Some Antecedents of Leibniz's Principles

by

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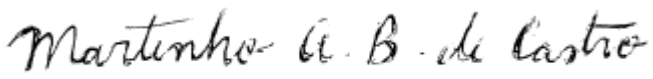
Declaration

I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis.

I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.



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Abstract

Leibniz considered that scepticism and confusion engendered by the disputes of different sects or schools of metaphysics were obstacles to the progress of knowledge in philosophy. His solution was to adopt an eclectic method with the aim of uncovering the truth hidden beneath the dispute of schools. Leibniz's project was, having in mind the eclectic method, to synthesise a union between old pre-modern philosophy, based on formal and final causes, and new modern philosophy which gave preference to efficient causes. The result of his efforts is summarised in the *Monadology*. But the question remains: to what degree was Leibniz successful in this enterprise? An objective of this thesis is to investigate whether philosophical tradition can justify or support some of the arguments that are at the basis of Leibniz's system (for example, monads have no window to the exterior world, a phrase that summarises the structure of *Monadology)*. I shall demonstrate how Leibniz reflects the concerns and the positions of his key predecessors. Thus, the aim of the thesis is to explore key antecedents to Leibniz's central doctrines. The thesis argues that Leibniz carried out a logical development of some principles in the eclectic system of Plotinus, which resulted in the structure of *Monadology*. Whether Leibniz's project was successful or not will depend on how we view those principles.

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Introduction

This thesis is concerned with the philosophical system of the German philosopher of the seventeenth century, Gottfried Wilhelm Leibniz. He was a person of encyclopaedic knowledge and his readings covered as much as was possible for one person; thus the span of influences on him is very broad and we can cite only some of them: Aristotle, Aquinas, Descartes, Augustine, Galileo, Kepler, Francis Bacon, Suarez, Hobbes, Spinoza, Gassendi, van Helmont, Malebranche and Lullus. This broad span of interest is perhaps due also to the philosophical method that he acquired by contact with some eclectic scholars like Johann C. Sturm.[1] In his book *Eclectic Philosophy*, Sturm presented as the goal and method of philosophy the idea that it was necessary to examine all significant intellectual traditions, and, by means of a proper critical analysis, to separate what was the genuine truth from what could only be considered merely the dogma of a sect. The fact, however, is that the search for synthesis or for a Perennial Philosophy that was beyond dispute was a task established well before Sturm. We can find this preoccupation in the Renaissance with Ficino and even before, for example, in the effort of the Neo-Platonists to merge the philosophies of Plato, Aristotle and the Stoics.[2]

Leibniz followed this tradition and considered that both scepticism and the confusion and disputes between the different sects of philosophy were obstacles to the progress of knowledge. His solution was the adoption of an eclectic method of uncovering the truth that was hidden beneath the dispute of schools: “It is not surprising therefore that throughout his life Leibniz studies a wide range of authors, that he is inclined to force comparisons between his own view and those of others thinkers, and that he often uses terms and philosophical jargon from odd collection of sources to express his own ideas.”[3] Mercer and Sleigh also point out the importance of two of Leibniz’s teachers: Jacob Thomasius of

[1]Mercer and Sleigh in JOLLEY, N., *The Cambridge Companion to Leibniz*, Cambridge, Cambridge University Press, 1995, p. 69. Leibniz was in contact with Sturm by correspondence but the Sturm’s book was published only in 1686.

[2] The search for a perennial philosophy by Ficino is discussed in KRISTELLER, P., *The Classic and Renaissance Thought*, Cambridge, Harvard University Press, 1955.

[3] Mercer and Sleigh in JOLLEY, p. 70.

Leipzig and Erhard Weigel of Jena. Those two teachers stressed to Leibniz that the philosophy of Aristotle was already a basis or foundation for this eclectic enterprise. After the removal of distortions added by Scholasticism, this philosophy could be made consistent with the new findings of modern mechanics.

But the science of Aristotle has as a central notion the concept of teleology, of final causes. It is an attempt to explain nature as penetrated by an effort to develop not yet existing forms. Any change or movement would be an expression of this trend, which was a kind of progress toward a goal. This notion was precisely the target of attack by the new science. The opposition to teleology was based on the fact that it seemed to close off the prospects for an explanation in terms of efficient causes, which was considered the true causal explanation. Moreover, teleology was also condemned for introducing an occult and non-observable factor, the entelechies or souls. Indeed, in the seventeenth century, modern thinkers started to consider Aristotelian science as a barrier to the progress of knowledge.

In this direction, the founders of the modern science, Galileo and Descartes, suggested that the instrument most adequate to investigate nature was mathematics. In this movement Descartes contributed to the exclusion of final causes by substituting the Aristotelian entities (the *entelechies*) for a more simple reality, subject to mathematical treatment, extension (the *res extensa*).[4] Cartesian reason, as applied in the *res extensa*, was founded in constant relations of mathematical language. It was, at least theoretically, reversible and consequently time had no place there.

This created, however, a clear dualism: on one side the world of the spatially extended, geometric bodies, *res extensa*, knowable entirely by mathematics, and on the other side, the realm of mind, without extension, *res cogitans*, whose essence is thought and whose activity was mainly mathematical deductive operations. Descartes seemed not to be very interested in *res cogitans*; and he never appealed to final causes to explain what happens in the realm of the mind.[5] The passivity of matter is a consequence of this Cartesian dualism. This led to the creation of the mechanist ontology: matter was considered perfectly inert and deprived of any sensibility or conscience; movement is no

[4] This discussion appears in Meditations 5 and 6. DESCARTES, R., *Meditation on first philosophy*, trans. J. Cottingham, New York, Cambridge University Press, 1986. It appears also in DESCARTES, R., *Principles of Philosophy*, trans. V. R. Miller and R. Miller, Dordrecht, Kluwer Academic Publishers, 1983, Part 1 section 53.

[5] BURTT, E. A., *As Bases Metafísicas da Ciência Moderna*, Brasília, Editora UnB, p. 95.

longer a symptom of inherent life, and is not guided by *telos* any more, but is a consequence only of external circumstances, basically the result of shocks or impacts.

Leibniz saw as his project the task of synthesising a union between the old pre-modern philosophy, based on formal and final causes, and the new philosophy which gave preference to efficient causes. In this regard this was consonant with his eclecticism. He valued the mechanistic mode of explanation, but he affirmed with emphasis that this method has its foundation in the proper final doctrine of the cause. Finally, Leibniz considered that the same reconciliation of the two methods would be of great advantage for the proper scientific and particular knowledge of things.

But the question remains as to what degree Leibniz was successful in this enterprise. The result of his effort is summarised in the *Monadology*. It is my objective to investigate whether the philosophical tradition can justify or support some of the arguments that are basic to the system of Leibniz (for example, that the monads have no window to the exterior word, a phrase that summarises the structure of *Monadology*).

In following this historical enquiry I have also been led by some consideration of the Italian philosopher Rodolfo Mondolfo. As a member of the historicist school, Mondolfo stressed that the constitution of any reality can be found and reveals itself in its process of formation. To defend this point, Mondolfo quoted the founder of the modern philosophy of history, G. Vico, who discussed in his work *Politics* the necessity of genetic study for the understanding of reality: “the nature of things is their birth” and “in any field … we would get a better intuition of reality, if we considered the things in their process of development and beginning with its first origin.”[6] These notions are basic to historicism, that is, the doctrine that reality is historical and consequently all knowledge is historical knowledge.

In this direction Mondolfo condemned as error all non-historical attitudes of philosophers, and insisted on the necessity of historical reconstruction as the foundation and previous condition for theoretical investigation. This kind of investigation will follow the development of the problem, its multiple aspects, the many possible solutions that were attempted in order to solve it and the consequences that these solutions produced. Mondolfo also recalled that an historical enquiry was not only valuable to show the discoveries and

[6] MONDOLFO, R. *Problemas e Métodos Investigação na História da Filosofia*. São Paulo, Editora Mestre Jou, 1969, p. 35.

truths expressed by the antecessors but also for the recognition of their mistakes, and even the process that led to these mistakes, because these are also useful ways to knowledge. Furthermore, in retracing the tradition we can identify some of Leibniz's hidden assumptions. This is important because as Mercer and Sleigh stated: "Leibniz neither states his most fundamental assumptions nor explains how he arrived at his conclusions."[7]

Concerning the historical method, it is necessary to remember that Vico was a strong anti-Cartesian. In fact, there is a coincidence between Vico's anti-Cartesian views and Leibniz's criticisms of Descartes, Leibniz being a probable influence on Vico himself.[8] It was Leibniz who re-introduced the entelechies of Aristotle, which he called monads, as the ultimate foundation of reality. These entities retain the traces or memory of everything that happens to them. Therefore time is essential to this conception of ultimate reality. Thus the historical research method that we are using is itself related to a conception of reality, which is itself evolving.

[7] Mercer & Sleigh, in JOLLEY, p. 71.
[8] CABRAL , R .in *Logos, Enciclopedia Luso-Brasileira de Filosofia*, v.5, Editorial Verba, Lisboa, p.483.

Chapter I – Context of this Thesis and Rationale for the Philosophers Chosen

In the introduction I presented my reasons for choosing the historical method as my approach to Leibniz's philosophy. In this chapter I want to briefly outline the situation regarding recent historical studies on Leibniz, mainly among English-speaking scholars. I also present an explanation for my selection of the philosophers whom I examine as antecedents of Leibniz

At the beginning of the twentieth century, Bertrand Russell wrote one of the best studies about Leibniz, renewing the interest in that philosopher. But Russell initially considered the picture presented in the most famous work of Leibniz, the *Monadology*, as a "kind of fantastic story of fairies, coherent perhaps, but wholly arbitrary."[9] Wilson explains his reaction: "Why a theory which is so obviously false, which is probably the falsest theory in the history of philosophy, should be the basis of the fame of a great man was a question which Russell, at the beginning of this century, realised and demanded an answer."[10]

This riddle demanded an explanation but Russell rejected using the historical approach to solve it. In the preface to the first edition of his work, Russell explained that the process of development by means of which the philosopher reaches his opinion constitutes an important and interesting problem, but it is irrelevant in respect of the discovery of the degree to which his opinion is correct. The successive philosophies, he says, can be compared with few or no consideration regarding their meaning; the influences can be demonstrated without any comprehension of the system whose causal relations are under discussion. Russell concludes that the "philosophic truth or falsehood, in short, rather than historical facts are what demand our attention in the inquiry."[11]

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[9] RUSSELL, B., *A Critical Exposition of the Philosophy of Leibniz*, London, George Allen & Unwin Ltd, 1964, p xiii..

[10] WILSON, C., *Leibniz's Metaphysics: a Historical and Comparative Study*, Princeton N. J., Princeton University Press, 1989, p. 321.

[11] RUSSELL., p. xx.

After reading *Discours de Metaphysique* and the letters to Arnauld, Russell formulated an interpretation that regards logic as the core of his metaphysics, and consequently argued that Leibniz's theory of substance proceeds from his logic. Russell conceived that the entire system could be rigidly deduced from a few simple premises or axioms. Basically, the main premises are that every proposition has a subject (such a subject is called a substance) and a predicate, and that the predicate (the consequent) is in the subject (the antecedent). Couturat presented a view very similar to Russell's only one year later.[12] Consequently, the Russell–Couturat account gained strength and became very influential.

Against the Russell–Couturat position, two important historical studies of Leibniz have recently appeared in English: Catherine Wilson's *Leibniz Metaphysics- a historical and comparative study* (1989*)* and Christia Mercer's *Leibniz's Metaphysics – Its Origins and Developments* (2001).[13] Both philosophers considered the insufficiency of Russell's approach

In this respect Catherine Wilson's "governing assumption" is that the words of a philosopher so distant from us in time "cannot be determined by an internal inspection of his texts" because this method "leaves too much undecided".[14] The resolution of indeterminacies, insofar as it is possible, requires historical and comparative analysis. Wilson follows the evolution of Leibniz's metaphysics while considering how a wide range of great philosophers and minor figures contributed and influenced Leibniz's project.

For Mercer the Russell–Couturat interpretation "sheds virtually no light on the motivation behind Leibniz's metaphysics" and she insisted that we will not grasp the elaborate metaphysics of Leibniz without a "good deal of historical and textual work. In this direction, Mercer claimed to provide "the first systematic account of Leibniz's philosophical development". She emphasised the fundamental importance of theological considerations and his Platonism, and placed less importance on Leibniz's engagement with mechanistic philosophy. In part one of her work she stressed the eclectic method that Leibniz adopted from his teachers Jakob Thomasius and Johann Adam Scherzer. In part

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[12] COUTURAT, L. *La Logique de Leibniz: d'après des Documents Inédits*, Paris, Alcan, 1901.
[13]MERCER, C., *Leibniz's Metaphysic – Its Origins and Developments*, Cambridge, Cambridge University Press, 2001.
[14] WILSON p. 2.

two she discussed the “Metaphysics of Substance” of Aristotelian character, and in part 3 she stressed Leibniz’s Platonism. Precisely here she found further evidence for the eclectic methodology ascribed to Leibniz in part one, since this system “handsomely combines”, in her view “Platonist assumptions about unity and diversity [...] with Aristotelian assumptions about causal self-sufficiency”[15]

The stress on Leibniz’s Platonism also appears in Wilson. But in her view, Leibniz appears as a Neo-Platonist. Plotinus, she said, is his “closest philosophical relative”: the two share the fineness of analysis and “a vision of the hidden and multiple perfections of the world.”[16] But it is clear that the Neo-Platonism was not a monolithic building itself. In this sense Leibniz considered that modern Neo-Platonists like Cudworth had distorted the original Platonism. Thus it was valuable to see, in the fifth chapter of Wilson’s book, reference to Leibniz's debate regarding the plastic natures of the Platonists of Cambridge, Cudworth and More.[17]

From what I have already said in the introduction to this thesis it should be clear that I share with Wilson and Mercer the emphasis on the need for an historical perspective, and I consider that this was the great shortcoming of Russell’s work on Leibniz. That work seems to suggest that Leibniz’s theories developed simply out of his own mind and that he was not trying to solve problems proposed by the philosophical tradition. For as Wilson said, “what a philosopher means to say can only be grasped in the light of the choices actually open to him, and these are defined by his relation to past and present authors”[18]

However I did not see the need for a careful study of the development of Leibniz’s ideas in his own lifetime since this work has already been done very well by Mercer and Wilson. My focus was rather on the comparison with great schools, concerning the relation of the doctrine of One and its relation with the problem of vitalism. I agree with Wilson’s contention that Plotinus is his “closest philosophical relative” But I differ from Mercer, because I make a clear distinction between Plotinus and Plato. This distinction is essential in my objective of investigating whether the philosophical tradition can justify or support some of the arguments that are basic to Leibniz’s system of (for example, that the monads

[15] MERCER, p. 378.
[16] WILSON, p. 4.
[17] WILSON p. 160.
[18] WILSON, p. 2.

have no window to the exterior word, a phrase that summarises the structure of the *Monadology*).

In writing a philosophical monograph it is a common practice to choose a specific problem of a certain philosopher and then proceed to analyse it. In this particular work I could not follow this strategy too closely and narrow the focus of attention to a single problem because my problem was how to exactly understand how Leibniz built the eclectic structure of his system; how he joined parts and ideas that he took from other philosophers and schools. This task, by its own nature, leads to the problems which come from anti-specialisation, because the objective here is to show how Leibniz managed to harmonise the parts in a whole. However, due to Leibniz's encyclopaedic erudition, I obviously could not cover all his background and influences, and even those that I do consider could not be treated exhaustively. For my objective it was not necessary to cover the entire span of influences that we can find in the work of Leibniz.

My guiding idea was to make a selection of what is most relevant and necessary to reveal the structure of his system. Thus, I discuss only the key concepts at the basis of his system and, to achieve this objective, the strategy was to review some of the key influences on Leibniz in such a way that the key steps of the construction of the *Monadology* could be revealed.

In addition, because my interest is mainly the doctrine of the One and its relation to the vitalism of the *Monadology*, other parts of his philosophy, for instance, the theories about the Universal Characteristic or the details of his physics will not be treated, although I am fully aware that Leibniz considered everything linked in a system.

My focus was solely the main figures of the Neo-Platonist tradition and, for this reason, I found it necessary to include the two first chapters to expose the foundations of this tradition. For this reason I have not included a detailed discussion of Descartes, who was an important influence on Leibniz, nor Spinoza or even Bruno, even though I do refer to them when their work is relevant to the issues under discussion.

The philosopher I regard as the single most important influence on Leibniz was Plotinus, and for this reason the chapter dedicated to him is the most important. Thus, I have devoted the third chapter to Plotinus who, in my view, expressed a system that is most similar to the *Monadology*. Leibniz's final system, which was exposed in a summary form

of that short treatise, has as its main structuring doctrine the Neo-Platonic notion of "All in All", an adage which can mean that each part of the universe represents the whole or that each part is a micro-cosmos that reproduces the totality of the cosmos in a contracted way. This doctrine is not prominent in the writings of Aristotle. However, for the Neo-Platonists, it was the coherent solution for the problem of One–Many; it was presented more explicitly by Plato in the *Timaeus* and supported by the discussion in the *Parmenides* dialogue. Accordingly, it is perhaps in Neo-Platonism, more precisely in Plotinus, that we will find the eclectic system beneath Leibniz's philosophical system.

The first two chapters are necessary then for an understanding of both Plotinus and Leibniz. The first chapter deals with a discussion of the precise meaning of unity, a process that originated with the Pythagoreans. The Neo-Platonists were said to be very interested in the Pythagoreans' doctrines, and the *Timaeus* is said to be a Pythagorean work of Plato. The discussion that Parmenides and the atomists achieved in the Pre-Socratic period regarding the conceptualisation of the One is also important. In this chapter I mention the figure of Melissus who clearly understood the paradoxical character of the notion of unity.

In the second chapter I will deal with the philosophy of Aristotle, an important source of the theory of substance and the pan-vitalism of Leibniz, that is, the notion that the last constituents of reality are units endowed with life and perception. In this part of this chapter I used Merlan's interpretation of some aspects of the notion of substance. My choice of Merlan's interpretation rests in the fact that he posits the notions of Aristotle as a crucial contribution to the Neo-Platonist doctrine. The importance of Aristotle is also found in Leibniz's use of the logic of predicates and his stress on the principle of contradiction. The interest in Merlan's interpretation of Aristotle is not that it is superior to others, indeed, I do not think that it is. However, what is striking in his reading is the way that Aristotle is read in a manner that suited the later developments of his views by the Neo-Platonists, who were as much Neo-Aristotelians as Neo-Platonists. This reading of Aristotle is the one from which we see the characteristic doctrines of the Neo-Platonists as developing naturally and, moreover, leading further to the doctrines we see in Leibniz himself.

But the philosophy of Aristotle is not totally consistent with Leibniz's system of and some aspects are in opposition to it. Somehow, some aspects of Aristotle are compatible

with the theories derived from Neo-Platonism that were in direct opposition to the philosophical choices made by Leibniz.

Thus, in the fourth chapter I discuss a movement that departs from the ideas of Leibniz, with some Neo-Platonic ideas, Proclus, which leads to the theories of Platonists of Cambridge (which includes Clarke), who are in direct opposition to Leibniz.

In the fifth chapter, I discuss the tradition of philosophical studies in optics which probably provided Leibniz with his famous metaphor that monads are mirrors of the universe. This tradition is also in debt to Aristotle and Proclus and consequently here again we have a problem of consistency with Leibniz's project

The sixth chapter is a concluding chapter and compares Leibniz with the Renaissance Neo-Platonist Nicholas of Cusa. Why the choice of Cusa here and not any other figure of that period, for example, Ficino? Cusa is important in this work because he consistently derived consequences from the Neo-Platonic central doctrine of All-in-All that Leibniz avoided. In some sense Cusa re-stated the notion that was already asserted by Melissus in ancient times, that the concept of unity is necessarily paradoxical, otherwise we fall again into a certain dualism. Thus, if we want to explain the ultimate unified reality, which implies going beyond dualities, it is necessary to accept the doctrine of the coincidence of opposites. The doctrine presented in *Learned Ignorance* is essential, I consider, to a proper analysis of the *Monadology* of Leibniz. The work of Cusa, properly corrected by Bruno, is also important for understanding the path that leads to Spinoza.

The aim of the thesis, then, is to explore the key antecedents to Leibniz's central doctrines and to show that some unresolved tension in that tradition resulted in the structure of Leibniz's system.

Chapter II – Pythagoreans and Leibniz

The problem that we intend to address in this chapter is the question of the definition of the philosophical concept of unity. Unity is the most central concept in Leibniz. In fact, one of his central terms, "monad," or unity, possibly has its origin in the Pythagorean sect. I want to present here a short summary of the views the Pythagoreans had about unity and the subsequent discussion on the nature of the discrete and the continuous made by the Eleatics and the Atomists. The Pythagoreans developed theories about the origin of objective unity which are not only mathematical but also biological and cosmological at the same time; thus the discussion of unity has consequences for these other fields. I argue in this chapter that it was from this discussion that the Neo-Pythagorean concept of unity appeared and it is different in important ways from the original Pythagorean notion. It is this Neo-Pythagorean concept of unity that is the basis of Leibniz's idea of monad.

A second question that is treated in this chapter, which is closely connected with the first objective, is the problem of how to connect a mathematical vision of reality with a vitalist understanding of nature (which historically was exemplified by the philosophy of Aristotle). Leibniz tried to theorise a deep connection of these two approaches. In this his inspiration may have come from Pythagorean tradition. This task was facilitated by the fact that Aristotle also made a profound study of the Pythagoreans and he is one of our main sources of information about the Pythagoreans. Leibniz, in his own praise of the Pythagoreans states their concern both with the science of the soul (life) and mathematics:

> I have the highest opinion of Pythagoras, and I almost believe that he was superior to all other ancient philosophers, since he founded not only mathematics, but also the science of incorporeal, having discovered that famous doctrine, worthy of a whole hecatomb, that all souls are eternal.[19]

[19] ROSS, G. M. "Leibniz and Renaissance Neoplatonism", In WOOLHOUSE, R. S. (ed.) Gottfried Wilhelm Leibniz – Critical Assessment, London, Routledge, vol. IV, p. 500.

His high praise for the Pythagorean doctrines emphasises aspects we will explore below.

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To ascertain whether Leibniz was faithful to the Pythagoreans, we need to review some of their basic theories. This review is also important because the Pythagoreans are at the root of the entire Western Philosophy. To do this it is necessary first to recognise that the information we have is fragmentary.

It is well known that Pythagoras did not leave any written work or even fragments of a work. The teaching in the Pythagorean sect was carried out orally and the members were required to remain silent and to respect the secrecy of the doctrines. As a consequence, all that we know today about these doctrines is very conjectural, and many misunderstandings that have occurred in ancient Greece and also today can be, in part, attributed to this demand for secrecy. Thus it is rather difficult to give a coherent description of the Pythagorean cosmology and we have more than one version of the explanation of unity. Besides Plato, our main early sources are the expositions in the works of Aristotle (who was unsympathetic to their claims) and a few fragments of the pre-Socratic Pythagorean, Philolaus.

It seems also that the Pythagorean cosmology has some resemblance to the Milesian. It was Anaximander who first said that everything and all the worlds arise from an eternal substance which he called infinity or *apeiron* (Unlimited). This substance was supposed to be the source of eternal motion, because it was alive and immortal. It was this motion that separated the pair of opposite powers (Light and Night) whose later interaction produced the creation of worlds.

We can relate the thesis of Pythagoras also to that of the other Milesian, Anaximenes, who called this primary substance air (*pneuma*). Like Anaximander he considered this substance not only divine and in eternal motion but also one and unlimited. But the air was also the *psyche* or the “breath of life”, both of humans and of the universe as a whole, as we can see by one of few fragments that has been passed down to us: “just as our soul, being air, holds us together, so do breath and air surround the whole universe.”[20]

[20] FREEMAN K., *Ancilla to The Pre-Socratic Philosophers*, Oxford, Basil Blackwell, 1948, p. 19.

From this short account of the Milesian view we can observe some relationship to the Pythagorean cosmology. Thus we know that for the Pythagoreans the world is a divine and living creature, with the form of a sphere, which grows breathing in the air from the infinite or Unlimited which surrounds it. The visible universe also inhales time and the void of the Unlimited. There is also evidence that the Pythagoreans considered the cosmos as formed of the five elements, as stated by Philolaus: "The bodies (physical elements) of the cosmic Sphere are five: the Fire in the Sphere, and the Water, and the Earth, and Air, and fifth, the vehicle (hull) of the Sphere."[21]

In fact, in the Pythagorean picture of the universe, the air of Anaximenes and the *apeiron* of Anaximander can be translated as the fifth element or *aither*. This is the surrounding pre-cosmic substance, which will form the cosmic egg (the hull of the sphere) from which the other elements were hatched and produced by different proportions. In ancient thought the fifth element is also compared with mind (whose eternal motion is a circular movement) and also with time (*Aion* or eternity), and even space. We have a variety of expressions to refer to this same substance, which is what makes Guthrie's comparison pertinent:

> This 'surrounding' was of pure and higher nature, everlasting, alive, and intelligent – in fact divine, this description applies to the *aperiron* of Anaximander, the air of Anaximenes and Diogenes of Apollonia, perhaps also to the logos-fire of Heraclitus. The Pythagoreans held that the cosmos 'breathed in' from an infinite breath outside it, and there are grounds for thinking that the dogmatic basis for Orphic or similar religious systems was the same.[22]

In some interpretations of the Pythagorean cosmology we will find the source of unity and order of the created cosmos in the element of fire, the first element generated by

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[21] FREEMAN, K., p. 75. Aetius, based on Theophrastus, explains this matter better. He ascribes to Pythagoras the idea that the element earth was made from a cube; the element fire from a pyramid, the air from octahedron; the water from the icosahedrons and from the dodecahedron is made the container for the other four, and this is equated as the sphere of the whole. In the *Timaeus* of Plato we find the idea of the equivalence of the elements with the solids and that the fifth is equivalent to the universe as a whole. GUTHRIE, W. K. C. *A History of Greek Philosophy*, vol. 1, Cambridge, Cambridge University Press, 1983, p. 267.

[22] GUTHRIE, p. 272.

the progenitor fifth element. Guthrie stresses the centrality of this first element and the formal aspect that it assumes in relation to the material aspect, which turns out to be the fifth element. The masculine and formative element presents itself as a fire-unit (the origin of the term focus) that develops itself as a seed in the womb of a receptive substance. Therefore the universe as a living being grows from a seed and from the centre outwards:

> … for the Pythagoreans the centre was occupied by fire. The unit-seed, then, physically considered, was of the nature of fire, and we can see what lay behind the brief doxographic statement in Aëtius that 'Pythagoras derived the world from fire and fifth element.' The active or formative element was the fiery unit; the living material on which it fed was identified with air or breath, but was in fact that substance embracing or cradling the world in which most of the Pre-Socratics believed, and which later cosmologists distinguished as a separated fifth element.[23]

But Burnet said that Pythagoras identified the Limit with fire (and the Boundless with darkness).[24] In fact, the Limit (*to peras*) with the Unlimited (*to apeiron*) formed the two contrasting principles of reality that we find in the fifth-century B.C. Pythagorean, Philolaus: "Nature in the cosmos was fitted together from the Unlimited and the Limit, the order of all as well as everything in it."[25]According to the previous quotation from Guthrie, the central seed of cosmos was made of fire. However, Burnet tells us that Limit is identified with fire. From the above we notice the following equivalence: the principles of limit were identified with the formal unit (or the seed) and the Unlimited with the material *aither*. Thus we have two theories: Philolaus' pair of opposites: Limited and Unlimited and a theory of derivation of a unit from the Unlimited, a process that implies that they are of the same kind.

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[23] GUTHRIE, p. 281.
[24] BURNET, *Early Greek Philosophy,* London, Adam Charles Black, 1971, p. 109.
[25] "All existing things must necessarily be either Limiting, or Non-Limited, or both Limiting and Non-Limited. But they could not be merely Non-Limited (nor merely Limited). Since however it is plain that they are neither wholly from the Limiting nor wholly from the Non-Limited, clearly then the universe and its contents were fitted together from both the Limiting and the Non-Limited." FREEMAN, K., p. 73.

Guthrie referred in another way to the existence of these two schools of Pythagoreans:

> … it is not to be doubted that for all Pythagoreans alike the unit stood for what is limited in opposition to the infinite or undefined (*apeiron*). The only difference between the two schools is that whereas one of them identified it with the active principle of limit itself, the other saw it as the first product of that principle imposing itself on the undifferentiated mass of *apeiron* …[26]

The first part of Guthrie's account of is more properly a dualist theory and it is probably the origin of the account of number that appears in Aristotle. This account is based on the table of opposites, and puts the unit on the side of the principle of Limit only (it is not a product of the two principles). Aristotle presented two columns that show the two principles and their respective manifestations on different levels of reality (*Met.* 986a22)[27]:

Limit	Unlimited
odd	even
one	plurality
right	left
male	female
resting	moving
straight	curved
light	darkness
good	bad
square	oblong

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[26] GUTHRIE, p. 247.
[27] ARISTOTLE, *Metaphysica*, ed. Ross, Oxford, Clarendon Press, 1966 (I present the two columns as they appear in Guthrie).

This account seems to be equivalent to Euclid's definition of number, wherein the unit was not properly a number but rather the source or origin of numbers.[28] The unity is what sets limits to the unlimited to create different numbers. Thus, a number is only a multitude limited by the unity. This seems to be what Sextus meant when, explaining the Pythagorean doctrine, he said: "all numbers fall under the One, since 2 is a *single* 2 and 3 is *one* particular thing, and 10 is a *single* compendium of number."[29] Basically, Sextus presented the idea of numbers as a category in which, by participation in the one, the many are said to be one – which is the same as saying that the one limits the many.

But the dialectical interplay of the opposites, Limit and Unlimited, goes beyond the creation of the number series. The Pythagoreans held that cosmology runs parallel to the birth of mathematical concepts. Both begin in the unit-seed. The following passage of Guthrie describes this arithmo-bio-cosmogony:

> The cosmic nucleus starts from the unit-seed, which generates mathematically the number-series and physically the distinct forms of matter.
>
> To do this it feeds on the Unlimited outside and imposes forms or limit on it. Physically speaking this Unlimited is unformed matter, imaged as breath or air; mathematically it is extension not yet delimited by number or figure.[30]

In this sense also, Cornford confirmed that Pythagoreans incorporated older biological terms in their mathematical language. Thus they had χροία (skin) for surface, δύναμις (power) for square, αὔξ·η (growth) for dimension, σῶμα (body) for solid:

These terms are applied to numbers as well as to figures. They were taken from living things and fit with the Pythagorean conception of the unit as the 'seed (σπέρμα) or eternal roots (ῥίζα) from which ratios grow or increase (αὔξονται) reciprocally on either side'.

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[28] *Euclid's Elements*, Book VII, Def. 1 and 2, T. L. Heath (translator), Dover, 1956.
[29] Quoted in CORNFORD, F. M., *Plato and Parmenides*, London, Routledge & Kegan Paul, 1958, p. 16 – the source of the quotation is *adv. phys.* Ii, 255–262.
[30] GUTHRIE, p. 340.

The unit contains potentially (δυνάεμει) all the forms of even and odd number, 'as being a sort of fountain (πηγή) or root (ῥίζη) of both kinds.'[31]

The difficulty in this whole conception is the idea of the unity-seed considered as Limit. The Limit, regarded as the unit, can account for the appearance of multiplicity. But how can it explain the appearance of the first unity? The one considered only as limit or formal source of unity of numbers cannot be itself that on which the limit is imposed, that is, the material cause of the number one. Thus two is a number because it has a unity imposed in its two elements, but what is it that imposes the limit to create each of its forming unities? The word "limit" implies something to be limited. If the one is non-dimensional, it cannot be split like a seed, because it is not composed of multiplicity, which it is supposed to generate. Thus the idea of limit regarded as a seed seems to be wrong and this is the basis of the objection of Aristotle: "Does number come then, from its elements as from seed? But nothing can be excreted from what is indivisible" (*Met.* 1092 a30). The idea of a unit regarded as an indivisible principle which imposes a limit on the Unlimited does not enter into this kind of objection, for the limit here means the indivisible formal cause of a certain number. Aristotle may be right in saying that the indivisible point cannot generate multiplicity in the way a seed does. But it is doubtful that it was this notion that this school of Pythagoreans proposed. The growing of the number series was due to the participation of the Unlimited in the process, which should account for the use of the biological metaphor.

The idea of Limit considered as *telos* can provide a better understanding of this biological conception. The Pythagoreans saw that the whole process of the generation of the number series was not strictly mathematical and this conception legitimates the equivalence in the table presented by Aristotle. Thus in this table both the one and the Limit are made equivalent with the good. Presumably the Pythagoreans supported the idea that the good is in the end (in the *telos*) when the work of the harmonising principle is completed (limited). Accordingly, the point is stressed by Aristotle (*Met*. 1072b30): "The Pythagoreans suppose that the supreme beauty and goodness are not present in the beginning: for although the beginning of the plants and animals are causes, beauty and

[31] CORNFORD, R. M. *Plato's Cosmology*, London, Routledge & Kegan Paul, 1956, note on p. 50.

perfection are rather in the outcome." The idea is also found in the *Philebus*, considered to be one of the Pythagorean dialogues of Plato: anything without *telos* was considered incomplete or unlimited.[32]

So in the Pythagorean generation of numbers we expect to find an equivalence of *telos*. In fact, the Pythagorean cosmos grows from a seed or egg and develops as an embryo, and so we can expect that it will develop until the animal cosmic is complete.

In the dualist version of the Pythagorean cosmology the egg is born of the marriage of two principles. Thus the Pythagorean Philolaus says that the Dyad (Unlimited) is the bride of Kronos.[33] In fact, in the Pythagorean conception, as we saw, the Unlimited is essential for the process of generation. The basic idea is that the forms of nature and the Universe as a whole are generated as the numbers were. To be generated means to admit a flux or a movement, and this was on the side of the Unlimited in the table of opposites. Some authors present the etymological analysis that shows that the word *arithmós* is related to the term from which it originates: *rythmós,* rhythm.[34] Unfortunately this analysis is controversial. But it is certain that the term *rythmós* (measured motion, measure, proportion[35]) derives from the verb *rhein*, which means to flow (*rhein* in its turn comes from *Rhea*, the goddess of fertility or generation).[36] Because of these attributes *Rhea* was also considered the goddess of life. In this sense, Aristotle (*Phys.* 203 b 18), reviewing old concepts of Unlimited, argues that "if becoming and perishing are not to fail, that which comes to be must be drawn from an unlimited store."

Thus it is plausible that the word "number" was, in some sense, apt to acquire the meaning of flow, passage or transformation. It is plausible also because in the cosmological scheme, the Unlimited was not only an extension considered as unformed matter but also the matter of time (which is not the ordered time of the cosmos), although at this level we

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[32] PLATO, *Philebus,* trans. J. C. B. Gosling, Oxford, Clarendon Press, 1975. The whole dialogue discusses the relationship between Limit (that accounts for *telos*) and Unlimited. In 16c he says: "and the ancients, who are superior to us and dwelt nearer to the Gods, have handed down a tradition that all things that are said to exist consist of One and Many and contain in themselves the connate principles of Limit and Unlimitedness."

[33] FREEMAN, p. 76.

[34] GHYKA, Matila, *The Geometry of Art and Life, New York,* Dover Publication, Inc., 1977.

[35] WEBSTER'S DICTIONARY, MA: G. & C. MERRIAM Co. 1913.

[36] HUFFMAN, C. A., *Philolaus of Croton,* Cambridge, Cambridge University Press. 1993, p. 351. For Huffman the etymological connection between *Rhea* and flow was made by Xenocrates who was reworking Pythagorean ideas and so it has origin in the Academy. Also Plutarch says: "and Zaratas the teacher of Pythagoras called this (sc. the indefinite dyad) the mother of the number and the One its father." Quoted in GUTHRIE, W. K. C., *A History of Greek Philosophy,* p. 253.

are to suppose no differentiation between space and time. Thus the equivalences are: Number = matter (of time) = unlimited = moving.

Only if the Limit is coupled with the Unlimited can we have the generation of a complete form, a body. *Rhea* must marry with *Kronos*, the representation of One, to produce reality. In other versions the metaphor of marriage is replaced by that of breathing. The first unit-seed proceeds to generate, by breathing in the Unlimited, the mathematical objects, following two stages: first the generation of numbers and then the generation of geometrical solids. In both cases we are heading toward a limit or *telos* because the whole process was conceived as a growing toward a completion. The paradigmatic *telos* necessary for any geometrical form was conceived as contained in the first four numbers: the point, the line, the surface, and the solid are represented respectively as "limited" by the numbers 1, 2, 3 and 4 – and they are generated in the same order (the idea is also associated with the four elements – fire is to earth as 1 is to 4).[37] The model is the biological growth of a seed as it appears in Theon's interpretation of the *tetractys*, where we still have the idea of the unit-seed: "The sixth *tetractys* is of things that grow (…): the seed is analogous to the unit and point, growth in length to 2 and the line; growth in breadth to 3 and the surface; growth in thickness to 4 and the solid."[38] When it reaches 4 the process reaches the complete form, or the body, that is, the process reaches its final *telos*. [39]

With time the Pythagorean conception was refined. In an improved version the dimensions are created by the stretching or fluxion of the line which begins in a non dimensional point. This theory was developed later in the fluxion theory (which says that a line is a fluxion of a point, etc.) a view which arises more or less at the time of Plato. The basic idea is that the point is the beginning of dimension, but not itself a dimension. It is the movement (an attribute of the Unlimited) or the fluxion which really creates a dimension. The following passage from the Neo-Pythagorean Nichomachus of Gerasa reflects this:

> Unity, then, occupying the place and the character of a point, will be the beginning of intervals and of numbers, but not itself an interval or a number,

[37] RAVEN J. E., *Pythagoreans and Eleatics* , Cambridge University Press, 1948, p. 15.
[38] CORNFORD, *Parmenides. and Plato*., p. 19.
[39] The Pythagoreans regarded the geometric point as equivalent to the arithmetical unit. The only difference is that the point is a "unit having position." BURNET, J., *Greek Philosophy,* New York, Macmillan, 1968, p. 66.

> just as the point is the beginning of a line, or an interval, but is not itself line or interval. Indeed, when a point is added to a point, it makes no increase, for when a non-dimensional thing is added to another non-dimensional thing, it will not thereby have dimension … Unity, therefore, is non-dimensional and elementary, and dimension first is found and seen in 2, then in 3, then in 4, and in succession in the following numbers, for dimensional is that which is conceived of as between two limits. The first dimension is called 'line', for 'line' is that which is extended in one direction. Two dimensions are called 'surface', etc.[40]

This explanation partially removes the objection of Aristotle: it is not the non-dimensionality of the point that creates the dimension but the movement of it. But the puzzle remains: we have the dimension limited but never the point itself. The dimension, interval or line, can be limited infinitely, but it will always be a dimension or something of multiplicity. Was this the meaning of the Pythagorean myth, that the Limit was associated with the Unlimited or that it was begotten by it?

