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DYNAMISM IN THE 20TH-CENTURY WORLDVIEW AND LINGUSTIC SCIENCE

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Abstract

This paper deals with a number of scientific theories, belonging to the fields of both natural and human sciences. However, they are only a pretext for us to illustrate our central concern: the notion of *worldview*, a concept that has to do with a certain understanding of reality and, consequently, with the way in which it needs approaching. Our aim is to show that natural and human sciences have a common ground as they share a similar way of picturing reality. For this purpose, we will refer to two ideas that were greatly emphasized and proved extremely fruitful in modern science. First, we will mention some 19th-century chemists whose work drew people's attention on relationships, which, in turn, triggered a structural understanding of reality and inspired the 20th-century movement in humanities known as structuralism. The second great idea, which emerged in 20th-century natural science, has to do with the dynamic understanding of reality. This view, too, triggered a "process" approach in humanities, which we will illustrate with some of E. Coseriu's linguistic theories on the nature of language. Both ideas had significant and powerful cultural effects, which proves beyond doubt that natural sciences and humanities are by no means separate fields in the history of culture.

Keywords: *worldview; language change; natural science; structuralism; system; linguistics; philosophy of science.*

The task of any scientific endeavour is to come up with an objective and accurate account of a specific segment of reality. However, this intended accuracy has become quite a challenge in the (post)modern era, especially in humanities.

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The 20th-century natural sciences showed that reality itself is much more complex than it had been previously thought, so it is anything but easy to describe. Consequently, their models of reality become, gradually, but surely, inaccessible to non-scientists. A similar situation can be noticed with respect to human sciences in the early 20th century, as the new formalist and functional perspectives begin to emerge.

Furthermore, the understanding and interpretation of reality in humanities is very much shaped by the worldview that is generated by the latest theories and discoveries in contemporary natural sciences. This conception of physical reality significantly accounts for the way in which the world is imagined and approached by humanists.

The aim of this paper is to focus on the relationship between natural and cultural sciences as mediated through this worldview. Specific reference will be made to the theoretical framework that underlies scientific thought in the early 20th century–the structural worldview–and to one of the features of contemporary science–the dynamic understanding of reality–, a perspective that developed in natural sciences and also took hold in post-Saussurian linguistics. Coseriu is one of the language theoreticians who reactivates von Humboldt's conception of language as a creative *process*, an interpretation which opposes the traditional "language as a *product*" approach.

While reading this paper, one may get the impression that it is about various episodes in the history of natural sciences and, thus, that it is moving away from the field of humanities. It is true that several references will be made to phenomena such as gravity, energy, and fields, which are central concerns of disciplines that aim at studying and explaining various parts of physical reality. However, this is not what our main focus will be. We will primarily be interested in the notion of *worldview*, which is in some way a bridge between natural and cultural spheres.

Antipositivist theoreticians and science philosophers in the first decades of the 20th century distinguished between two types of scientific disciplines: natural sciences and human or cultural sciences (Coseriu, "Antipositivism" 49). They claimed that the "realities" that these scientific disciplines study are fundamentally different in nature and, consequently, require equally different approaches. Thus, natural phenomena, since they belong to a realm of necessity, should be approached from a causalist perspective, that is, their researcher is

supposed to identify their causes. Cultural objects, on the other hand, are creations which belong to man's sphere of freedom, so they are not the result of some easily identifiable causes, like natural phenomena. Their creation is directed to specific purposes, so they should be studied from a teleological perspective.

The starting point of this discussion has to do with the notion of *worldview*. Although it has been used for more than 100 years, this concept does not have a standard definition. Yet, it basically refers to a system of beliefs by means of which people try to make sense of their world, i.e., a way of understanding reality, with all its components and the way in which they work together (De Witt 7).

It is important to understand that this picture of the world does not remain the same throughout history. Reality is not fixed, as we might be tempted to think;[1] on the contrary, it is a flexible concept: it never stays the same from one historical period to another. What we call reality is actually an intellectual construction, a representation of the outside world, which may be greatly influenced by the historical and cultural context. If we study the history of natural sciences, we realise that this is true: there are elements in our surrounding world which are described and interpreted differently by different scientists in different historical periods.

An illustrative example in this respect is related to gravity and the various ways in which it has been theorised so far in the history of physics. Maybe the most famous definition of this phenomenon was elaborated by Isaac Newton in the 17th century (the so-called law of universal gravitation). According to the English scientist, gravity is a universal force of attraction which is exerted between any two bodies in the universe. Thus, (any) two bodies in the universe are attracted to each other by a force which is directly proportional to the product of their masses and inversely proportional to the squared distance between their centres (Goldman, "Copernicus" 195).

