church, the economy, and different social groups," texts also bore "the marks of patronage, censorship, enmities.”[31]

Furthermore, when texts appeared in print, they assumed not only "the form given to them by the craftsmen who set the type, laid out the format, and turned the press bars"[31] but also the meaning provided by the editors as they assembled the text with a materiality, specific format, type of paper, and illustrations.

However, if we recognize that "a text exists only because a reader gives it meaning,"[19] the act of making a text public is not synonymous with its entry into a conversation. Subsequent inaction can hinder communication and prevent that text from being integrated by an interpretive community and included in a tradition.

From this perspective, we are interested in reconstructing those *traces* or *marks* left by actions understood, in Ricœur's terms,[5] as social phenomena that either expand or limit the circulation of the narrative objects of the sciences and enter into dialogue with the interpretive community that each journal brings together. Situating oneself in these mediating actions involves a shift from a "unilinear conception of diffusion,"[31] which used to focus on authorship, to a notion of the text as an object in motion and circulation that acquires meanings and significance through reader communities. This change includes many other actors, thus dethroning “the author from his or her role as sole creator.”[18]

Unlike the editorial structure of books, which according to Roger Chartier, was managed by bookseller-publishers between the 16th and 18th centuries and primarily focused on the commercial exchange of books,[13] scientific journals have historically held a different editorial structure, overseen by a "scientist-editor" accompanied by a broad group of contributors not involved in the commercial side but engaged in the study of various scientific disciplines. This particularity gave rise to practices that responded to the specific needs of scientific communities, for example, the dialogic nature of scientific narratives that demands an awareness of developments in other countries and regions around the world. In this way the "exchange" system came to be, in which one publishing institution would send its journal to another institution and the latter would send its journal in return. Analyzing the "exchange" system of the Royal Swedish Academy of Sciences in the early 19th century, Jenny Beckman[32] highlights how the roles of producers and consumers, publishers, and repositories of scientific knowledge overlapped in this context of publication exchanges.

In this sense, one of the particularities of scientific journals is that those responsible for managing, editing, and circulating them are part of the scientific community itself. That is, there is an "overlapping" of roles, as Beckman mentions, so those who write, publish, tend to the materiality of the textual object, put it into circulation, and engage in dialogue with these texts are all active participants in the same conversation.

Historically, members of scientific communities themselves have assumed these roles. When Descartes traveled to Leiden in the spring of 1636, he stayed there for a year, supervising the engraving plates illustrating *Discourse on the Method*.(33) We understand this interest in the graphic and visual materiality of the statement as part of a communicative action that considers those who will later appropriate these texts and illustrations. This relational conception of the text was already present in scientific journals starting in the 17th century. In his work examining the German journal *Acta Eruditorum*, Hubertus Laeven mentions that the precise reproduction of mathematical articles filled with formulas and symbols, which often had to accompanied by figures and models engraved in copper, was a constant source of tension between German philosopher and mathematician Otto Mencke, the editor of the journal from 1682 to 1707, and the different printers. For Mencke, "the perfect reproduction of the calculations and the avoidance of a single typographical error were absolutely essential, while as far as the printers were concerned, it was well nigh impossible to meet such high standards."(34)

These practices unique to a community of peers led to a certain isolation of the sciences from broader culture. Those who published, edited, or read these narrative objects started forming a new collective identity that proposed a more agile and interactive communicative device than books, less perishable than formats that existed before the emergence of journals in the 17th century (such as flyers or printed sheets), and featuring a more consensus-based and stable narrative than personal correspondence. However, in order to enter a conversation, scientific journals demand actions from those who make up the social environment. These actions have the potential to either broaden or censor dialogue, to expand or limit its geographical reach. Therefore, we must undertake the analytical effort to integrate these scientific conversations in the narrative dimension with the social environment in which they are inscribed. In this regard, the following questions arise: How are editorial bodies structured, and what are their practices? How does their interest in the material quality of the narrative object manifest itself? What actions both formal (institutionalized) and informal (personal trajectories) promote the expansion of

circulation? What kind of actions do editorial bodies undertake to form an interpretive community around a journal?

CLOSING THOUGHTS

This text set out to explore certain theoretical categories that would allow us to move beyond the materiality of the editorial apparatus and capture the relational characteristics of scientific journals, understood as narrative objects of the sciences. As we have attempted to demonstrate, scientific journals articulate the scientific rationality present in the narrative dimension and the interests of the social environments that put them into circulation. From this perspective, disciplinary and thematic frameworks do not suffice to explain this articulation, because what binds an interpretive community around a scientific journal is a shared way of interpreting the world scientifically, which in turn is linked to certain interests and values shared in the primary life-world.

This way of understanding the connection between interpretive communities and the interests of the primary life-world reveals the link between the sciences and society to be much deeper: it is not that external forces subject the sciences to practices that exceed their interests, nor that scientific communities that autonomously impose their worldview. It is precisely the pre-scientific agreement regarding ways of understanding and engaging with the world that brings different social actors around more industrial or more artisanal scientific practices, from humanized, interrogative, or instrumental perspectives. It is this pre-scientific agreement regarding ways of understanding and engaging with the world that brings interpretive communities together around a scientific journal.

As mentioned, we owe to ourselves the analytical effort of integrating these conversations that the sciences engage with in the narrative dimension with the interests of the social environment in which they are embedded. The numerous conversations that come into play in the narrative dimension are driven or relegated by action or inaction at the macro-social level and by the action or inaction of the network of actors operating at the micro-social level, transforming a manuscript inscribed in the private sphere into a *narrative object* that has the potential to circulate in the public sphere and become part of a conversation.

Reconstructing the social fabric of interests in which strategies are chosen and technologies are used to legitimize or delegitimize certain scientific conversations in the

narrative dimension requires temporarily setting aside technical rationality as a way of understanding social actions, in order to reclaim political reason and reconstitute the political potential of action for a critical analysis of these practices. Centering the complex processes of mediation that drive or limit a text's access to the public sphere and its circulation implies revisiting certain established notions and reinstating the "social framework of interests" of which Habermas speaks,[12] not from the perspective of individual action, but from the perspective of action as a social phenomenon.

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Conflict of interest

The author of this article declare that they have no ties or commitments that might condition what is expressed in the text and that could be understood as a conflict of interest.

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