This leads us to the other version of the Pythagorean unity which also faces Aristotle's objection. We find it in a fragment of Philolaus referred to by Stobeus**:** "The first thing fitted together, the one in the middle of the sphere, is called hearth."[41] The *one* or hearth is regarded as the first combination of the two principles, the Unlimited and Limited, or, to express it another way, the *one* is the first product of the imposition of Limit on the Unlimited. Stobeus is a late writer, but this version is also found in Aristotle. Referring to the two principles, he wrote:

> There need be no doubt whether the Pythagoreans attribute generation to them or not; for they say plainly that when the one had been constructed, whether out of planes or surface or of a seed or of elements which they cannot express, immediately the nearest part of the unlimited began to be constrained and limited by the limit. (*Met.* 1091a13–22).

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[40] Quoted in GUTHRIE, p. 261.
[41] HUFFMANN, C. A., *Philolaus of Croton*, p. 62.

Further evidence for the fact that the Pythagoreans proposed this kind of unity is the method of Eurytus, the disciple of Philolaus, in which pebbles (*calculi*) were arranged in a certain form to imitate a figure of a man or a horse, or anything else.[42] In these passages we have the suggestion of a conception that unities necessarily have magnitude, they contain something of the Unlimited, which is of the nature of space. The pebbles or seeds, even the tiny ones, are constructed out of planes. In this sense, Burnet recalled that Zeller insisted that in the Pythagorean cosmology the numbers were spatial.[43]

Now the role attributed to the Unlimited was conceived also as introducing intervals of void in the unity as a way to create multiplicity, as the process of breathing continues. Aristotle explained this aspect:

> The Pythagoreans also asserted the existence of the Void, and that there comes into the Heaven, from unlimited breath which keeps things distinct, the Void regarded as a sort of separation or division between things that are next to one another; and this occurs first in numbers, for the Void keeps their natures distinct. (*Phys*. 213b, 22).

Thus the two is created from the unit-seed when this is split by the void inhaling from the Unlimited. This explanation seems crude, but the idea of growth can be applied here too: the one splits in two because of its growth, like the multiplication of cells in a seed. The unity here can be separated in two, since it is of the nature of unlimited. Mathematically and physically the extended magnitudes or units are separated by the void, which is not an absolute nothing that would make the unities touch each other. Rather, this relative void was thought to have some kind of tenuous corporeity known as air, *pneuma or* breath. With this concept in mind, Aristotle considered that the Pythagoreans regarded all things as numbers (*Met.* 1083b16). Aristotle claims that this is an incorrect idea, since mathematics for him deals only with eternal objects.

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[42] This theory is mentioned in *Met.* 1092B10.
[43] BURNET, *Early Greek Philosophy,* Adam & Charles Black, London, 1930, p. 291.

Aristotle managed to identify the difficulty of their theory. The core of the confusion of formal cause with the material cause, which allows them to say that all things are composed of numbers, lies in the notion that number had magnitude:

> the Pythagoreans also (sc. as well as Speusippus) recognise a single type of number, mathematical number, but not as existing apart from sensible things (sc. which was the view of the Platonists in general), which they regard as being composed of it. They in fact construct the whole universe out of numbers, not however truly monadic numbers, for they suppose the units possess magnitude (*Met*. 1080.16).

According to Aristotle, Plato followed the Pythagoreans in most things, but differed from the Pythagoreans in holding that the numbers are distinct from sensible things. However, the doctrine of Ideas is basically of Pythagorean origin, with the difference that the ideas or forms are placed in the intelligible realm. Aubenque refers to the fact that in Plato's non-written teachings, preserved in part by Aristotle, the two principles of One (Limit) and Dyad (Unlimited) engender the ideal numbers; and these in their turn engender the world of ideas or forms.[44]

To better understand the Aristotelian evaluation of the Pythagoreans' concept of unity, we need to recall the Eleatics' theory of One.

Eleatics

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Santillana, Cornford (whose views are based on Tannery), Burnet and Raven defended the same point of view, arguing that it was the usage of the principle of Unity along with the discourse of cosmogony that elicited criticism from Parmenides, who was Pythagorean before becoming a dissident. They said that the Pythagoreans were the main object of the Eleatics' attack . But the Eleatics' fragments are also vague and their ambiguity perplexed even the ancients. In fact, some Neo-Platonists saw Parmenides' theory of One as a complement of the Pythagorean cosmology. Syrianus, for example, regarded Parmenides as

[44] AUBENQUE, P., *Plotino e o Neoplatonismo*, In CHATELET, F., *História da Filosofia*, Rio de Janeiro, Zahar Editores, 1981, p. 202.

a very faithful Pythagorean (like Plato, Socrates and Empedocles).[45] But since it seems that Plato tried to refute Parmenides, we can suppose that the first hypothesis has stronger evidence.

If we follow the most traditional interpretation, we have a picture of Parmenides using the demonstrative technique that he learned from Pythagorean geometry to object that, if the principle of Unity was maintained as the ultimate principle, reason constrains us to abandon any kind of cosmogony. His criticism, as our historians maintain, was mainly directed at the Pythagorean conception of the opposites, the One and Many. Thus it was non-sense to conceive that the original One could be split or multiplied into two principles and then into many, thus creating a cosmos. For Parmenides, the logical consequences of the concept of Unity include the characteristics of timelessness, indivisibility and changelessness. These attributes exclude the possibility of any birth of the cosmos or any kind of development of unit-seeds into a multiplicity. If we take the One consistently, we have to deny everything else. Accordingly, it is implicit that in taking the One we also reject any kind of multiplicity. For Parmenides, this Unity is the Being (what it is). As it is in a kind of eternal now, it cannot come-into-being, from which we deduce the impossibility of cosmogonies. He said:

> … Being has no coming-into-being and no destruction, for it is the whole of limb, without motion, and without end. And never Was, nor Will Be, because it is now, a Whole altogether, One continuous; for what creation of it will look for? How, whence (could it have) sprung? Nor shall I allow you to speak of it as springing from Non-being; for neither is expressible nor thinkable that What-Is-Not.[46]

And this means that "for it is the same thing to think and to be." [47]

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[45] O'MEARA, Dominic, *Pythagoras Revived*, Oxford, Oxford University Press, 1990. Szabo also said that the Pythagoreans did not contest Parmenides' theory of One, but they tried to "develop it further." SZABO, A., *The Beginnings of Greek Mathematics*, Boston, Reidel, 1978, p. 263.
[46] FREEMAN, p. 43.
[47] FREEMAN, p. 43.The expression "whole of limb" may mean "it is wholly perfect".

The fullness of the Being is stressed: “Nor is the Being divisible, since it is all alike. Nor is there anything (here or) there which could prevent it from holding together, nor any lesser thing, but all is full of Being. Therefore it is altogether continuous.”[48]

For many interpreters this point means that the continuous is of the mind’s nature itself, and cannot be perceived as a sensible object. In fact, it contradicts all of our sensible experience, and for this reason it should be considered without validity and delusional. Thus, despite his logical structure, Parmenides’ poem suggests a mystical inspiration and his vision of the One suggests this divine approach: a perfect and complete entity which has the most perfect geometrical shape, the sphere.

In Parmenides’ fragments the rejection of the idea that a general principle of unity could generate a multiplicity is presupposed, but he does not discuss the theory of monads or numbers. It was only implicit in his defense of the absolute unity of the One (with its associated notion of continuity) that the existence of any discrete entity was impossible.

It was Zeno, one of his disciples, who specifically attacked the theory that things consist of a plurality of units. Simplicius preserved a commentary of Alexander of Aphrodisias on this passage, which gives some force to the thesis of Burnet, Raven and Cornford about the relationship between the Eleatics and the Pythagoreans: “As Eudemos relates, Zeno the disciple of Parmenides tried to show that it was impossible that things could be many, seeing that there was no unit in things, whereas many means a number of units.”[49]

Zeno tried to expose the pitfalls that appear when we regard the unit, point and atom as extended entities for forming things. He showed that we are meant to deal with the question of the infinite divisibility of geometrical magnitudes – the question of the continuous. The theory that regarded things as equated with many discrete units spatially extended was logically incompatible with the truly continuous, which is presupposed by the consistent notion of unity as proposed by Parmenides. If we suppose that things are composed of units with some magnitude, other consequences follow. In the second part of fragment 3, Zeno wrote: “If things are many, they will be infinite in number; for there will always be other things between, and others again between these. And so things are infinite

[48] FREEMAN, p. 43.
[49] BURNET, *Early Greek Philosophy,* London, Adam Charles Black, 1971, p. 315.

in number."[50] So if we say that the units that compose things have some magnitude, even a minimum magnitude, everything will have infinite size. Even the task of finding elementary units will be an impossible task. So we can try to divide a line of some length and we find two lines of smaller length, and so on until the infinite. We will never find the original unit or point. Aristotle enunciated the consequence of this reasoning: "For if it (the all) is divisible at every point there is no one, and therefore no many, and the whole is empty."[51]

The proponents of the existence of multiple unities cannot face these difficulties by hypothetically proposing the alternative of non-extended unity-point-atoms, since other paradoxes will appear. If, for instance, the proposal is the existence of the unit without magnitude (and so it is indivisible), Zeno points out the consequences: "If it (a unit without magnitude) is added to another existing thing, it would not make the latter at all larger. For if a thing without magnitude is added (to another thing) the latter cannot gain anything in magnitude. And thus (it follows) at once that the thing added is nothing."[52] The same is true with reference to subtraction. Basically the arguments of Zeno defend the idea that continuity cannot be analysed in or composed of discrete dimensionless unities.

On the other hand, Aristotle rejected Parmenides' theory of One for many reasons. But he seems to have shared, in some sense, the Eleatics' view that the combination of opposites would generate contradiction. As Cornford said: "It was, in fact, Parmenides quite as much as Zeno, that had assumed all opposites to be not only contrary but contradictory."[53] But he seems to have followed Zeno's arguments against Pythagorean unity. He also considered the notion that numbers have contradictory magnitude, because unity by definition cannot have the multiplicity implicit in the concept of magnitude. If it has magnitude, it is infinitely divisible and cannot be composed of indivisibles (atomic). Therefore, the Pythagorean number is not an atomic (monadic) number, that is, it has no substantial unity.[54] In this respect Aristotle argued: "For it is not true to speak of indivisible spatial magnitudes; and however much there might be magnitudes of this sort, units at least

[50] FREEMAN, p. 47.
[51] BURNET, *Early Greek Philosophy*, p. 334 (ARISTOTLE, *De gen, corr.* A,8,324b35).
[52] FREEMAN, p. 47.
[53] CORNFORD, *Parmenides. and Plato.* p. 72.
[54] Guthrie said that the expression "monadic" means, according to his commentator, Alexander, unextended and incorporeal. GUTHRIE, p. 234.

have no magnitude; and how can a magnitude be composed of indivisibles?" (*Met.* 1083b10).

For Aristotle, both the Pythagoreans' versions of unity, the non-dimensional and the dimensional, are self-contradictory and are consequences of the failure to distinguish between the concepts of number and numbered objects.[55] He rejected the doctrine of substantiality of numbers and the consequence that numbers can be the cause of substantiality of individual objects or of forms. He also rejected, as we have seen, the idea that Pythagorean unity can be non-dimensional.

We can enumerate the main points of Aristotle on the Pythagorean unit. Points 1) and 2) concern points we have already seen; 3) and 4) are additional points.

1) The Pythagorean unit cannot be non-dimensional or atomic, because as such it cannot generate dimension. Besides, if it were atomic, the All would be not continuous but would be fragmented by these atomic unities.

2) It cannot be a dimensional unity, because in this case it can be divided infinitely and therefore there will be no ultimate unity or substantiality. "For if it is divisible at every point there is no one, and therefore no many, and the whole is empty."[56] In these two objections he was following arguments presented by Zeno. But the question still remains as to whether the Pythagoreans really proposed this kind of units.

3) In fact, Aristotle also understood that the Pythagoreans proposed to connect the unity (the Limit) and the infinite (the Unlimited) and posited them as substance. In *Met.* 987a13 he explained:

> But the Pythagoreans have said in the same way that there are two principles, but added this much, which is peculiar to them, that they thought that finitude and infinity were not attributes of certain things, e.g., of fire or earth or anything else of this kind, but that infinity itself and unity itself were the substance of the things of which they are predicated. This is why number was the substance of all things.

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[55] CHERNISS, Harold, *Aristotle's criticism of the Presocratic philosophy*, Octagon Books Inc., New York 1964, p. 43.

[56] BURNET, *Early Greek Philosophy*, p. 334 (ARISTOTLE, *De gen. corr* A, 8, 324b35).

Aristotle also rejected this version, because the opposites (in this case the Limit and the Unlimited) cannot be the first principles. This argument is the basis of his theory of Substance:

> All contraries then, are always predicable of a subject, and none can exist apart, but just as appearance suggests that there is nothing contrary to substance, argument confirms this. No contrary, then is the first principle of all things in the full sense. (*Met.* 1087b).

Furthermore, the unity cannot be both finite and infinite at the same time, because this violates the principle of contradiction which says that we cannot affirm contrary attributes of the same subject/substance at the same time.

4) In addition, Aristotle rejected the Pythagorean postulation that the infinite can be substance, a theory mentioned by him in the *Physics*, that is, that the Unlimited could be an *arche*.[57] He considered that in refuting the substantiality of number, the substantiality of infinity was also refuted, because for him the infinite was only an attribute of number.[58]

The fairness of Aristotle's evaluation of the Pythagoreans is regarded as questionable by most scholars who have studied this school of thought. He seems to have attacked the Pythagoreans only to present his own theory of substance.[59] But at least he did not condemn all the Pythagoreans' conceptions about number. Thus in one passage he complained that the Pythagoreans posit the infinite both as substance and as divisible into parts.[60] In another passage he made the same complaint against their use of the notion of infinite with other words: "All other thinkers who use it as matter, and for this reason too, it

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[57] ARISTOTLE, *Physics* 203a5: "The Pythagoreans and Plato posit the infinite as a thing by itself, not as an attribute existing in some other thing (for they do not posit number as existing apart from sensible things) and that the infinite exists also outside of the heaven …"

[58] CHERNISS, p. 38.

[59] For instance: "And again, by virtue of what, and when, will mathematical magnitudes be one? For things in our perceptible world are one in virtue of the soul, or of apart of soul, or of something else that it is reasonable enough; when these are not present, the thing is a plurality, and split up into parts. But in the case of subjects of mathematics, which are divisible and quantities, what is the cause of their being one and holding together?" *Met.* 1077A20.

[60] ARISTOTLE, *Phys.* 204A5.

is absurd that they should posit it as containing and not as being contained" (*Phys.* 208a). His intention seems to be to say that the Pythagoreans were right when they proposed that Unlimited is what leads to completion in the Limit. In another part of *Physics*, where he is not referring to the Pythagoreans, he seems to have been defending his position as they did:

> … the whole and the complete are either entirely the same or quite close in their nature. Nothing is complete which has no end, and end is a limit … For the infinite is the matter of the completeness of a magnitude and is potentially the whole and not actually, and it is distinguished as proceeding in the direction of both reduction and its inverse, which is addition; and as for its being a whole and finite, it is not so in itself but in virtue of something else. And *qua* infinite it does not contain but is contained; and because of this it is unknowable qua infinite, for matter has no form. So it is evident that the infinite is the formula of the part rather than in that of a whole (*Phys*. 207a15).[61]

Indeed it is also possible to see that both the Pythagoreans and Aristotle were concerned with immanent forms in nature. As we know, Aristotle placed the Platonic ideas, which he called forms, within a concrete reality.

In this section then I wanted to present the impact of the Eleatics on the formulation of the notion of unity. It also demonstrates that some arguments and even the form of reasoning used by the Eleatics to evaluate the idea of unity were very similar to those used later by Aristotle.

[61] The other passage in which the continuous is equated to matter is *Met.* 1036 b7 : "… some people already raise the question even in the case of the circle and the triangle, thinking that it is not right to define these by reference to lines and to the continuous, but that all these are to the circle or the triangle as flesh and bones are to man, and bronze or stone to statue; and they reduce all things to numbers, and they say the formula of 'line' is that of 'two'. And of those who assert the Ideas some make two the line-itself and others make it the Form of the line."

Melissus and the Atomists

This section discusses the third member of the School of Eleatics. His importance is due to his relationship with the School of Atomists. Melissus affirmed that the idea of unity necessarily implies that of infinity. In doing this he seemed to be reaffirming the Pythagorean pair of opposites, Limit and Unlimited. At the same time, he influenced the atomists. These philosophers, by proposing the infinity of atoms, exerted some influence on Leibniz.

Melissus helped the defence of Parmenides' theory by perfecting it. The theory of Parmenides tried to defend, at least, the logically absolute unity of the Being. But the theory was liable to destructive criticism since he claimed that reality is a limited sphere, and we could certainly object that the limited sphere presupposes the infinite void around it, which was almost the same as the Pythagorean view of a limited cosmos surrounded by the unlimited. So the reality was two and not one. It was with these objections in mind that the disciple Melissus came to defend the doctrine of the master Parmenides. Basically, Melissus shared the same ideas as his master but he introduces important modifications for the sake of the coherence of the whole doctrine. For Melissus, therefore, the One cannot be limited: it is infinite both spatially and temporally. The arguments he used are as follows: (frag. 5) "If it were not One, it will form a boundary in relation to something else." (frag. 6) "If it were infinite, it would be One; for if it were two (these) could not be (spatially) infinite, but each would have boundaries in relation to each other."[62] The infinity in time or eternity is also stressed along with its equivalence with completeness. Thus, for Melissus the idea of an Absolute One logically implies the idea of completeness or totality, since it is full and nothing can exist beyond it. The notion of the absolute One also logically implies the idea of the infinite: it is One because it is only one, so there is nothing else that can limit it, and as a consequence it is unlimited or infinite. Through the absolute One it becomes possible to link two ideas that are apparently incompatible: completeness and the infinite. These notions complement each other and there is no reason to suppose the priority of one aspect over the other. We cannot say that the One is prior to the Infinite. We seem to again be facing the same connection that the Pythagoreans faced when they tied the Limit to the

[62] FREEMAN, p. 48.

Unlimited on the same level. Aristotle also criticised Melissus, because he considered this notion self-contradictory: "his argument is rather crude and presents no problem, for something absurd is granted, the rest follows, and there is no difficulty in all this" (*Phys. 186a10*).

With regard to Melissus there is a further fragment, which Burnet called the most remarkable, number 8, the first sentence of which says: "If Things were many, They would have to be of the same kind as I say the One is."

This statement was not a proposal. But, according to Burnet, Melissus was able to see that it would be the only way possible to consistently maintain a theory of multiplicity. Leucippus took the statement as a suggestion and created the atomic theory. In fact, the atomists distinguished their atom from a geometric point. Consequently, they admitted the infinite divisibility of geometrical magnitudes but denied this kind of divisibility to matter. The atoms are not mathematically indivisible, but they are physically indivisible since there is no empty space in them. However, the resemblance between the Pythagoreans and atomists is clear, and Aristotle noticed it. The atoms are a transformation of Pythagorean monads which assume the characteristics of the One of Parmenides. But the One as a totality is maintained in the postulation of a plenum. Aristotle says: "For", (Leucippus) said, "that which is strictly speaking real is an absolute *plenum*; but the *plenum* is not one. On the contrary, there are an infinite number of them, and they are invisible owing to the smallness of their bulk. They move in the void (for there is a void); and by their coming together they effect coming into being; by their separation, passing away."[63] There is no inconsistency here, because Leucippus claimed that it was a mistake to assume that the void is a non-existence. In this aspect he also followed the Pythagoreans who do not distinguish the void from the air. In the part preceding this passage, Melissus is also mentioned by reason of his thesis that the real is infinite. Burnet stated that the writing of Zeno can be added to this, showing that all pluralist systems cannot resist the argument of infinite divisibility. Leucippus accepted Melissus' suggestion and also paid attention to Zeno's observation by setting a limit to the divisibility; thus he created the atoms.

[63] BURNET, *Early Greek Philosophy*, p. 335.

Another interesting consequence of the Eleatic Philosophy was its impact on the later Pythagorean and Platonic traditions.

Thus Plato, in his dialogue *Parmenides*, analysed Parmenides' claims about the One. This was an exercise of dialectic in which Plato intended to show the ambiguities of the "One" and also to show that Parmenides failed to distinguish its different meanings. Hypotheses I and II are two different theses about the One, and Parmenides confused them, as Cornford's comment indicates:

> But in fact he (Plato) distinguishes in Hypotheses I and II two different senses and keeps them apart. The consequences deduced in each case do actually follow, and they are of course different. It is true that Parmenides can be held responsible for both senses, because he had confused them. Some of the attributes he had deduced for his One Being follow from supposing it to be a bare Unity that is one in every sense and in no sense many; others from supposing it to be a One which is a whole of parts. Plato separates the two assumptions, and by adhering strictly to each in turn shows that they lead to opposite conclusions.[64]

Here I shall quote the first hypothesis or first meaning of the One and two of its consequences, that is, that it has no extension and that it is nowhere:

– 137c–d "If the One is defined as absolutely one, it is in no sense many or a whole of parts."

– 137d–138a "The One (being without parts) has no extension or shape."

– 138a–b "The One (being without parts or extension) is nowhere, neither in itself nor in another."

There is then the second hypothesis, enunciated by Plato in 142b–c: "If the One has being, it is One Entity, with both unity and being." This hypothesis implies a duality since One Entity has two parts or it is a subject of which one can assert two truths: that it has unity and that it has being. This is what allows him to say that "One Entity is a whole of

[64] CORNFORD, *Plato and Parmenides*, p. 110.

parts (142 c–d) for it is at same time one and many", meaning that One being is a whole and the "one" and "being" will be its parts.

In *Parmenides* 142d Plato explained: "Again, take each of these two parts of the One Being – its unity and its being: unity can never be lacking to the 'being', nor being to the part 'unity.' Thus each of the two parts, in its turn will possess both unity and being; any part consists of at least two parts, and so on for ever by the same reasoning. Whatever part we arrive at always possesses these two parts; for a 'one' always has being, and a being always has unity. Hence any part always proves to be two and never can be one. In this way, then, what is 'one Being' must be unlimited in multitude."

Now Cornford said that this reasoning, which seems fallacious, is valid against Parmenides, because he said that "what can be thought can be" and that his One–Being was conceived as a continuous magnitude with a spherical shape, and so it may be endlessly divided.[65]

The Eleatics intended to refute the Pythagorean derivation of numbers, a multiplicity of ones, from the One, which they also called Being. Plato, in his second hypothesis, showed that the existence of number can itself be derived from Parmenides' doctrine. In doing this, said Cornford, he is restoring, in a peculiar way, the Pythagorean evolution of numbers.[66] From this reasoning it was possible to derive the unlimited plurality of numbers, which is the same process that produces infinity of beings. Plato said, in *Parmenides* 144a:

> Now, if number is, there must be many things, and indeed an unlimited plurality of things, that are; for we must admit that number, unlimited in plurality, also proves to have being. And if all number has being, each part of number must have being also. Thus being is distributed throughout all the members of a plurality of beings, and is lacking to none of these beings from the smallest to the greatest; indeed it is nonsense to suggest that anything that is should lack being. Thus being is parceled out among beings of every possible order from smallest to greatest; it is subdivided to the furthest possible point and has an illimitable number of parts."

[65] CORNFORD, *Plato and Parmenides*, p. 139.
[66] CORNFORD, *Plato and Parmenides*, p. 138.

The wholeness of the One is preserved, but this whole is divisible: (144e) “Further, since its parts are parts of a whole, the One, in respect of its wholeness, will be limited. For the parts are contained by the whole; and a container must be a limit. Therefore, a ‘One which is’ is both one and many, whole and parts, limited as well as indefinitely numerous.” This is a restatement of the original Pythagorean dualist doctrine, with the difference that the infinite is now deduced from the unity. In this sense the procedure of Plato is similar to that of Melissus, both having their starting point in the One of Parmenides. In this direction Cornford says that the development of this second hypothesis is “a brilliant refutation of the Eleatic thesis that the One is, and yet a plurality of beings is irrational.”[67] The third hypothesis is, in some sense, a development from the second hypothesis. It implies also that the One co-exists with otherness: “One Entity (being in Time) comes into existence and ceases to exist, is combined and separated, becomes like and unlike, and it increases and diminishes” (155e–156b).[68]

Over the centuries there has been a long debate about the intentions of Plato in this dialogue. It is not altogether clear that he would endorse the Neo-Platonic interpretation of it. In this regard Cornford mentioned Taylor’s claim that the scheme of Plotinus is inconsistent with the theology of *Timaeus* and the *Laws.*[69]

So far we have two theories of the first principles of the Pythagoreans. The first is that everything begins with the Unlimited (the unit or monad comes after). The second is that the first principles include both the Unlimited and the Limited. Here also there is no statement of priority of unit or monad. In neither of these two accounts does the unit have priority. It was only after the Platonist discussion of Parmenides that the Neo-Pythagoreans adopted a monist form.[70] This discussion, together with the doctrine of substance developed

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[67] CORNFORD, *Plato and Parmenides*, p. 143.
[68] All these quotations of *Parmenides* are from Cornford’s book.
[69] CORNFORD, *Plato and Parmenides*, p. ix (the reference is TAYLOR, Mind N. S. No. 19, p. 326).
[70] In this sense John Rist wrote: “As long ago as 1928 Professor E. R. Dodds demonstrated the dependence of the One of Plotinus on the first hypothesis of the *Parmenides*. His demonstration has been universally accepted. But Dodds not only showed the dependence of Plotinus on the *Parmenides* but also offered an account of the doctrine of the One between the late fourth century B.C and the third century A. D. His view is that the first three hypotheses of the *Parmenides* were already treated in what we should call Neo-Platonic fashion by Moderatus, a Neo-Pythagorean of the second half of the first century A. D. Moderatus was not the originator of this interpretation whose origin can in fact be traced back through Eudorus and the Neo-Pythagoreans of his day to the old Academy.” RIST, J. “The Neo-Platonic One and Plato’s Parmenides.”

by Aristotle, created the foundation of the theory of transcendent unity that stands before all duality. This is clear despite the fact that some, like Numenius, still defended a dualist doctrine. Cornford mentions these monist Pythagoreans on the basis of the fragments of the work *Successions of Philosophers* of Alexander Polyshistor (first century B.C,) preserved by Diogenes Laertius, and also on statements by Eudorus. Alexander's first paragraph is: "The first principle of all things is the One. From the One came an Indefinite Two, as a matter for the One, which is the cause. From the One and the Indefinite Two came the numbers; and from numbers, points; from points lines; from the lines, plane figures; from plane figures, solid figures; from solid figures sensible bodies."[71] Eudorus, who was a middle Platonist, in his turn, asserted also that the Monad is the first principle of all things and the "supreme god"; the other opposing principles, the Limited and the Unlimited, are secondary or posterior to the first principle, the embracing Whole. The general view of these philosophers is adopted by the main Neo-Platonist, Plotinus.

Leibniz

Having traced some early history of the concept of unity, it remains to us to consider in what sense the Pythagoreans may be important for understanding Leibniz. Was Leibniz a follower of the original Pythagoreans as he claims? First it is necessary to point out that Leibniz, as one of the discoverers of calculus, is directly linked to the Pythagoreans. The intuitions that lead to calculus were already implicit in the Pythagorean doctrine. We saw that the basic idea of the Pythagoreans was that the numbers were born from the interaction of the Limited and the Unlimited. The Neo-Platonist Proclus enunciates this notion:

> The mathematicals are the offspring of the Limit and the Unlimited … This is why in this order of being there are ratios proceeding to infinity, but controlled by the principle of Limit. For number, beginning with the unit, is capable of infinite increase, yet any number you chose is finite; magnitudes likewise are divisible without end, yet the magnitudes distinguished from one another are all

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Transactions and proceedings of the American Philological Association, Vol. 93 (1962), p. 389. Dodds' work is "The Parmenides of Plato and the origin of the Neo-Platonic One", CQ 22 (1928)129–42.

[71] CORNFORD, *P. and P.*, p. 3.

> bounded, and the actual parts of a whole are limited. The division of quantities is pursued to the infinite, but everything that is divided is defined, and the fragments of a whole are determined in act.[72]

The proposition is that the Unlimited (infinite) is allowed to be conditioned by the Limit. Thus there is a progression towards the infinitely great or infinitely small (the infinitesimals). Plato seemed to be trying to improve the conception when he replaced the expression "Unlimited" by the Dyad of great and small. According to the testimony of Aristotle (*Phys*. 206b27), Plato posited two infinities, and his Dyad is the conception that introduces the possibility of surpassing all magnitudes and proceeding to infinity in the direction of both increase and of reduction. Now this idea of progress toward the immeasurably small (or tending to 0) is basically the idea of the infinitesimal. Equally important is the idea of limit contained in this notion, that is, that the terms of the infinite series converge to 0 as its limit. Infinity, zero and limit are the intuitive concepts that are the foundation of the modern calculus.

Thus it is not a surprise to find a historian of calculus, Boyer, saying that "we know from Plato's own writings that he was thinking out the solutions of the problems that lead directly to the discovery of the calculus."[73] In fact, one member of the Academy, Eudoxus of Cnido, developed the method of exhaustion or the "quadrature", which can be considered a kind of precursor of calculus.[74] We have seen in the table that the Pythagoreans regarded the curve as a form of the Unlimited and the line as a representation of the Limit. The successive interaction between these two geometric entities has the tendency to produce the increasingly small, the infinitesimals. Eudoxus' method of regarded the curve as a succession of infinitely short segments and used the accumulation (or integration) of these infinitely fine slices to calculate its area.

The calculus, which was elaborated by Leibniz and Newton, was the culmination of this effort to provide a better expression for these infinitesimals. Leibniz referred to them as

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[72] PROCLUS, *Commentary on the First Book of Euclid's Elements*, Princeton, Princeton University Press, 1970, p. 5

[73] BOYER, Carl B. *The History of the Calculus and its Conceptual Development*, New York, Dover, 1959, pp. 27–29.

[74] FINE, Henri, "Ratio, Proportion and measurement in the Elements of Euclid", *The Annals of Mathematics*, 2nd Ser., Vol. 19, No. 1. (Sep., 1917), p. 71.

quantities that were "vanishingly small" or "infinitely small."[75] This infinitely small was conceived as not a "simple and absolute zero but a relative zero, tending to zero." The differential calculus demonstrates that a quality presents itself in an evanescent state. It is an "evanescent quantity, which retained the character of that which was disappearing."[76] Here we can also find biological expressions, because the calculus was said to express not only what is disappearing but also how magnitudes that grow from elements smaller than all magnitude are generated. Newton suggestively called the calculus the method of fluxions, meaning by this expression that he was not dealing with static quantities but rather with dynamic entities. Thus he referred to the infinitesimals as the least indivisible, but also as "evanescent divisible quantities" and as "nascent increments", meaning that the series of infinitesimals also accumulates for the generation of a magnitude or a quality (Integration).[77] It is, therefore, not only the formulation of a law that expresses the intermediate states between the being and the (almost) nothing (zero) but also the inverse. The idea that a quality can be generated by the addition of the infinitesimally small was a Pythagorean idea that Aristotle adopted, as we see in the next chapter, and to which Leibniz gave full expression.

I now want to stress a second point. We have shown that the intervention of Parmenides in the Pythagorean theory gave birth to two main branches of thought: the development of the atomic theory and the theory of the monad of Neo-Pythagorean inspiration. We want to show that Leibniz, in a sense, managed to follow both.

In fact, Leibniz's works also present some aspects that are similar to the original Pythagoreans. And I will show that this appears in his metaphor of a pond of fishes and gardens of plants in the *Monadology*. But the decisive aspect of the monad of Leibniz is that it is non-dimensional. Thus Leibniz can be better categorised as post Neo-Pythagorean than properly as Pythagorean.

However, we find another approach to the Pythagoreans' principles when we read in a letter from Leibniz to the Princess Sophie, of the two pillars of his system: "My

[75] MORRIS, Richard, *Achilles in the Quantum Universe, the Definitive History of Infinity*, New York, Henry and Holt Co., 1997, pp. 63-64.
[76] MORRIS, idem.
[77] MORRIS, idem.

fundamental meditation is about two things: to know about the unity and the infinite."[78] The *Monadology* can be summarised by these meditations, because in it we have not only the principle of unity, the monad, but also an infinity of monads. It is on these two notions that he builds the architectonic of his philosophy. That Leibniz was trying to follow Plato in his discussion of Parmenides is evident from his writing of 1675:

> Therefore the essence of things is the same, and things differ only modally, just as a town seen from a high point differs from a town seen from a plain … it follows that no thing really differs from another, but all things are one, just as Plato argues in the *Parmenides.*[79]

Thus, basically the unity is the fundamental aspect of things but it can vary infinitely in the same way as there are infinite angles on the same city.

However, we need to see in what sense unity and infinity are present in the theory of monads in connection with the theories that we have examined. Now the evolution of numbers achieved by taking into account Parmenides' theory of Being and the maxim "for it is the same thing to think and to be" allowed Plato to say, in the second hypothesis of *Parmenides*, that: "if number is, there must be many things, and indeed an unlimited plurality of things, that are …" This is an aspect of the thought of the original Pythagoreans, since their unity is at same time a multiplicity. This theory is similar to one important feature of Leibniz's philosophy, which is the doctrine that matter and even the whole cosmos are infinitely divided. For Leibniz this actual infinite divisibility does not dissolve the All into nothing, as Aristotle said, because each part divided is supported by a unity, a being or monad. These unities allow that the division continues until infinity. That these unities should be a kind of spiritual entity like a soul is a consequence of the fact that they are deduced from the Spiritual Being (although in this aspect he is already making connections with Aristotle's notions). He expressed this view in the *Monadology*: § 65:

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[78] Quoted in CLEMENT, Catherine. *Encyclopédie Française*, 1986, p. 1086.
[79] LEIBNIZ, *De Summa Rerum*, trans. G. H. R. Parkinson, New Haven and London, Yale University Press, 1992, p. 95.

> And the author of nature has been able to employ this divine and infinitely marvelous artifice, because each portion of matter is not only divisible ad infinitum, as the ancients recognised, but each part is actually endlessly subdivided into parts, of which each has some motion of its own: otherwise it would be impossible for each part of matter to express the whole universe. § 66 Whence we see that there is a world of creatures, of living beings, of animals, of entelechies, of souls, in the smallest particle of matter. § 67 Each portion of matter may be conceived of as a garden full of plants, and a pond full of fishes. But each branch of the plant, each member of the animal, each drop of its humour is also such a garden or such a pond."[80]

Leibniz's intention of with this metaphor is to say that matter is divisible, but the unities that sustain the matter are not (which distinguishes his idea from that of the first Pythagoreans). Obviously the metaphor is ambiguous and does not make his notion evident.

In another text there is a conception of the continuum as the source of the multiplicity of monads by means of division. In this passage we can see the meaning of infinity as an explanation of the progress (described as perpetual) of monads connected with the idea of infinity as the source of the indefinite multiplicity of individuals:

> In addition to the general beauty and perfection of the works of God, we must recognise a certain perpetual and very free progress of the whole universe, such that it advances always to still greater improvement (*cultum*) … And as to the possible objection, that if it were so the world ought long ago to have become a paradise, the reply is ready: Even if many substances have already reached great perfection, nevertheless on account of the infinite divisibility of the continuum, there are always remaining in the depths of things slumbering parts which must yet be awakened and become greater and better, and in a word, attain a better culture. And hence progress never comes to an end.[81]

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[80] LEIBNIZ, *Monadology*, *Leibniz Selections*, ed. by Philip Wiener, Charles Scribner's Sons, New York, 1951, p. 547.
[81] LEIBNIZ, *On The Ultimate Origin of Things*, 1687, Wiener, p. 354.

However, there is a difference here that must be noticed. In the second hypothesis of *Parmenides,* Plato allowed the whole to be divided into several unities because the Being was a continuous entity. The resulting unities were also unproblematically continuous and this allowed the division to continue to infinity. At least for the earlier Pythagoreans it was possible to consider the unity as a continuous (spatial) entity. However, it is difficult to understand how Leibniz can describe the appearance of monads from the infinite divisibility of the continuous, since he always affirmed that his monads have no dimension.

The monad has diversity but it is a diversity of representations, not of parts.[82] In Leibniz's conception of a monad, unity has precedence over multiplicity. But it is a priority of the substratum over its representations. The monad is without parts, which for Leibniz means that it is clearly non-dimensional or non-spatial, that is, spiritual, although it is a foundational condition for the existence of the material world. This is one of the main tenets of Leibniz's philosophy.

This is why the theory of monads harmonises better with the theory of atoms. In fact, Leibniz was an advocate of atomism when he was young but later refused the crude idea of elementary and material atoms as inconsistent. It is against reason (or against the principle of continuity), he said, that the divisibility of matter should stop on one level, the level of atoms. But he retained the atomist idea that we need to find a conception to avoid the idea that infinite divisibility of matter in the end reduces all reality to a mere nothing.

We have seen that Melissus' argument that the possible multiplication of the One would be the only possible source of multiplicity. The atomists interpreted this in their own way and created the idea of material atoms. However, the One of Parmenides was not a material unity but was rather like a mind unity. We saw that the theory that regarded things as equated with many discrete and spatially extended units was taken by Zeno as incompatible with the truly infinite divisibility of the continuous implicit in the Parmenidian theory of unity. But the idea of the atomists was significant, since it provided a way to avoid infinite divisibility reducing the reality to nothing.

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[82] He says, for example, in the *Monadology* § 13 "… and consequently, there must be in the simple substance a plurality of affections and of relations, although it has no parts." Leibniz, Wiener, p. 535.

The monads of Leibniz have the same role as the atoms of the Atomists, with the difference that his monads are non-extended unities. Thus the ultimate reality must be something like true unities. In other words, the things that we see are aggregates of matter that have these unities as a fundamental level of reality:

> I realized that it is impossible to find the principles of true unity in matter alone or that which is only passive, since everything in it is only a collection or mass of parts to infinity. Now a multitude can only get its reality from true unities which come from elsewhere and are quite different from points (it is known that the continuum cannot be composed of points). Therefore to find these real unities I was compelled to have recourse to a formal atom, since a material being cannot be both material and perfectly divisible or endowed of true unity.[83]

Not only in the *New System of Nature* but also in the *Monadology*, he expressed the idea of ultimate substance using the specific term *atoms.* In the *New system*, another passage combines an allusion to the atoms with an allusion to the Pythagorean stress on the mathematical point:

> There are only substantial atoms, that is to say, real unities, absolutely destitute of parts, which are the sources of the actions; they are the first absolute principles of the composition of the things, and the last elements of the analysis of substances. They might be called metaphysical points; they have something vital and a kind of perception, mathematical points are their point for expressing the Universe.[84]

In fact, the monads of Leibniz are unities similar to the atoms which cannot be split. In this case they cannot be split, because the monads have their unity derived directly from the unity of the One (of which the monad is a copy) and because, being incorporeal, it has no

[83] LEIBNIZ, *New System of Nature*, 1695, Wiener, p. 107.
[84] LEIBNIZ, *New System of Nature*, 1695, Wiener, p. 112.

material parts to be separated. This indivisible unity will be the main reason for maintaining that the monad is closed in itself (without windows to the outside, except to God).[85] We can suppose that one reason for this conception is again Melissus' suggestion that the Parmendian One should be the model for the created Ones (since the One is a full being, he is already all that he could be). Thus the unities are not only mind-like, they are almost completely self-sufficient entities. They are a micro-cosmos since they are like the One. Since they are unities or atoms in the full sense, which means that they are completely separated from the other atoms, they are without windows.