In the 20th century, Einstein came up with a new understanding of the same phenomenon. According to him, gravity is not to be thought of as a universal force, as Newton thought three centuries earlier, but as the curvature

[1] We might think that since reality is one and the same for all of us, its representation is also identical for everybody.

of spacetime itself. Einstein theorised that massive objects naturally curve the spacetime around them (Hey and Walters 188). A closer look at Einsteinian worldview reveals another way of understanding space and time, which, too, is fundamentally different from the older conception. In the previous centuries, these two dimensions of reality were considered separate and absolute:

> Newton defined space and time as absolute realities independent of one another. Space is an infinite three-dimensional Euclidean geometric container, as it were, for material bodies, everywhere the same, with no physical properties of its own, exerting no influences on matter and unaffected by the matter in it. Space would exist and be exactly the same even if there were no material bodies at all in the universe. Time, too, is defined to be uniform, a metaphysical 'clock' ticking away at the same rate always and everywhere, independent of matter and of anything happening in time. (Goldman, "Copernicus" 192-193).

Einstein revolutionised the previous picture of the universe by combining them into one notion: spacetime. This is nothing but the three-dimentional Euclidian space that we know, to which a fourth dimension is added: time

So, interpretation is not only applicable to cultural creations within the fields of the humanities, as we might expect; elements of the physical world, too, can be theorised, defined, and interpreted in various ways.

This example also illustrates something else, which is significant to our topic: it also tells us something about what natural sciences do. We normally think of them as human activities which aim at describing and explaining our surrounding physical world. But this is not all they do. By providing us with certain descriptions and interpretations of reality, they also generate a certain way of looking at the world, that is, they reveal certain interpretation patterns that are applied to reality. And it is these patterns that are then also imposed on human sciences in the sense that cultural creations also start being theorised by means of those specific patterns.

The basic point that needs stressing here is that science does not only describe and explain the physical world; it also generates ideas about reality, ideas that give structure to reality and thus configure a certain design of our surrounding world; it is these ideas that are then applied to cultural sciences.

This is how natural and human sciences connect and this is why they sometimes share common approaches.

A brief historical context is necessary for these issues to be understood properly. Up to the 19th century, Western scientific thought had been dominated by materialistic determinism and atomism. The former idea refers to a philosophic view according to which matter is the ultimate reality, so all physical phenomena are theorised and explained in terms of material interactions (Goldman, "Copernicus" 347). Atomism, on the other hand, has to do with a way of understanding reality which is based on the idea that any real object is made up of minimal components[2], i.e., "atoms".

19th-century science challenged materialist determinism and the traditional way of looking at the world. Scientists made some shocking discoveries which proved that there is much more to reality than meets the eye.[3] New elements of reality were discovered: energy and fields (Einstein 48), but they are fundamentally different from everything science had ever recorded until then. What distinguishes them is that they are immaterial, yet they are real. Their "reality" is proved by the fact that they have concrete manifestations: they can exert forces and produce physical interactions. Thus, if they can act as causes for other perceivable phenomena, they have to be attributed to physical reality. It is also worth noting that energy is different from matter in the sense that it is not a "thing". We conceptualise it more around the idea of dynamism.[4]

Another component of reality revealed by 19th-century scientists that had tremendous implications for 20th-century intellectual thought is centered on relationships (Goldman, "Copernicus" 541). We are normally used to thinking of them as something abstract, but natural science showed that their existence goes beyond the boundaries of our minds. The physical importance of relationships was proved by 19th-century chemists.

Up to the 19th century, it had been accepted that the properties of a molecule are due to its component atoms. But chemists have discovered that these properties also depend on how their atoms are physically arranged. The theory of isomers convincingly shows that different substances described by the

[2] Even light was approached in this manner by Newton.

[3] This is also shown by 20th-century science.

[4] This may be related to the "process" approach which is visible in 20th-century science.

same chemical formula (isomers) have indeed different properties. The molecules of these substances are made up of the same number of atoms of the same kind, but what differentiates them is the structural organisation of these atoms. So, relationships are indeed physically relevant, an idea which revolutionised how people thought about the world. This is why the idea of structure as a component of our world, which opposes the traditional identification of reality with "thinghood", had such a great impact on the sphere of 20th-century humanities. Here, the focus on structure and relationships found its greatest expression in structuralism, a philosophical movement, which is commonly believed to have its origins in de Saussure's *Course in General Linguistics*. Although many things can be said about this book, we will only refer here to two basic ideas which are relevant for the topic of this paper.