We can summarise the two forms of unity presented by Leibniz in this way:

– When he said that matter is infinitely divisible he was presenting the metaphor of ponds full of fishes. In this regard his theory is similar to the early Pythagoreans' notions and the second hypothesis of the *Parmenides* of Plato, where the unities are infinite divisible (and *qua* parts of a whole the unities are not truly separated). Obviously what is divisible here is matter. But he affirmed some kind of unity in this metaphor with the allusion to (individual) fish.

– When he discussed individual monads the multiplicity attributed to them is only the multiplicity of representations. Consequently, the unity here is without parts and is indivisible. In this sense the monads of Leibniz are more like the atoms of Leucippus and Democritus (in the form proposed by Melissus) than the unities of the Pythagoreans and the second hypothesis of *Parmenides*. Since they are unities without parts, the monads are also similar to the unity of the first hypothesis of Plato's *Parmenides*.

This choice of unity made by Leibniz will have as an important consequence his denial of the substantiality of space, which is directly against the original Pythagorean view (as well as the Milesians') that we saw at the beginning of this chapter.

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The last point that I would like to stress in this comparison between Leibniz and the Pythagoreans concerns the notion of harmony, which is a key concept for the Pythagoreans. The concept of harmony is another way of presenting the idea of unity, but in this case the

[85] LEIBNIZ, *Monadology* § 7: "The monads have no windows through which anything can enter or depart." Wiener, p. 534.

idea of unity is connected with the notions of beauty or good. This association will be later adopted by Plato in the form of his equivalence of One and Good.

Guthrie said that the idea of form regarded as something that could be given in a mathematical structure was the Pythagoreans' great contribution to philosophy and was as important as the Milesians' introduction of the concept of matter.[86] But they considered also that the ideas of order and beauty in the cosmos are directly dependent on this concept. Here one distinction is important. The idea of form *presupposes* limit, since shape without limit is amorphous or chaotic. However, the limit can set boundaries in the continuum, but this process by itself does not necessarily produce beautiful or harmonious wholes. An almost infinite number of a limited set of boundaries can be produced from the continuum. Thus, Huffman stated that this is the reason why Philolaus introduced the third factor; harmony: "Limiters are simply things that set boundaries within a continuum, but in their own nature they do not necessarily produce order, that is the role of *harmonia* in Philolaus' system."[87] Thus harmony presupposes the idea that some combinations of numbers are more valuable than others. Only when the continuum is limited according to harmony do we produce a pleasant (beautiful and ordered) whole. And since these combinations can have truly aesthetic and moral effects on man, Pythagorean science, quite differently from modern science, is said to be rooted in values. So we can suppose that there is a kind of principle of unity that presides over the harmonisation of the Limit and the Unlimited in a specific whole. In this sense Kahn mentions a passage from a book attributed to Archytas, the Pythagorean pupil of Philolaus and friend of Plato, referring to this third factor necessary to bring the principles of the Limited and the Unlimited together: "This principle is first in power and superior to the others; it is appropriate to name this 'god' (*theos*)."[88] Thus even in Philolaus and Archytas, two more genuine Pythagoreans, there seems to be a certain tendency which is in conflict with the original dualism of the two principles. In addition, Nichomachus explains that harmony appears for the unification of the diverse and the reconciliation of contraries.[89]

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[86] GUTHRIE, W. K. C. *A History of Greek Philosophy*, p. 267 and following pages.
[87] HUFFMAN, p. 45.
[88] KAHN, C, *Pythagoras and the Pythagoreans*, Cambridge, Hackett Publishing Company, 2001, p. 77.
[89] GERASA, Nichomachus of, *Introduction to Arithmetic*, trans. M. L. D'Ooge, Greatest Books of the Western World, v. 11, Enyclopaedia Britannica and University of Michigan, 1989, p. 841.

In Leibniz, harmony is also a key concept and it has a role similar to that in the Pythagorean doctrine, with the difference that Leibniz tends to equate the limiting factor with God or with the cause of harmony itself. And this can be understood because, for Leibniz, God is the great monad (principle of unity).

Thus for Leibniz harmony is perfection, which he defines as "unity within diversity" or "similarity in variety or diversity balanced by identity."[90] And the world has harmony because it has "greatest variety together with the greatest order."[91]

According to Leibniz, to be delighted is to feel harmony and "in fact nothing is pleasing to the mind besides Harmony." But he added that "variety delights but only if it is reduced to a unity;"[92] and he considers both perception and thinking to be underpinned by harmony: "to be perceived is to be according to the principle of harmony." Regarding thinking, which is similar to perceiving, he said: "thinking is nothing other than perception of harmony." He presented a variation of this theme when he said that: "thinking is nothing other than the perception of a relation or more briefly, the perception of many things at same time or the one in the many."[93] God enters into the whole scheme because, for Leibniz, the unity of diversity happens as a consequence of a choice by God, the necessary being. Thus the simplest combination is that which better pleased God. In this sense he says that: "the necessary being acts in the simplest ways. For among the infinite possible ways there are certain simplest ones, but the simplest are the ones which offer most."[94]

In this first chapter I have attempted to show some aspects of the discussion about the meaning of unity in pre-Socratic philosophy. We have that the Pythagoreans had more than one notion of unity. One of these notions was that the unit was a product of the Limit and the Unlimited, or that it was itself made of the Limit and the Unlimited. After the advent of the philosophy of the Parmenides, the subsequent analysis by Plato in the *Parmenides* and Aristotle's criticism, the Neo-Pythagorean notion of unit appeared. This notion was the

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[90] Quoted by David Blumenfeld, JOLLEY, *The Cambridge Companion to Leibniz* Cambridge, Cambridge University Press, 1995, p. 383. One reference is *Monadology* § 58.
[91] Quoted by David Blumenfeld, p. 386. The passage is in *Principles of Nature.*
[92] Quoted by MERCER, Christia, *Leibniz's Metaphysics,* p. 214. The text of Leibniz quoted is *Elements of Natural Law.*
[93] These three quotations are in MERCER, p. 320 and p. 321. The text quoted is *On endeavor and motion, perceiving and thinking.*
[94] Quoted by David Blumenfeld, p. 389 (from GRUA, G, *Leibniz: Texts inédits d'après des manuscrits de la Bibliothèque provinciale d'Hanovre*, Paris, Presses Universitaires de France, 1948 cf 285 f.).

basis for the conception of unity in both Neo-Platonic philosophy and the system of Leibniz.

Chapter III – Aristotle and Leibniz

The role that Aristotle plays in the theories of Leibniz is historically recognised. It is significant to remember some aspects of these theories, taking into account what they have in common with the Pre-Socratics, mainly the Pythagoreans, but also facing the question of Aristotle's criticism of Pythagoreans' mathematical philosophy of the. This chapter is divided into six sections: the first deals with the concept of being and substance in Aristotle; the second discusses the dynamic and vitalist approach of the concept of substance in Aristotle; the third is about the notion of knowledge as a biological process as it appears in *De Anima*; the fourth concerns the idea of cumulativity of changes; the fifth considers the question of stages of change and their relationship to the idea of the unconscious and the last section explains the relationship of the subjects of the former sections to Leibniz's philosophy.

All these sections are connected by the pervading notion that unity, for Aristotle, is a unity of the soul. This conception implies that the soul is an entity of process and that the unity of the soul explains both the cumulativity of changes and the necessary notion of the unconscious.

1 – Substance

This section attempts to explain what substance is for Aristotle. Aristotle's development of this notion was of supreme importance for Leibniz in constructing his own concept of substance. The section is subdivided into sections A–G, each relating to one meaning of substance.

The notion of substance in Aristotle is not an easy or clear concept. He develops this concept mainly in the *Metaphysics,* a book that is an ensemble of writings from different periods, in which many sections are mutually contradictory, while others are of great obscurity. They are like collected lectures rather than a book prepared for publication.[95] Thus it is not surprising that different historical conceptions of substance developed from

[95] RANDALL, John Herman. *Aristotle,* New York and London, Columbia University Press, 1965, p. 23 and p. 25.

this source and were then subject to many academic disputes, since no coherent view was ever possible. Different dimensions of this concept appear also in other books such as *Categories*, *De Anima*, etc. The logical notion appears primarily in the *Categories*. The view of *Metaphysics*, which I will call the self-governing notion, is best presented in the biological works and in the *Physics*.

It seems that Aristotle began his theory by bearing in mind the theory of Being-One of the Eleatics. It is possible that his theory of many meanings of being is an attempt to deal with the problem presented by the immobility of the Eleatics' One. The Eleatics posited the Being (*to on*) as a transcendent entity subsistent for itself, and beyond the multiplicity of things. It is interesting to note its similarity to Aristotle's notion of substance. But Aristotle is also interested in explaining the world that we experience. In this way he could not ignore the multiplicity and mobility seen in daily experience. Maintaining the importance of a theory of being as formulated by the Eleatics, he opens the door to reconcile it with the recognition of movement and multiplicity in the world so stressed by Heraclitus. The well-known passage in which Aristotle asserted this doctrine is book Γ of *Metaphysics*, 1003a:

> There are many senses in which a thing may be said to 'be', but all that 'is' is related to one central point, one definite kind of thing, and is not said to 'be' by a mere ambiguity. (...) So too there are many senses in which a thing is said to be, but all refer to one starting point; some things are said to be because they are substances, others because they are affections of substance, others because they are a process towards substance, or destructions or privations or qualities of substance, or productive or generative of substance, or of things which are relative to substance or negations of one of these things or of substance itself.[96]

Thus "being", has many meanings. However, all of them have a precise relation with an identical principle; that is, this diversity of meanings is based on a central core meaning. Several things that are said *to be* express different modalities of being, but all make reference to this something that is *one*. This *one* is the substance (in Latin *substantia*, in Greek *ousia*), which is more basic than the affections, processes and qualities. The

[96]ARISTOTLE, *Metaphysica*, Oxford, Clarendon Press, ed. Ross, 1966.

recognition of many meanings of being allows processes (illustrated by the multiplicity of attributes that the substance has over the time) to be taken into account, but these are non-substances in the sense that they are only modifications, qualities or relations of substances. The science of Metaphysics or First Philosophy has its centre in the concept of substance which is the unifying principle of being, or the ontological principle of reality (the ultimate cause of reality*).*

Some of the meanings of substance that appear in Aristotle can be enumerated here:

A) First I will refer to that which is perhaps the most important; substance as *being-qua-being*. This concept is subject to a great deal of scholarly debate. But since this work is not about Aristotle, I will take as my reference only the interpretation of the notion of *being qua being (or being as such)* as presented by Philip Merlan.[97] The reason for my choice of Merlan's interpretation is that it situates the philosophy of Aristotle as an important factor in the preparation of Neo-Platonism.

Aristotle considers Wisdom (which he also calls the First Philosophy or Theology, and we call Metaphysics) as the study of the supreme principles and elements. In a passage in *Met.* E 1026a26 he explains that research about being is not only a matter for the *physikos* (the natural philosopher):

> ... if there is no substance other than those which are formed by nature, natural science will be the first science; but if there is an immovable substance, the science of this must be prior and must be first philosophy, and universal in this way, because it is first. And it will belong to this to consider being *qua* being – both what it is and the attributes which belong to it *qua* being.

Thus the idea is that Theology (or Metaphysics) is the science that deals with unmoved *ousia* or being *qua* being. The subject matter of his first philosophy is this being *qua* being (*ens qua ens*).

Aristotle recognised the existence of this sphere of being as the uppermost or supersensible sphere, a sphere in which stability dominates. It is in this way the ontological basis for the principle of non-contradiction "for such a principle and substance seems to

[97] MERLAN, P., *From Platonism to Neoplatonism*, The Hague, Martinus Nijhoff, 1960.

exist and is sought by nearly all the most refined thinkers as something that exists; for how is there to be order unless there is something eternal and permanent?" (*Met.* K1060a25).

In this sense it is also said to be incomposite, lacking parts or incorporeal (*Met.* Θ10, 1051b17–1052a5), since matter is said to be the source of multiplicity. In that sphere there is the full sense of being, of existence: it is eternal, uncreated and divine: the "necessary being". According to Merlan, this has become the traditional interpretation. He mentions Avicenna, who asserted that the subject matter of the Metaphysics is the *ens*, and Averroes, who asserted that the subject matter is God and the *intelligentiae separatae*.[98] From this proposition that the subject matter is God *and* the *intelligentiae separatae*, it is possible to suspect that there is a plurality of incorporeal forms in the Aristotelian system.

The being *qua* being is a being that exists without any determination. It has no positive attribute or predicate, and in this sense it is the best example of what Aristotle calls *ousia*: "Therefore that which is primarily, i.e. not in a qualified sense but without qualification, must be substance" (*Met.* Z 1028a29). According to Merlan, it is pure being and so does not admit any contamination with non-being. Only when this pure being begins to be involved with non-being do we have the derivation of all things.[99]

Thus the variety of things proceeds from the involvement of being with otherness (or non-being) and so it becomes full of a variety of determinations (or attributes) to which correspond a set of negations. To be a composite thing is to be a thing from which we can predicate many determinations or attributes. Thus, ordinary knowledge is nothing more than the activity of predicating or withholding attributes. It is not clear how this involvement in otherness (or in matter) can happen. But at least when expounding the theory of being-as-such, Aristotle does not seem to have defended the view that the

[98] MERLAN, p. 207. Merlan quoted Duns Scotus in his *Quaestiones subtilissimae*, super Il. Met. Arist. (Opera, v. VII 11–40 Vivès).

[99] In this sense Merlan wrote: "Being as such, i.e., being which has not to pay the price for its existence by being something and in this sense of the word to admit non-being – just being and therefore fully indeterminate in this sense of the word (...). From the fully indeterminate and in this sense fully and positively being and its opposite, all things are derived. As they proceed, they become more and more determinate, in the sense of being involved more and more with non-being (...). Being as such as the theme of Aristotle's metaphysics is the richest in being, not poorest. (...). On the other hand, the thing that is fully determinate in the ordinary sense of the word, including determinateness in time and space, is one bundle of negations (...). MERLAN, p. 185.

contraries can be the first principle of all things, as there is no thing contrary to substance.[100]

The problem of knowing this being *qua* being is the problem of knowing an entity which has no determinations, no predicates and consequently does not allow any predication. The solution to this problem is the postulation of a kind of knowledge which happens without the mediation of predication. Merlan translated this method of intuitive (*noetic*) knowledge, which is above discursive thinking, as a non-predicative act of "touch". God knows himself only through this act. Aristotle uses the word *entelecheia* for the functioning that has the end in itself, or in cases where the exercise is the ultimate thing. This concept is most valid for this self-knowledge of the *being qua being*: "Therefore it must be of itself that the divine thought thinks (since it is the most excellent of things), and its thinking is a thinking on thinking" (*Met* Λ 1074b34). This doctrine is the basis of the notion of the self-sufficiency of the substance, and also of the notion that the soul is the origin of all motion in the universe. In fact, the Aristotelian terminology allows the relationship of pure thinking (*actus purus* n activity per se) and motion (*activity*) to be acknowledged. In addition, it is by its self-knowledge that the *being qua being* causes and knows everything that exists (since, for Aristotle, God is the primary cause).

Aristotle's theory of being seems to imply that there are degrees of being, some degrees having more being than others (because they are more or less involved with non-being or they have a greater degree of unity). This process implies a concatenation between these spheres, so that the superior can be termed the "cause" of the inferior spheres, among which we have the sphere of sensible things. Because the superior sphere is the "cause" of the inferior, the elements of the superior must in some way be present also in the inferior. Thus, according to Merlan's interpretation, this *being-qua-being* is an element is something indwelling in all that is.

This exposition of *being-qua-being* seems to gain support by what Aristotle says in the *De Anima*. In book III5 he wrote that

[100] "All contraries, then, are always predicable of a subject, and none can exist apart, but just as appearances suggest that there is no thing contrary to substance, argument confirms this. No contrary, then, is the first principle of all things in the full sense; the first principle is something different" (*Met* N 1 1087 b35).

> mind in this sense of it is separable, impassible, unmixed, since it is in its essential nature activity (for always the active is superior to the passive factor, the originating force to the matter which it forms) … When mind is set free from its present conditions it appears as just what it is and nothing more: this alone is immortal and eternal (we do not, however, remember its former activity because, while mind in this sense is impassible, mind as passive is destructible), and without it nothing thinks.

Thus we see the connection of the theory of *being-qua-being* with the idea that mind as activity is eternal and therefore unaffected and separable. This passage of *De Anima*[101] is one of the sources of the notion of active intellect, but it is reminiscent of Anaxagoras, who talked of a changeless, separable and unaffected (*apathés*) intellect, and also of the Eleatics (who stressed the One as changeless). In any case, when Aristotle wrote that the *being-qua-being* is the cause of the inferior spheres, it is clear that he was defending the idea that no contrary is the first principle of all things.

Besides the passage in *De Anima*, the doctrine of active intellect is also present in *De generatione animalium* II, 3,736b27. In these passages, Aristotle stated that the active intellect is "immortal and eternal." As this concept is only schematic in Aristotle's writings, it provided the opportunity for considerable discussion and different interpretations in the philosophic tradition of antiquity, the Middle Ages and the Renaissance. However, many explained the action of active intellect in the soul as "the intellect that comes from outside" or God himself.

From what we have expounded we can see that the notion of substance as pure being in Aristotle can be interpreted in these ways:

– Soul or mind in its pure form (separate from matter) and in this case having divine character.

– Self-identity (or unity), exerting a pure activity, self-thinking, which is the paradigm of all activity. As self-identity it is the basis of the principle of contradiction.

– An element which is immanent or dwelling in all that it is (active intellect or *intelligentae separatae*).

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[101] *De Anima* 430a15.

2 – Other Meanings of Substance:

In the previous section (Section A), we discussed the concept of pure being, which is the condition of the world of determinations. Thus we can understand the next meaning of substance, as that which can support attributes of contraries.

B) This section could be called the "logical" account of substance. In the *Metaphysics* 1017b14 and *Categories* 2a11 we have the idea that substance is that which is the subject of predicates and not itself the predicate of anything else.[102] Similarly, in *Categories* 4a10, substance is called that which undergoes and underlies change: "One and the self-same substance[103], while retaining its identity, is yet capable of admitting contrary qualities … at one time warm, at another cold." Thus we need to understand substance as being prior to the play of opposites, which, in fact, allows the appearance of different attributes.

C) Strongly connected with this previous meaning is the conception that substance is matter. In *Met.* (1029a10-11) Aristotle said: "If this is not substance, it baffles us to say what else is. When all else is stripped off evidently nothing but matter remains." In this case, being acquires a new meaning and it seems that Aristotle was thinking in terms of the Pythagorean notions which involve the contrary factors, Limit and Unlimited (now called being and non-being). Underlying these two he puts a third factor: the substratum or subject matter, which he calls matter. Thus there is a passage from privation or non-being to being as the realised final form. The passage to being has as its basis a substratum which is the substance, or in this case matter. This passage to being is generation and its opposite (from being to non-being) is perishing. He explained his theory on another level, following the same Pythagorean equivalence of the form and the hot: "perhaps the elements of perceptible bodies are, as form, the hot, and in another sense the cold, which is the privation; and as matter, that which directly and of itself potentially has these attributes" (*Met*. Λ, 4, 1070b10).

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[102] WOOLHOUSE, R. S., *The Concept of Substance in the Seventeenth Century Metaphysics.* London and New York , Routledge, 1993, p. 8.
[103] ARISTOTLE, *De Anima*, trans. J.A. Smith, Oxford, Clarendon Press, 1931.

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He repeated this theory in another passage, considering it valid for all sorts of generation, as for example, a quality: “for i.e. one might say that there are three principles – the form, the privation and matter. But each of these is different for each class; e.g. in the color they are white, black, and surface, and in day and night they are light, darkness, and air” (*Met*. Λ, 4 1070b20). Matter here is to be understood in the sense of substance because substance is what is in change but persists unchanged itself. Thus matter, as underlying both the contraries form and privation, and persisting throughout a change of one into the other, is a true substance. Also, matter as a substratum is the potentiality that allows some privation to become some form. Thus in this sense the contraries cannot be substance or first principles, because sometimes they exist and sometimes they do not – they are only attributes.

D) In another version substance means a concrete thing. This is also known as primary *ousia*, subject or subject matter. Aristotle wrote in the *Categories* v.3b10–13: “Every substance seems to signify a certain ‘this something’. As regards primary substances, it is indisputably true that each of them signifies a certain 'this something’; for a thing revealed is atomic and numerically one.”[104] What exists is “this something” or “this here thing” (*tode ti*), an individual thing. Hence, for Aristotle, all that exists is individual and determinate. Thus this meaning of substance or being differs from the monolithic One of the Eleatics, since it must account for multiplicity. There are many particular or individual substances.

It is in this version of individual substance that we can include a different notion of matter. In books Z and H of the *Metaphysics*, matter is not substance, but is coupled with form in the hylomorphic analysis of the substance. Matter in this case has a relative meaning. When deprived of form, matter can be regarded as indeterminate (for example a pile of bricks and roof tiles) but it still has the potential to acquire form. Obviously indetermination is relative; roof tiles and bricks, flesh and bones, for example, have their own forms as individual unities, as well as their matter. Aristotle considered that absolute indetermination, that is, matter totally deprived of form, was nonexistent in an independent way. Thus, as Lear explained, matter is a relative item and that irreducibility means that the order (which is the expression of form) that “exists at any level of matter is insufficient to

[104]ARISTOTLE, *Categories*, Oxford, Clarendon Press, ed. Ross, 1966.

generate the order required at the next level of organization."[105] Because each level of matter can be analysed into form and matter in its turn, matter obviously cannot be substance here.

If matter is to be shaped into a form, it is necessary to understand how it participates with form in the constitution of things as things. For Aristotle, both are constituted in a synthesis or a *synolon* when originating individual things, the substances.

E) From this notion we arrive at another meaning of substance, which is "essence", which obviously is part of the conception of substance considered as a concrete thing. Thus, in one passage Aristotle considers that it is the essence that better expresses what an *ousia* is: "Clearly, each primary and self-subsistent thing is one and the same as its essence" (*Met.* Z, 6,1032a5) and "the essence of each thing is what is said to be *propter se* (in virtue of itself) ... what then you are by your very nature is your essence" (*Met.* Z, 3, 1029b14). As Randall explains: "'to be' anything means 'to be something that can be stated in a discourse … any subject of discourse.'"[106] The essence is the reason of the attributes in the substance. It is the cause of something or its explanatory property. Consequently, it is the intelligible core or what can be known and stated about a thing in its individuality. In other words, the essence, although by nature non-linguistic (the discourse is not the *ousia* itself), can nevertheless be stated or expressed in a definition or formula. As Aristotle says:

> Each thing itself then, and its essence are one and the same in no merely accidental way, as is evident both from the preceding arguments and because to know each thing, at least, is just to know its essence, so that even by the exhibition of instances it becomes clear that both must be one (*Met.* Z,6,1031b19).

It is because the essence instantiates an order or *logos* (which can be translated as intelligible core of a thing) in the matter that it can render a thing intelligible and subject to a scientific discourse.

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[105] LEAR, Jonathan, *Aristotle, the desire to understand*, Cambridge University Press, 1988, p. 39.
[106] RANDALL, p. 111.

The word “definition” has as a part of its meaning the notion of delimiting, of a limitation (*finis*) which allows a thing to be apprehended by intelligence. The classic example used to illustrate the definition of essence is that of man. Thus, the essence of man is said to be a rational animal. But such universals and genera (which are a formulation of *logos*,) are not primary *ousia*. In the *Categories* (chap. 5: 22 11–16), Aristotle called them secondary substances. They are not particular things but are predicated of many particular things. Essence is, properly speaking, peculiar only to an individual thing.

The Aristotelian universal has the character of an immanent ontological structure and is different from a Platonic idea, which Aristotle condemned as being inoperative. Aristotle’s *eidos* (his word for universals) has a genetic or generating power. The character of immanent structure of the Aristotelian *eidos* does not allow it to be confused with universals such as a hypostasised Platonic Idea. The universal does not have an existence separate from its instances. The universal bird is immanent in individual birds. The soul, which is a primary substance, instantiates these substantial forms as a principle that informs the bodies of animals and plants.

Aristotle also wrote in another place, *Posterior Analytics*, that only the universal can be an object of science.[107] Consequently, there is a gap between what can be said about a thing and the thing itself in its individuality. Moreover, matter also seems to be an obstacle to intelligibility. Aristotle said: “... there is neither definition of nor demonstration about sensible individual substances because they have matter whose nature is such that they are capable of being and of not being” (*Met*. Z, 15, 1039b25). Thus, when he said that matter is capable of non-being, he seems to have been suggesting that for this reason discourse cannot describe the individual thing exhaustively. It is not capable of demonstration because there is always more than can be said: “And so when one of the definition-mongers defines any individual, he must recognize that his definition may always be overthrown; for it is not possible to define such things” (*Met*. Z, 15, 1040a 5). And the material aspect of *ousia* or the *hyle* is something that cannot be stated in words. “Matter is unknowable in itself” Aristotle wrote (*Met*. Z, 1036a9). In fact, the primary substance has something that means that it cannot be stated in words (and so we can only denote it by pointing it out).

[107] ARISTOTLE, *Posterior Analytics*, Oxford, Clarendon Press, 1975, Book 1, chap. 2.

This something is its matter.[108] Thus for the Aristotelian tradition, matter was to be considered the *principium individuationis* or cause of the singularity of a thing. Thus in this case too, matter seems to be equivalent to the notion of substance.

F) Contrary to this previous view, Aristotle suggested that substance is form (*Met*. vii 1–6), as I have already mentioned in section (A). Irwin said that in this case form must coincide with the individual subject and its essence.[109] Thus the statue is identified with its form, which is its essence. The matter is included somehow in the conception of form, since there is no statue without matter. Furthermore, the form is made equivalent to actuality or activity. This meaning of substance is perhaps another way to express the meaning of substance as substratum. Substance conceived as substratum seems to be a necessary condition of the appearance of a manifested form (in the sense of *telos*) from mere potentiality. We will return to this topic later on.

G) Natures may also be considered as *ousia*. Aristotle considered that natures (*phusis*) are substances because they have the source of movement in themselves. He studies this subject in his book of Physics.

3 – Dynamic and Vitalist Concept of Being

In this section this dynamic notion of being in Aristotle and how it was connected with this teleology is discussed in further detail. Aristotle said that the soul is the form of the body (which is the matter) or the substance of a body (*Met*. H 1043a35). This sense of "form" cannot be confused with the sense that *ousia* is the form or the result of a process of change or movement (*genesis*). To be in this context means to be something that comes into being and passes away (to acquire a certain form that will disappear later). And this is one of the most important kinds of change: the process of "generation" and "corruption." But form considered as soul is what allows this generation.

Thus for Aristotle the form cannot be regarded only as a shape, but it is also a forming power (*energeia*), an inner necessity or effort (of the soul), which shapes matter in a specific fashion. Thus, in book Θ (6 1050b 2) of the *Metaphysics*, Aristotle saw the *ousia*,

[108] RANDALL, p. 122.
[109] IRWIN, Terence, *Aristotle's first principles*, Clarendon Press, Oxford, 1988, p. 223.

the being, as activity (*energeia*), and as the operation or functioning of powers. To name this effort or tendency to put powers into operation, Aristotle also uses the term *horme*, which was translated in the seventeenth century as "conatus" or "endeavour."[110]

Aristotle denominated *entelechy* for the act, which is the acting perfection, or better, the perfection resulting from an actualisation. The senses attributed to this term are not, however, always the same. In *De Anima* (II 412 a 20), he states that the soul is *entelechy* or e*ntélékheia* (*en*, in; *telos*, aim or finishing; e*kho*, I have or I bring with me). On the other hand, in *Met.* Θ (3 1047a30–32), he says also that the soul is energy or *enérgeia* (*en*, in; *ergon*, work), meaning the aspect of the soul that can be called effort or striving. Both terms seem to be synonyms, although Randall specifies them: e*nérgeia* means literally the operation or functioning of powers (*dynameis*).[111] In this sense Aristotle associates movement with spiritual activity. *Entelechy* is a term coined by Aristotle to denote the functioning that has the end in itself, as the seeing is the end of the power – *dynamis* – of vision or the fullest functioning or culminating activity – in Latin, actuality.[112] Thus in this second sense, entelechy is a way of being that does not own its realisation or perfection state instantly, but is designed to reach it through a progression. Thus a perfect oak tree living in the fullness of its capacities and in its full form as an adult tree is the entelechy of the oak, reached only after a lengthy period of growth (to be followed by a period of decay).

In a passage of *De Anima* (415b 8) Aristotle reaffirms the soul as the essence of life but also stresses its teleological character as well as its character as a source of movement.[113] Here there is, again, a link to Pythagorean–Platonic doctrines, for in the *Phaedrus* the soul is the only entity that is able to move itself (the soul, consequently, is the origin and source of all movement in the universe). Still, in this dialogue it is suggested that the moving power present in the soul is *Eros*, desire, which always tends towards the aimed object.

In Aristotle also, the final cause is that which determines the purposes aimed for by the striving, and in this sense it can be seen as the most explanatory in the last instance. It is

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[110] RANDALL, p. 127.
[111] RANDALL, p.129.
[112] RANDALL, p.135. W. D. Ross's translation uses the word actuality instead of *entelecheia* and movement instead of *energeia*
[113] PLATO, *Phaedrus*, trans. C. J. Rowe, Warminster, Aris & Phillips, 1986, 245e2–4 and 245e7–246a1.

the mechanism of final cause that determines the way in which efficient causes (the movement) agree with the material cause in the effort to achieve their full form. Thus all becoming is progress towards a final complete form, which is the guarantee for the unity of the whole process. In this sense also the three causes, final, formal and efficient, can be regarded as one.[114]

But the definition of soul that at the same time affirms its character of essence and also of activity directed to an end, (that is, introduces the discussion of the functional character of the soul) occurs in *De Anima (*412b10). Continuing with the question "what is soul", he wrote: "Suppose that the eye were an animal – sight would have been its soul, for sight is the substance or essence of the eye which corresponds to the formula, the eye being merely the matter of seeing; when the seeing is removed the eye is no longer an eye, except in name – it is no more real than the eye of a statue or a painted figure." Thus, the form results from activity and is actuality (*entelechy*). It acquires the meaning of function. This is said in a different way in another passage, *Partibum Animalim* (694b14): "because nature makes organs for the function, and not the function for the organs."[115] Obviously a relationship with the environment is presupposed in this concept. In this sense he talks particularly of aquatic bird feet: "For they are in harmony with the mode of life of these birds, who, living in the water, where their wings are useless, require that their feet shall be such as to serve in swimming. For these feet are so developed as to resemble the oars of a boat, or fins of a fish" (*Partibus Animalium* 694b15).

The resulting form of living beings is a consequence of these two factors: the degree of power of a certain kind of soul and the soul's precise functional role in its interaction with the environment. In *De Anima* the hierarchy of beings is represented according to the criterion of power of the souls, going from the nutritive function to which plants are limited, up to the rational faculty. The degree of perfection of a living being is also recognisable by its respective structural form. This classification of beings according to a degree of perfection (each entelechy is a relative perfection) became the model accepted by the naturalists for centuries.

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[114] "The last three (causes) often amount to one; for both the whatness and the final cause are one, and the first source of motion is the same in kind as these." (*Phys*., B7 198a25).

[115] This passage both anticipated and inspired Lamarck. ARISTOTLES, *De Partibus Animalium*, trans. J. A. Smith and W. D. Ross, Oxford, Clarendon Press, 1949.

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4 – Knowledge Considered as Biological Process

Having seen Aristotle's many senses of substance and the connection between those and what can be known, we now look to the substance not only as activity, but as an activity of knowledge.

For Aristotle the activity is spiritual and so we can understand why *entelechy* (actuality) is to be considered as representing: "possession of knowledge and actual exercise of knowledge." (*De Anima* 412a20). In fact, as Randall stressed, for Aristotle, the "knowing" is a biological or living process.[116] The power to respond with discrimination to the object of desire is the power to know and as such it is a natural activity. Thus, for Aristotle, the soul (*psyche*) is not only the power or *arche* of living, but also the power or *arche* of discrimination, *to kritikon*: the power of selective response. This is the power to know, which includes both sensing (*to aistheterion*) and in animals like man, thinking – the operation of *nous* – which Aristotle called *noesis*.[117]

In treating the problem of discrimination in the psychology of Aristotle the relationship with the environment is an obvious presupposition. Living beings do not achieve their (desired) ends without intercourse with the outside world, and this happens through sensation, imagination and thinking. The general definition of sense is in *De Anima (*424a15):

> By a 'sense' is meant what has the power of receiving into itself the sensible forms of things without the matter. This must be conceived of as taking place in the way in which a piece of wax takes on the impress of a signet-ring without the iron or gold.

These forms received through sense will be the origin of imagination (*phantasia* – Aristotle stressed that this notion is related to the word *phos* – light): "imagination must be a movement resulting from actual exercise of a power of sense." (*De Anima* 429a). Thus

[116] RANDALL, p. 59.
[117] Idem, p. 81.

the imagination is a kind of changing or movement in the soul (or in the *pneuma* of the soul).

In *De Anima* Aristotle also claimed that the function of discriminating is itself a motion. Thus sensation is a motion and this motion is an "alteration" or a change of quality of the soul. It is possible to say that the soul receives the sensations passively and this process is considered as a change of quality of the soul: "Sensation is held to be a qualitative alteration, and nothing except what has soul in it is capable of sensation." (*De Anima* 415b22). And in another place there is a similar statement: "Sensation depends, as we have said, on a process of movement or affection from without, for it is held to be some sort of change of quality" (*De Anima* 416b30).

The term "affection" (Gr. *páthos*, Lat. *passio*) carries the suggestion here that sensation is an alteration that the soul suffers (and consequently *transforms* it). Aristotle also mentions the theory by which thinking produces the same effect, since this process has the same characteristic as sensation. The following can be found in *De Anima* 427a 17: "Indeed the ancients go so far to identify thinking and perceiving; (...) They all look upon thinking as a bodily process like perceiving, and hold that like is known as well perceived by like ..." It is worth recalling that in the history of philosophy this conception remained important for the Stoics and others, such as some scholastics who designated the concepts as *passio animi.* [118] When Aristotle said "that like is known by like" he states a principle that is valid both for thinking and perceiving: both these faculties have the capacity to identify themselves with the objects of their knowledge ".... the soul is in a way all existing things; for existing things are either sensible or thinkable, and knowledge is in a way what is knowable, and sensation is in a way what is sensible ..." (*De Anima* 431b20). In fact, in *Met.* Λ.9.1075, he said that "thought and the object of thought are not different in the case of things that have no matter" and he suggested that these things without matter are essences. This argument is equivalent to his notion that perception captures the form without the matter. We can suppose that what Aristotle was proposing is that the two forms of knowledge, sensible and intellectual, have their paradigm in the form of knowledge of

[118] For example, William of Ockham says that "a passion of the soul is the proper *act* of intellect". OCKHAM, W., *Seleção de Obras/selection of works – Expositio Super Librum Perihermenias*, São Paulo, Nova Cultural, 1989, p. 127.

the *being qua being*, who, when thinking himself, implies that the subject and object are the same.

Thinking and sensing are similar in the sense that both are processes that imply action upon the soul. Aristotle analysed this thesis in *De Anima (*429a13): "If thinking is like perceiving, it must be either a process in which it is acted upon by what is capable of being thought, or a process different from but analogous to that." In fact, according to Aristotle, it is a specific kind of intellect that produces the thoughts (or acts upon) in the soul, and this intellect is not that created by the elaboration from sensation and imagination. The latter is the *passive intellect* (*nous pathétikos*), which also receives thoughts from the *active intellect* (Gr. *nous poiétikus*, Lat. *intellectus agens*).

Taking into account this formulation, we have in Aristotle a theory that the individual soul receives new forms through two different doors: the senses organs and the active intellect. We can imagine how these new forms can change the quality of the soul or, expressed in another way, how they *transform* it (which means to become impregnated with forms from outside). For example, he says: "... let a motion with respect to quality be called "alteration"(...)… by quality I do not mean that which is in the substance of a thing (for a differentia is also called a quality), but an affective quality in virtue of which a thing is said to be affected or to be incapable of being affected" (*Met.* E 2–226a 25).

5 – The Cumulativity of Change

This section deals with the infinitesimal analysis of movement and how Aristotle related it to psychology.

The analysis of movement refers to knowledge of what nature is, since nature is the principle of motion or change. The starting point of the analysis of movement in Aristotle is the Pythagorean–Platonic theory which he complained was not very clear. As he says: "they do not tell us at all, however, how there can be movement if limit and unlimited and odd and even are the only things assumed, or how without movement and change there can be generation and destruction ..." (*Met.* A, 989a9). The Platonists, as the main followers of the Pythagorean tradition, did not help very much to clarify the matter. In fact, the Platonists regarded generation from non-being as somehow existing. However, the notion

of non-being was still obscure, even when they called it the Indefinite Dyad (of Great and Small) or when it acquired the meaning of matter. They also seemed to defend the idea that the Dyad (or infinite) is an *arche* (a beginning or principle). Thus Aristotle complained that the Pythagoreans posit the infinite both as a substance and as something divisible into parts. He rejected this idea because he maintained that the infinite is a mode of number or magnitude and, as such, it belongs to the category of a subject's attributes and it is not the subject itself.

In the *Metaphysics* he tried to deal with this question. Aristotle kept the two Pythagorean factors, which are limit and unlimited (also called being and non-being), but added to these two a third factor: the substratum or subject matter. Thus there is a passage from privation (non-being) to being (the realised final form), and this passage occurs with the substratum or substance as basis. The passage to being is conceived as generation and its opposite (from being to non-being) is a corruption.

This theory implies that change or movement is a process that involves a distinction between potential and actual (form), because the potential is the basis from which the striving starts. This starting point is in a sense non-being, because it is still a privation of form. However, it is not non-being in an absolute sense, since in this case this potentiality would produce nothing. A change is an actualisation of potentiality, or a change from potency to act. The notion of development is implied, since the change or coming-to-be is a power that is working or developing – the *operatio* (it is not pure power or potency nor an already achieved goal). In this sense Aristotle says: "... as for becoming is between being and not being, so that which is becoming is always between that which is and that which is not; for a learner is a man of science in the making, and this is what is meant when we say that from a learner a man of science is being made" (*Met.* A, 1, 994a27).

The final cause is the conceptual instrument that allows Aristotle to deal with infinite regress. The final cause is the opposite of the infinite and as such it is conceived as the end or limit: "... those who maintain the infinite series eliminate the Good without knowing it ... the reasonable man, at least, always acts for a purpose, and this is a limit; for the end is a limit" (*Met.* A, 2, 994b10). Again, in another place, he stated: "Further, if generation and movement exist there must also be a limit; for no movement is infinite, but every movement has an end, and that which is incapable of completing its coming to be cannot be

in process of coming to be." (*Met.* B, 999b9); and: "now ... for change may be completed and there is an end of a change, and this was in fact shown to be indivisible because it is a limit" (*Phys.* Z, 5,236a10). Aristotle thus says that no movement is infinite, because it reaches the limit which is the completed form or goal. Aristotle, however, recognised that it is necessary to deal with the concept of infinity, since it is inherent to any motion: "Now a motion is thought to be one of those things which are continuous, and it is in the continuous that the infinite appears, and for this reason, it often happens that those who define the continuous use the formula of the infinite, that is, they say that the continuous is that which is infinitely divisible" (*Phys.* Γ 200b17). As he said, only the end of the change, the limit, will be indivisible.

Motion is also infinite in relation to the time which it occupies. Aristotle said in the *Phys.* 237a10: "if, then, all time is divisible, and that which is intermediate between moments is time, everything that is changing must have completed an infinite number of changes." Thus this reasoning implies that movements are subject to being potentially infinitesimally divided or infinitely composed. The approach toward a complete form is continuous, but can be conceived in terms of the potential addition of quantities, which are potentially infinitely divisible, or, as he said, "everything that is changing must complete an infinite number of changes." Thus, in Aristotle, the infinite division is only potential and never actual, because he argues that actual division will destroy the whole.

However, even with the division being potential, Aristotle managed to apply numerical analysis. When he considered qualitative changes or alterations, he applied this kind of analysis: "similarly, we have a definite thing that causes alteration and a definite thing that undergoes alteration and a certain amount, or rather degree, of alteration is completed in a certain amount of time" (*Phys.* H 250a31).

All this has stronger support when Aristotle asks about the possibility of the infinite divisibility of sensation and sensible qualities. He concluded that if body can be infinitely divisible, consequently the same is valid for the sensible qualities that it projects, as the following quotation indicates:

> A difficulty might arise as to whether, if every body is susceptible of infinite division, its sensible qualities, e.g., color, flavor, smell, weight, sound, cold and

> heat, lightness, hardness and softness, are also susceptible, or is this impossible? For each of these produces sensation; in fact they are called sensible from their capacity to excite sensation. Then on the above assumption sensation must be capable of infinite division. (*De Sensu* 445 b3–20).

He proceeded to affirm that some sensible increment is not perceptible by itself, but needs to be inter-related in an aggregate to be perceptible, stating that: “but it is important to realise that as the increment of sense is not perceptible by itself, nor isolable (for it exists only potentially in a more distinctly perceptible whole), so neither it will be possible actually to perceive its small object when separated from the whole, yet it will be perceptible, for it is so already potentially, and will become so actually by aggregation” (*De Sensu* 446a10).

6 – Stages and the Unconscious

In the preceding section, the Aristotelian idea of change as being directed towards a goal, a *telos*, was raised. In this section we will examine the idea that changes occur in stages directed to a goal, and its relationship to the idea of the unconscious.

Since all movement is succession directed toward an end, we can understand why change in Aristotle is achieved, taking into account the fulfilment of a number of stages. Each stage is a preparation for the next. Again the idea of the unity of a process is prominent. Each stage preserves its effect for the final goal and in this aspect nature imitates art. For Aristotle, in human art, we see operations directed to a purpose, according to a plan in the mind of the worker. In the same way, nature exhibits a progress towards order and perfection. It has a teleological character.

Thus in living beings, changes happen in such a way that the earlier changes are regulated in view of later results, until a completed end is reached. The whole process is similar to the role that human work plays, and therefore Aristotle used art to illustrate teleology. In his exposition there a notion of unconscious effort is implicit, since in living beings there is a succession of stages towards an end, but all this happens without deliberation. Aristotle explained:

> Now intelligent action is for the sake of an end; therefore the nature of things also is so. Thus if a house, e.g. had been made by nature, it would have been made in the same way as it is now by art; and if things made by nature were also made by art, they would come to be in the same way as by nature. Each step then in the series is for sake of the next; and generally art partly completes what nature cannot bring to a finish, and partly imitates her. If, therefore, artificial products are for the sake of the end, so clearly also are natural products. The relation of the later to the earlier terms in the series is the same in both. This is most obvious in the animals other than man: they make things neither by art nor after inquiry or deliberation. (…) If then it is both by nature and for an end that the swallow makes its nest and the spider its web, and plants (...) send their roots down (not up) for the sake of nourishment, it is plain that this kind of cause is operative in things which come to be and are by nature. And since 'nature' means two things, the matter and the form, of which the later is the end, and since all the rest is for the sake of the end, the form must be the cause in the sense of 'the for the sake of which' (*Phys.* B 8 199a11).

Importantly, Aristotle continued (*Phys.* B, 8, 199b26): "It is absurd to suppose that a purpose is not present because we do not observe the agent deliberating. Art does not deliberate. If the ship building art were in the wood, it would produce the same results *by nature*".

Hence it must be well understood that although the example of handicraft is used to better understand nature's operations, it is art, in truth, that imitates nature. Aristotle stressed that animals and plants strive to reach their goals without inquiry or deliberation. Even art does not need deliberation to produce its objects (since it becomes second nature – a habit). In the biological analogies exposed in the *Metaphysics*, the example frequently used is that of the tree seed; for example, the acorn, the potential oak tree that "struggles" to develop in order to reach its full form, the adult oak tree, the actualised seed. The seed grows until it becomes an adult tree, because in some sense it has an impulse or desire to do so. It does not have a conscious purpose nor does it consciously strive to become a tree,

since it has not any conscious thinking. However, it has desires or “strivings”. In fact, if the soul is *energeia* or activity, it is crossed with acts, which is the same thing as saying that it is crossed by forms. Here Aristotle was expressing the idea of possibility of the unconscious effort.

Concerning the relations between earlier and later stages, Aristotle explained that they are the same in those that happen by art as they are in those that happen naturally. In both cases the formal aspect precedes the material one. He stated this in places such as, for example, *Met*. Θ (8, 1050a4,) where he argued that “because the things that are posterior in becoming are prior in form and in substantiality”; and *De partibus animalium* (646a25), where he pointed out that:

> Now the order of actual development and the order of logical existence are always the inverse of each other. For that which is posterior in the order of development is antecedent in the order of nature, and that is genetically last which in the nature is first. (That this is so is manifest by induction; for the house does not exist for the sake of bricks and stones, but these materials for the sake of the house; and the same is the case with the materials of other bodies ...). In order of time, then the material and the generative process must necessarily be anterior to the being that is generated; but in logical order the definitive character and the form of each being precedes the material.

The suggestion is that it is this precedence of the form that allows living beings to strive to achieve form almost automatically, that is, without deliberation and unconsciously. Thus we can understand better why Aristotle conceived form as substance. Somehow and somewhere this previous or substantial form exists and is a condition for the appearance of the forms that we see in nature.

There is a tension in the writings of Aristotle on this subject. Aristotle’s explanation of sensation and the idea of interaction with the environment implicit in his functionalism seems to conflict with the notion that the organism develops depending only on the prescriptions already present in its essence or in its substantial form.

Leibniz and Aristotle

In this section I consider some ideas about the continuity between Aristotle and the Pythagorean–Platonic tradition, attempting to show how Leibniz helped to make this continuity more explicit.

Aristotle rejected the Pythagorean faith of the Platonists and the Platonic tradition that the order of nature is and must be mathematical in character. The criticism of Aristotle is based, for instance, on the claim that Pythagoreans and Platonists do not take into account the gap between the sphere of the ideal (and numbers are ideal beings) and the realm of the real. He reproached the Pythagoreans (in *Met.* N 3, 1090a30–35) for producing bodies out of numbers, deriving bodies out of planes, or as he said, weight out of what is weightless. Moreover, he directed his criticism to the Platonic conception that universals (Ideas) can generate particulars. Thus for Platonism, the soul is equivalent to mathematicals, and in this sense the Platonists were again the object of Aristotle's criticism (for the derivation of bodies out of numbers).

In this respect the Neo-Platonists not only did not agree with this Aristotelian differentiation between Plato and the Pythagoreans, but also considered Aristotle himself to be dependent on the philosophy of Pythagoras. Moreover, in those matters where Aristotle dissented from the Pythagoreans, he was regarded as having cut himself off from the truth. Thus for Iamblichus and Proclus, Aristotle "was something of a deviant requiring active and constant correction." [119] But Syrianus believed that *Metaphysics* could be used in the Pythagorean–Platonic tradition if some corrections were made, and Iamblichus even tried to improve Aristotelian physics in such a way as to turn it into a true "Pythagorean" science of nature.[120] Indeed, it is possible to see that both the Pythagoreans and Aristotle were concerned with immanent forms in nature. As we have seen, Aristotle placed the Platonic ideas that he transformed into his notion of form within a concrete reality as a forming power (*energeia*) that shapes matter in a specific fashion. Thus, for Aristotle the soul was also a formal reality and as such it could be, somehow, translated into numbers.

[119] O'MEARA, Dominic, *Pythagoras Revived*, Oxford, Clarendon Press, 1989, p. 180.
[120] O'MEARA, p. 128.

Leibniz followed the indication of the Neo-Platonists in working with the compatibility or continuity between the Pythagorean vision and that of Aristotle; a project that, as Randall's comments indicate, is still not finished: "the real vision of Leibniz in the seventeenth century still remains to be fulfilled: to work out a mathematical expression of the fundamental Aristotelian concepts for the understanding of the world that has generated us as beings with the natural desire to understand." [121]

But the idea of substance in Aristotle seems to be more similar to the Parmenidian unity than properly to the Pythagorean concept. His substance has no opposite and we have seen that the main concept of unity of the Pythagoreans came from the prior pair of opposites – the Limited and Unlimited. The analysis of alteration, however, has a Pythagorean influence.

The importance of Aristotle for the philosophy of Leibniz is centred mainly on the concept of substance, a thesis which is put forward almost unanimously by commentators. First there is the idea found in Aristotle that substance is individual or particular. In Aristotelian scholarship this can be subject to controversy. But it is clear that Leibniz interpreted Aristotle's substance as being individual. There is not only one individual substance, God, as in Spinoza. There is also an infinity of other individual substances, the monads. He totally rejected the notion that such a non-individual thing as space could be a substance. And, in fact, he tried to construct a science of dynamics, elaborated against Descartes, based on the notion of activity of the individual substances.[122] It is true that using Aristotle's substance as a basis for a conception of matter was a very creative act on the part of Leibniz. It is not evident that Aristotle proposed such a vitalist conception of matter, although he also insisted that the continuous is infinitely divisible. The fact is that, as far as possible, Leibniz placed the dynamics into an Aristotelian framework. Thus for him force is said to be an attribute of a subject and in other texts it is said to be the

[121] RANDALL, p. 58.
[122]We have a discussion of the controversy with Descartes in WOOLHOUSE, Roger, *Descartes, Spinoza and Leibniz: The Concept of Substance in Seventeenth Century Methaphysics*, London and New York, Routledge, 1993.

Entelechy itself.[123] Force is derived from the efforts of substances and from this conception Leibniz formulated the argument against the substantiality of space. As he put it:

> We have elsewhere explained that there was contained in material things something which has to be added to mere extension, and is really prior to it, viz., a natural force implanted by the Creator in all things. It does not consist in the mere 'potentiality' with which scholastic philosophy seems to be content, but is characterized by an effort (*conatus*) or nisus which, were it not limited by a contrary effort would also come to a complete realization…Since activity is the characteristic mark of substance; extension on the contrary affirms nothing other than the continual reiteration or propagation of an already presupposed effort and counter-effort, that is resistant substance, and therefore, extension cannot possibly constitute substance itself."[124]

Bertrand Russell said that Leibniz achieved fame exactly by his derivation of the science of dynamics from the doctrine of substances, an association that he completely failed to demonstrate.[125] But the basic idea does not seem to be totally wrong, and it inspired the whole scientific research of Boscovich.[126]

Second, Leibniz thought of his notion of substance in terms that we expressed in item (B), where Aristotle's substance is the subject of predicates. Thus Leibniz used it to explain his notion of individual substance and the entire *Monadology*. Here I shall quote a passage in which the idea of substance as the subject of predicates is connected with meaning (A), that substance is dependent on God:

> My idea of pure proposition is such that every predicate, necessary or contingent, past, present and future, is included in the idea of subject … This is

[123] Leibniz says "Aristotle calls the first Entelechies. I call the more intelligible, primitive forces which do not contain only the act or complement of possibility, but further an original activity." LEIBNIZ, *New system of nature,* 1696, Wiener, p. 108.
[124] LEIBNIZ, *Specimen Dynamicum*, 1695, Wiener, p. 120.
[125] RUSSELL, Bertrand, *A critical exposition of the philosophy of Leibniz*, p. 89.
[126] Boscovich used the theory of monad and combined it with Newtonian elements to develop a concept of impenetrability in terms of force rather than in terms of matter. WHITE, LANCELOT LAW, ed., *Roger Joseph Boscovich, S. J., F. R. S., 1711–1781, Studies on His Work on the 250th Anniversary of His Birth*, London, G. Allen & Unwin, 1961.

> a very important proposition that deserves to be well established, for it follows that every soul is a world apart, independent of everything else but God, that it is not only immortal and impenetrable but retains in its substance traces of everything that happens to it.[127]

We have seen that in Aristotle, according to conception (C) of substance there is a passage from privation (non-being) to being (the realised final form), and this passage occurs with a substratum, the substance, as a basis. This passage to being is generation, and its opposite (from being to non-being) is corruption, but the whole process has as its basis a substratum, the substance ("being" in a deeper sense). The equivalence in Leibniz is his doctrine of the immortality or indestructibility of the monads and even of animals. He said, for example, in the *Monadology*: "it is because of this, too, that there is never complete generation or, strictly speaking, perfect death, consisting in the separation of the soul. What we call *generation* is development and growth, just as what we call death is envelopment and diminution."[128] Here he was clearly following the theory that generation and corruption are not absolute events but occur with a substratum as a basis, which in no way can disappear. We also have another passage in which Leibniz connected Aristotle with other philosophers such as Parmenides and Hippocrates:

> … the ancient author of the book *On Diet*, attributed to Hippocrates, had glimpsed something of the truth when he said explicitly that animals are not born and do not die, and that the things believed to begin and to perish only appear and disappear. That is the thought of Parmenides and of Melissus, according to Aristotle. For these ancients were more solid than people believe.[129]

He expressed the same thought in a different way, in the following quotation, when he said that substance is the sphere of reality where no experience is lost:

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[127] LEIBNIZ, *Identity in individuals and true propositions*, 1686, Wiener, p. 97.
[128] LEIBNIZ, *Monadology*,*§* 73, trans. Loemker, Reidel, 1969, p. 650.
[129] LEIBNIZ, *New System of Nature* … 1695, Wiener, p. 107.

> … on my hypotheses souls are not 'indifferent to any parcel of matter', as it seems to you that they are; on the contrary they inherently express those portions with which they are and must be united in an orderly way. So if they passed into a new coarse or sensible body, they would retain the expression of everything of which they had had any perception in the old one; and indeed the new body would have to feel the effects of it. So that there will always be real marks of the continuance of the individual.[130]

This conception was useful for Leibniz in defending his theory that the monad preserves all its previous states. For him the mind is eternal thinking since: "every mind is endless duration."[131]

In Leibniz's early philosophy of, as was shown by Mercer and Sleigh, Leibniz tried to explain the generation of the organisation of living beings by substance.[132] Thus substance is mind, which is incorporeal, indestructible (eternal) and a source of constant activity, causing and maintaining the organisation of the matter in a living body. As in Aristotle there is also a connection between substantiality and activity. The mind acts through matter. As the mind has thoughts, each one of them is an action of the mind in matter and these actions produce the properties and create the organisation of a living being. In the late period, from the *Discourse of Metaphysics* of 1686 until the time of the *Monadology*, his theory was modified and mind does not directly act through matter, but "actions happen" by an adjustment inherent to the pre-established harmony. In this version, the monad loses its organisation when its perceptions become increasingly confused.

We have seen that, even in Aristotle, form must coincide with the individual subject and its essence. Also, the concept of final causes is conceived as almost coinciding with formal cause and efficient cause. Leibniz followed the same scheme. But he expanded the Aristotle's concept of immanent teleology into a cosmic teleology, connecting the final cause with the principle of the best (or Good). Thus explanation by final causes means that nature acts in an intelligent way to make everything for the best. He defended final causes not only in biology, as an explanation for the existence of organs like the eye, for example,

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[130] LEIBNIZ, *New Essays*, 240.
[131] JOLLEY, p. 90.
[132] JOLLEY, p. 81.

but also to explain the laws of physics.[133] He said that: "very far from excluding final causes and with wisdom, we must from these deduce everything in Physics."[134] Ultimately God is the foundation of final cause, or the last source of intelligence and perfection in nature, "… the true Physics may be tapped from the source of divine perfection. God is the final reason of things, and the knowledge of God is no less the principle of sciences than his essence and will the principle of beings."[135] Thus the doctrine of monads is also dependent on final causes. Therefore, the perceptions of each monad arise from one another according to the internal laws of appetitions, which are ruled by final causes guided by the idea of Good. Each monad follows its own law of the series of perceptions, something equivalent to the Aristotelian notion of essence. Here the meaning of following the final causes is that the individual is achieving its individual concept.

Leibniz's theory of perceptions of can be identified more clearly as originating in Aristotle. It was in the *Physics* that the Greek made the connection between the analysis of infinity in change (or movement) and regarded perceptions and other cognitive functions as an example of movement (an alteration) in the soul. Leibniz assumed this postulate in paragraphs ten of the *Monadology* when he wrote: "I assume it as admitted that every created being, and consequently the created monad, is subject to change, and indeed that this change is continuous in each. That this change happens by a graduation"**.** And in the thirteenth paragraph he said, "every natural change takes place by degrees." He also stressed that this graduation happens in a causative way: "Every present state of a simple substance is a natural consequence of its preceding state, in such a way that its present is big with its future" (§ 22).[136]

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[133] LEIBNIZ, *On a general principle, useful for the explanation of laws of nature*, 1687, Wiener, p. 69.
[134] Idem
[135] Idem.
[136] In this sense Randall said: "Aristotle insists that the world displays real geneses, real comings into being, with a fundamental unity and continuity, a basic temporal pattern and structure. Wherever we cut into these processes, we find them, in the words of Leibniz, the seventeenth-century Aristotelian, 'heavy with the past and big with the future.' We find that in a significant sense, every process is now what it will be. It has genuine temporal parts and relations which are essential to its being that process, and not merely incidental to it. The process cannot be adequately understood apart from this temporal character and pattern. Now this, as Whitehead made clear, is precisely our own criticism of the Newtonian philosophy of nature. That philosophy makes time as accident, we say; it does not take time seriously. It regards motion as a succession of instantaneous states, as just one state after another. This view, as Whitehead pointed out, culminates in the structureless world of Hume, in which 'anything may be followed by anything.'" RANDALL, p. 170.

As in Aristotle, Leibniz took into account the notion of desire **(***l'appetit***)** in the process of change. However, his explanation of appetition seems to be very similar to the way Aristotle talks about *enérgeia*, that is, actuality, as meaning operation, or "exercise of knowledge." Leibniz explored the connection between desire, perceptions, the unconscious, infinity and final cause or limit. Monads, he said, have perceptions with specific content and a "power of transition" or "appetition" which is a tendency to new perceptions. It seems that appetitions are not only pure movement but the tendency of a given perception to pass to a new perception in its efforts to achieve states of increased perfection. Leibniz explained, in a passage of the *Monadology* that makes clear the idea of the unconscious, that if a living thing strives to reach a goal it is necessary to have some kind of knowledge of it. The passage is in paragraph fifteen:

> The action of the internal principle which brings about change, or the passage from one perception to another, can be called appetition. In fact, the appetite cannot always attain in its entirety the whole of the perception towards which it tends, but it always obtains some part of it, and attains new perceptions.

These perceptions do not necessarily imply thought, as Leibniz explained in his correspondence with Arnauld: "[it] is enough for us to conceive a perception, without its being necessary for us [to] attach thought or reflection to that representation."[137] Usually Leibniz called these unconscious perceptions "petites perceptions" and he said that they are also necessary to create clear perceptions:

> Besides, there are hundreds of indications leading us to conclude that at every moment there is in us an infinity of perceptions unaccompanied by awareness or reflection; That is, of alteration in the soul itself, of which we are unaware because the impressions are either too minute and too numerous, or else too unvarying, so that they are not sufficiently distinctive on their own. But when

[137] LEIBNIZ, G. W., *Philosophical Texts*, Oxford, Oxford University Press, 1998, p. 132.

> they are combined with others they nevertheless have their effect and make themselves felt, at least confusedly, within the whole.[138]

Such insensible perceptions are confused while they remain single parts, but become clear as they accumulate. Leibniz explained these petite perceptions by appealing to the notion of actual infinity which he considered to be an expression of the law of continuity, as he pointed out: "all of which supports the judgment that noticeable perceptions arise by degrees from ones which are too minute to be noticed. To think otherwise is to be ignorant of the immeasurable fineness of things, which always and everywhere involves an actual infinite."[139]

As we have seen, the basis of this reasoning can be found in *Physics*. In that book we find the claim that the alterations suffer the same process of generation as happens in a living being: there is a cumulative progression of many stages or degrees until the end of the process is achieved. The infinitely divided or small is understood, through a rising process to reach a limit, becoming a complete and clear perception. Thus we have the elements for Leibniz to appropriate the infinitesimal calculus, which he invented as the mathematical expression of the analysis of the infinite, into an instrument for the analysis of cognitive faculties. As Michel Serres stated, perception is no more than an "integral" of petite perceptions: "Une connaissance donnée domine toujours une décomposition élémentaire qui la prépare, celle-ci découvre une infinité, la décomposition est différentiation et l'idée ou connaissance qui la domine est une intégrale."[140] Also the calculus puts the perceptions (and the knowledge, the memory, the creation, etc) into the context of final causes: "la théorie place également les petite perceptions dans un contexte téléologique"[141] (as we have seen, the limit was identified by Aristotle with the end or goal).

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[138] LEIBNIZ, G. W. *New Essays on Human Understanding*, trans. Renmant and Bennett, Cambridge, Cambridge University Press, 1981, 53.
[139] LEIBNIZ, *New Essays on Human Understanding*, 57.
[140] SERRES, Michel, *Le Système de Leibniz et ses modèles mathématiques*, Paris, Presses Universitaires de France, 1968. "A particular knowledge dominates an elementary decomposition which prepares it, here we discover an infinite, the decomposition of which is the differentiation and the idea or knowledge which dominates it is an integral." p. 209. The reference quoted by Serres is GERHARDT, C. I., *Die philosophischen Schriften von Gottfried Wilhelm Leibniz*, Berlin 1875–1890, V 151.
[141] "The theory places equally the *petite* perceptions in a teleological context." SERRES, p. 14.

The notion of infinitesimal perception, or its correlate, the idea of infinitesimal endeavour or *conatus* was also an object of Leibniz's attention in his thinking about dynamics. The *conatus* is said to be the origin of movement. In this he was following Hobbes, who, before him, arrived at an intuitive understanding of infinitesimal processes. Hobbes defined endeavour as infinitesimal motion or "motion made in less space and time than can be determined or assigned by exposition or number."[142] Equally for Leibniz "thinking is an endeavor or minimum motion, and there can be several endeavors in the same (space)."[143] This identification of thinking with movement, in which Leibniz followed Hobbes, Aristotle and ultimately Plato, was important for his project of deducing the science of dynamics from the monads.

In his theory of monads, Leibniz proposed that monads do not have only perceptions of their immediate experiences in its world. They have also *petite* (unconscious) perceptions of all that will happen to them in the future. Moreover, all monads express the totality of the world (all other monads) with some degree of obscurity. In a certain sense the monad is omniscient (although only on an unconscious level). In fact, to support this aspect of the theory of monads Leibniz appealed to the Aristotelian theory of the active intellect: "...in sum ... there is something divine in mind, which Aristotle called active intellect, and this is the same as the omniscience of God."[144] In fact, Leibniz said that it is God who mediates what one monad can perceive from another, or from the world. What God does is to intervene in each monad to select from the infinite set of possibilities – some of which will be gathered in a singular series of privileged perceptions. This process is similar to his work of creating a world from an infinite set of possibilities. Leibniz's conception was that a chain of these perceptions selected from the infinite background, (which is the totality of the world) will create a law of series or the concept of each individual. Thus Leibniz said that the series of petite perceptions, which are traces of former states, are constitutive of the individual. As he put it: "these insensible perceptions also indicate and constitute the same individual, who is characterized by vestiges or expressions which these perceptions conserve from the individual's former states, thereby connecting these with his present

[142] In MERCER, Christia, *Leibniz Metaphysics*, p. 162.
[143] Letter to Johan Friedrich, of May, 1671, In MERCER, Christia, *Leibniz Metaphysics*, p. 282.
[144] In JOLLEY, p. 98.

state."[145] These vestiges of former states, together with obscure perceptions or precognitions of future states, will constitute the unity of the individual concept. In the creation of this notion of sense, Leibniz was possibly also following Aristotle, who mentioned that "the unity is ... in some cases that of serial succession" (*Met.* Γ1005a11). This last assertion, combined with the Aristotelian doctrine that the sphere of the actual is prior to the potential, explains many aspects of the Leibnizian idea of the concept of the individual.

Since Leibniz used this theory to account for the individual, it is no surprise that he also used it to explain his principle of identity of indiscernible: "I have also pointed out that in consequence of imperceptible variations no two individual things could be perfectly alike…"[146] We find a better indication that Aristotle is his source in this respect in a text from 1698: *On nature in itself; or on the force residing in created things, or on the force residing in created things and their actions.* Also referring to the principle of identity of the indiscernible ("there is nowhere any perfect similarity"), he said:

> … it is, I believe, because he had understood something of this, that Aristotle, more profound in my opinion than many think, judged that in addition to local change there was need of alteration, and that matter would not be invariable. Moreover, this dissimilarity or diversity of qualities, and hence this ἄλλοίωσις or alteration, which Aristotle did not sufficiently explain, comes from the diverse degrees and directions of efforts, and so from the modifications of indwelling monads. We understand by this that there must be in bodies something besides a uniform mass and its local motion."[147]

Perhaps we could understand Aristotle's notion of *being qua being* of as that sphere of reality which has in actuality all that will happen to each monad. In fact both notions, that is, the *being qua being* and the individual monads, share self-sufficiency (except with regard to God) since they only deal with their own thoughts (a kind of self-intuition). Both

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[145] LEIBNIZ, *New Essays,* 55. Consequently it should be also a concept of possible individuals.
[146] LEIBNIZ, *New Essays,* 57.
[147] LEIBNIZ, *On Nature In Itself; Or On The Force Residing In Created Things, and Their Actions,* 1698, Wiener, p. 153.

are said to be outside the determinations of space and time. Both are said to be the principle of individuation (which can be interpreted as confounding them with matter or the source of matter. But further, the *being qua being* can be seen as an essence (as unity) that is the necessary condition for the existence of substance, which will have the gradual development of a series of predicates (the *operatio*).

This chapter has presented the concept of being and substance in Aristotle. All the sections are connected by the guiding notion that unity for Aristotle is a unity of the soul, a fact which explains that it is a thing of process, that it has cumulativity of changes and that the whole activity depends on a certain notion of the unconscious. I have compared it with Leibniz and showed that it was an important factor in his doctrine of the monad and his notion of *petites perceptions*. It is important to stress, however, that not all Aristotle's philosophy of is harmonious with Leibniz's system. A great part of the Aristotelian theory of perception, which I will discuss in Chapter 5, does not fit very well into Leibniz's system.

Chapter IV – Plotinus and Leibniz

This chapter initially contains an historical introduction to Plotinus, with some notes about his efforts towards a philosophical synthesis of the previous schools. The rest of the chapter consists of two parts. The first part attempts to show how Plotinus understood the production of substances in the eternal and their fall into the sphere of time. The second part deals with the dimension of simultaneity and the communication of substances. The theories presented in Part I are the basis for Part II. At the conclusion of each part there is a comparison with Leibniz.

Plotinus attempted to unite the many intuitions of Aristotle that are scattered in his many books into something close to a system, and he tried to unify these intuitions into a Platonic framework. Inside this framework his union of the three hypotheses of Plato's *Parmenides* is important in the creation of his system. The claim here is that Plotinus is the strongest influence in the system of *Monadology*, because Leibniz took the synthesis of Plotinus up to its final consequences.

Leibniz himself said that he was more a Platonist than anything else, that many of his basic doctrines were to be found in Plato, and that the reading of Plato had had a profound influence on the development of his thought. According to George M. Ross, this admiration for Plato has been carefully registered by scholars such as Foucher de Careil, Brunner, Schrecker and Belaval. However as Ross explains, the doctrines he saw as Platonic are different from genuine Platonism and can be best recognised as Neo-Platonist.[148]

This is true despite the fact that Leibniz had criticised some Neo-Platonists (for example, Fludd, More and Cudworth) for having distorted the ideas of Plato in various ways, either by extending spiritualism too far or by interpreting Plato too superficially. On the other hand, he praises Plotinus for his Parmenidian concept of unity, and the Renaissance Neo-Platonist and Cabalist tradition (the Paracelsians, such as the two Van Helmonts) for their universal vitalism.

[148] ROSS, G. M. *Leibniz and Renaissance Neoplatonism*, In WOOLHOUSE, R. S. (ed.) Gottfried Wilhelm Leibniz - Critical Assessment, London, Routledge, vol. IV, p. 500.

Perhaps it is specifically in the figure of Plotinus that we can find the system which, better than any other ancient school, lays the foundation of Leibniz's doctrine. The Neo-Platonists, as is known, thought of themselves as simply Platonists, or better, as followers of the ancient wisdom brought to Greece by Pythagoras and developed by Plato. However, they worked strongly to incorporate elements of the philosophy of Aristotle and of the Stoics. Facing the problems and questions postulated by both Plato (they praised mainly the *Timaeus* and the *Parmenides*) and Aristotle (as in *Metaphysics*), they made an effort to achieve a great synthesis.[149]

Thus, Plotinus constructed a system that tries to unify the three main schools of antiquity, Platonism, Aristotelianism and Stoicism, on the basis of the belief that these schools could be seen as pertaining to a very old tradition, much older than Greek civilisation. Whether he was successful in this enterprise remains in question, but it is true that the whole Neo-Platonic philosophy can be read as an eclectic enterprise in the better sense of the word recognised by Hegel:

> In the better sense of the word the Alexandrians may, however, very well be called eclectic philosophers, though it is quite superfluous to give them this designation at all. For the Alexandrians took as their groundwork the philosophy of Plato, but they availed themselves of the general development of Philosophy, which after Plato they became acquainted with through Aristotle and all the following philosophies, and especially through the Stoics; that is to say, they reinstated it, but invested with a higher culture.[150]

Having in mind this effort of synthesis, we can stress the central importance of a doctrine found in Plotinus, to the discussion of Leibniz. This doctrine, found in *Timaeus*, is the principle of participation that says "all things are in each thing, but in each according to its own way of being." In his introduction to MacKenna's translation of *The Enneads*, Paul Henry says that Plotinus is in debt to Numenius, who interpreted a passage of *Timaeus*

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[149] PLOTINUS, *The Enneads*, trans. Stephen MacKenna, London, Faber and Faber Limited, 1962, p. lxiii.
[150] HEGEL, G. H., *Lectures on the History of Philosophy*, Plato and Platonists, vol. II, Lincoln and London, University of Nebraska Press, 1995, p. 401.

(39e) to create the doctrine of three superior principles or hypostases, that he calls the three Gods: the father, the creator and the creation.[151]

Paul Henry called attention to the fact that in *V Ennead* I, 8 Plotinus discussed the three hypostases, the One, the Intellect and the Soul of the World, and regards these three principles as being connected with the three hypotheses of the *Parmenides* of Plato. The first principle is the One, the pure unity that transcends Being or the world of forms and all material reality. According to Henry, Plotinus also identified the One with the Good discussed in the dialogue of the *Republic* of Plato (*Rep.* vi 509b).[152] The association of the three hypotheses of the *Parmenides* (which are different conceptions of unity) will have important consequences for Plotinus' system and it seems that Leibniz adopted this same structure. It is not clear, however, as we have said before, that Plato would agree with this move.

The One, the Good and Plotinus' Theory of Procession

In Plotinus the notion of emanation or irradiation of powers is of central importance. He defended the premise of the fundamental reality, the eternal One, from which other realities emanate, while its unity remains intact. With this notion of pure or intact unity we can see that Plotinus made his choice between the other options of unity that existed before him. He did not choose a unity parallel to the multiplicity, as we have seen in some Pythagoreans, nor did he choose a unity produced by a previous Unlimited. He took care to separate his unity from the Being. The partless Unity only pertains to the first principle which is completely simple, the Good. It seemed to Plotinus a logical necessity that the Unity should be free of all multiplicity, as he considered that the Unity cannot be the total of beings, or a

[151] According also to P. Henry, in the time of the Middle Platonist Albinus (another possible source of Plotinus) the Platonists shared the doctrine that the trinity of causes were God, the Ideas and Matter. p liii.

[152]PLOTINUS, p. xliv. But Paul Henry also went on to suggest that the three hypostases of Plotinus recapitulate the three gods of the main schools of philosophy of Greece, the One being the Good and One of Plato, the Intellect that thinks itself is compared to the God of Aristotle and the World Soul that executes the providence in the world is the God of the Stoics. In another version Dodds, in his translation of *Elements of Theology*, referring to Porphyry, tells us that the entire trinity was discovered by the Neo-Platonists in the works of Plato combining the One of the *Parmenides*, the demiurge of the *Timaeus* and the World Soul of the *Timaeus* and the *Laws X. (*PROCLUS, *Elements of Theology*, Oxford, Clarendon Press, 2004, p. 206). The theologians of the Middle Age would not find it difficult to identify this trinity with the Christian Holy Trinity, on the grounds that they reported to the same old wisdom.

sum of beings, since in that case its oneness would be cancelled. In this sense, therefore, we can say that Plotinus accepts the considerations of Aristotle about unity. In fact after the first and simple principle, everything is contaminated by multiplicity. Thus the Unity is said to be beyond being and as such it is transcendent. However, its unity is the cause of the unity of all that comes after it.

Thus Plotinus in this sense indicated that this primordial unity is not exactly a number, but the foundation of all numbers. This gives intelligibility to the all or the being. He made intelligibility and unity equivalent, but the same unity is also the cause of the existence of beings and their forms:

> And just as there is, primarily or secondarily, some form or idea from the monad in each of the successive numbers – the latter still participating, though unequally, in the unity – so the series of Beings following upon The First bear, each, some form or idea derived from that source. In Number the participation establishes Quantity; in the realm of Being, the trace of The One establishes reality: existence is the trace of The One – our word for entity may probably be connected with that for unity.[153]

This primacy of the unity, then, is the basis for the doctrine of the emanation or procession, which postulates that this primordial reality irradiates the other levels of reality from itself. The consequence of this notion is that emanation or procession is a descending movement, which proceeds from the superior to the imperfect and from unity to multiplicity, a movement that is, in certain way, non-teleological. Plotinus said: "The emanation, then, must be less good, that is to say, less self-sufficing: now what must that be which is less self-sufficing than The One? Obviously the Not-One, that is to say, multiplicity, but a multiplicity striving towards unity; that it is to say, a One-that-is-many."[154] Thus when Plotinus defended the idea that multiplicity is a derivation from the One, he shared not the original but the later development of the Pythagorean theory, which

[153] *Fifth Ennead* V, 5.
[154] It strives towards the One-that-is many because the pure unity is beyond being. *Fifth Enn.* III, 15.

is the Neo-Pythagorean doctrine that the dyad is issued from the monad.[155] The asymmetry is present because the dyad is always less good than the monad.

The movement of emanation is counter-balanced by the tendency to return to the One, the conversion. This second movement is the turning back of that which was emanated, for the contemplation of the principle from which it derives. The ultimate goal of this movement is a striving towards its origin, and so we have the basis for the doctrine of finality. To understand better this return to the One, we need to remember that for Plotinus the One is also the Good. It is because it is the ultimate Good that the act of everything else is directed toward it, but it itself does not look for anything else. Plotinus said it is beyond existence but because it does not look for anything else, and is therefore characterised by a certain immobility or stability, it turns out to be the foundation of existence or being. Thus it is the ultimate goal and at the same time the spring of all aspiration, desire or will. Plotinus explained:

> Now, if all aspiration and Act whatsoever are directed toward the Good, it follows that the Essential-Good neither need nor can look outside itself or aspire to anything other than itself: it can but remain unmoved, as being, in the constitution of things, the wellspring and first cause of all Act: whatsoever in other entities is of the nature of Good cannot be due to any Act of the Essential-Good upon them; it is for them on the contrary to act towards their source and cause. The Good must, then, be the Good not by any Act, not even by virtue of its Intellection, but by its very rest within itself.[156]

It seems that here Plotinus was thinking in terms of the Aristotelian doctrine of the ultimate self-thinking substance as the foundation or substratum of everything else. Thus the One has a kind of activity which is its self-sufficing activity or its life. This can be called the act of essence of the One. But the act going out of the essence is its emanation, which Plotinus referred to frequently as an image (in Greek, *eidōlon*). Basically this is the dualism of

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[155] See note number 60.

[156]PLOTINUS, *First Enn.* VII, 1 This is similar to what Plotinus says about substance in the Sixth Ennead: "Substance, then is that from which all other things proceed and to which they owe their existence; it is the centre of passivity and the source of action." *Sixth Enn.* III, 4.

Platonic tradition, as propounded in *the Timaeus* (27C–29D), between the archetypal world of ideas and the world of appearances, images. For Plotinus, like Plato, the image was of less value than the original, as he indicated in the fifth Ennead: "Now even in the Divine the engendered could not be the very highest; it must be a lesser, an image."[157] In the case of the One, it is the Intellect which is the emanated image. On the next level, the Intellect is substantial activity and the soul is the act going out of the essence, its image. This same paradigm is again repeated in the relation of soul with the material world.

If the Good is self-sufficient and as such the substratum, it is nonetheless true that all that comes after looks for it also as the object of the conversion.

> The Good has no need of the Intellectual-Principle which, on the contrary, needs it, and, attaining it, is shaped into Goodness and becomes perfect by it. The Form thus received, sprung from the Good, brings it to likeness with the Good. Thus the traces of the Good discerned upon it must be taken as an indication of the nature of that Archetype: we form a conception of its Authentic Being from its image playing upon the Intellectual-Principle.[158]

The Intellect is perfected by the Good and in this process images of goodness and oneness are communicated to itself; images which are the forms (and numbers) themselves, principles of order and beauty. It is in this way that the Plotinian doctrine says that the Good is the cause of the perfecting of the Universe or Nature.[159] Ultimately the doctrine of the Good is the justification for the explanations based in final causes.

However, because the Intellect has the One–Good immanent in itself it also contains the will, which is identified with the process of intellection. Thought is the will as it attains its final goal, which is its good:

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[157] *Fifth Enn.* I, 7.
[158] *Third Enn*. VIII, 10.
[159] The same conversion happens in nature: "Nature produces by looking to the Good, for it looks towards Order – which has its being in the consistent total of the good, while the unordered is ugly, a member of the system of evil, and besides, Nature itself clearly springs from the divine realm from the Good and Beauty." PLOTINUS, *Third Enn.* V, 1.