Saussure insisted, first of all, on the systematic nature of language. According to him, language is not just a list of words, as some people might think. Its essential feature is the interdependence of its units:

> Language is a system that has its own arrangement. (22) Again, the more complex and rigorously organized a system of values is, the more it is necessary, because of its very complexity, to study it according to both co-ordinates. No other system embodies this feature to the same extent as language. Nowhere else do we find such precise values at stake and such a great number and diversity of terms, all so rigidly interdependent. (81)

This leads to an interesting way of thinking of these "atoms" of language. What matters here is not the linguistic units themselves, but their relational and oppositive nature. The identity of a language unit does not depend on its intrinsic properties, but on what differentiates it from other units. Its identity rests on its distinctiveness[5].

So, what we have here is very different from how things were looked at in the past: the specificity of an object does not rest on some internal property; it emerges from the relationships connecting that object to its containing whole.

This focus on relationships was also applied by the representatives of the Linguistic School in Prague in their approaches to the phonic side of language.

[5] To understand how revolutionary this perspective really is, one should compare it to how Aristotle understood reality. According to the Stagirite, objects behave the way they do on account of their internal essential nature, not because of the way in which they are related to other entities.

Their creation, Phonology (or functional phonetics), is usually defined as that branch of phonetics that deals with the way in which sound units are systematically organised. Organisation refers here to the relationships (of opposition) which are established between and among various phonemes (Clark 4, 404). Furthermore, according to phonological approaches, phonemes are theorised as oppositive units. /*p*/, for instance, matters because it opposes /*b*/.

However, Saussure was not the only linguist interested in relational issues. On the contrary, this focus on relationships was shared and even developed by other language theoreticians as well. It is to be noted that post-Saussurian linguists' concerns were not limited to the relationships within the linguistic system, but rather switched to the study of relationships between language use and various extralinguistic elements. They were no longer limited to the study of the Saussurian *langue*, but primarily focused on *parole*. Sociolinguistics, for instance, studies the way in which various social factors influence how language is used, while pragmatics is an attempt to relate language use to various elements that have to do with the communicative context where the speech act takes place.

Furthermore, the Saussurian interest in language mechanism is extended in the following decades to the study of the way in which the human mind works especially in terms of the acquisition of language. Chomsky's theories of LAD (language acquisition device) and generative grammar are significant in this respect.

But stress on relationships was not the only feature of 20th-century science and worldview. They were also characterised by dynamism (Goldman, "Copernicus" 541). Just like the idea of structure, dynamism, too, has its roots in the discoveries of natural sciences.

During the 20th century, the picture of the universe changed dramatically in the sense that the way in which people imagined the universe in the 1900s was completely different from what they came to think of it in the 2000s, not only in terms of scale.

In 1453, Copernicus overturned the Aristotelian geocentric view by arguing that the sun was the centre of the universe and was orbited by the Earth (Goldman, "Science Wars" 29) and other planets known at the time. In the second half of the 19th century, astronomers extended the scale of the universe from a

few light years up to the entire galaxy. Thus, in the early 1900s, the universe was considered the Milky Way, which was thought to be the only existing galaxy.

In the 1920s, Edwin Hubble, using the famous telescope at the Mount Wilson Observatory, argued that what had been previously considered mere nebulae within the Milky Way were actually other galaxies. Within the next few years, those "other galaxies" increased their number and became millions of other galaxies. What happened was that, due to Hubble's discovery, the Universe underwent a tremendous expansion in people's minds. Furthermore, based on the Doppler effect noticed in the light emitted by other galaxies, astronomers concluded that they were moving away. This led Hubble to publicly announce in 1929 that the universe was expanding (Goldman, "Science Wars" 176).

This is one of the most dramatic changes that affected the humans' worldview in the 20th century. Before Hubble, scientists believed that the universe was static and unchanging. 20th-century scientists proved otherwise: Hubble's discoveries led to a whole new picture of the universe: the picture of a dynamic environment, which changed over time.

A similar shift also occurred with respect to the way in which people thought of the Earth and was brought about by the discoveries made by geologists. In the 1900s, Earth was seen as characterised by stability: geologists believed that the continents and the oceans were where they had always been. However, the theory of continental drifts and then the theory of plate tectonics induced a dynamic view of the Blue Planet (Goldman, "Copernicus" 448 and 536).

The change of the pictures of the universe and planet Earth have induced the idea of dynamism so that our contemporary worldview is dominated by a dynamic interpretation pattern. One of the cultural fields in which this pattern is detectible is contemporary linguistics. We will very briefly refer here to the Coseriu's linguistic theory, which, in our opinion, illustrates very well the influence of this dynamic worldview.