> The contemplating Intellect, the first or highest, has self-disposal to the point that its operation is utterly independent; it turns wholly upon itself; its very action is itself; at rest in its good it is without need, complete, and may be said to live to its will; there the will is intellection: it is called will because it expresses the Intellectual-Principle in the willing-phase and, besides, what we know as will imitates this operation taking place within the Intellectual-Principle. Will strives towards the good, which the act of Intellectual-Principle realizes. Thus that principle holds what will seeks, that good whose attainment makes will identical with Intellection."[160]

Like Aristotle, Plotinus also identified thought with act or action. In other words, the act of the intellect is the thought and the culmination of the will. It is important to stress here that in Plotinus the process of intellection goes together with or is inseparable from will.

2 – The Intellect in Plotinus

Plotinus used the Pythagorean term "dyad", to describe this level of reality after the One. This is called Intellect or Intellectual Principle (or yet again Spirit, *Nous*) and is created with the introduction of principle of multiplicity or alterity, although Plotinus also uses the term "Divine Mind". The dyad is the Intellectual World, or the realm of Ideas: "'out of the indeterminate dyad and the One arise the ideas and the numbers': for the dyad is the Intellectual-Principle."[161] Here Plotinus was being faithful to Plato, who before him placed the interaction of the Limited and the Unlimited of the Pythagoreans in the transcendental sphere and not inside the world itself as the Pythagoreans thought. Thus the dyad, or matter, is the first product of the One (the Good), since it is an emanation from it, and when it turns back to contemplate the One, it generates the numbers and the Ideas from this vision. This dyad is, in fact, a kind of indeterminate intelligible matter. When it turns to contemplate the One it acquires determination, generating the *Nous* or Intellect.

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[160] *Sixth Enn*. VIII, 6.
[161] *Fifth Enn*. V, 2.

Thus contemplation or thinking implies the idea of a multiplicity of thoughts being thought. The Intellect contemplating the One thinks, besides the archetypal Ideas, an infinity of thoughts (thus it is a dyad, as Plotinus said). For Plotinus the Intellectual Principle is a Seeing and, as seeing, the Intellect implies duality or the first alterity. The first division created by the emanation of the principle of the dyad is the division of subject and object or thinker and its matter. On another level of meaning of the term "dyad", the Intellect is undetermined in its infinity (since it results from procession), but achieves form and perfection from its seeing (its reversion).[162] In some sense the Intellect is not only this amorphous infinite (or a kind of matter) because it unifies and perfects itself, creating numbers and ideas when it contemplates the One. Moreover, there is a certain circularity, because the subject and its matter confound themselves. In this sense Plotinus is part of the tradition coming from Parmenides, Plato and Aristotle, who claim that Being is equivalent to thought.

Plotinus said that Being is the Intellect thinking, and it thinks itself or its own thoughts. He explains this point when he says that the process of thinking implies the existence of a potentiality that is turned into actuality. Thus a kind of matter is being presented to thought, intelligible matter:

> The Intellectual-Principle is a seeing, and a Seeing which itself sees; therefore it is a potentiality which has become effective. This implies the distinction of Matter and Form in it – as there must be in all actual seeing – the Matter in this case being the Intelligibles which the Intellectual–Principle contains and sees.[163]

If we consider the question as to whether the Intellect was seeing the One or was seeing itself, Reale clarified: "the Spirit, in fact, doesn't think the One, but thinks itself as full and fecundate by the One."[164] This means that even at that stage the One is already immanent in Intellect. It is the final goal but it is also immanent. As we have seen, it is the

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[162] In this sense Plotinus says: "There is a infinity in the Intellectual Principle since, of its very nature, it is a multiple unity". *Sixth Enn* VII, 14.

[163] *Third Enn.* VIII, 10, *theorein* means *looking at or viewing*, rather meaning intuitive than discursive thought.

[164] REALE, G., *História da filosofia antiga*, vol. 2, São Paulo, Loyola, 1994. p. 461.

substance of the Spirit. We have already said that the Intellect produces an infinity of thoughts or ideas because of its own nature as a dyad. Thus we can conclude that in contemplating the One from its own infinite nature it at the same time creates and contemplates infinite thoughts (each thought as a formal entity implies unity).

Because the Intellectual Substance is substance in the first degree, or truly a Being, it alone has true existence and other beings have it only to a lower degree.[165] They are thinking substances and are at the same time intelligences and intelligibles, which dismiss the possibility of regarding the intelligibles as mere representations. It seems to Plotinus that since the thinking substances are in direct contact with their intelligibles and because the thinking substances are themselves intelligibles, they are consequently in the possession of truth. But this possession of their own intelligibles implies that the substance paradoxically possesses all intelligibles and this can happen because the being of the thinking substance is derived from the One. This derivation allows the Intellect to share the oneness or wholeness of the One. We can see this in the following passage from *Enneads:*

> Only the Transcendent can be that; it is the great beginning, and the beginning must be a really existent One, wholly and a truly One, while its sequent, poured down in some way from the One, is all, *a total which has participation in unity and whose every member is similarly all and one*. What then is the All? The total of which the Transcendent is the Source. But in what way is it that source? In the sense, perhaps, of sustaining things as bestower of the unity of each single item? That too; but also as having established them in being.[166]

The previous passage is worthy of note, since Plotinus enunciated the idea that the level of the Intellect is a totality in which each member "is similarly all and one." If we combine this with the notion that the Intellectual Principle is infinite, we have the picture of a totality of infinite substances, with each participating in the unity of the One and being at same time the all. In this infinite number of substances, each substance is itself an authentic being or full being, and as such it is infinite, not limited. Its infinity means that it thinks all

[165] *Sixth Enn*. I, 3.
[166] *Fifth Enn.* III, 15.

other ideas, since to think is to be. Consequently, it is in some sense all others at the same time: everything in everything. Nevertheless, the intelligible objects keep their individual identity despite being present to all others. Each one contains the whole and is part of the whole without losing its individuality in the whole. As individuals each object is subject to the qualification that the whole is present "in each according to its own way of being."

In this direction it is to be noted that not only are the general or archetypal ideas part of the Intellectual world but so are individuals and modes or accidents of individual things. Thus the Intellectual world is the producer of infinite formal diversity. Plotinus considered that there is a pre-existence of individuals in that sphere:

> Before we had our becoming Here we existed There, men other than now, some of us gods: we were pure souls, Intelligence inbound with entire of reality, members of the Intellectual, not fenced off, not cut away, integral to that All. Even now, it is true we are not put apart (…).[167]

Because each substance reflects each other, those infinite substances reflect in themselves the archetypal or general ideas.

As a result of this doctrine we also have the character of the eternity of the Intellect. Plotinus affirmed that characteristic of the Intellect in passages such as the following: "Now the life of Authentic-Existence is measurable not by time but by eternity; and eternity is not a mere more or less or a thing of any magnitude but is the unchangeable, the indivisible, is timeless Being."[168] Time, he said, is a characteristic of the Soul. In fact, it arises with the activity of the Soul, which is the sphere of succession.[169] Nothing is lacking on the level of Intellect because it is All.

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[167]*Sixth Enn.* IV, 1.4. It was a Greek belief, and it was made notorious by Socrates' biography, that each man has a personal *daimon (in Latin genius),* in the superior sphere; even Plotinus refers to it as the Primal man.
[168]*First Enn.* V, 7. Regarding this aspect, the Intellect is said to be in the sphere of the monad and not in the sphere of the dyad, because the dyad is the sphere for more or less or the sphere of graduation.
[169]*Fourth Enn.* IV, 15 Also in the *Third Enn.* VII, 13 he wrote: "Simply, that the Soul-Movement has for its Prior Eternity which knows neither its progression nor its extension. The descent towards Time begins with this Soul movement; it made Time and harbours Time as concomitant to its Act. And this is how Time is omnipresent: that Soul is absent from no fragment of the cosmos just as our Soul is absent from no particle of ourselves."

3 – The Good and Intellect in Leibniz

3.1 – The Good

Beginning with the notion of the Good, Leibniz followed Plotinus in placing the Good as the cause of the increasing perfection of things in the world and the purposive or finalist feature of the cosmos. Now, in his version of the return or conversion to the One, all the monads contemplate the cosmos or the totality with a better or lesser degree of clarity, forming a *great chain of being.*[170] This notion is not in contradiction with the assertion that the monads are contemplating the world. Leibniz, in fact, said that we can only see the world by means of God and the world itself is only a sign of this ultimate reality, God.

The degree of perfection that a monad can achieve is proportional to the clarity of its perceptions. Following the precept of Parmenides that to think is to be, as they reflect the Good with more clarity, they themselves become better or more perfected. They have a spontaneous movement, the appetition or desire, for new perceptions. Reaching new perceptions, they achieve at the same time pleasure and a new degree of perfection, in a never-ending ascent towards higher levels of perfection. In certain passages, pleasure, which is the signal of the reception of goodness, has the meaning of increasing in perfection. For example: "In us, pleasure is the sense of increase in perfection; in God it is perfection in its entirety, possessed once for all."[171]

This whole process seems to be explained by Plotinus with the idea of identification of the One with the Good, summarised in the passage quoted above where he says: "the will is intellection."

In the Intellect the intelligible substances are each a unity and they have goodness because they receive an impression from the One. Thus each intelligible substance has a definition or a limitation which constitutes its form, its oneness. Thus it is implicit in Plotinus that the idea of each form by itself implies a choice from the field of possibilities or indetermination (chaos) which is the dyad, the intelligible matter prior to contemplation.

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[170] The expression used by Lovejoy as the theme and title of his book: *The Great Chain of Being*.

[171] LEIBNIZ, *De Summa Rerum*, New Haven: Yale University Press, 1992, p. 83. Again if Plotinus says that the forms have "sprung from the Good," and so have traces of the Good, Leibniz equally says that "perception, pleasure, and happiness are everywhere." p. 83.

Following Plato (in *Timaeus* 47e–53c), he believed that matter (dyad) is a mere possibility of being. In fact, matter regarded as infinity can mean the infinity of all possibilities. Thus the act of contemplation implies choices and these are choices that are manifested in the unities of ideas or individual substances. Because the One is connected with the Good, we can say that these selections are better in relation to the previous state of indetermination of the dyad. Thus the ideas of the One and the Good meet in the concept of order. By contrast, there is no choice in Leibniz's sense, in that the understanding and the will work together and forms are produced almost necessarily.

This is not the case with Leibniz, although the *chain of beings* of his *Monadology* seems to be an example of this notion of parallelism of goodness and form. In fact, each monad is situated in the hierarchy of monads according to its degree of perfection. If perfection can be related to the pleasure or volitional aspects of the soul (will) we can understand why Loemker said that in Leibniz the will of God is identified with the understanding: "Descartes' theory of the will was promptly corrected by both Spinoza and Leibniz in the interest of the older tradition; both of them affirmed that "will is nothing but (or "does not differ from") the intellect."[172] This is the position of Plotinus and Spinoza, but I do not consider that this identification exists in Leibniz, or, rather, it exists only in parts of his system.

It is true that Leibniz was opposed to Descartes, who conceived the precedence of the will of God (which we can identify with the Good) in relation to his understanding. Thus, for Descartes, God could have chosen different laws of logic. But against the thesis of identification of the understanding and will, Leibniz asserted in *The Discourse* the precedence of the understanding. As he put it, "besides it seems that every act of will implies some reason for willing and that this reason naturally precedes the act of will itself."[173] And he continued, saying that the truths of geometry and metaphysics are consequences of his understanding which are not established by his will. "Hence their necessity is blind, unintelligent" says Joseph,[174] in so far as they are independent of final causes. But Leibniz wanted to preserve the freedom of God so that he could use this

[172] LOEMKER, L., *Struggle for Synthesis*, Cambridge, Harvard University Press, 1972, p. 131.
[173] LEIBNIZ, *Discourse of Metaphysics, Philosophical Papers and Letters*, trans. L. Loemker, Dordrecht, D. Reidel Publishing, 1969, p. 304.
[174] JOSEPH, H. W. B., *Lectures on the Philosophy of Leibniz*, Oxford, Clarendon Press, 1949, p. 90.

prerogative to make a better choice (intelligent choice) in the production of the most perfect world, whose laws are for this reason contingent. God has a will, which is the capacity for choosing: "… we take the will for the power of choosing, the exercise of which is volition."[175]

The One of Plotinus, as for Plato, on the contrary, seems to necessarily produce the world. As Lovejoy said: "This expansiveness or fecundity of the God, moreover, as Plato clearly implies, is not the consequence of any free and arbitrary act of choice of the personal creator in the myth; it is a dialectical necessity."[176] This view was followed by Spinoza, who said that: "God produces the world by that necessity by which he knows himself."[177] But the God of Leibniz uses creative intelligence and his prerogative of choice to produce the best possible world. And for this reason he reproached Spinoza; "From what precedes it is seen that what Spinoza says on the intellectual love of God (*Eth*., pt. 4, prop. 28) is only trappings for the people, since there is nothing lovable in a God who produces without choice and by necessity, without discrimination of good and evil."[178]

Leibniz rejected the idea of those "who say that the works of God are good only for the formal reason that God has made them."[179] This seems to be the case for Plotinus, but Leibniz also shares some similarities with him. Leibniz also treated the initial state as unordered. Thus, the infinity of the possible objects precedes order, since they can be contradictories. As such they are completely without form, and are chaotic or unthinkable. In this sense Leibniz said: "All possibles cannot be understood distinctly by anyone, for they imply contradiction."[180] Contradiction, therefore, is the principle of impossibility. To give order to chaos means to give existence to some possibles, turning them to actuality by exclusion of the contradictory. The creation of order occurs then, since the exclusion of contradictories allows for a nexus of subordination of the possible into a totality, or an order of connection inside the whole. In this sense the principle of identity is itself achieving the good by eliminating the contradictory and so creating order. But after the separation of the incompatibles into compatible wholes, we still need the exercise of

[175] LEIBNIZ, *Refutation of Spinoza* (1708), Wiener, p. 493.
[176] LOVEJOY, A., *The Great Chain of Being*, Cambridge, Harvard University Press, 1964, p. 54.
[177] Ep. 49 quoted by Leibniz, in LEIBNIZ, Wiener, p. 492.
[178] LEIBNIZ, *Refutation of Spinoza* , Wiener, p. 496.
[179] LEIBNIZ, *Discourse of Metaphysics, section 2*, Loemker, p. 304.
[180] LEIBNIZ, *De Summa Rerum*, p. 29.

choice. Thus from a group of many sets of possibles it is necessary to choose one, of which the constitutive order is more harmonious, to produce the world. The idea that guides Leibniz is also that God is working with a continuous entity, and as such, it involves an infinity from which He can make his choices. Leibniz always had in mind the analogy of geometrical continuity: "… Geometrical figures appear simpler than moral entities; but they are not so, because anything which is continuous involves an infinity, from which selections must be made."[181] From a continuous plane someone can draw an infinity of forms of triangles, but if s/he wants the most perfect form, s/he will choose the equilateral, whose symmetry of proportions, in some sense, reflects the unity of God. Thus, choosing the best from the several possibles is *influenced* by the perfection (goodness) of God. Furthermore, for Leibniz it was also a condition of this perfection that he could exert his creative freedom. Thus God always chooses the best, and Leibniz always maintained that he does so without being compelled. Thus the principle of the best is the criterion according to which God chooses to mould the infinite matter into the best of possible worlds, choosing the most perfect world, which is the one with more reality or more being. According to the principle of Perfection, the best possible world is that which has the maximum reality. This means the maximum of diversity produced by the simplest cause: "simplest in hypothesis and richest in phenomena." This is also the criterion for efficiency in the creative act of God, since it allows the production of the most with the least expenditure.[182] Thus we can say that the proper work of the creative intelligence of God is based on the principle of the Best and linked with the philosophical notion of Good.

But this perfect world is the only possibility that achieves reality, that is, becoming the World. Many possibilities will remain possibilities for ever. This is in direct contrast with Plotinus' view because, he said, following Plato, that the infinite power of the One is capable of producing an equally infinite effect, which is the Intellect in its infinite contemplation, ultimately the origin of everything in the world.[183] Lovejoy analysed this

[181] LEIBNIZ, *New Essays*, p. 385.
[182] "As for the simplicity of the ways of God, this is shown especially in the means which he uses, whereas the variety, opulence and abundance appear in regard to the ends or results. The one ought thus to be in equilibrium with the other, just as the funds intended for a building should be proportional to the size and beauty one requires in it." LEIBNIZ, *Discourse*, section 5, Loemker, p. 306.
[183] Plotinus also had the conflicting ideas that the emanations of the One are always of less value than the One itself. For this reason matter is sometimes considered as a sign of evil or imperfection. The idea of conversion or return to the One requires or supposes this notion.

point, from which we deduce that not only the best possible but all possibles must be made real:

> How many kinds of temporal and imperfect beings must this world contain? – the answer follows the same dialectic: all possible kinds. The 'best soul' could begrudge existence to nothing that could conceivably possess it, and 'desired that all things should be as like as himself as they could be.' 'All things' here could consistently mean for Plato nothing less than the sensible counterparts of every one of the Ideas … In the *Timaeus*, it is true, Plato speaks of 'living things'…but in respect of these, at least, he insists upon the necessarily complete translation of all the ideal possibilities into actuality … the fullness of the realization of the conceptual possibility in actuality … If any eternal essences have temporal counterparts, the presumption was that all do so, that it is of the nature of an Idea to manifest itself in concrete existences. If it were not so, the connection of the two worlds would have seemed unintelligible … I shall call it the principle of plenitude, … not only the thesis that the universe is a *plenum formarum* in which the range of conceivable diversity of kinds of living things is exhaustively exemplified, but also any other deduction from the assumption that no genuine potentiality of being can remain unfulfilled, that the extent and abundance of the creation must be as great as the possibility of existence and commensurate with the productive capacity of a 'perfect' and inexhaustible Source, and that the world is the better the more things it contains.[184]

In some sense Leibniz shared this view as well. Thus, for him, the axiom of perfection of God goes together with another notion: the idea of the equipollence between cause and effect: "We say that the effect involves its cause; that is, in such a way that whoever understands some effect perfectly will also arrive at knowledge of its cause. For it is necessary that there is some connection between a complete cause and the effect."[185] The

[184]LOVEJOY, A., *The Great Chain of Being*, Cambridge, pp. 50–52. Lovejoy's references are the Platonic dialogues of *Parmenides* 130 c, e and *Timaeus* 39 e, 42e, 51 a, 92 c.
[185] LEIBNIZ, *De Summa Rerum*, p. 51.

most important thing is that he uses this principle as an example of the correspondence of God and the world: "... every complete effect represents a complete cause, for from the knowledge of the effect I can always infer its cause. Thus … the world itself in a sense represents God."[186] The principle of equipollence is important for the science of dynamics, since it is built in analogy with the properties of the soul, and so the forces are also ultimately dependent on or in analogy with the Good (or the process toward the Good, the will). For Leibniz dynamics is related to the *conatus* of the monads, that is, their appetition or effort of passage from one perception to another. Ultimately, since the Good is identified with the One (in Plotinus), we have a clue regarding the principle of conservation in dynamics.

But if God manifests only some of his ideas, the axiom of equipollence cannot be defended. The Intellect is the most immediate emanation from the One; it shares more than any other reality its characteristic goodness (its forms). Thus it is the main mediate source of the order and perfection delivered to Nature. All ideas or all possible individual intelligible concepts therefore have some degree of goodness/oneness. Following Leibniz, these ideas could never be manifest, and consequently part of the goodness of God will never be manifested. The equipollence would be ruined.

But we still can attempt to understand this axiom on the basis of Leibniz's claim that this is the best of the worlds. Thus if God is perfect and he is a cause, the world, as his effect, must be perfect too. But in this case we cannot see why a perfect Being will have possible thoughts, less perfect ones, which he will never express in the world. This seems to be against the principle of economy that Leibniz defends as the rule of the creation of the world.

3.2 – The Intellect in Leibniz

The infinite and eternal generation of intelligible substances in Plotinus in the sphere of the intellect can help us understand some concepts in Leibniz. Firstly, it can provide an explanation for the diversity of perception in each individual subject on that level. And secondly, it provides an understanding of the doctrine of the immanence of knowledge in

[186] LEIBNIZ, *What is an idea*? (1676), Wiener, p. 282.

the substance, which is ultimately the basis of Leibniz's doctrine that the monads have no windows.

The discussion of the Intellect in Plotinus, with his assertion that the infinity of forms is created by it was, perhaps, a starting point for some of the Leibnizian tenets. Thus, Plotinus' statement that the infinity of forms or intelligible things is created as an emanation of the One has its exact equivalence in Leibniz, in that God emanates the infinite souls. The model for this creation is the form of God itself, which is varied infinitely according to different perspectives or from the point of view of the contemplation of God. In Leibniz usually there is no differentiation between One and Dyad, because the intellect is the mind of God, but the idea of infinity of form produced by contemplation is present in his philosophy.[187]

Leibniz was usually very close to Plotinus in defending a theory of emanation. Thus he said in the *Discourse of Metaphysics:*

> Now it is clear, first of all, that the created substances depend on God, who preserves them and indeed even produces them continually by a kind of emanation, as we produce our thoughts. For God turns the universal system of phenomena which he has seen fit to produce in order to manifest his glory, on all sides and in all ways, so to speak, and examines every aspect of the world in every possible manner, there is no relation which escapes his omniscience, and there thus results from each perspective of the universe, as it is seems from a certain position, a substance which expresses the universe in conformity to that perspective, if God sees fit to render his thought effective and to produce that substance.[188]

In a text written when he was young, *De Summa Rerum,* he expressed the same idea with a small modification, that the variety of perspectives comes from the same essence.

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[187] Sometimes Leibniz sustains a sharp dualism of God and Matter (that is, nothingness). Thus he says: "All creatures derive from God, and from nothingness (*Nichts*). Their self being (*Selbstwesen*) is of God, their nonbeing (*Unwesen*) is of nothing. (Numbers too show this in a wonderful way, and the essences of things are like numbers". *On The True Theologia Mystica*, 1690, Loemker, p. 368. However this view is contrary to the general framework of the system of *Monadology* which is a kind of monist idealism.

[188] LEIBNIZ, *Philosophical Papers and Letters*, Discourse, Section 14, Loemker, p. 312.

The infinity of form is only a variation, by means of different perspectives, of the contemplation of the same entity (God), just as in Plotinus infinite variability is produced from the contemplation of the One: "There is the same variety in any kind of world, and this is nothing other than the same essence related in various ways, as if you were to look at the same town from various places…"[189] And this essence is said to be the essence of God: "hence it comes about that the same essence of God is expressed in any genus of the world in its totality, and so God manifests himself in infinitely many ways."[190]

In another part of the *Discourse of Metaphysics* we also have the doctrine of substances explained in terms of emanation.[191] God is said to be light and the soul its image. The next passage is important because it displays the famous doctrine of Leibniz in which he says that the soul is alone with God. This is one of the arguments of his theory of non-communication between the monads:

> God is the only immediate object of our perceptions which exist outside of us, and he only is our light. In the rigorous sense of metaphysical truth there is no external cause which acts upon us except God alone, and he alone communicates himself immediately by virtue of our continual dependence upon him. Whence it follows that there is no external object that affects our soul and immediately excites our perception. It is also only by the virtue of the continual action of God upon us that we have in our soul the idea of all things; that is to say every effect expresses its cause, the essence of our soul is a certain expression, imitation or image of the divine essence, thought, and will and of all the ideas which are comprised in God

After this passage comes Leibniz's connection of the Platonic metaphor of the sun with the Aristotelian intellect agent:

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[189] LEIBNIZ, *De Summa Rerum*, trans. G. H. R. Parkinson, New Haven and London, Yale University Press, 1992, p. 83.
[190] LEIBNIZ, *De Summa Rerum*, p. 71.
[191] LEIBNIZ, *Discourse*, section 14, Loemker, p. 311.

> God is the sun and the light of the souls (...) In addition to the Holy Scriptures and the Fathers, who were always more Platonists than Aristotelians. I recall having observed long ago that at the time of the Scholastics, several believed that God is the light of the soul, and as they put it, the *intellectus agens animae rationalis.*[192]

Plotinus referred to the level of the Intellectual Principle where the vision of everything seems to be an instantaneous intuition, and it is the condition necessary for the existence of infinity of forms on the level of reality where successiveness reigns, the reign of the Soul. The multiplicity which is simultaneous on the level of Intellect unfolds itself in the successiveness and is thus the condition of the finalist doctrine. The hypostasis of Soul is an emanation from the Intellect and as such it depends on it. This dependence can be translated as the relationship that exists between cause and effect.

In Leibniz, the infinity of forms will be present in the mind of God, but also in each individual mind, there is an intelligible world, following the doctrine of All in All. Leibniz expressly presented his ideas as being supported by the Plotinian system, explaining the differences between the mind of God and us. In a letter to Hansch of 1707 he wrote:

> Furthermore, as Plotinus has rightly said, every mind contains a kind of intelligible world within itself; indeed, in my opinion it also represents this sensible world to itself. But there is an infinite difference between our intellect and the divine, for God sees all things adequately and at once, while very few things are known distinctly by us; the rest lie hidden confusedly, as it were, in the chaos of perceptions. Yet the seeds of things we learn are within us.[193]

Thus Leibniz not only adhered to this idea of an intelligible world within us but also added that even the sensible world is part or is included in that intelligible sphere. This notion is consistent with Plotinus' system, in which the sensible world is the last manifestation of the hypostasis of the Intellect.

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[192] LEIBNIZ, *Discours*e, section 28, Loemker, p. 321.
[193] LEIBNIZ, Letter to Hansch on the Platonic Philosophy or on Platonic Enthusiasm, Loemker, p. 593.

Connected with this theme we have Plotinus' notion, that the Intellectual Principle is a substance whose activity is basically self-awareness or self-reflection (a doctrine which recalls Aristotle's self-thinking substances). This will also be a central theme in Leibniz, although mediated by Augustine's and Descartes' rethinking of it. Thus, for Leibniz, human self-consciousness, which he called apperception, is a kind of intuitive knowledge that is the key for many basic metaphysical concepts (of the referred intelligible world) which are also called perfections of God. By reflecting on himself, the subject can, by analogy, reach these basic notions. Thus the metaphysical notion of unity arises from reflection on the I or self. The simple internal experience of oneself can also give us the notions of substance, action (or force) and others, which is sufficient proof that they do not come from the senses. In a letter to Queen Sophia, in 1702, Leibniz affirmed that from this introspection we arrive at the basic metaphysical notions or simple Ideas of God:

> And since I conceive that there are other beings who have the right to say 'I', or for whom this can be said, it is by this that I conceive what is called substance in general. It is the consideration of myself also, which provides me with other concepts in Metaphysics, such as those of cause, effect, action, similarity, etc., and even those of logic and ethics.[194]

Thus we can see here that his idea of substance, the ultimate foundation of reality, has support in the idea of the self-reflecting ego. The self-reflecting ego is autonomous regarding the external world in the process of acquiring knowledge (at least of the truths of reason):

> What the ancient Platonists have said is thus quite true and quite worthy of consideration – that existence of intelligible things, particularly of the I who think and am called a mind or soul, is incomparably more certain than the existence of sensible things and that it would not be impossible, speaking with metaphysical rigor, that there should exist at bottom only intelligible

[194] LEIBNIZ, *On what is independent of sense and of matter* (letter to Queen Sophia Charlotte of Prussia, 1702), Loemker, p. 549.

> substances, of which sensible things would be only appearances. Instead, our lack of attention causes us to take sensible things for the only true ones. It is also well to observe that if I should discover some demonstrative truth, mathematical or other, in a dream (and this can in fact be done), it would be just as certain as if I were awake. This shows that intelligible truth is independent of the truth or existence of sensible and material things outside of us. This conception of being and of truth is thus found in the ego and in the understanding rather than in external senses (…). In the understanding we discover also what it means to affirm, to deny, doubt, will, and act. But above all we find there the force of the conclusions in reasoning, which are a part of what is called the natural light."[195]

In all that we have referred to so far we see that the emphasis of Leibniz recalls the Platonic theory of knowledge, in something similar to the theory of reminiscence. The conception of the external environment as a source of knowledge is almost non-existent and, in this aspect, Leibniz is very far from Aristotle. Leibniz's conception is that the natural light, which is the distinct understanding of the nature of the mind and its innate ideas, allows us to know the necessary truths or truths of reason with no need for the senses. They are always there, shining in the depths of the soul, but are obscured by our attention to the confused external things and our inclination to the necessities of the body. But for Leibniz this intuitive knowledge, which begins with the experience of self-consciousness, allow us to know not only most abstract principles or concepts, but also to know intuitively that we think a multiplicity of thoughts. Thus, from self-experience I can infer the existence of the world (to which this multiplicity of thoughts refers). Here he seems to be talking not only of truths of reason, but also about the truths of fact. And in fact even the self-thinking basis of truth or reason seems to be derived from the fact that we have inner experiences:

> As for primary truth of fact, these are inner experiences which are immediate with the immediacy of feeling. This is where the first truth of the Cartesians and

[195] LEIBNIZ, idem, Loemker, p. 549.

> St. Augustine belongs: I think therefore I am. That is, I am a thing which thinks. But we must realize that just as identities can be general or particular, and that they are equally evident in either case (since A is A is just evident as a thing is what it is) so it is with the first truth of facts. For not only is it immediately evident to me that I think, but it is just as evident that I think various thoughts; At one time I think about A and another about B and so on. Thus the Cartesian principle is sound, but is not the only one of its kind. This shows that all the primary truths of reason and of fact have in common that we cannot prove them by anything more certain.[196]

Most important is that for Leibniz, as it was for Aristotle, it is from the intuitive experience of oneself or self-awareness that we can deduce the abstract principle of identity, that he called the general law of being. This is the fundamental principle of reason, since it gives intuitive legitimacy or immediate validity to connections between coherent notions. And so it is the basis for the building of all discursive reasoning. As Loemker stressed, this principle is also broadened into a guiding scientific axiom since the principles of equality in mathematics (for instance, in algebraic equations), of congruence and similarity in geometry and mechanics, the principle of the equipollence of cause and effect or conservation in dynamics, and also the logical notion of identity of complete subject and complete predicate, are very important for the construction of his doctrine of monads.[197]

4 – The Hypostasis of Soul in Plotinus

In Plotinus we have a sphere of time in which the simultaneity of states of the universe can occur. Later (in the logical sense), this sphere will be translated into the successiveness of states of the entity in the realm of process, the soul.

Thus in the Hypostasis of Intellect proposed by Plotinus, the past and the future are contained in the eternal now:

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[196] LEIBNIZ, *New Essays*, 367.
[197] LEIBNIZ, Loemker, p. 45.

> Certainly there is no later in the divine; what is There as present is future for elsewhere. If then the future is present, it must be present as having been fore-conceived for later coming to be; at that divine stage therefore it lacks nothing and therefore can never lack; all existed, eternally and existed in such a way that at the latter stage any particular thing may be said to exist for this or that purpose; the All, in its extension and so to speak unfolding, is able to present succession while yet it is simultaneous; this is because it contains the cause of all as inherent to itself.[198]

Plotinus presented the notion of the Intellectual Principle, in which everything is simultaneous, as the necessary origin of the seminal causes of everything. It is a necessary condition for the existence of the world of process. The essence of a thing in Nature is its cause, which is a kind of "Idea itself, unfolded". This is what Plotinus called the Reason–Principles in Nature and this originates from the Intellectual realm. According to Cudworth, this is equivalent to the metaphysical seeds or seminal reasons of the Stoics.[199] Thus, the theme of successiveness of acts of soul in Plotinus is treated with the adoption of the idea of *spermatikos logoi*.[200] This notion, in its turn, is an adaptation of Aristotelian concepts, if we accept David Hahm's thesis.[201] In fact, it was Aristotle who took the Platonic eternal Ideas and brought them to the natural world, making them operative, and thus creating the concept of *Entelechies*.

The Stoic cosmobiology, however, emphasised the fact that the *spermatikos logoi* are metaphysical seeds containing the "seminal formula", which will govern the developing individual, unfolding itself according to the seeds' fate. The *logoi* contained the "seminal

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[198] *Sixth Enn*. VII, 1.

[199] CUDWORTH, R. *The true intellectual system of the universe*, Stuttgart-Bad Cannstatt, Frommann, 1964. This notion appears in several parts of Cudworth's work.

[200] Plotinus' Reason Principle of is also guided by Providence or fate, ultimately coming from the Intellectual World: "The Reason Principle has two phases, one which creates things of process and another which links them with their higher beings: These higher beings constitute the over providence on which depends that lower providence which is the secondary Reason-Principle inseparably united with its primal." *Third Enn*. III, 4.

[201] Hahm wrote: "thus the *spermatikoi logoi* in the cosmos or any other living thing are the formulas or principles contained in the seed of anything that determines what it shall be and how it shall behave during its life. The concept of formulas or formulas governing the development, form and activity of the cosmos and all living things in the cosmos is surely a Stoic appropriation of the Aristotelian concept of the same name, the *logos."* HAHM, D., *The Origins of Stoic Cosmology*, Ohio State University Press, 1977, p. 76.

formula" which governed the developing of the individual and how it would behave. The original seed was said (perhaps this is a Pythagorean reminiscence) to be made of fire (by Cleanthes) and was completely ruled by fate (*heimarmene*).[202] The Stoics also linked this concept of fate with the idea of the cause as continuity. "*Heimarmene* is the continuous (literally: strung together) cause of things."[203] For Plotinus, the Reason–Principle is the unfolding of the Intellectual Principle in the realm of soul or in matter in the same way as there was for the Stoics the development of their metaphysical seeds. This is the creative or demiurgic work of the soul (in accordance with the Intellectual Principle) and it follows a pre-ordered rule or plan.[204]

Plotinus equivalently says: "Given the Reason-Principle (the out going divine idea) of a certain living thing and the Matter to harbor this seed principle, the living thing must come into being: in the same way."[205] The essential existence encompasses things of nature in its whole time of existence, from its beginning to its end, and in this sense it is its cause. These things were generated, as we have seen, in a sphere outside the dimension of time. Later on Augustine used this idea. In his account of the creation, in the book *The Literal Meaning of Genesis,* Augustine already proposed that in the event of creation God produced the seeds of all creatures at once.[206] It was left for the ages to develop all the seeds and the contents of the seeds in due time.

Following the teaching of Aristotle, Plotinus posited the intellectual substances as those substances that are already activated, and as such they can awaken what is on the level of mere potentiality in the lower level of reality, that of the soul. For Plotinus, then, the Intellect is its entire content, simultaneously present or eternal. He differentiates it carefully from the process of the soul: "But though Intellect possesses them (his

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[202] HAHM, D., pp. 77–80.

[203] SAMBURSKY, S., *Physics of the stoics*, Edinburgh, Routledge Kegan Paul, 1959, p. 57.

[204] "The Intellectual Principle, then in its unperturbed serenity has brought the universe into being, by communicating from its own store to Matter: and this gift is the Reason-Form flowing from it. For the emanation of the Intellectual Principle is Reason, an emanation unfailing as long as the Intellectual Principle continues to have place among beings" *Third Enn*. II, 2.

[205] *Fifth Enn*. IX, 9.

[206] AUGUSTINE, *The Literal Meaning of Genesis*, trans. John Hammond Taylor, vols 41 and 42 in the series, Ancient Christian Writers, New York, Newman Press, 1982; "But from the beginning of the ages, when day was made, the world is said to have been formed, and in its elements at the same time there were laid away the creatures that would later spring forth with the passage of time, plants and animals, each according to its kind" (6.1.2) "In all these things, beings already created received at their own proper time their manner of being and acting, which developed into visible forms and natures from the hidden and invisibles reasons which are latent in creation as causes" (6.10.17).

constituents) all by way of thought, this is not a discursive thought, nothing it lacks that is capable of serving as Reason Principle, while it may itself be regarded as one great and Perfect Reason Principle ... It is a universal rule that whatever reasoning discovers to exist in Nature is to be found in the Intellect apart from all ratiocination." [207] The Intellectual Principle is also a vision, but it possesses what it sees, since it possesses itself. There is no deficiency there. But the soul has a certain deficiency or lack of perfection, since it looks toward the Intellectual Principle for what it does not have, to be perfected by it. This is the reason why Plotinus says that "Wisdom comes first" while "Nature is last" but also: "Nature doesn't know, it merely produces."[208] Nature acts intelligently, following an ordered series of steps, but does so without deliberation. Thus, for Plotinus, the notion of unconscious teleology also occupies a central place in the metaphysical scheme.

However, in other passages, Plotinus said that Nature does not have any deficiency. This is not an inconsistency of Plotinus because he was then considering the idea of the immanence of the Intellectual Principle (in the form of the Reason–Principle) in the soul and in Nature (regarded as the creative phase of the soul), which is the reason why he uses the term self-intellection: "... Nature does not lack; it creates because it possesses. Its creative act is simply its possession of its own characteristic Essence; now its Essence, since it is Reason–Principle, it is to be at once an act of contemplation and an object of contemplation."[209]

But the soul is not the Intellect. Thus Plotinus explained that the discursiveness accompanies movement and both pertain to the realm of the soul. The movement, in fact, is caused by the successive process of reasoning or the discursiveness of the soul, as it unfolds the content of the Intellect. Thus when the soul turns back to contemplate its origin it is perfected, but this happens gradually, by the process of reasoning: "Sprung, in other words, from the Intellectual-Principle, Soul is intellective, but with an intellection operation by the method of reasoning ..."[210] The soul is also an intelligible being and is activated when it turns to contemplate the Intellect. This is an intellective act or effort of the soul and it operates by reasoning, or successiveness of reasons. Obviously reasoning has a specific

[207] *Sixth Enn*. II, 21.
[208] *Fourth Enn*. IV, 13.
[209] *Third Enn*. VIII, 3.
[210] *Fifth Enn*. I, 3.

meaning here. It does not mean deliberation exactly. It means that the unfolding of the content of the Intellect happens by degrees. Thus Plotinus adds that all kinds of life can be described as forms of thought, which vary in grades of thinking, and we have again the notion that the soul results as an emanation from the Intellectual-Principle, and, as such, the souls constitute seminal reasons, or Reason Principles, which manifest themselves in different degrees:

> In a certain sense no doubt all lives are thoughts – but qualified as thought vegetative, thought sensitive and thought psychic. What, then, makes them thoughts? The fact that they are Reason-Principles. Every life is some form of thought, but of dwindling clearness like the degrees of life itself ... Thus every Life, of the order strictly so called, is an Intellection. But while men may recognize grades in life they reject grade in thought… This is simply because they do not seek to establish what Life is. The essential is to observe that, here again, all reasoning shows that whatever exists is a bye-work of visioning (…).[211]

Thus Plotinus understood life as a certain kind of discursive thinking, as life varies in degrees because the soul gradually converts to its Intellect.

In many places in the *Enneads*, Plotinus insisted that the soul creates, after contemplation, a doctrine which is a development of the Parmenidian doctrine of the identity of being and thought. Thus, for Plotinus, to think or to see is to bring into being, or to see is to become what is seen, by virtue of the Parmenidian principle: "Thus the act of production is seen to be in nature an act of contemplation, for creation is the outcome of a contemplation which never becomes anything else, which never does anything else, but creates by simply being contemplation."[212] The soul accordingly has two aspects in its

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[211] *Third Enn*. VIII, 8. But Plotinus understands the existence of grades of Life also in another sense. The matter of a body of a living being is alive too. Our failure to perceive the life in these matters cannot be a proof that it does not exist: "How an ensouled living form can include the soulless: for this account allows grades of living within the whole, grades to some of which we deny life only because they are not perceptibly self-moved: in truth, all of these have a hidden life; and the thing whose life is patent to sense is made up of things which do not live to sense, but, nonetheless, confer upon their resultant total wonderful powers towards living." *Fourth Enn*. IV, 36.

[212] *Third Enn*. VIII, 3.

action; it contemplates the Intellect on one side and produces Nature on the other. In fact, the creation of Nature is a mere by-product of the contemplation of the Intellect.

I consider that this exposition shows the strong immanentism of the philosophy of Plotinus. The subject has certain autonomy. All that happens is the development of an essence given since eternity. Consequently there is a devaluation of the external world, considered as a causative sphere. According to Plotinus, the external circumstances are not decisive. The same circumstance acts differently on different individuals, as the perception or judgment of the soul varies. But Plotinus attempted to avoid the notion of Stoic Providence or *Heimarmene* as a factor determining what will happen to a certain subject. He tried to stay close to Aristotle's original notion of essence . Thus when he gave the example of the different conduct of persons he said: "The act of the libertine is not done by Providence or in accordance with Providence; neither is the action of the good done by Providence – it is done by the man – but is done in accordance with Providence, for it is an act consonant with the Reason-Principle."[213]

5 – Leibniz – Soul

Plotinus' notion of the eternal Intellect can provide a framework to explain Leibniz's notion of individual concept. This notion implies that all states or perceptions (the predicates of the substance) that will happen to a certain individual subject are somehow totally given beforehand. Plotinus said that the substance considered as Soul presupposes the existence of the intelligible substance. But the intellectual substance of Plotinus exists basically in act and not activity and, in this sense, it can be compared to Leibniz's individual concept of in the sense that it has already presented all events that will happen to the monad. Hence, the monad considered as an entity of process must presuppose the existence of this other stance or it could never have any intuition of its future states, as Leibniz claimed. We could say that the individual concept is the condition for the actualisation of the perceptions of the monad regarded as a thing of process. This is why he said the monad has no need of anything outside itself. It becomes what it is by self contemplation or self-thinking, because its individual notion as well as the intelligible world is immanent in itself, almost in the

[213] *Third Enn*. III, 5.

same way as posited by Plotinus. Its duration is nothing more than the development of the content of its individual notion. The doctrine of individual concept is therefore strongly based in Plotinus, who in turn was inspired by Aristotle's notion of essence and the Stoics' notion of metaphysical seeds. These doctrines were accepted by Augustine, who saw them as being in concordance with the Biblical narrative. It is therefore strange that this notion of individual concept met with so bitter a reception on the part of Arnauld. After having received the thesis of Leibniz by means of Landgrave, Arnauld replied to this last:

> I find in these thoughts so many things to frighten me, and which if I mistake not nearly everyone will find so shocking, that I cannot see what would be the use of a writing that all the world apparently would reject. I will give as an example only what is said in article 13 – that the individual notion of each person contains once for all all that will ever happen to him.[214]

Arnauld found this notion frightening because for him it seemed to imply a "necessity more than fatal."

In the following correspondence Leibniz tried to convince Arnauld of his view in a detailed argumentation. But my purpose here is only to show that Leibniz was following the framework posited by Plotinus' synthesis . As quoted above, Leibniz said that "God sees all things adequately and at once, while very few things are known distinctly by us; the rest lie hidden confusedly, as it were, in the chaos of perceptions." In the *Discourse* he says: "One could call our 'essence' or 'idea' that which contains all that we express, and as it expresses our union with God himself, it has no limits …"[215] In these propositions it is clearly implicit that the individual created substance cannot see the infinity of all things at once as God can. The soul or monad cannot see and will never see all things adequately, because it is attached to a certain point of view; this is its individuality. But in a limited way it shares the omniscience of God. From its individual point of view the soul can see, although dimly, the all. Thus for Leibniz, the infinite series of confused perceptions of the soul, which are organised in a series, becomes the foundation of the theory of individuality,

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[214] In JOSEPH, H. W. B., *Lectures on the Philosophy of Leibniz*, p. 4.
[215] LEIBNIZ , *Leibniz Philosophical Writings*, trans. Parkinson p. 29.

which he calls also the “idea” or “essence” of the individual. The principle that to see is to become what is seen (or the equivalence between to see and to be) seems to be the case of the monads, as their identity or essence lies in their individual series of perceptions. This notion demands that this particular infinite series of perceptions should be regarded as the individual’s point of view of the universe:

> What is most noteworthy in this is, that individuality involves infinity and only he who is capable of understanding it (infinity) can have knowledge of the principle of individuation of such or such thing, which comes from the influence (rightly understood) of all things in the universe on one another.[216]

Thus the idea of the individual concept implies a point of view regarding the totality of the Universe. This can happen because the soul brings with itself the intelligible world and so it, in some sense, has the science of everything that happens in the world. This is more or less the doctrine of Plotinus, that the intelligible substances which mirror the All present in the Intelligible World are brought to the realm of process, the realm of the soul. Leibniz proposed that the soul will have a specific position in the universe in such a way that it will obtain a specific set of perceptions, which are the basis for its individual notion. But this point of view and these privileged perceptions do not preclude the perception of the rest of the universe, although dimly: “Thus when we consider the connection of things, it can be said that there are at all times in the soul of Alexander traces of all that has happened to him and marks of all that will happen to him and even traces of all that happens in the universe, though it only belongs to God to know them all.”[217]

Obviously, this conception implies that is inappropriate to separate the individual into two parts, its future and its past, which will destroy its unity as substance. The identity of the individual requires the conception of continuity implicit in the individual concept. Thus

> … each soul retains all its previous impressions, and could not be separated into two halves in the manner you have described: within each substance there is a

[216] RUSSELL, p. 221 (G. V. 268).
[217] LEIBNIZ, *Discourse of Metaphysics*, section 8, Loemker, p. 308.

> perfect bond between the future and the past, which is what creates the identity of the individual. Memory is not necessary for this, however, and is sometimes not even possible, because of the multitude of past and present impressions which jointly contribute to our present thoughts; for I believe that each man's thoughts has some effects, if only a confused one, or leaves some trace which mingles with thoughts which follows it.[218]

The past contributes to the present and we can suppose that this process will continue into the future. The principle of continuity is strongly present here as we can see in these two other passages: "no endeavor in the universe is lost, they are stored up in the mind, not destroyed"[219] and "each present state of a substance occurs in it spontaneously, and is nothing but a consequence of its preceding state."[220] Hence in so far as all these notions imply a constant accumulation of petite perceptions to produce clear perceptions, the soul is said to be progressing in degrees of perfection. All these positions presuppose the irreversibility to a more primitive state. Even when Leibniz spoke of a passage to a lesser degree of perfection, as is the case of death, he considered it as only a relative or momentary fallback or preparation for a forward jump. In this sense he said:

> Perpetual preservation, immortality … Their changes of state never are and never were anything but changes from more to less sensible, from more perfect to less perfect, or the reverse, so that their past and future state are just as explicable as their present one. Even the slightest reflection shows that this is reasonable, and that a leap from one state to an infinitely different one cannot be natural.[221]

This is, obviously, a re-statement of his doctrine of individual notion, in which the notion of continuity makes the necessary link between past and future.

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[218] LEIBNIZ, *New Essays,* p. 115.
[219] Quoted in JOLLEY, *The Cambridge Companion to Leibniz*, Cambridge, Cambridge University Press, 1998, p. 92.
[220] LEIBNIZ, *Identity in Individuals and True Propositions, 1686,* Wiener, p. 98.
[221] LEIBNIZ, *New Essays*. p. 59.

We can see in all these notions that the theory of Leibniz can be read as a statement of the doctrine of conversion of souls in Plotinus. What is missing perhaps is the doctrine that some individual notions will always remain mere possibilities in the mind of God. This would be, as I said before, an anomaly in Plotinus' system, because it would imply that some emanated intelligible ideas will not emanate in their turn, as would be expected. However my exposition about Plotinus is intended to show that the doctrine of monads was virtually present there. It appears as a singular application of a Neo-Pythagorean theory of One together with a synthesis of material taken from Aristotle and Stoics. Leibniz also took care, as did Plotinus, to affirm that the progress of the substance is not determined by fate, as the Stoics thought. And so Leibniz, concerned to defend the liberty of men as he was defending the liberty of God, used the word "spontaneously" as we have seen above, although his line of thought was providing reasons for the opposite view. In fact, Leibniz's whole doctrine of *petites perceptions* of and the notion which says that the individual is connected with all that happens in the universe are more fitted to support the determinist view of the Stoics' doctrine of providence. Arnauld perceived this "fatal necessity" in the notion of the individual concept, but Leibniz tried to convince him that those reasons "incline without necessitating." Obviously this argument is not very convincing. It is even more unsatisfactory if we take into account that Leibniz defended the "Principle of sufficient reason", which says that nothing happens in the universe without a reason.

The second point that I want to stress in this part is the manifestation of the substances creating nature. In Plotinus we saw an infinite and Eternal Intellect which manifests itself in the realm of Soul, and ultimately this realm expresses itself in producing nature. The project of Leibniz, as he said to Des Bosses, was to give an "explanation of all phenomena solely through the perceptions of monads functioning in harmony with each other."[222] Thus material things are appearances that result from the harmony of a set of monads and their perceptions. A mass of matter is not a true substance; its unity is ideal or imaginary, since it results or is a manifestation of a collection of these true substances, the monads. But Leibniz is also committed to the thesis that the reality of material things needs the supposition that they are well founded in perceptive substances, which is their factor of diversification. In a letter to De Volder he said:

[222]LEIBNIZ, *Letter to Des Bosses,* 1712, Loemker, p. 604.

> I have shown (…) in my rejection of empty space that matter so long as it is commonly thought to be determined by mere modifications of extensions or mass does not suffice to fill the universe, and further we must assume something necessarily quite different, amounting to a principle of change and diversity in the phenomena, so that along with expansion, contraction, and motion of the several parts of matter, a principle is required for its consilience and diversification. Consequently I insist on assuming that no substance can be created or annihilated.[223]

And he repeated in another letter to De Volder: "… if matter were not differentiated – as it is primarily through the entelechies – no manifold of phenomena could arise, that furthermore, then the only uniform states of extension would ever differentiate one another."[224]

Thus the notion of individual concept is in the last resort used to explain diversity in Nature. Here the substances and their perceptions have the same decisive role as the soul in Plotinus: to create a diversified Nature. The notion of the individual concept can be seen as the basis for the principle of Identity of the Indiscernible, which says that we cannot find any two things exactly equal in Nature. Again, if the phenomenal accidents which constitute a body are a reflection of its constitutive monad, the consequence is that this body is the reflection of what the monad sees. Thus the Parmenidean tenet that "to think is to be" is achieved also in Leibniz in the level of substances, the self-thinking monads, and afterwards manifested in the sensible world. In this aspect Leibniz was following Plotinus, and ultimately Aristotle, Plato and Parmenides, for whom the spheres of being and knowledge are in fact the same.

Ultimately the diversification that we see in Nature will be nothing more than the manifestation or unfolding of the infinite diversity already present in the realm of Intellect. Leibniz seems to have recognised this connection as the following passage suggests:

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[223] LEIBNIZ, *Letter to De Volder*, 1703, Wiener, p. 181.
[224] LEIBNIZ, *Letter to De Volder*, 1701, Wiener, p. 171.

> It follows also that there cannot be two individual things in nature which differ only numerically. For surely it must be possible to give reason why they are different, and this must be sought in some difference within themselves. Thus the observation of Thomas Aquinas about separate intelligences, which he declared never differ in number alone must be applied to other things also Never two eggs, two leaves, or two blades of grass in a garden to be found exactly similar to each other.[225]

Obviously in the case of Leibniz, as we have discussed, the realm of infinite possibilities will not be totally manifested. Only the set of the best compossibles, that is, the best group of things which are of possible combination, will be manifested.

Part II

6 – The Universal Sympathy and Perception

One main topic in Plotinus is the idea that the Universe, Nature or the All constitutes a unity or a whole, in which each part is perfectly connected with everything else. Plotinus took this idea from the Stoics (an idea also present for the Pythagoreans and in the *Timaeus*) but he elaborated it in his own way. Even while criticising the Stoic theory of knowledge, he used their ideas of the sympathetic whole as the basis for his own theory of knowledge.

Plotinus said that the Universe is contemplating the Good.[226] However, he said that even now it can be considered perfect, because it is an ordered whole made as a perfect copy of the Divine realm. It is already an All. If we do not perceive this perfection it is because we do not see the harmony of the whole, but we pay attention to the ugly minor detail without noticing that it gains beauty in the whole: “We are like people ignorant of painting who complain that the colors are not the beautiful everywhere in the picture; but

[225] LEIBNIZ, “*First truths*”, 1680, Loemker, p. 268.
[226] “...the All is bringing this activity into being while in itself it seeks – or better, contemplate- The Good” *Forth Enn.* IV, 35.

the artist has laid on the appropriate tint to every spot."[227] This perfection, or the ultimate cause of this ordered organisation of the Universe (or the All), comes from the eternal plan existent in the Divine Mind or, we may say again, the Universe results from the unfolding of the Intellectual Principle. The idea of continuity in the unfolding of the Intellectual Principle (which itself is a whole) guarantees the unity of the development of the Universe, its wholeness. The Soul of the World consequently governs the Universe because it already has its complete plan. Thus we can say that the World Soul is the unity of the One projected to rule and harmonise the world. It is projected to rule the world because it is similar to individual things which follow the rules already present in their seminal reasons. Here the unity of the World Soul is a unity with reference to development in time. In this aspect it was called "Providence". In the synchronic dimension, the World Soul also follows the biological analogy because the harmony of the world is similar to the form in which, in individual organisms, each different part is adapted to its function in the whole. The same World Soul is present in each individual part, but in each part the World Soul manifests a degree relative to that part's essence, a degree that corresponds to the achievement of the part's function in its adjustment in the All:

> The gist of the whole matter lies in the consideration that the Soul governs this All by the plan contained in the Reason-Principle and plays in the All exactly the part of the particular principle which in every living things forms the members of the organisms and adjust them to the unity of which they are portions; the entire force of the Soul is represented in the All, but, in the parts, Soul is present only in the proportion to the degree of essential reality held by each of such partial objects.[228]

For Plotinus then, the limitation of each thing, determined by its essence, is not a reason to prevent its share of participation in the All. In fact he says that each part has been made with a view to the whole and so its limitation is a requisite for this participation. We remember that Plato said in the *Timaeus* that the Universe was a great animal, which

[227] *Third Enn*. II, 11.
[228] *Second Enn*. III, 13.

implied a great communion between its parts. [229] Plotinus followed this doctrine. Thus the sympathy between the different parts happens because these are like organs of this great organism, which is a living and dynamic whole:

> But, with all this gradation, each several thing is affected by all else in virtue of the common participation in the All, and to the degree of its own participation. This One-All, therefore, is a sympathetic total and stands as one living being; the far is near; it happens as in one animal with its separate parts: talon, horn, finger, and any other member are not continuous and yet are effectively near; intermediate parts feel nothing, but at a distant point the local experience is known. Correspondent things not side by side but separated by others placed between, the sharing of experience by dint of like condition – this is enough to ensure that the action of any distant member be transmitted to its distant fellow. Where all is a living thing summing to a unity there is nothing so remote in point of place as not to be near by virtue of a nature which makes of the one living being a sympathetic organism.[230]

In this All, each part performs a distinct function. In its functioning, each individual is related to each other. And this relation occurs in a twofold way: exerting influence by means of its tasks, and receiving some influence of the acts of others. Thus when performing its own function, every member acts on every other member. Plotinus' belief in the action on distance or the efficacy of magic was a corollary of this doctrine. Magic and its success also depend on this sympathy of the whole.[231]

Since everything is so closely knit, intertwined into a whole, all is ordered and nothing is left to chance. As Plotinus said, everything exists with a Law of Justice. Thus all the parts are in strict relation to the whole: "All the living things, then ... fall under the general principle of the All – they have been made parts with a view to the whole."[232] This whole is, accordingly, the ultimate cause: "The beings thus coordinated are not the causes;

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[229] PLATO, *Timaeus* (30a–b)*:* "Wherefore, using the language of probability, we may say that the world became a living creature truly endowed with soul and intelligence by the providence of God".
[230] *Fourth Enn*. IV, 32.
[231] *Fourth Enn*. IV, 26 and 40.
[232] *Second Enn*. III, 13.

the cause is the coordinating All."[233] Thus, it is the whole that establishes the definite role or function of the parts. It is this unity of coordination that guarantees that each part has its just place and is in certain harmony with the others.

Because all relations of sympathy in the whole are ruled by strict proportion, with no room for chance, Plotinus said that it is a living unity and at the same time mathematically determined:

> The being we are considering is a living unity and, therefore, necessarily self-sympathetic: it is under a law of reason, and therefore the unfolding process of its life must be self-accordant: that life has no haphazard, but knows only harmony and ordinance: all the groupings follow reason: all single beings within it, all the members of this living whole in their choral dance are under the rule of Number.[234]

Their reciprocal interaction, or their sympathy, follows the strict rule of mathematical determination. The unity of the whole is thus the cause and consequence of this determination. Obviously this doctrine forced Plotinus to search for a solution to the problem of how any freedom of the individual can be harmonised with the idea of cosmic causes working in a mathematically unified cosmos.

Plotinus built his theory of the sympathetic Whole on the basis of the idea that each part of the Whole (which he calls also the All or Universe) is itself a whole. Each part of the Universe, that is, each individual soul, is itself a whole or totality. Here we remember his explanation of the soul, as the intermediary between the Intellect (the Being or the Existent) and matter (represented by the things of sense). This doctrine, he affirmed, is directly inspired by a doctrine in the *Timaeus*. Referring to the demiurge, Plato said: "By blending the impartible, eternally unchanging essence with that in division among bodies He produced a third form of essence partaking of both qualities."[235] Plotinus interpreted this passage in this way:

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[233] *Fourth Enn*. IV, 33.
[234] *Fourth Enn*. IV, 35.
[235] In the *Fourth Enn.* II, 2 and in Plato, *Timaeus* (34c–36c).

> So far we have the primarily indivisible – supreme among the Intellectual and Authentically Existent – and we have its contrary, the Kind definitely divisible in things of sense; but there is also another Kind, of earlier rank than the sensible yet near to it and resident within it – an order, not, like body, primarily a thing of parts, but becoming so upon incorporation. The bodies are separate, and the ideal form which enters them is correspondingly sundered while, still, it is present as one whole in each of its severed parts, since amid that multiplicity in which complete individuality has entailed complete partition, there is a permanent identity;…[236]

Thus the nature of the soul is radically different from the material or extended things. It is not a kind of continuance of subtle matter extended inside the body, as some ancient doctrine seems to say.[237] Nor can it be sundered like the body parts. However, it is present in each part as a whole:

> The nature, at once divisible and indivisible, which we affirm to be the Soul has not the unity of an extended thing: it does not consist of separate sections; its divisibility lies in its presence at every point of the recipient, but it is indivisible as dwelling entire in the total and entire in any part.[238]

If it had the nature of material things, each part could be isolated from the others, like the bricks in a wall, but then the soul could not form a true unity. The supposition of Plotinus here is that a material thing is necessarily a discontinuous thing. And consequently, interaction (or sympathy) between two extremely isolated things would be impossible. Even if those parts were souls, there would be a great multiplicity of souls with no means of communication among each other.

Thus, Plotinus defended the conception that each soul is, in some sense, the All or the totality. To illustrate this point, Plotinus used the example of the interaction of the parts of the organism:

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[236] *Fourth Enn.* II, 1.
[237] Such a doctrine was defended by Anaximenes, the Pythagoreans and the Stoics.
[238] *Fourth Enn.* II, 1.

> If it (the soul) had the nature of body it would consist of isolated members each unaware of the conditions of every other; there would be a particular soul – say a soul of the finger – answering as a distinct and independent entity to every local experience; in general terms, there would be a multiplicity of souls administering each individual; and, moreover, the universe would be governed not by one soul but by an incalculable number, each distinct apart to itself. But without a dominant unity, continuity is meaningless.[239]

The organism is a good analogy for the world, because it illustrates that the order demands the existence of a pervading unity which is the cause of sympathy between the different parts. It is a unity of diversity and each part is in sympathy or feels all that happens in the rest of the Whole.

The soul, then, is a unity and a multiplicity; but what does this affirmation mean? The unity can be interpreted as the unity of the individual and the multiplicity or infinity can be seen as the presence of the All in that individual: "The one principle reaches the individual but nonetheless contains all souls and all intelligences; thus, because it is at once a unity and an infinity; it holds all its contents as one yet with each item distinct, though not to the point of separation."[240] We had this same idea when we described Plotinus' Idea of a multiplicity of Intellects. And this is the same paradigm for the soul. However, in that case the presence or mirroring of the All is simultaneous in each Intellect. In the individual soul, the presence of the All is not simultaneous, since in the Soul the perceptions obey the rule of succession. But it is important to stress here that this might be considered as one important solution for the One–Many problem. It is the basis of the Neo-Platonic doctrine of the micro-cosmos, or that each part is a contracted form of the whole.[241] That each thing can be, in some sense, a contracted form of totality is explained by the fact that it is at the same time a unity and an infinity or Limited and Unlimited thing. And this was, as we saw, the doctrine of the first Pythagoreans.

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[239] *Fourth Enn*. II, 2.
[240] *Sixth Enn*. IV, 14.
[241] This notion is similar to the doctrine of Anaxagoras: "In all things there is a portion of everything…". *Anaxagoras Fragments and Commentary*, Arthur Fairbanks, ed. and trans. *The First Philosophers of Greece* London, K. Paul, Trench, Trubner, 1898,p. 235-262.

But for Plotinus, this theory of non-limitation of things could not be understood as something that could "spatially" connect the different souls between themselves. This conception could be, however, a kind of return to the idea that the soul is extensible. As we have seen, Plotinus said expressly that the soul is inextensible and that it contains all souls. Although Plotinus mentioned the idea of All Soul (or World Soul) many times, which could be a kind of general soul connecting the others, he himself clarified how this concept should be understood: "The Soul is not a thing of quantity; we are not to conceive of the All-Soul as some standard ten with particular souls as its constituents units. ... The Ten could not be (essentially) a unity (the Soul would be an aggregation, not a self standing Real-Being) and further – unless every one of the single constituents were itself an All-Soul – the All-Soul would be formed of non-souls."[242] Also, in another passage he affirmed that the All-Soul cannot be seen as an entity separate from the others souls: "... it is the identical Soul that is present everywhere, the one complete thing, multi present at the one moment; there is no longer question of a soul that is apart against a soul that is an all ..."[243]

Plotinus' theory of perception is dependent on the postulation of this theory of universal sympathy and the conception of the monadic soul. The postulation of an individual and immaterial (or non-dimensional) soul is necessary, since it is the sphere which guarantees the reunion of the multiplicity of the perceptive experience into a unity or into a monadic structure: "There can be no perception without a unitary percipient whose identity enables it to grasp an object as entirety." Perception, knowledge, memory and, consequently, moral excellence depend on the existence of this postulation. It assures the absolute unity of experience through time (diachronic level), but it also guarantees the unity of experience necessary for the act of interpretation or cognition of a certain spatial or multidimensional entity (synchronic level). Plotinus posed this unity of the percipient as another argument against the theory of impressions:

> When sight and hearing gather their varying information, there must be some central unit to which both report. How could there be any statement of difference unless all sense impressions appeared before a common identity able

[242] *Fourth Enn.* III, 2.
[243] *Fourth Enn.* III, 3.

> to take the sum of all? This there must be, as there is a centre to a circle; the sense–impressions converging from every point of occurrence will be as lines striking from a circumference to what will be a true centre of perception as being a veritable unity.[244]

The soul cannot be a material thing because the centre of consciousness cannot be a thing of quantity or a thing subject to being divided in a multiplicity. The image received as impression needs the unifying stance of subject to be perceived as a unity: this implies the immaterial soul, since this unification can be achieved only by an immaterial substance.

The affirmation of the unity of soul has importance for another reason. Plotinus denied that Soul has a spatial dimension as the *pneuma* of the Stoics seems to have. Soul must be one-dimensional like the centre of a circle. He discussed the consequences if we consider the soul to be spatial. Thus, he denied the possibility of an extended soul that attaches point to point to its object of perception:

> … supposing the centre of consciousness to be a thing of quantity and extension, the sensible object will coincide with it point by point of their co-expansion so that any given point in the faculty will perceive solely what coincides with it in the object: and thus nothing in us could perceive any thing as whole. This cannot be: the faculty entire must be a unity; no such dividing is possible; this is no matter in which we can think of equal sections coinciding; the centre of consciousness has no such relation of equality with any sensible object.[245]

Thus for Plotinus the idea of an extended soul would imply perception in each point of its extension. But this would destroy the unity or wholeness of perception and the soul would perceive many things at the same time without any kind of coordinating unity. The argument then is that the faculty of perception unifies the multiplicity of an extended

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[244] *Fourth Enn.* VII, 6.
[245] *Fourth Enn*. VII, 6.

sensible object in its unified act of perception. Therefore, the seat of perception, the soul, must itself be a unity and not an extended thing.

This unity represented by the soul, must be immaterial (spiritual), because a material thing is also subject to gain or loss and gains and losses cannot maintain a true unity. The parallel is with numerical or geometrical objects or things of quantity as material masses: they cannot achieve unity because they have no true stance of unification. On the contrary, their partition or increase destroys its totality or wholeness, and being such dispersion they cannot grasp a unity as the immaterial substance can. In assuring that the centre of consciousness cannot be material, Plotinus was again attacking old theories of spatial and material souls, such as souls made of air or fire like those of the Stoics or of atoms, as proposed by Democritus: "Would not such soulless addition be subject to just such loss and gain of substance, in fact to the non-identity, which marks the rest of the material mass? And, if this were so, how explain our memories or our recognition of familiar things when we have no stably identical soul?"[246] Thus the unity here is a unity that keeps the experiences through time. A material thing would not preserve this unity since it pertains to the realm of dyad, which, by definition, is a subjected to losses and gains.

Plotinus then developed his own doctrine of perception which, to repeat, presupposes the theory of sympathy of the Whole. For Plotinus, all perception happens because the parts are parts of a self-sympathetic Whole. The interaction between these parts is mediated by the wholeness of each part: "Perception of every kind seems to depend on the fact that our universe is a whole sympathetic to itself: that it is so, appears from the universal participation in power from member to member, and specially in remote power."[247] He defended his point of view against that of the Stoics, from whom he adapted his own doctrine of sympathy.

The Stoic theory, under Aristotelian influence, says that perception results from the imprints that the forms or the images (likeness or species) exerted over a medium, the air or *pneuma*. This whole theoretical framework is also part of that tradition that we mentioned in the first chapter, the idea of air or *pneuma* of Anaximenes or the spatial *aither* of the first Pythagoreans. In *De Anima* (424a15) Aristotle says: "by sense is meant what has the power

[246] *Fourth Enn*. VII, 5.
[247] *Fourth Enn*. V, 3.

of receiving into itself the sensible forms of things without matter," and (*De Anima* 416b30): "Sensation depends, as we have said, on a process of movement or affection from without, for it is held to be some sort of change of quality." Following these ideas, Cleanthes claimed that the representation or image (*phantasia*) was a kind of impression on the soul, like the impression made by a ring on wax. And for receiving such an impression the soul obviously should be material, the *pneuma* itself. Chrysippus stressed that the cause of perception was the modification or tensions of an elastic and material medium, the *pneuma* (a kind of fiery air), tension similar to the propagation of waves of sound. The air between the object and the body continues the action of propagation of an image originating in the body and, since there is a continuity between the *pneuma* in the Soul, which is also a kind of air, and that *pneuma* of the external space, the image reaches the ruling centre of the Soul, the *hegemonikon*, where the sensation takes place.[248] Thus the notion of space through which this tension takes place was important to this conception. Equally, the existence of this medium in a state of tension would be for a Stoic the explanation for a movement of a finger as demanded by the *hegemonikon*, the centre of the soul. In fact, the Stoics diverged from Aristotle on a special point. For Aristotle the *pneuma* was only a subtle envelope of the Soul, made from the substance of the stars.[249] Because it was made of a very subtle matter it had a function of being an intermediary between an immaterial soul and the body. Thus, it was its function to primarily receive the impact of sensible objects. For the Stoics, however, the whole soul was *pneuma.*

Plotinus maintained the existence of such a subtle body, as Aristotle proposed, and expressly dismissed the Stoic conception: "Perceptions are no imprints, we have said, are not to be thought of as seal impressions on soul or mind."[250] The reason alleged against this theory is that it is based upon a modification of a material medium, and Plotinus insisted that perception depends on a spiritual and immaterial cause:

> … there is further consideration showing that sight is not brought about by this alleged modification of the intervenient. Any modification of the air substance

[248] SAMBURSKY, *Physics of the stoics*, Edinburgh, Routledge Kegan Paul, 1959, p. 25.
[249] For this reason later, in the Renaissance, it would be called astral body. WALKER, D. P., "The Astral body in the Renaissance Medicine." Journal of the Warlburg and Courtauld Institutes, vol. 21, Nos 1/2 9 (Jan–Jun 1958) pp. 119–133.
[250] *Fourth Enn*. VI, 1.

> would be necessarily corporeal: there must be such an impression as is made upon sealing wax ... the facts are explicable only as depending upon greater laws, the spiritual, of a living being one and self sensitive.[251]

Thus, perception for Plotinus depends on the unification of the experience in an immaterial unity, or a percipient subject, and matter, which, by definition is a thing of pure multiplicity, has no such stance.

Plotinus shared the doctrine of universal sympathy with the Stoics, but he explained it in a different way. The Stoic *pneuma* was conceived as a medium whose tensions transmitted images of things. This was the cause of sympathy or interaction, not only between the parts of the body, for instance, between the brain and finger, but through the external environment, to other bodies. They conceived this transmission to be also the cause of perception. In Plotinus, sympathy is caused not by a medium but rather is explained by the doctrine that there is an All-Soul (which would be in some sense similar to the Stoic *pneuma*). Thus there is no communication between the different parts of the body or different individuals through a medium such as the *pneuma* or other kind of extended subtle matter of the individual soul or of the Soul of the World. The communication occurs because there is a presence of the Wholeness of the All-Soul in each part of the body and in each individual as a totality. Plotinus seems to have generalised the idea also for external perception: “That every living being is a self-sensitive allows of no doubt; if the universe is a living being, no more need be said; and what is true of the total must be true of the members, as inbound in that one life.”[252] Perception must be so based in both the self-sensitiveness of a living being which is derived from the self-sensitiveness of the universe. The object seen must be in some sense within the self-conscious subject (self-sensitiveness) and because the object exists in its own right as a different part of the universe, he can say that the universe as a whole is self-sensitive.

The conception of perception in Plotinus relies on the idea that the soul (or Mind) is an activity (*energeia*). This implies that it should have an essentially active role or it means that its character is not to accept an impression passively but rather to act. And it is by its

[251] *Fourth Enn*. V, 3.
[252] *Fourth Enn*. V, 8.

activity, which in the last instance relies on self-thinking, that the soul exercises discrimination or judgment (*kriseis*) on the impressions the body receives. As activity, it does not passively submit to its environment but tries to be master of it. Its mastery is in proportion to its capacity of self-thinking. Thus, for Plotinus, the existence of the impressions alone cannot account for the existence of perceptions, or in other words, intellectual knowledge cannot be derived from sensible experience:

> As with sight, so with hearing. It is the air which takes the impression, a kind of articulated stroke which may be compared to the letters traced upon it by the object causing the sound; but it belongs to the faculty, and to the soul-essence, to read the imprints thus appearing before it, as they reach the point at which they become matter of its knowledge. In taste and smell also we distinguish between the impressions received and the sensations and judgments; these last are mental acts, and belong to an order apart from the experiences upon which they are exercised. The knowing of the things belonging to the Intellectual is not in any such degree attended by impact or impression: they come forward, on the contrary, as from within, unlike the sense-known as from without: they have more emphatically the character of acts; they are acts in the stricter sense, for their origin is in the soul.[253]

Plotinus did not seem to deny the existence of sense impression, but he did not give it the crucial role of transmission of knowledge or production of meaning. The soul is aware of the stimuli that the sense organs receive from the external world. However, the impression by itself (as a sign or a letter) does not convey its meaning. The recognition of sensible forms depends on the access of the soul to the forms of the Intellectual Realm. As Emilsson explained, Plotinus did not think that the image or representation itself is self-evident, or "says what it is."[254] The very image does not carry its intelligibility to the receiving subject. In fact, Plotinus considered that if we accept the theory of the imprints of the objects of our vision we see only vestiges of the objects, not the objects themselves: "if to see is to accept

[253] *Fourth Enn*. VI, 2.
[254] LlOYD, P. G., *The Cambridge Companion to Plotinus*, Cambridge, Cambridge University Press, 1996, p. 217.

imprints of the objects of our vision, we cannot see the objects themselves; we see only vestiges they leave within us; the things themselves would be very different from our vision of them."[255] It seems that what Plotinus wanted to say here is that sense perception by itself cannot grasp the truth of the thing itself or its inner essence. In fact, the intelligibility of the image depends mainly on the presence in the subject of the intelligible form of that essence that the image expresses. And since the intelligible content cannot be separated from the Mind that thinks it, we arrive at the Plotinian formula that there is no knowledge without the self-thinking of the subject. Only by self-thinking does the soul reach the forms, because the Intellectual Realm is immanent in itself.

As appearance, the image only gives the opportunity of perception, but the interpretation of the realm of sense (*krisis*) is relative to the essence of the perceiving subject, since the soul only progressively awakens the content of the Intellect in itself. For Plotinus the awakening of the Intellectual Principles in the soul makes it more apt to elaborate the world of senses.

9 – Space and Power

For Plotinus, each part of a body has some kind of consciousness. Since extension or rather, the extended body, participates in the unity of the soul (which Plotinus calls "another Kind") this participation in the soul must take place in such a way that the soul as a whole is present at every point of this body. The soul is not divisible like a body or a thing of quantity. However, the mass of the extended thing is really divided into an infinity of points:

> If, then, the divided and quantitatively extended is to participate in another Kind, is to have any sort of participation, it can participate only in something undivided, unextended, wholly outside quantity. Therefore, that which is to be introduced by participation must enter as itself an omnipresent indivisible. This indivisibility must, of course, not be taken in any sense of littleness: littleness would be still divisible, could not cover the extension of the participant and

[255] *Fourth Enn.* VI, 1.

> could not maintain integral presence against that expansion. Nor is it the indivisibility of a geometrical point: the participant mass is no single point but includes an infinity of points; so that on the theory this principle must be an infinity of points, not a simultaneous entire, and so, again, will fail to cover the participant. If then, the participant mass in its entirety is to contain that principle entire, *the universe must hold that one soul present at its every point*.[256]

Thus the extended mass acquires indivisibility by its participation in the unity of the soul. This indivisibility implies, however, an infinity of points at which the soul is present as a one or as a whole. Directly afterwards, Plotinus asked "if admitting this one soul at every point, how is there a particular soul of the individual …?" His answer was this: "The one soul reaches the individual but it nonetheless contains all souls and all intelligences. This is because it is at once a unity and an infinity; it holds all its content as one yet with each item distinct, though not to the point of separation."[257] Thus the way for an extended body to participate in the unity of the soul and, at the same time, respect its material condition of infinite divisibility, is that we assume the presence of the soul as a whole at each point.

This aspect also explains how the soul, being in essence a non-dimensional essence, can be the principle of number, as the Platonic tradition says. The soul has the multiplicity in its essence, but this multiplicity is a mind's multiplicity, this dyad is intellectual: "… it holds all its contents as one yet with each item distinct, though not to the point of separation." The numerical multiplicity then is a thing of the mind. The numbers, as we have expounded, are produced by the mind process which is the contemplation of the Dyad. Plotinus explained this point better in another passage, where he referred to the theory of Xenocrates that the soul is a self-increasing number. He clearly wanted to correct the interpretation that the soul, because it is the principle of number, is a thing of extension:

> It is in this understanding that the soul has been taken to be a numerical principle, while others think of it as in its nature a self-increasing number; this

[256] *Sixth Enn*. IV, 13.
[257] *Sixth Enn*. IV, 14.

> latter notion is probably designed to meet the consideration that the soul at no point fails (...) Of course, we must understand this adding of extension not as a literal increase but in the sense that the soul, essentially a unity, becomes adequate to omnipresent; its unity sets it outside of quantitative measurement, the characteristic of that order which has but a counterfeit unity, an appearance by participation. The essential unity is no aggregate to be annulled upon the loss of some one of the constituents; nor is it held within any allotted limits, for so it would be the less for a set of things, outside its scope; or it must wrench itself asunder in the effort to reach to all; besides, its presence to things would be no longer as whole to all but by part to part; (.....) Now if this principle is to be a true unity – where the unity is of the essence – it must in some way be able to manifest itself as including the contrary nature, that of potential multiplicity, while by the fact that this multiplicity belongs to it not as from without but as from and by itself, it remains authentically one, possessing boundlessness and multiplicity within that unity; its nature must be such that it can appear as whole in every point...[258]

Thus for Plotinus the consideration of the soul as a principle of number must be understood in the sense that the soul is allowed to be omnipresent in an extended entity. Thus the soul does not lose its unity but by its omnipresence it creates the condition for the appearance of the extended entity. Here again Plotinus considered that the notion of multiplicity implies necessarily the idea of aggregation, since multiplicity is a notion opposed to a true unity.

Here again we have the idea of the existence of the Intellectual or Divine Matter, which can be the object of determination, and which explains the feature of multiplicity of the soul or of the Mind. If this Matter implies multiplicity, this multiplicity is always under the domain of Unity, which is prior, as we saw in the theory of emanation. Plotinus differentiated the matter of our experience from that matter that exists in the Intellectual World. It is a kind of living and intellectual matter, compared with which familiar matter is only a kind of sterile or dead matter. It has the capacity, which is caused by its own living or thinking movement, to multiply itself and thus allows the appearance of spatial shapes of

[258] *Sixth Enn.* V, 9.

different material forms. But this multiplication is not to be taken as a spatial extension. It is a kind of intelligible multiplication, which makes the soul adequate to be omnipresent. This allows the extended body to acquire its extension by participation in that intelligible extension of the soul. The determination of Intellectual Matter is the paradigm for determination in the material world which, being dependent on the other, has a lesser degree of reality. It is like an image in a mirror of the other.[259] Between the two spheres of matter there is no true interaction, but only this process of reflection. Any hypothetical interaction, any outgoing or ingoing, would be incompatible with the maintenance of the unity of the soul.

The consequence of these propositions is that Plotinus was led to deny the true ontological status or true reality of extension. If the extension of bodies is based on numbering, and this numbering is only a reflection of the numbering of an indivisible Soul (whose multiplicity is involved by its unity) how can true unities of extension, be possible, as, for example, the case of space? Because the numbering is produced by a numbering soul, Plotinus regarded the numbering as the true magnitude. This is not the case of space which is only a kind of relation:

> Now we have often maintained that number and magnitude are to be regarded as the only true magnitudes, and that space and time have nor right to be conceived as quantitative: Time as the measure of Motion should be assigned to relation, while Space, being that which circumscribes Body, is also relative and falls under the same category; though continuous, it is like Motion, not included in Quantity.[260]

Plotinus complemented this explanation, adding that the unity of extension which forms the magnitude of a body is so only because it participates in the absolute unity of the One

[259] The matter of this world is also considered a image of the other matter: "Further, admitting that there is an Intelligible Realm, beyond, of which this world is an image, then since this world–compound is based on Matter, there must be Matter there also" *Second Enn*. IV, 4, and: "The Divine Matter, though it is the object of determination has, of its own nature, a life defined and intellectual; the Matter of this sphere while it accepts determination is not living or intellective, but a dead thing decorated; any shape it takes is an image." *Second Enn.* IV, 5.
[260] *Sixth Enn*. III, 11.