In his linguistic theory, Coseriu rejects the Saussurian static understanding of language, i.e., the "language as a product" view[6], and reactivates von Humboldt's vision of language as *énergeia* (Humboldt 12), that is, as a creative activity. According to Coseriu, language is to be understood as a

[6] According to Saussure, "no society, in fact, knows or has ever known language other than **as a product inherited** from preceding generations, and one to be accepted as such" (Saussure 71).

dynamic reality. Its very nature is dominated by the idea of change and it should not be theorised otherwise.

Coseriu's conception of language emerges from his theory of linguistic change, which can also be seen as a critique of Saussure's ideas. The Swiss linguist argued that the linguistic system was naturally stable and time had a destructive effect on linguistic signs,[7] so linguistic change was understood as a process of decay, i.e., as a negative phenomenon which can have a potentially destabilising effect on the system: "Time changes all things; there is no reason why language should escape this universal law." (Saussure 77)

Coseriu rejects this view and claims that linguistic change is not a "problem" and it is not a destructive phenomenon either. According to him, it is actually the process by which language reconstructs and renews itself. This is a continuous process by means of which language is always synchronised to its speakers' communicative and expressive needs in order to be able to continue fulfilling its basic function. This is the only way in which language can continue functioning. So, linguistic change, far from being a negative phenomenon, belongs to the very nature of language, which, Coseriu argues, should always be approached dynamically.

It is interesting and relevant to our topic to look at Coseriu's language view in more detail. Thus, while Saussure distinguishes between language and speaking (*langue* and *parole*) and chooses to focus on the former and study its systematic character, Coseriu acknowledges the complexity of the linguistic phenomenon by including both elements in his theory. Furthermore, he turns the Saussurian dichotomy into a trichotomy by introducing a third concept: *norm* (Coseriu, "Synchrony" 47), by which he means the linguistic tradition of a certain linguistic community.

For Coseriu, the speaker's knowledge of language is of a technical nature: it is an ability to create speaking acts. Learning a language actually implies learning what to do with the available linguistic material. This material is used according to the existing linguistic traditions. When we communicate, the speaking acts that we create are not entirely new, i.e., they are usually not created from scratch, but they are elaborated according to both the system and the established traditional norm.

[7] Saussure believed that time alters linguistic signs as it alters everything else.

Coseriu insists on the historicity of speaking acts, which means that they occur based on certain traditions that correspond to certain historical contexts. Speaking acts do not simply externalize some meanings. Communicating with other people means much more: it requires people to share some common ground. In other words, the act of communication implies conveying some meanings by means of something that speakers have in common: they speak "as others do" ("Synchrony" 63). Communication is not only about information exchange, it is also about how that information is conveyed, the technical strategies that are used for elaborating our speaking acts. On the other hand, a listener is not just a passive receiver of the message; in addition to getting the interlocutor's information, (s)he also internalizes the way in which the speaker uses language and takes this as a model for his/ her future use.

According to Coseriu, what is commonly called language change has its origins in dialogues ("Synchrony" 71), where speakers may learn new models for their future speech acts. If these models are adopted by a significant number of speakers, a new tradition is established. This means that it is not language (as a system) that changes, it is the way in which it is used (the norm). Language is understood as a system of possibilities and speakers adopt and spread the new possibilities which they appreciate aesthetically and/ or because they serve their expressive necessities. These new possibilities become incorporated within a new linguistic tradition.

This is how Coseriu believes languages function. The crystallization of linguistic traditions is an ongoing process as speakers constantly renew their linguistic traditions with the aim of synchronizing them with their own expressive needs. Thus, far from being a negative process, language change is actually a constitutive process of language itself. This theory of language and linguistic activity accounts for the way in which the dynamic dimension of language is understood by Coseriu: language is in a constant process of renewing and re-making itself through speech acts. The fact that it changes is not a problem. On the contrary, it is a *sine qua non* condition for it to continue fulfilling its basic function: communication. And it is also a sign that a specific language is "alive". A language that stops changing can no longer serve its speakers' communicative needs, so it "dies".

So, our contemporary worldview is characterized by dynamism. The fact that this is noticeable in both natural and human sciences is not accidental. It

convincingly shows that the two types of sciences are not separated from each other after all. They belong to the same cultural realm and correspond to the same way of picturing reality. Thus, all sciences, whether natural or cultural, reflect the specificity of the cultural paradigm they belong to.

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