(represented by the unity of the Soul). Its unity is not absolute or substantial and so can be regarded as a unity only in an accidental sense:

> Again, whence does Matter derive its unifying power? It is assuredly not a unifying force in itself, but only through participation in Unity. We inevitably conclude that mass or extension cannot be ranked as the first of things; Non-Extension and Unity must be prior. We must begin with the One and conclude with the Many, proceed to magnitude from that which is free from magnitude. Magnitude is a unity not by being Unity-Absolute, but by participation and in an accidental mode: there must be a primary and absolute preceding the accidental, or the accidental relation is left unexplained.[261]

The spatiality of a thing is a secondary reality. It follows the expansion of the unity into a multiplicity of parts. This body remains an individual thing only because it is sustained by participation in that original unity which, by giving its identity to this thing, can be considered its essence. However, this spatiality of a thing has a price; it loses in power what it gains in extension:

> Consider the thing that has taken extension; broken into so many independent items, it is now those several parts and not the thing it was; if that original is to persist, the members must be collected to their total; in other words, a thing is itself not by being extended but by remaining, in its degrees, a unity: through expansion and in the measure of the expansion, it is less itself; retaining unity, it retains its essential being.[262]

The phenomenon of expansion (its procession) causes the thing to gain distance from its own essential unity. As procession gains in multiplicity, it loses in power, since its immanence is relaxed. For Plotinus, one principle has more creative efficacy as it acts

[261] *Sixth Enn*. I, 26.
[262] *Sixth Enn*. VI, 1.

less.[263] Thus the hypostasis of Soul, which is the sphere of process and action, has less creative efficacy than the hypostasis of Intellect which, in its turn, has less creative efficacy than the One.

Thus the unity of body is unity only in an accidental way. Having denied the true existence or reality of the extension, Plotinus concluded that it is a mere illusion of sense perception:

> But how account, at this, for this extension over all the heavens and all living beings? There is no such extension. Sense perception, by insistence upon which we doubt, tells of Here and There: but reason certifies that the Here and There do not attach to that principle; the extended has participated in that cosmos of life which itself has no extension.[264]

And again in another passage: "For what passes for the most truly existent is most truly non-existent – the thing of extension least real of all – while this unseen First is the source and principle of Being and sovereign over Reality."[265] It is important to recall here that the denial of extension was characteristic of the One of the first hypothesis of the *Parmenides* of Plato. Here Plotinus is projecting this feature to everything because the One is immanent in every existent thing.

The truly real or the authentic existent does not have any kind of extension. Plotinus liked to compare it to a geometrical point in the centre of a circle. The line and the circle are produced by this centre and are like images of it.[266] This centre is then the source of generation of extension. We can use the sign of the geometrical centre, as it represents the negation of magnitude and as such it is a symbol of the unextended unity.[267] It is because

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[263] In this sense he says: "A widespread activity is dangerous to those who must go out from themselves to act. But such is the blessedness of this Being that in its very non-action it magnificently operates and in its self dwelling it produces mightily." *Third Enn.* II, 1.
[264] *Sixth Enn*. IV, 13.
[265] *Fifth Enn*. V, 11.
[266] *Sixth Enn*. VIII, 18.
[267] *Sixth Enn*. IX, 5: "We are not to think of such unity and partlessness as belong to point or monad; the veritable unity is the source of all such quantity which could not exist unless first there existed Being and Being´s Prior: we are not, then, to think in the order of point and monad but to use these – in their rejection of magnitude and partition –as symbol for the higher concept."

the centre is said to be immanent that it is considered the source or maker of extension (lines and circumferences) outside extension.

Yet we cannot say that unity is situated in the extension created. In fact, what happens is the opposite: extension is contained within its creator, but the creator, in its turn, is nowhere, since it is prior to extension which is created by it (and this extension is the condition of the existence of space). Thus Plotinus explained:

> Everything brought into being under some principle not itself is contained either within its maker or, if there is any intermediate, within that: having a prior essential to its being, it needs that prior always, otherwise it would not be contained at all. (…) That Source, having no prior, cannot be contained: uncontained by any of those forms of being, each held within the series of priors, it is orbed round all, but so as not to be pointed off to hold them part for part; it possesses but is not possessed.[268]

Thus as it is not contained in any limited thing we can say that the source (or the unity) transcends everything. And in this sense it is said to be nowhere. However, because that unity is the creator, it is the cause of all existent things and so it is said to be immanent. In this sense it is said to be everywhere.

The One cannot be said to be situated in any place, but contains everything, thus its paradoxical omnipresence. It cannot be said to be remote from things because it contains and is the cause of them, but at the same time it is not possessed by them: "… but that prior principle has nothing in which to be: the First is therefore in nothing, and, therefore, nowhere. But all the rest must be somewhere; and where but in the First? This can mean only that the First is neither remote from things nor directly within them."[269]

As Plotinus said, things are not contained directly in the One. There are intermediaries: the soul is contained in the Intellectual Principle and is the container of body. The Intellectual Principle, in its turn, is contained in the One. We know that the Intellectual Principle is simultaneously self-intellection and intellection of the All, a notion

[268] *Fifth Enn.* V, 9.
[269] *Fifth Enn.* V, 9.

which allows the possibility that the self-intellection of the particular individual eventually reaches the intuition of the All.[270] This is the basic notion in the foundation of the theory that considers the individual soul as a micro-cosmos (each individual thing is itself and at same time the All). This basic theory, of Pythagorean origin, combined with the doctrine of the Parmenidian One is the foundation of Plotinus' doctrine of perception. It implies action in distance, in the self-sympathetic whole. The presence of space is ineffective and the theory of impressions is also rejected. The omnipresent and immanent One, which is outside space, achieves the connection necessary for perception. It is this One which brings about possible action at a distance, precisely because it is out of Space. It is, in the last resort, the entity that causes the unity of the soul of the Cosmos.

I would like to suggest that we can better understand the immaterial nature of the One, and the other two hypostatic entities in the light of our discussion to date. The infinity of the One as well as that of the Intellect and the soul cannot be the infinity of space because, as Plotinus said, space is a secondary and derivative reality and it has, in fact, a dubious reality. He explained this immateriality in accordance with the tradition of Greek philosophy. As we have seen, the Pythagoreans (not to mention Heraclitus) defended the idea that a certain fire is the centre and origin of everything, the monad itself. Plato compared the Good to the Sun in the *Republic*. Aristotle stressed the activity of the substance, or its character as *energeia.* Plotinus followed them. He offered the similar notion that infinity of the First, the One, is infinity of power: "All its infinitude resides in its power ..."[271] The First Reality in the form of the Good is compared with a flowing of power which is the cause of intelligence: "It is The Good since, being a power (being effective outwardly), it is the cause of the intelligent and intellective life as of life and intellect" [272] Like Plato he also used the metaphor of light, or the light from the sun: "The only reasonable explanation of act flowing from it lies in the analogy of light from a sun."[273]

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[270] "… he [the thinker] is himself (by the self-possession of contemplation) in such a way as to be identified with what is all, then by the act of the self-intellection he has the simultaneous intellection of all: in such case self intuition by personal activity brings the intellection, not merely of the self, but also of the total therein embraced ... " *Fourth Enn*. IV, 2.

[271] "Yet its Being is not limited; what is there to set bounds to it? Nor, on the other hand, is it infinite in the sense of magnitude; what place can there be to which it must extend, or why should there be movement where there is no lacking? All its infinitude resides in its power..." *Fifth Enn*. V, 10.

[272] *Fifth Enn.* V, 10.

[273] *Fifth Enn.* III, 12.

In fact, in Plotinus the question of infinity of power is linked with that of freedom and limitation. He said that because the Intellect has itself as object it has a "self disposal", it has its own possession, or in other words, it is autonomous. The soul is not a thing which can be divided into an infinity of parts. But it is infinite in the sense that it has infinite power and as such, it is free from any limitation (complete freedom). If a particular soul seems to be limited it is because it chooses to use only a share of its power. Plotinus explained:

> But what becomes of the Soul's infinity if it is thus fixed? The infinity is a matter of power: there is question, not of the soul's being divisible into an infinite number of parts, but of an infinite possible effectiveness: it is infinity in the sense in which the Supreme God, also, is free of all bound. This means that it is no external limit that defines the individual being or the extension of souls any more than of God; on the contrary each in right of its own power is all that it chooses to be: and we are not to think of it as going forth from itself (losing its unity by any partition): the fact is simply that the element within it, which is apt to entrance into body, has the power of immediate projection any whither: the soul is certainly not wrenched asunder by its presence at once in foot and in finger. Its presence in the All is similarly unbroken; over its entire range it exists in every several part of everything having even vegetal life, even in a part cut off of the main; in any possible segment it is as it is at source.[274]

Thus, we have here the theory of soul explicated above, now explained in terms of power. It is the condition of true unity and it is what allows the characteristic omnipresence of soul in each part of a living being:

> Consider the life in any living thing; it does not reach only to some fixed point, unable to permeate the entire being; it is omnipresent. If on this again we are asked how, we appeal to the character of this power, not subject to quantity but such that though you divide it mentally for ever you still have the same power,

[274] *Fourth Enn*. III, 8.

> infinite to the core; in it there is no Matter to make it grow less and less according to the measured mass.[275]

Thus, in filling the body as a power, the soul imitates the omnipresence of God in the world. It is present everywhere in the body, at the same time as a wholeness and infinity, because it is not lessened by any division, as is a mass or extension.

This omnipresence means that the source of the power (or light), the One, is not separated from beings and is available to everything. The souls, as rays of light, Plotinus affirmed again, take from the source in the measure of their capacity, in a kind of self-limitation:

> But are we to think of this Authentic Being as, itself, present, or does it remain detached, omnipresent in the sense only that powers from it enter everywhere? Under the theory of presence of powers, souls are described as rays, the source remains self-locked and these flung forth to impinge upon particular living things. Now, in beings whose unity does not reproduce the entire nature of that principle, any presence is presence of an emanate power: even this, however, does not mean that the principle is less than integrally present; it is not sundered from the power which it has uttered. All is offered, but the recipient is able to take only so much.[276]

Truly the omnipresence is necessary for the harmony and sympathy of the whole, but at the same time the existence of multiplicity implies a certain self-limitation, otherwise all multiplicity would disappear in the omnipotence and unity of God.

Sympathy and Perception – Leibniz

The theme of sympathy is adequate to compare the notion of Leibniz with regard to Plotinus and some references to the Stoics. With both Plotinus and the Stoics he said that

[275] *Sixth Enn*. V, 12.
[276] *Sixth Enn*. IV, 3.

this universe is perfect since it reflects a perfect cause. To Leibniz this is already the best possible world. He also used the same analogy used by Plotinus of the painting to explain that what seems to be ugly is so because we pay attention to the detail instead of looking for the harmony of the whole picture.[277]

The idea is that the whole is perfect and has already its complete plan made from the beginning. The Soul of the World, which is the whole ruling the cosmos, merely executes the pre-established plan. In this aspect it encompasses the ensemble of seminal principles which together have the plan of development of all individuals. Leibniz followed the same scheme. Individuals have a complete concept which is their plan for development. Plotinus attributed to the Soul of World the government of this All, the Universe, by the plan ultimately created in the Intellect Principle. As the Soul is itself the All, Leibniz said that the governing cause is the "coordinating All." In Leibniz this coordinating All is the pre-established harmony.

For Plotinus, each particular thing is affected by all else. Thus everything is related to everything in some way. In this sense he even admits the possibility of such action at a distance as in the case of magic. But Plotinus said these "beings thus coordinated are not the causes; the cause is the coordinating All." For Leibniz equally each monad is affected (reflected) by all other monads, even if what they represent is far away in distance. Distance, in fact, is irrelevant, because space has no real existence, it is only an ideal entity.[278] But what coordinates the totality of "interaction" between the monads is the pre-established harmony.

In Plotinus, the work of ordering the All is ruled by number (or law of justice), in such a way that nothing is left to chance. For Leibniz too, nothing is left to chance because

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[277] We quoted Plotinus about this in note 88. We can compare with the metaphor that Leibniz uses to defend the perfection of this world: "If we look at a very beautiful picture but cover up all of it but a tiny spot, what more will appear in it, no matter how closely we study it, indeed, all the more, the more we closely examine it, than a mixture of colors without beauty and without art. Yet when the covering is removed and the whole painting is viewed from the position that suit it, we come to understand that what seemed to be thoughtless smear on the canvas has really been done with highest artistry by the creator of the work." LEIBNIZ, *On the Radical Origination of Things,* 1697, Loemker, p. 489.

[278] In this sense Russell explained Leibniz: "Space … is something purely ideal; it is a collection of abstract possible relations." "Spatial relations do not hold between monads, but only between simultaneous objects of perceptions of each monad. Thus space is properly subjective." But the difference of perceptions is due to different points of view. For Russell the difficulty in such theory is that the idea of different points of view is part of an objective theory of space. The idea of phenomena *bene fundata* is also incompatible with a subjective theory of space. RUSSELL, p. 122.

of his Principle of Sufficient Reason. He also seems to have tried to configure the perceptions of the monads mathematically. Because of these ideas both Leibniz and Plotinus were forced to detail how liberty can be consistent with these views.

The doctrine of sympathy in Plotinus is based on his conception of soul, following a way of interpreting the *Timaeus.* There the soul is said to be an intermediary entity and consequently is at once an indivisible and divisible essence. As indivisible, the soul is, somehow, present in the whole world. As divisible, it is present in every point of the world, but its divisibility is not the fragmentation of extended things. It is present as a whole in each part. However, the perception of the presence of the whole by the individual souls, which are entities of process, is not simultaneous, but follows an order of successiveness.

In Leibniz's philosophical scheme the monads are also totalities. They are equally concentrations of the whole. The entire world is, somehow, present in each of them. Thus direct interaction between the monads is unnecessary and in fact, does not exist. The monad, somehow, has perception of the whole world. However, the perception of the world is not simultaneous (as such perception pertains only to God), but follows an order of successiveness. Plotinus' idea of the World Soul did not exist for the mature Leibniz. This World Soul may, perhaps, not be considered as a universal soul that makes the link between individual ones. Plotinus seems to suggest this with the phrase: "... it is the identical soul that is present everywhere, the one complete thing, multi present at the one moment; there is no longer question of a soul that is apart against a soul that is an all." Leibniz reflected that, given such features of the soul, it was not necessary in any way to conceive any World Soul. Thus the presence of the Soul of the All in each individual can be translated by the idea that the individual concepts already have marks of everything that happens in the world. Plotinus says: "The soul is not a thing of quantity; we are not to conceive of the All Soul as some standard ten with particular souls as its constituents units ... The Ten could not be (essentially) a unity (the Soul would be an aggregation, not a self standing Real-Being) …" Leibniz seems to have made a different use of this argument, since he seems to have used it to totally deny the existence of the Soul of the world. As with Plotinus, the point is to deny that the soul can be a thing of aggregation, or is similar to matter or extension:

> There is no soul of the world, because a continuum cannot be composed of minds, as it can be composed of spaces. You will say that such a soul does exist in a certain way, in so far as minds sense themselves. I say that a soul cannot be an entity by aggregation, but that universal space is an entity by aggregation.[279]

The link between all individual substances is assumed by the unity of God and Leibniz consistently said that we see all things in God. It is God who, providing the pre-established harmony, and choosing the best set of compossibles, makes the links between them. Thus the Leibnizian correlate view of Plotinian sympathy rests in the idea of individual concept. This is an idea already present in Plotinus and the notion of pre-established harmony is akin to the idea of providential World Soul. The resulting view is:

> For my view; there is nothing in the whole realm of created things which does not require the concept of other things in the totality of things, since all things exercise a reciprocal effect on one another, and we can consequently think nothing moved or modified without thinking the whole present state of the universe transformed.[280]

In the theory of perception the points of the contact between Plotinus and Leibniz turn on the concept of soul. The first point is their assertion of the necessity of an absolute unity of the subject as a condition for perception. This substantial unity was for Leibniz, as it was for Plotinus, the soul. In a letter to Arnauld, Leibniz wrote:

> In natural perception and in sensation it is sufficient that what is divisible and material, and is to be found dispersed in a number of entities, should be expressed or represented in a single indivisible entity, or in a substance possessing genuine unity. There can be absolutely no doubt of the possibility of a good representation of several things in one single thing; for our soul presents us with an example.[281]

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[279] LEIBNIZ, *De Summa Rerum*, p. 81.
[280] LEIBNIZ, *Leibniz to De Volder*, July 6, 1701, Wiener, p. 170.
[281] LEIBNIZ, *Leibniz Philosophical Writings*, trans. Parkinson, p. 72.

The postulation of this immaterial unity was demanded by the defence against materialism in the theory of impressions. Plotinus argued against the proponents of this theory, the Stoics and the Atomists (and in some sense also Aristotle). In his time Leibniz opposed the postulation that knowledge comes by means of sensation which was defended by the English empiricist Locke and earlier by Hobbes. Hobbes, for example, claimed that sensation was caused by motions or pressure from bodies. The solution adopted by Leibniz is radically antagonistic to empiricism, for he said that as monads have no windows, they do not really interact with each other. The more problematic aspect of this assertion is obviously the question of perception, since we usually consider that this faculty is our window to our environment.

Although Plotinus did not affirm expressly that the individuals are solipsistic entities or entities closed in themselves, he did affirm that the activity of perception depends mainly on the interpretative activity of the subject. In some sense everything is happening in the world (which is the All). However, the subject only has perceptions of some events because its perceptions are determined by its nature or essence.

Plotinus also put perception in the same category as magic (sympathy). Both phenomena are dependent on the theory of sympathy of the parts of the whole. Perception, as well as magic, can only happen because the soul of the subject has the presence of the whole in itself. The subject can only have the representation of a thing because the thing itself is already present, as part of the whole, in his mind. The magician, equally, acting only in himself, manages to produce an effect in the “external world”. On the other side, the comparison Plotinus drew between the soul and the mirror (that does not receive anything from outside) again approximates the idea of the monads without windows.

Perhaps the same coexistence of points of view can be seen in Leibniz. His ideas began from a perspective where he did not deny that we can have contact between substances, as can be seen in section 27 of the *Discourse of Metaphysics:*

> In this same sense we can say that we receive our knowledge from without through the ministry of the senses, because certain external things contain or express more particularly the reasons which determine our soul to certain

> thoughts. But when the exactness of metaphysical truths is involved, it is important to recognize the compass and the independence of our soul (….) But … it is always false to say that all our notions come from the senses which are called external, for the notions which I have of myself and of my thoughts, and consequently of being, of substance, of action, of identity, and many others, come from an internal experience …

and he continued in section 28 "In the rigorous sense of metaphysical truth there is no external cause which acts upon us except God alone …"[282] Thus both Plotinus and Leibniz denied any decisive role to impressions coming from the environment. The basis for their explanation of perception is the same: the doctrine of immanence of the One (or All).

Space and Force – Leibniz

Bertrand Russell said that the dynamic of Leibniz was constructed in direct opposition to Descartes. Descartes also propounded two substances: mind and extension, (but he avoided an absolute dualism separating them when he affirmed that God was the true substance behind these two). Furthermore, he equated extension with matter. Leibniz, on the contrary, maintained that matter is not a substance and that the essence of matter is not extension, which, in its turn, is not substance either. He believed he had proved that force was the fundamental concept for dynamics and that it was ultimately the essential activity of substance.

Russell said that Leibniz may have discovered that the essence of matter is force by 1672.[283] He mentioned that Leibniz may have based this discovery on some reasoning about the nature of space, or in a philosophical theory of the Eucharist. However, Leibniz had arguments from the philosophical tradition to support his view. Although Aristotle discussed the theme of *energeia*, and Zeno, following Parmenides, denied the existence of motion and space, I consider that it is in Plotinus that we see the clearest exposition of the

[282] LEIBNIZ, *Philosophical Papers and Letters*, Loemker, pp. 320 and 321.
[283] RUSSELL, *Critical Exposition of the Philosophy of Leibniz*, p. 77.

idea of force considered as fundamental to substance and at same time opposed to the notion of extension.

To refute the idea that extension is the essence of matter, Leibniz argued, as did Plotinus, that the appearance of the extension of a thing is not a real thing. In the *Discourse of Metaphysics* he wrote: "that the concepts which are involved in extension include something imaginary and cannot constitute the substance of the body."[284] The extension cannot be substance because it has not a truly substantial unity.

For Leibniz, as for Plotinus, extension was a relation and not a substantial unity. Extension, he said, is like number considered detached from things and its repetition or continuous multiplication represents the thing whose quality is spread.[285] Thus, extension presupposes multiplicity and multiplicity presupposes numbering and unities. Plotinus translated the conception of the Pythagoreans in the form of his own doctrine of procession. Thus the dyad or the principle of many, which is configured by extension itself, is produced by the fluxion of the unity or monad. Plotinus said: "We inevitably conclude that mass or extension cannot be ranked as the first of things; Non-Extension and Unity must be prior. We must begin with One and conclude with the Many, proceed to magnitude from that which is free from magnitude."[286] Leibniz said, in a similar fashion:

> Extension is quantity of space. It is false to confound extension, as is commonly done with the extended things, and to view it as substance. If the quantity of space is continuously and uniformly diminished, then it becomes a point which has zero magnitude.[287]

Because it deals only with numbers, Leibniz claimed that manipulation of extension can be restricted to the field of mathematics and mainly to geometry.

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[284] LEIBNIZ, *Discourse*, section 12, Loemker, p. 309.
[285] "If we distinguish extension from the extended things, it is something abstract like duration or like number considered detached from things, in which the connection of the parts is just necessary as with extension. Extension is, furthermore, a relative concept, for it is related to a determined nature whose spread it represents; duration is related to a continually persisting subject." *Leibniz to De Volder, Dec. 27, 1701,* Wiener, p. 175.
[286] *Sixth Enn*. I, 26.
[287] LEIBNIZ, *Metaphysical foundation of mathematics, 1715*, Wiener, p. 202.

But extension, as a purely geometrical entity, cannot be confused with the extended thing itself: "The best proof that body differs from space or extension is derived from this: that one cannot, from extension alone, or from the notion of length, breadth, and depth, demonstrate impenetrability, i.e., demonstrate that two extended things cannot be in the same place ..."[288] We cannot account for something extended in nature without introducing the qualities, as for example, the diffusion of whiteness of milk and the diffusion of yellow hardness in gold, which are the main reason for these things appearing as extended and tangible. And this is the reason of the importance of the doctrine of monads or substantial active unities that Leibniz thought could better explain extension. According to Leibniz, activity makes the matter substantial and the perceptions are the acts of these active principles, the monads. These perceptions are connected or even equal to forces or are confounded with them because the passage from one perception to another is made by a power of transition that he calls appetition. Donald Rutherford explained that he sometimes seems to consider only the existence of a modification, the perception.[289] We can suppose that in this case the appetition is reduced to the infinitesimal perceptions that make the transition between one clear perception and another one. The argument perhaps follows the identification that Plotinus makes between intellection and will. We can find an example that he may consider that the perceptions and appetition are, in some sense confounded, in the following passage:

> What usually drives us are those minute insensible perceptions that we cannot be aware of, if the notion of suffering did not involve awareness. These minute impulses consist in our continually overcoming small obstacles – our nature labors at this without our thinking about it.[290]

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[288] LEIBNIZ, *Summa Rerum*, p. 111.

[289] He quoted this passage: "The soul … though entirely indivisible, involves a composite tendency, that is a multitude of present thoughts, each of which tends to a particular change according to what it involves and what is found at the time by virtues of its essential relationship to tall the others things in the world." JOLLEY, *The Cambridge Companion to Leibniz*, p. 137.

[290] LEIBNIZ, *New Essays*, p. 188. Also the passage "These minute perceptions … cause that disquiet which I show to consist in something which differs from the suffering only as small from large, and yet which frequently causes our desire and even our pleasure, to which it gives a dash of spice" *New Essays* 56. And it is the continuation and accumulation of these semi-sufferings, which are at same time semi-pleasures, that lead eventually to whole pleasure, the effect confounded with the summation of petite perceptions into a clear perception.

The importance of the infinitesimal summation effect of the perceptions for his theory of extension is that it can explain the phenomenal specific qualities that we see in diffusion. Diffusion presupposes that these qualities are continually acting (they are appetitions) and these actions cause spreading. Leibniz called this resulting substantiality "secondary matter." These extended things, such as milk and gold, are examples of this secondary matter. As well-founded phenomena these extended things *result* from a set of monads considered as forces. But this substantiality of extension can only be understood in a relative way, since the real substances are the monads. Extension, for Leibniz, is a relative concept and cannot be conceived only by itself. It is derived from other concepts and so can be further analysed in notions like multiplicity and co-existence. He said, for example:

> I do not believe extension alone constitutes substance, since its conception is incomplete. Nor to my mind can extension be conceived in itself; rather it is a further analyzable and relative conception. For we can analyze it into plurality, continuity and co-existence (that is simultaneous existence of parts). Plurality has to do with number, and continuity with time and motion; co-existence, on the contrary, is the only thing that approaches extension. Accordingly, there must always be presupposed something which continually acts or spreads, as the white color of milk, the glitter, malleability and weight of gold, the resistance of matter. For continuity in itself – extension, is namely, nothing but a continuum with the character of simultaneity – is no more capable of constituting a complete substance than plurality or number require the presence necessarily of the things counted, repeated and continued. Hence I believe that our thought of substance is perfectly satisfied in the conception of force and not in that of extension.[291]

In this passage the object of attack is clearly the idea sustained by Descartes that impenetrability belongs to the essence of extension. And Leibniz propounded the use of the Cartesian analytic method of searching for clear ideas to prove its inconsistency. He began,

[291] LEIBNIZ, *On substance as active force rather than mere extension*, 1699, Wiener, p. 158.

as we said, by defending the idea that his substantial unities, the monads, have a primitive force which is to be considered similar to a feeling or appetite.[292] But he added additional clarification, maintaining that monads are not only an active force but also a passive power. These two forces are conceived in a certain animist fashion or following a psychological analogy. The passive force was also called primary matter and was conceived as the obscurity or confusion of perceptions of the monad. The infinite in number enters here because it accounts for the confusion of perceptions of the individual monads. This passive power is not extension but is the necessary presupposition for the idea of extension. Being itself a power, the primary matter is the ultimate cause for resistance to action, resistance which implies the impenetrability and inertia that we see in extended things.[293] This happens because it is the cause of the body's resistance to penetration and external motion and consequently it establishes the conditions for an extended thing to exist. Ultimately extension results as a consequence of the repetition of the *material prima* of a great or infinite number of monads. Matter then has this aspect of tangibility or "appearance of materiality" because of the predominance of the passive faculty of its constitutive monads, which is nothing more than the obscurity or unconscious character of representations of these monads, an inertia which precludes them from reaching a new level of perception. Leibniz thinks that without this quality, the passive force, it would be impossible to have an extended surface or a cohesive body. Without this inertial force we have no cohesion and everything would be radically dissipated in consequence of extreme fluidity:

> For it can be demonstrated that extension without the addition of other qualities is not capable of either action or its passive receptions. That everything

[292] "I thence found that their nature consists in force, and that from that there ensues something analogous to feeling and appetite … I call them perhaps more intelligibly, primitive forces which do not contain only the act or the complement of possibility, but further an original activity." LEIBNIZ, *New System of Nature and of the Communication of Substances, as well as of the Union of Soul and Body*, 1695, Wiener, p. 108.

[293] "Monads are the grounds not only of actions but also of resistances or passivities, and their passions reside in their confused perceptions. This also comprehends matter or the infinite in numbers …" *Leibniz Selection* Wiener, p.189. The action of the monad is never impeded by the action of another monad but only by its internal resistance or its passions that precludes new perceptions: "A substance acts as much as it can, unless it is impeded; even a simple substance, however is impeded, but not naturally unless internally by itself. And when a monad is said to be impelled by another, this is to be understood of the representation of the other in itself." RUSSELL, B. *A Critical Exposition of the Philosophy of Leibniz*, London, George Allen & Unwin Ltd, 1964, p. 268.

> becomes fluid in the most extreme way, that is becomes vacuous; that then the cohesion of bodies and what is felt as solid in them cannot be explained.[294]

In Leibniz's scheme the secondary matter is a body or mass of the aggregate that results from a set of active monads: "Therefore body is extended activity."[295] A given body has a substantiality that is conferred by the monads, but even then it has no true unity. Its unity is a unity of aggregate similar to a heap of stones or an army of soldiers.[296] Only in the case of living beings can the matter be said to be unified in the organic body, because there is a subordination of the body's monads to a single power which is the dominant monad.[297] In this case, the extension shaped in the form of the animal is dependent on the activity of the dominant monad, which sometimes Leibniz said can be conceived as the substantial form of the body.[298] But even in this case bodies do not have a true unity. If they have a certain appearance of unity, this is derived from the unity of the soul: "If a body is a substance, and not a mere phenomenon like the rainbow, not a being united by accident or by aggregation like a heap of stone, it cannot consist of extension, and it is necessary to conceive in it something which we call a substantial form, and which corresponds in some way to a soul."[299] Plotinus equally claimed that the unity of the body is a consequence of its participation in unity of the soul. He maintained that the soul has omnipresence in the body but keeps a character of indivisibility even if it covers the infinity of points of the mass of the body. To achieve this it has the property of manifesting in itself the contrary nature without losing its character of unity. The body has a derived unity and, consequently, is not a true unity.

Plotinus maintained that substance is power, and that power is prior to extension. Taking into account this character of power we can understand some paradoxical properties of the substance conceived as unity. Thus, because the substance is the primordial entity it cannot be situated in space, otherwise it would not be substance. Because it cannot be

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[294] LEIBNIZ, *On true Method in Philosophy and Theology*, 1686, Wiener, p. 63.
[295] LEIBNIZ, *On true Method in Philosophy and Theology*, Wiener, p. 64.
[296] "The body by itself apart from the soul, has only unity of aggregation." RUSSELL, B. *A Critical Exposition of the Philosophy of Leibniz*, p. 152.
[297] "It is to be held as proved that every body is actually subdivided into other parts (…) the reality of a corporeal substance consists in a certain individual nature; that is, not mass, but in a power of acting and being acted." *Leibniz Philosophical Writings*, Parkinson, p. 81.
[298] LEIBNIZ, *Correspondence with Arnauld*, Loemker, p. 338.
[299] RUSSELL, B., *A Critical Exposition*, p. 241.

situated in any space it transcends everything. But because it is the cause of all particulars it is said to be omnipresent. However, it is a peculiar aspect of the theory of Leibniz that the essential feature of the monads, the series of their perceptions that makes them acquire their individuality, is dependent on a certain notion of space. Thus the monads acquire their individuality from their points of view of the cosmos, which implies the notion of spatiality. In this case the main characteristics of the substance are dependent on what comes after the monad, space. This seems to constitute a vicious circle. It seems that Leibniz wanted to avoid the view that perception presupposes the logically prior existence of things to be perceived, since these things are supposedly already spatially placed. At the same time, it was difficult to sustain that only the subjective act of perception could account for the fact of perception. Thus, it was necessary to explain in what way the accidents or perception of the monads could express spatiotemporal relations.

Catherine Wilson suggested that Leibniz hinted at the solution of this problem although he never developed it to its full extent.[300] Mathematical space may be constructed by the imagination of the solipsist monad using the non spatial notions of point, line and plane. Perceptual space would be constructed in the same way using, instead of mathematical concepts, the material provided by perception. We have seen that Plotinus discussed the conception of soul as a "numerical principle", or its "nature a self-increasing number" and thus, as a principle of number, the Soul can achieve an "adding of extension". In both cases, the source seems to be the Aristotelian discussion of intelligible matter along with the Pythagorean discussion of the generation of mathematical objects. In this sense Leibniz said, in 1716: "For that reason the ancients were right in calling a space outside the world, that is, space without bodies, imaginary."[301] However, he had been thinking about this subject long before then. In the text *On the Origin of Things from Forms* of 1676, there is a passage which shows that Leibniz conceived this imaginary space as the explanation of the omnipresence of God, which, as we saw, is the idea behind the conception of the monad as microcosm: "Clearly, in the same way, the divine mind is to our mind as what is called imaginary space (for that space is supremely real, since it is God himself in so far as he is

[300] WILSON, C., *Leibniz's Metaphysics*, p. 223.
[301] LEIBNIZ, Letter to Remond, 1716, in *De Summa Rerum*, p.135.

considered everywhere, or, is immeasurable) is to place, and to various shapes that arise in the immeasurable."[302]

I would like to suggest that Leibniz intended to say that space is an ideal thing, and instead of being situated in space the monads have position (*situs*) in this imaginary space. The distance of one monad from other monads is its ideal relation of position in an order of coexistence; when the monad changes these relations it is the equivalent of saying that it changes its place.

In this chapter I have attempted to show the important similarities between the philosophy of Plotinus and Leibniz. It is plausible to see that Plotinus was inspired by the first hypothesis of Plato's *Parmenides* (as well as Aristotle's analysis regarding the unity) to create his doctrine of One. The doctrines of Intellect and Soul are, according to the scholars, based on the second hypothesis of *Parmenides* (which supports the Pythagorean notion of unity and ultimately the doctrine of All in All). Thus Plotinus took some features that Plato attributed to the One in the first hypothesis (that the One has no extension and is nowhere) and applied them to the unities of the realms of the Intellect and Soul (respectively second and third hypotheses). I do not consider that Plato would have approved this application, because in the *Parmenides* he showed that hypothesis I was totally different from hypotheses II and III. Aristotle would also have rejected this move because, as we have shown, he rejected the Pythagorean notion of unity. Leibniz, however, was following Plotinus' analysis and system of, and therefore he endorsed such combination. Thus both of them arrived at the same conclusions: their doctrine of unity implies the denial of extension and in some sense the interaction of substances. Consequently, both Leibniz and Plotinus denied the doctrine of impressions, when they explain perception. Both of them asserted that perception happens by the immanence of the All in the subject in accordance with the doctrine of micro-cosmos.

In both Plotinus and Leibniz then, we also have the notion that force is fundamental to the substance and explains the doctrine of micro-cosmos. Force is also regarded as opposed to extension in the sense that it is not divisible.

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[302] LEIBNIZ, in *De Summa Rerum*, p. 77.

Chapter V – Proclus, the Cambridge Platonists and Leibniz

Proclus, perhaps the last great Greek philosopher (411–485 CE), systematically review of all Neo-Platonic philosophy. Nicholas of Cusa, in the fifteenth century, referred to him many times as an important authority.[303] In this section I want to mention him because he opened a way for an interpretation of Platonism that supports the substantiality of space, a thesis defended by the Platonists of Cambridge. We saw in the last chapter that Leibniz followed Plotinus in considering space as non-real. Thus, in the first part of this chapter there is a short exposition about Proclus and how he differs from Plotinus. In the second part there is an exposition of the soul considered as the objective principle of mathematical extension. This theory was the basis of the view of the Platonists of Cambridge, who defended the substantiality of space, and concerning whom I present a short exposition in the third part of the chapter. In the last section I compare the Platonists of Cambridge with Leibniz.

Proclus still supported the theory of the One of Plotinus but in another sense he returned to a more genuinely Pythagorean position, in the sense that he put the Limited on the same level of Unlimited. Proclus affirmed, following the Pythagorean tradition, that all levels of reality, including the superior hypostasis (*henads*), the mathematical beings, the Soul, and even physical beings, are composed of Limit and Unlimited. Everything is therefore a synthesis or mixture of different degrees of these two terms. In this context, the Unlimited (dyad or the requirement of the infinite) corresponds to the moment of the procession, generating diversification and movement, whereas the Limit (structure requirement) corresponds to the conversion and the return, generator of identity and rest.[304]

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[303] Hegel also praised him: "... Proclus is hence much more detailed, and he went much further than did Plotinus; it may indeed be said that in this respect we find in him the most excellent and best that was formulated by any of the Neo-Platonist" In HEGEL, G. H. *Lectures on the History of Philosophy*, Plato and Platonists, vol. II, Lincoln and London, University of Nebraska Press, 1995, p. 440.

[304] In a passage of the *Commentary on Timaeus*, Proclus explains these two terms: "Orpheus likewise delivers the very same things. For as Plato produces twofold causes from the one, viz. bound and infinity, thus too the theologist gives subsistence to ether and chaos from time; ether being the cause of bound everywhere, but chaos of infinity. And from these two principles he generates both the divine and visible orders of things; from the more excellent indeed, producing every stable, effective of sameness, and source of measure and connexion; but from the less excellent, everything motive, effective of difference, never failing progression,

These principles are the laws of realisation of reality and they condition their productions in diverse ways. Each one is inseparable from its opposite and necessarily assumes it. Isolated from the other, the procession would deteriorate in an inexhaustible incoherence, while the conversion, without its opposite, would be perverted into a barren and monotonous identity. Proclus elaborated these complementarities dialectically and thus there is no superiority of one of these principles with regard to the other. In this he is radically different from Plotinus, whose One was always superior to its emanation.

However, Proclus' position was in another way close to Plotinus' because he also considered that the Unlimited itself was a procession from the One. Thus, the Unlimited is the condition for existence of matter but the One is the foundation of its existence. However, against the Plotinian pessimism regarding the material world, Proclus affirms that matter cannot be evil. There is not any ontological sphere that can be deprived of the Good, therefore the divine is present in all the beings and all the levels of the Real. In so far as it originates from the infinite, matter is the last degree of manifestation of the abundance of the One. Or, as Trouillard said , "the mystery of matter would be the privileged expression of the mystery of the One, because it is its inverse replica."[305] Thus matter is the feminine receptivity which Proclus opposed to the virile and seminal power of the formal element. Using mythical vocabulary, he still called it: "Night", "Chaos" and "Silence", it being the sources of all infinitude, either of intelligible, psychic or material nature. But as we have seen, it only works in dialectical conjunction with its opposite. In this way, according to Trouillard, he recovered in the Homeric and Orphic hierogamies the thesis – according to which only fecundity appears in the conjunction of antithetic principles.[306]

Proclus' theory of emanation, as we have said, is nonetheless similar to that of Plotinus in the sense that each one of the inferior subjects is produced and supported by the superior principle, that is, it can be said that everything is in One and One is in everything, according to the formula found in *Timaeus.* This principle is the basis whereon Proclus erected the monadological principle that each being expresses the entire universe according

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the nature which is defined, and the last infinity by which matter is comprehended" PROCLUS, *Commentaries of Proclus on the Timaeus of Plato,* tr. Thomas Taylor, Kessinger Publishing, vol. 1, p. 324.

[305] TROUILLARD, J. *Le néoplatonisme de Plotin à Damascios,* in *l'Histoire de la philosophie* I de l'Encyclopedie de la Pleiade, Paris, Gallimard, 1969, p. 130.

[306] TROUILLARD, J. *Le néoplatonisme de Plotin à Damascios*, p. 130.

to its particular law.[307] Thus each point of the universe reproduces the standard of formation of the universe, that is, it reproduces the procession scheme, according to its proper perspective. And so the centre of the universe is everywhere, and in each point we can find it, in some sense, totally present.

Therefore, the unity is said to be simultaneously the maximum (in that it transcends everything) and the minimum (in that it is the substance even of the "minimum" being), since each unity of matter is unified by a subjacent unity. As minimum it is contained by the whole but as maximum it contains everything as it is the whole. It is, perhaps, this doctrine that makes the Neo-Platonic conception of matter so similar to the notion of One, an aspect recognised by Proclus. In fact, both matter and the One are unlimited or infinite, both are the potentiality of everything, both are formless, both are sources of power, *dynamis*. In *The Elements of Theology*, prop. 59, Proclus indicated the situation of matter (or the last being) in this way: "For the last being is, like the first, perfectly simple. For the reason that it proceeds from the first alone; but the one is simple as being above all composition, the other as being beneath it."[308] Dodds said that Proclus explained in the *Theology Platonic* III (vi) 127–9, that the One which is uncaused has maximal unity and the matter which is caused by the One has minimal unity.[309] But this minimal unity, in fact, derives ultimately from the all embracing unity of the One.

The immanent principle or the One which is present in each being of the cosmos is referred in terms such as "One of the soul", "top of the soul", "centre of the soul", "flower of our substance", "seed of non being that there is in us" or still the "divine immanence in the sanctuary of the soul".[310] Proclus called the spirit the *"monad"* because of this immanence. All the three, spirit, soul and matter, are constituted of Unlimited and Limited (dyad and monad) as we have seen. But the denomination "monad" is more appropriate to the spirit (or intellect), because its procession is more concentrated, not advancing until the

[307]Trouillard used the expression "monadology of Proclus". He justified the use of this term: « Employer cet mot leibnizien n'est pas commettre un anachronisme, mais souligner une source néoplatonicienne de Leibniz, d'ailleurs reconnue par lui." "To employ this Leibnizian word is not to commit an anachronism, but it is to underline a Neo-Platonic source of Leibniz, moreover recognized by him." TROUILLARD, J., *La Mystagogie de Proclus*, Belles Lettres, 1980, p. 124.
[308] PROCLUS, *Elements of Theology*, commentary by E. R. Dodds, Clarendon Press, Oxford, 2004.
[309]PROCLUS, *Elements of Theology*, p. 232.
[310] In Remp. 1, 177, 16–23, 18, 10–179, quoted by TROUILLARD, *La Mystagogie de Proclus*, p. 100.

last determination, and so it stays enveloped in itself. Proclus explained this distinction in this way:

> For the monadic alone pertains to intellect, on which account also intellect is impartible. But the dyadic pertains to body, whence in the generation of the corporal-formed nature Plato begun from the duad (...) the soul however, being a medium between intellect and body, is a monad and at same time a duad. But the cause of this is, that in a certain respect it equally participates of bound and infinity; just as intellect indeed, is allied to bound, but body rather pertains to infinity, on account of its subject matter, and divisibility ad infinitum.[311]

But Trouillard explained that it is not the spirit but the soul which is the best ontological sphere to represent the monadology of Proclus. This is because the soul is in the middle position and consequently it is in the best position to incarnate the unified Pythagorean principles of Limit–Unlimited. Thus, in the *Elements of Theology*, Proclus believed in the necessity of beginning with the soul to study the universal order, since it is in the soul that all the characters of the cosmos are determined in concentrated form. The soul, situated in the middle point, is the recapitulation of the entire procession, from the sphere of intellect to the matter**.**

> Every soul is all things, the things of sense after the manner of an exemplar and intelligible things after the manner of an image. (…) Accordingly it pre-embraces all sensible things after a manner of a cause, possessing the rational notions of things immaterially, of bodily things immaterially, of extended things without extension; on the other hand it possesses as images the intelligible principles, and has received their Forms (…).[312]

[311] PROCLUS, *Commentaries of Proclus on the Timaeus of Plato*, vol. 2, p. 77.
[312] PROCLUS, *Elements of Theology*, Prop. 195.

Proclus explained that the soul is substantially monad and dyad, unit and multiplicity, but it is unified before being divided though the soul does not subsist prior the plurality of its parts:

> If we affirm these things correctly, it is not proper to separate the soul from the union, dividing it, nor to consume the totality of itself in a generation of parts (…) It is necessary, therefore, that the whole remains always the whole; that the generation of parts is realized with the totality remaining; and that this is not consumed in the division of the parts. Therefore we must conceive, that the essence of the soul is one, and at the same time multiple, the whole remaining and being distributed in parts, and possessing continuity, and being, at the same time, divided.[313]

In this last line Proclus arrived at a conception of soul different from that of Plotinus. It is not a pure or non-dimensional unity any more. It can be distributed into parts (being multiple) while remaining one. Its character of multiplicity does not destroy its unity.

2 – Psychic Vehicle and Imagination

In Proclus' scheme the imagination (*phantasia*), together with discursive thinking, occupies the intermediary place between the intuitive *nous* and sensation (*aisthesis*). Properly speaking, the scheme is *nous-dianoia-phantasia-aisthesis*. But, as we have seen, it is the soul which achieves this mediating status between mind and body. Thus these two faculties, *dianoia* and imagination, can be grouped together as upper and lower faculties of soul. In this way they achieve a graduated passage from the predominant unity of *nous* to the predominant multiplicity of sensation.

Proclus also called imagination the passive *nous* as it receives the projection (procession) of the content of the *nous* in its intelligible matter, through the dianoetic reason. Thus *dianoia* has the rational notions organised logically and discursively and imagination unfolds them, presenting them separately (as the dyad is a power of

[313] PROCLUS, Idem p. 54.

separation), so that they are in a way presented figuratively or projected in space. Hence imagination is almost inseparable from *dianoia.* It is possible to illustrate their relation using the model form–matter. Thus *dianoia* contains the pure rational *forms* that are projected in the intelligible *matter*, forming an imagined notion.

But Proclus also assumed the intermediary character of mathematics between the intelligible world and the physical world, or in other words, that mathematics results from a mixture of the indivisible and the divisible, Limit and Unlimited, one and many. In this sense Proclus, as well as other Platonists such as Iamblichus, Xenocrates (who said that the soul is a self-moved number) and Speusippus (who said that the soul is the all-extended) was a conceptual realist or anti-abstractionist.[314] Again, this is consistent with the Parmenidian notion that what is thought must be real. Consequently, Proclus believed in the full reality or subsistence of mathematical objects or mathematicals. Furthermore, because of the intermediary character of these two realms of being, he identified soul with mathematicals, a point of view also shared by the aforementioned Platonists. Thus, for him, the soul does not simply know mathematics, it is mathematics. However, this association of mathematics with the principle of life is certainly much older than the time of Proclus. As we saw in the first chapter of this thesis, it was a Pythagorean doctrine.

Thus, in the *Commentary on the first Book of Euclid's Elements* the thesis is that the creation of mathematics confounds itself with self-creation or the self-constitution of the soul, following the circuit of procession and conversion when the soul, in a kind of substantial movement, projects and recoils again to itself. For Proclus, all branches of mathematics are generated within the soul through its faculty of imagination. He even said that the imagination is the mirror of the soul.[315] Considering only geometry we come to know that the geometric equivalent of procession is the movement (fluxion) of a point creating a straight line, which, being extended indefinitely, is the expression of the generative power of the infinite. The corresponding geometric for conversion is the circumference, which is a movement that returns back to the centre the multiplicity previously generated, thus limiting and determining multiplicity. With only these two

[314] MERLAN, p. 47.
[315]PROCLUS, *Commentary on the First Book of Euclid's Elements*, "…so the soul, exercising her capacity to know, projects on the imagination, as on mirror, the ideas of the figures" p. 141.

movements, the line and the circle (or the curve), all possible objects of geometry are generated:

> For this reason the soul contains in advance the straight and the circular in her nature, so that she may supervise the whole array of unlimiteds as well as all the limited beings in the cosmos, providing for their forthgoing by the straight line and for their reversion by the circle, leading them to plurality by the one and collecting them all into unity by the other.[316]

And since the two movements have the same origin in the point which contains both, they cannot be radically different and in some sense they can be identified. Thus, Proclus says:

> … so also the idea of the figure shows that circular lines are implicated in straight and straight in circular; that is, it projects its whole nature in characteristic fashion in each thing, and all of them are in all when the whole is simultaneously in all of them and in each separately.[317].

Thus it is a living and substantial movement (*kinesis* or fluxion) that generates extension in the soul and gives to it a certain plasticity. Instead of imagining a space receiving the rational notion, we could view the whole process happening together: the space being created together with the procession of the rational notions. In addition, Aristotle also conceived that the properties of geometric figures were discovered through activity (*energeia*).[318] In fact, ultimately, this movement results from the activity considered as thinking, since there cannot be thinking without moving from one thought to another. Hence thinking goes along with extension, because extension is a space created, in the intelligible matter, by this noetic movement, in a kind of process of becoming. The

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[316] PROCLUS, *Commentary on the First Book of Euclid's Elements*, p. 107.
[317] PROCLUS, *Commentary on the First Book of Euclid's Elements*, 145.
[318] In NIKULIN, D., *Matter, Imagination and Geometry*, Burlington, Ashgate, 2002 p. 226 (Aristotle, *Met* 1051a 21–32).

continuous activity of mind which is connected with the notion of duration, or flux of consciousness, manifests itself in this growing imagined extension.[319]

For Proclus, the soul considered as principle of motion is inseparable from its mathematical character. And because the movement is not discrete, but continuous, we cannot consider this space composed of summed unities. This generation of extension by the soul follows the principle asserted about the soul that we have seen Proclus assert: "the generation of parts is realized with the totality remaining; and that this is not consumed in the division of the parts." And so we conclude that this space was conceived preserving its unity. At same time, extension is generated, and so it is conditioned by the opposite realm of dyad, of more or less, of expansion and contraction. Although, since Proclus claimed that the soul is a union of monad and dyad, we can deduce that something of the extension (or of intelligible matter) always remains with it.

The following passage is a sample in which we can find the claim of realism about mathematics as a product of imagination, the plastic capacity of the soul:

> For imagination, both by virtue of its formative activity and because it has existence with and in the body, always produces individual pictures that have divisible extension and shape, and everything that it knows has this kind of existence. For this reason a certain person has ventured to call it "passive *Nous*'". Yet if it is *Nous*, how could it be other than impassive and immaterial? And if feeling accompanies its activity, has it any longer a right to be called *Nous*? For impassivity belongs to *Nous* and intellectual nature, whereas whatever can be affected is far removed from the highest being. But I think he intended rather to express the middle position it occupies between the highest and the lowest types of knowledge and so called it at the same time "*nous*", because it resemble the highest, and "passive", because of its kinship with the lowest. (….) By contrast the imagination, occupying the central position in the scale of knowing, is moved by itself to put forth what it knows, but because it is not outside the body, when it draws its objects out of the undivided centre of its

[319] Moreover imagination was not only a movement. Aristotle even considered imagination as capable of causing movement in the body. NIKULIN, p. 227, *De an.* 432a 15 sqq, esp. 433a 9–10.

> life, it expresses them in the medium of division, extension and figure. For this reason everything that it thinks is a picture or a shape of its thought. It thinks of the circle as extended, and although this circle is free of external matter, it possesses an intelligible matter provided by the imagination itself. This is why there is more than one circle in imagination, as there is more than one circle in the sense world; for with extension there appear also differences in size and number among circles and triangles.[320]

This passage illustrates the plasticity of imagination which is associated with its formative or creative capacity. The "he" to whom Proclus referred is possibly Aristotle, who proposed the idea of passive intellect. Thus the imagination reproduces the intelligible species in its intelligible matter. But imagination is not only replicatory but can also diversify, producing variation in the forms, variation in sizes and even achieving combinations and compositions of different intelligible forms, since its plasticity is conditioned by its own will. In this sense, in the capacity of infinite variability it shows its relation with the Unlimited and, as Nikulin said, the imagination is enabled to imitate (or incarnate) the divine infinite creative power. [321] But the imagination, as a faculty of the soul, is itself also a mirror of two faces, as it replicates not only the reasons of intellect but also images (*phantasmata*) of the sense, which are in the last instance also appearances of other externalised reasons. The imagination is the only way to represent extended external objects and so it is the stance where the two kinds of images meet and interact.

Proclus considered the imagination as equivalent to the first vehicle or first body, being neither material nor immaterial. It is an intermediate between pure power and pure spatiality, and so has attributes of both. As Trouillard said, it is a passage from the intensity psychic to somatic extension.[322] Each soul, he said, has attached to itself this first body which is co-eternal with the soul. In Prop. 196 we read:

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[320] PROCLUS, *A Commentary on the First Book of Euclid's Elements*, Princeton, Princeton University Press, 1970. 52. But the intelligible matter is present in the imagination and also in the *nous*, since, for example, to discern an idea of triangle from the idea of square, the difference is only a certain broader extension of intelligible matter.
[321] NIKULIN, D., *Matter, Imagination and Geometry*, Burlington, Ashgate, 2002, p. 221.
[322] TROUILLARD, *La Mystagogie de Proclus*, p. 46.

> Every participated soul makes use of a first body which is perpetual and has constitution without temporal origin and exempt of decay. For every soul is perpetual in respect of its existence (prop. 192), and if further by its very being it directly ensoul some body, it must ensoul it at all times, since the being of every soul is invariable (prop 191). And if it is so, that which it ensouls is on its part ensouled at all times, and at all times participates in life; and what lives at all times a fortiori exists at all times; and what exists at all times is perpetual: therefore a body directly ensouled and directly attached to any soul is perpetual."

He said that this psychic vehicle or envelope of the soul (*ochema*), being always material, descends to the temporal sphere by addition of more material to itself, and so it is greater or smaller depending on the addition or removal of these vestments.[323] This notion, Dodds remembered, can be traced back to the notion of a vehicle of the soul in Aristotle, the *pneuma*, also called the fifth element or *quintessentia* which is present in the divine bodies of the stars. In *De Gen. Animal.* 736b27 Aristotle said: "the spirit which is contained in the foamy body of the semen, and the nature which is in the spirit, analogous to the element of stars."[324] Porphyrius added that this substance, although of ethereal origin, is progressively thickened as it absorbs moisture from the air and that it alters its forms in response to the imaginings of the soul.[325] Furthermore, the Stoics, sustaining their monism, regarded the *pneuma* not only as vehicle but as the soul itself.

As we have seen already, Plotinus had the conception that the emanation (dyad) of the One is light. But the *quintessentia* of Aristotle was also to be considered a kind of light as it was conceived as the substance of the stars. In fact, in Proclus we also find the identification of space and light in a lost work, *On space*, which is nevertheless mentioned

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[323] In the proposition 209 and 210 of *Elements of Theology.*

[324] ARISTOTLE, *De Gen. Animal.* 736b27. Dodds mentioned this theory in the comments to *Elements of Theology*, p. 306 to 318. Dodds recalled also that in the *Timaeus* 41 D f., the demiurge is said to have mounted the souls upon the stars.

[325] For Proclus the psychic vehicle is said to imitate the life of the soul, and in certain souls it reproduces its intellectual movement by circular revolution "For the congenial vehicles imitate the lives of the souls which uses them, and moves everywhere with their movements: the intellectual activity of certain souls they reflect by circular revolutions." *Elements of Theology,* prop. 209. Besides in the *Commentary on Timaeus* (in *Timaeus* II 72.14) Proclus maintains that this vehicle is spherical like the human skull, the stars and the universe itself.

by the Neo-Platonist commentator of the sixth century C. E., Simplicius.[326] And Proclus supported Porphyry's idea that this light is the luminous vehicle of the world soul.[327]

In our discussion this concept has importance because it is the foundation of the substantiality of space as propounded by philosophers in the Middle Ages (for instance, Grosseteste) and in the sixteenth and seventeenth centuries. And with the Platonists of Cambridge we have the debate of substantiality of space with Leibniz. We will see that More said that it is the spirit (the soul) that is the cause of extended substance and that it occupies space.

3 – Substantiality of Space Defended by the Cambridge Platonists

Henri More, Ralph Cudworth and Barrow, the seventeenth-century Platonists of Cambridge, discussed the substantiality of space. Their premises were not radically different from those of Spinoza, as Leibniz himself recognised.

The idea that spatial extension is the same as corporeal extension appears in the Middle Ages. At that time the philosopher Robert Grosseteste propounded a metaphysics of light in which he adopted Proclus' notion that light is the first corporeal form. It was also the first principle of motion, and the creation of the universe was regarded as nothing but the work of diffusion of the dimensional tenuous body of light. From this comes the importance given to the development of optics, the discipline wherein the science of space, geometry, meets with light.[328]

This idea of a tenuous spatial substance was radicalised by the Platonists of Cambridge. Henri More (1614–1687) who was the main figure of this movement exerted strong influence on the others of the group, and also on Newton, Clarke and Locke. He studied the Platonic tradition, including the works of the Italian renaissance thinker Ficino, but studied also and wrote about the cabalist theories, for example, his *Cabalist catechism*. As a Neo-Platonist, More defended the idea of an intermediary stance between God and matter, which is his Hylarchic spirit. Contrary to Ficino, he did not consider matter as being

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[326] JAMMER, Max. *Concepts of space, the history of theories of space in Physics*, Harvard University Press, Cambridge, 1969, p. 38 (Simplicius, *Physics* 612, 32).
[327] SORABJI, Richard, *Matter, Space and Motion, Theories in Antiquity and Their Sequel*, Ithaca, Cornell University Press, 1988, p. 109.
[328] CROMBIE, A. C., *Robert Grosseteste and the Origins of Experimental Science*, Clarendon, Oxford, 1953.

produced by this spirit. For him, matter was essentially inert and different from spirit. But he nevertheless stated that matter is animated by spirit. In the preface to the *Immortality of the Soul* he called this spirit the invisible agent which is "the vicarious power of God upon the matter", that is, the immediate plastic agent of God through which his will is fulfilled in the material world. He also called it the "universal soul of the world."[329]

More was initially very interested in the philosophy of Descartes, with whom he exchanged letters. In some sense he reproduced, some years earlier, the intellectual itinerary of Leibniz. In the beginning, he was an enthusiast of the Cartesian natural philosophy, but his mood evolved in an opposite direction, and he developed a desire to refute Descartes. More based his arguments on notions taken from old philosophical tradition, mainly the Platonic doctrines as seen by a Christian reader. He thought that the Cartesian attribution of all phenomena to blind matter left almost no place for God and the spirit in the universe, which for him led to a dangerous materialism and atheism. And so he proposed a different definition of extension:

> By true extension you understand that which is accompanied with the faculty of being touched and possesses impenetrability. I admit with you that this is not a case with God, with an angel, and with the soul, which are devoid of matter; but I maintain that there is in angel, and in souls, just as true extension, however little acknowledged by the run of the schools.[330]

Thus More claimed that it is not matter but the spirit which truly has the essence of an extended substance: it is a substance because it occupies space and can affect matter. Differently from inert matter, the nature of spirit is to be indivisible, penetrable and self-moving. Also, the spirit is a plastic power and so it is able to expand or contract in such a way that it can produce many phenomena in nature, like directing or moving parts of matter, making it cohesive and causing effects that cannot be explained mechanically. As he considered matter to be inert, so its forming atoms as well are only building blocks

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[329] MORE, H. *Philosophical Writings of Henry More*, New York, AMS Press, 1969, in *Immortality of the Soul* Bk III, Ch 13, Par. 7.
[330]BURTT, Edwin. *The Metaphysical Foundations of Modern Physical Science*, Atlantic Highlands, Humanities Press, 1996, p. 144.

submitted to a motion which is not generated by them. In a letter of 1649 to Descartes, More wrote:

> Lastly, since incorporeal substance has this stupendous power (*virtus*) that by its mere application it can bind together or separate, divide and project or control matter without the use of strings or hooks, wedges or fastenings, may it not seem likely that it can contract itself together, since nothing impenetrable impedes it, and the like?[331]

Only Lady Anne Conway, the pupil of More, was to radicalise his ideas, denying real existence to matter, considering it merely a derivation of spirit.[332]

Thus his doctrine begins with the recognition that extension was the feature existing in both spirit and matter. The pervading spirit conferred extension to brute matter and consequently achieved the interaction between the two spheres of reality. More claimed that the whole space was spiritual or divine, a fact that guarantees its status as a very real thing. In the work *Enchiridion Metaphysicum* he identifies Space and God, eliminating the distinction between God and the Hylarchic Spirit or between Spirit and universe. He was accordingly somehow defending a doctrine with strong pantheist connotations. Thus the spirit is not only the moving force in the universe but also the immobile background to where the matter is moved:

> If after the removal of corporeal matter out of the world, there will be still space and distance, in which this very matter, while it was there, was conceived to lie, and this distant space cannot but be conceived to be something, and yet not corporeal, because neither impenetrable nor tangible, it must of necessity be a substance incorporeal, necessarily and eternally existent of itself; which the

[331] HALL, A. R., *Henri More and the Scientific Revolution*, Cambridge University Press, Cambridge, 1990, p. 153.
[332] HALL, p. 7.

> clear idea of a being absolutely perfect will more fully and punctually inform us to be the self-subsisting God.[333]

The notion is based on the idea of the omnipresence of God, central as we have seen in Neo-Platonic thought, but is also present in the Jewish religious tradition, as we can see in a letter to Descartes.[334] More says:

> you define matter or body in too broad fashion, for it seems that not only God, but even the angels, and everything which exists by itself, is an extended being; whence extension appears to possess no narrower limits than the absolute essence of things, though it can nevertheless be diversified in accordance with the variety of the same essences. Now the reason which makes me believe that he is omnipresent, and fills immediately the whole universe and each of its parts; for how could he communicate motion to matter, as he has done betimes, and as he is actually doing according to you, if he did not have immediate contact with matter … God is therefore extended and expanded after his fashion; whence God is an extended being.[335]

Thus, if this extension communicates motion to nature it does not do it irregularly or miraculously. It does it in such an orderly way that we can acquire scientific knowledge of it. The gravitation of planets was supposedly to be explained by this agency, as was the resonance between musical strings and the formation of the animal foetus and development of plants.[336] Thus the working of this principle is not only the blind necessity of mechanical causation. Nonetheless the principle can have its effects predicted: "the only thing

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[333] JAMMER, Max, *Concepts of Space, the History of Theories of Space in Physics*, p. 47 (the appendix to the *Antidote against atheism*).

[334] More attributed his idea of divine extended space to Pythagoreans: "I on the contrary when I have so manifestly proved that the internal space or place (*Spatium sive Locum*) is really distinct of matter, I conclude that it is for that reason a certain incorporeal substance or spirit, jus as the Pythagoreans formerly thought. And through that same gate through which the Cartesian philosophy seemed to intend to exclude God from the world, I on the contrary strive to reintroduce him. And this infinite and immobile extension appears to be not only real but divine." Quoted in Hall, p. 189.

[335] Idem, p. 144.

[336] HALL, A. R. *Henri More and the Scientific Revolution*, Cambridge University Press, Cambridge, 1990, p. 115.

mechanical about the spirit of nature is that it acts in predictable ways in its interaction with matter."[337]

Another point of disagreement between More and Descartes concerns the absolute or relative character of space. This will be important for us as we look to Leibniz's work. According to Hall, Descartes considered the recognition of motion to be dependent on the position of observer – each observer having an account of space that is necessarily relative to himself and so different from the position of other observers, it being impossible to discern a best choice between the alternatives.[338] Against this relativist vision, More defended the idea of a privileged observer, who was obviously God, who could have a unified vision of everything.

Newton defended the same notion of absolute space. Many historians of science (for instance, Hall, Westfall and Koyré) presumed that this conception of Newton was due to the influence of More, directly, or by means of Barrow. Referring to the concepts of absolute space and absolute time of Newton, Alexandre Koyré says that they are: "the selfsame concepts for which Henry More fought his long-drawn-out and relentless battle against Descartes."[339] And the conception is sustained as a consequence of metaphysical or theological motivations of Newton, to which he also added axioms necessary to his dynamics. But the presence of theological assumptions is clear, since the idea of absolute space is to be connected or explained by the idea of the omnipresence of God. Thus Newton says: "God is one and the same God always and every where. He is omnipresent not as in *virtue* only, but as in *substance*. In him the universe is contained and moved, but without mutual interaction, for just as God has no feeling of the motions of bodies, so bodies feel no resistance from the omnipresence of God." [340]

The second most important Cambridge Platonist, Ralph Cudworth (1617–1688), published his massive *The true intellectual system of the universe* in 1678. In this book he developed the notion of Hylarchic spirit derived from More, which he calls "plastic spirit". It suffices here to stress a few points from this work.

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[337] HALL, p. 115.
[338] HALL, p. 207.
[339] HALL, p. 219.
[340] HALL, p. 217.

Cudworth also claimed that the principle is present strongly in the history of philosophy. In most cases, however, he stresses the intermediary nature of what he calls the Plastick principle:

> And as Hippocrates followed Heraclitus in this (as was before declared) so did Zeno and the Stoicks also, they supposing besides an Intellectual Nature, as the Supreme Architect and Master – builder of World, another Plastick nature as the Immediate Workman and Operator; which plastick nature hath already been described, in words of Balbus, as a thing which acts not fortuitously, but regularly, orderly and artificially (…) Lastly, as the latter Platonists and Peripateticks have unanimously followed their Master herein, whose vegetative Soul also is no other than a Plastick nature, so the Chymists and Paracelsians insist upon the same thing, and seem rather to have carried the notion on further, in the bodies of animals, where they call it by a new name of their own, The Archeus.[341]

In the case of the Stoics, the principle is presented in a monist way, and for this reason Cudworth called them atheists.[342]

Cudworth mainly developed the idea that nature acts like an artist, but it acts without explicit consciousness. Cudworth, like More, asserted that the plastic nature does not act blindly by necessity of mechanism or by fortuitous chance: "Nature is art as it were incorporated and embodied in matter, which do not act upon it from without mechanically, but from within vitally and magically."[343]

Again we have the same reference to passages of Aristotle that inspired the thinking about unconscious teleology:

> How the Plastick Nature is in general to be conceived, Aristotle instructs us in these words: If the Naupegical art, that is the art of shipwright, were in the

[341] CUDWORTH, Ralph, *The True Intellectual System of the Universe*, London: Printed for R. Royston, 1678, p. 153.
[342] "Stoical atheists, who made the whole world to be dispensed by one Orderly and Plastick Nature." CUDWORTH, p. 141.
[343] CUDWORTH, p. 156.

> timber itself, operatively and effectually it would there act just as Nature does (…) And thus we have the first general conception of the Plastick Nature, that it is the art itself, acting immediately on the matter., as inward principle.[344]

In many places he discussed the unconscious work of the Plastick Nature and it suffices here to only mention a short passage: "there is in the next place another imperfection to be observed in the Plastick Nature, that as it doth not comprehend the reason of its own action, so neither is it clearly and expressly conscious of what it doth …"[345]

But for nature to act in this way, Cudworth said, it must follow a program inserted in its seeds, as the Stoics propounded: "Nature is a habit moved from itself according to Spermatick Reasons or Seminal Principles, perfecting and containing several things, which in determinate time are produced from it, and acting agreeably to that from which it was secreted." Thus in Cudworth we have the meeting of the idea of plastic nature, which is the shaping extension, with the Aristotelian notion of *energeia/entelecheia* which notion is, in its turn, coloured with meanings of Stoic origins: the seminal principles. To all this is also added the idea of the presence of the unconscious work. In other words, all that Plotinus presented as an attribute of his non-extended soul, was established by More and Cudworth as properties of the extended or plastic soul.

It should be also mentioned here that Leibniz recognised the link between the doctrines of More and Spinoza.[346] He quoted in the same text in which he discussed the Platonists of Cambridge the doctrine of Spinoza that "thinking substance and extended substance are one and the same, known now under the attribute of thought, now under that of extension." For Spinoza, the principle of continuity precludes that extension can be regarded divisible and thus only by a superficial approach can account for such divisibility.[347]

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[344] CUDWORTH, p. 155.
[345] CUDWORTH, p. 158.
[346] LEIBNIZ, In *Refutation of Spinoza*, 1708, Wiener, p. 486.
[347] "… but if we regard it (extension) as it is represented in our intellect, and conceive it as substance, which it is very difficult to do, we shall then, as I have sufficiently proved, find that it is infinite, one, and indivisible." Part I, Prop XV, SPINOZA, *Ethica*, MSTU (Middle Tennessee State University), Philosophy Web Work Hypertext, 1997.

4 – Leibniz

Leibniz followed the Platonic tradition represented by Proclus in some aspects, but in others he modified it. He acknowledged three levels of objects of knowledge: sensible, imaginable and intelligible. And he said, like Proclus, that "Mathematics is the science of imaginable things" and that geometry is the science of universal imagination.[348] He also considered the space of imaginable objects as an ideal thing, like the intelligible matter of Aristotle. Proclus, however, assumed the notion of intelligible matter but his concept of imagination is substantial, as it guides the plasticity of soul when it informs matter. In contrast, for Leibniz, the imagination is only an ideal entity of the mind.

Thus for Leibniz we see the extended thing and then the mind obtains a dimensionless idea of that extension. But the extended thing we see is not really substantial extension. As we saw in the last chapter, its extension is a well-founded phenomenon that results from the harmony of the set of monads. Thus the extension we see is not a real continuum. It is not real, but is a creation of the mind. In this sense extension is an entity of reason. As abstraction it is an imagined entity and so in this sense, surfaces or spaces and lines are also imagined things. In a letter to De Volder he explained this point:

> For space is nothing but the order is the existence of things possible at the same time, while *time* is the order of the existence of things possible successively (…) extension is an abstraction from the extended and can no more be considered substance than can a number or a multitude, for it expresses nothing but a certain non-successive (i.e., unlike duration) but simultaneous diffusion or repetition of some particular nature, or what amounts to the same thing, a multitude of things of this same nature which exist together with some order between them; and it is this nature, I say, which is said to be extended or diffused.[349]

[348] JOLLEY, p. 184.
[349] LEIBNIZ, *Correspondence with De Volder*, June 30, 1704, Loemker, p. 536.

The two orders result from relations among a plurality of discrete things. Because they are abstractions, these two orders are only an extrinsic denomination and indifferent to the things from which they were abstracted. Number and time also have the same status of things of the imagination, as they are abstracted from numbered things. In this case, they are an order of succession, whereas spatial objects pertain to the order of coexistence. Thus Leibniz sustained that space and time are not substantial: "space and time are order of things but not things." Space and time are well-founded phenomena and can be explained in terms of perceptions of the souls.

In both cases, the order of co-existence and the order of succession, the unities are organised in relations by perception, that is, by the understanding or imagination. In this sense, Leibniz wrote in the *New Essays*:

> It may be that dozens and score are merely relations and exist only with respect to the understanding. The units are separate and the understanding takes them together, however scattered they may be. However, although relations are the work of the understanding they are not baseless and unreal. The primordial understanding is the source of things; and the very reality of all things other than simple substances consists only in there being a foundation for perceptions or phenomena of simple substances.[350]

Thus, although the relations are only in the understanding they are not altogether unreal. Their reality is guaranteed by the fact that they are present in the understanding of God.

It is because of this process that Leibniz maintained the constructive character of a perception. In some sense, this is the second function for imagination, which is also a function of the understanding: to bestow unity to sensible things. Thus the sensible world, as a phenomenon, does not have true unity: "a body is not a true unity, it is only an aggregate, which the Scholastics call a being *per accidens*, a collection like a herd. Its unity comes from our perception. It is a being of reason, or rather, of imagination, a phenomenon."[351]

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[350] LEIBNIZ, *New Essays*, 145.
[351] LEIBNIZ, *Conversation of Philarete and Ariste*, 1711, Loemker, p. 623.

These thoughts about imagination, extension and phenomena are associated with Leibniz's conception of matter. Leibniz rejected the Cartesian idea of matter as a perfect fluid or as equivalent to extension. The idea of a perfect fluid is to be opposed as being as absurd as the idea of the perfect hard atom which cannot be split. All matter must be something between these two extremes of absolute cohesion and absolute fluidity, and so even liquids have some kind of cohesion. Leibniz thought that matter must be a kind of elastic fluid, since it can be separated. Consequently, it must be discrete in its deepest nature. The ultimate foundation of the physical world must be these discrete entities or unities. Thus liquidity is equivalent to divisibility, so matter is not a true continuum as abstract space is, but can be divided to infinity:

> Rather, we would think of space as full of matter which is inherently fluid, capable of every sort of division and indeed actually divided and subdivided to infinity … That is what brings it about that matter has everywhere some degree of rigidity as well as of fluidity, and that no body is either hard or fluid in the ultimate degree – we find in it no invincibly hard atoms and no mass which is entirely unresistant to division. The order of nature, and in particular the law of continuity, equally pull down both alternatives.[352]

The argument Leibniz used for explaining elasticity is this: a body must be made of smaller parts and the elasticity is due to the movement, caused by tension, of these parts in a subtle fluid which permeates them. This fluid, by its turn, is composed of still smaller parts that themselves float in a fluid. This process goes on to infinity.[353] Thus the elasticity (or fluidity) that the Platonists of Cambridge used to support the idea of continuous extension (because it can be stretched in many forms without losing its unity), was transformed by Leibniz into an argument for the discrete nature of matter and of the universe as whole.

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[352] LEIBNIZ, *New Essays*, 60.

[353] Daniel Garber quotes two passages of Leibniz in this respect: "Elasticity ought always to derive from a more subtle and penetrating fluid, whose movement is disturbed by tension or by the change of the elastic body" And: "And since this fluid itself ought to be composed, in turn, of small solid bodies, themselves elastic, one well sees that this replication of solids and fluids goes to infinity." In JOLLEY, N., *Cambridge Companion to Leibniz*, p. 323.

But Leibniz rejected the idea of plastic natures for another reason. As Wilson points out, Leibniz believed that the idea of plastic natures was not the idea of an internal agent but of an external one. In fact, there is a dualism when More defended the idea that plastic nature always acted on inert matter.[354] But this is not the only way of seeing these matters. As we saw in our exposition of Proclus, the duality of acting principle and acted-upon matter can be seen as both parts of the soul. For this reason Lady Anne Conway and perhaps Cudworth were even closer to Proclus than More was. The soul is then considered as having the dual ontological level that makes a perfect continuous link between the unity of Intellect and multiplicity of matter. We have presented the arguments that the Platonists of Cambridge used to sustain it. But also Paracelsus and Van Helmont, following the idea of world Soul, postulated the existence of a certain spiritual and spatial medium for the possibility of transference of accidents from one subject to another. By means of this conception, all types of bodily extension are somehow united by a connecting field, "the Light of Nature", that conveys images inside the World Soul. None of this exists in Leibniz, as he always denied both the existence of the World Soul and the transference of accidents. He interpreted this notion of "Light of Nature" not as a real entity, but only as the access to the contents that we have in our own mind:

> But the light of nature, as it is called, involves distinct knowledge; and quite often a 'consideration of the nature of things' is nothing but the knowledge of the nature of our mind and of these innate ideas, and there is no need to look for them outside oneself.[355]

The corresponding immanent imagination, the plastic faculty that acts as demiurge and provides the extended form for the body, is also naturally ruled out.

For Leibniz, the monads are non-dimensional and immaterial beings and consequently they cannot interact with anything extended. Beside, because the soul is this immaterial unity, it is outside space and any extension is only a phenomenal appearance of an aggregate of monads. In fact, Leibniz thought that he could replace the extended plastic

[354] WILSON, p. 175.
[355] LEIBNIZ, *New Essays*, p. 84.

natures by his own conception of an infinity of discrete monads. Thus in a writing of 1705, entitled "*Considerations on Principles of Life, and on Plastic Natures*" he agreed with Cudworth that the laws of mechanics alone could not form an animal. But he said:

> Thus I have no need to resort with Cudworth to certain immaterial plastic natures, although I remember that Julius Scaliger and other peripatetics, and also certain partisans of the Helmontian doctrine of *Archei*, have believed that the soul manufactures its own body. I may say of it *non mi bisogna, e non mi basta*, for the very reason that pre-formation and organisms *ad infinitum* will furnish me the material plastic natures suited to the requirements of the case; whereas the immaterial plastic principles are as little necessary as they are little capable of satisfying the case.[356]

Therefore, Leibniz said that the soul is always accompanied by an organic body. This is similar to the plastic natures, with the difference that it is formed by an infinity of discrete elements, other monads.

Leibniz had another reason for rejecting the plastic natures. According to him, the science of mechanics proves that the interaction between the soul or plastic natures and matter was impossible. Bodies can only interact with bodies. He reported that Descartes has well established the law of nature that the same quantity of force is always preserved. Consequently, the soul could not increase or diminish the force of bodies. Leibniz thought that he had proved that even the total direction of the forces of bodies could not be changed by the soul (contrary to what Descartes believed). Thus these two levels do not interact. The souls, he said, must follow their own law of final causes, following a progressive series of perceptions according to good and evil and the bodies or extended things must follow their own laws, the efficient causes or the mechanic laws of motion. The two levels are synchronised by the pre-established harmony.[357] Thus, by constructing a metaphysics partly based on the results of the still-young science of Mechanics, and partly based on Plotinus'

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[356] LEIBNIZ, *Considerations on the Principles of Life, and on Plastic Natures*, 1705, Wiener, p. 197. The expression means: "I don't need these notions and they are not enough for me".

[357] LEIBNIZ, *Considerations on the Principles of Life, and on Plastic Natures* (1705), Wiener, p. 193: "The system has moreover the advantage of preserving in all its rigor and generality the great principle of physics, that a body never receives change in its motion except by another body in motion which impels it."

doctrine of the soul (dimensionless soul) he ended by creating a very sharp dualism very similar to the Cartesian one, where the substance of matter cannot interact with the substance of mind.

Leibniz remained a strict supporter of mechanism and rejected non-mechanical causes, as can be seen in his letter to Clarke. He rejected the explanation provided by the theory of gravitation of Newton on the grounds that it did not fit into the theoretical framework of the new science of mechanics. The movement of bodies, he says, must be linear otherwise it would be miraculous:

> If God wanted to cause a body to move free in the *aether* round about a certain fixed centre, without any other creature acting upon it, I say it could not be done without a miracle, since it cannot be explained by the nature of bodies. For a free body naturally recedes from a curve in the tangent. And therefore, I maintain that the attraction of bodies, properly so called, is a miraculous thing, since it cannot be explained by nature of bodies.[358]

Leibniz insisted that extension is divisible presumably as any bit of common sense can verify. However, the Platonists of Cambridge (and perhaps Spinoza too) maintained that the extension to which they referred is a kind of basic and primeval spiritual extension. This spiritual extension represents the proper omnipresence of God and follows the Platonic tradition. As Koyré pointed out, Newton's concepts of absolute space and absolute time are the same as those of Henry More and possibly are derived from him.[359] And, as Halls claimed, Henry More was a decisive influence "in assisting Newton to repudiate Cartesian mechanism."[360] Thus Newton rejected the main axiom of Descartes' science that one body can only act on another by direct contact. In fact, gravitational attraction was a good example of non-mechanical action. In convergence with More, Newton wrote in the last

[358] LEIBNIZ, Third letter to Clarke, part 17, Loemker, p. 684.
[359] HALL, p. 219. The reference is: Koyré, A., *From the Closed World to the Infinite Universe*, Baltimore, 1957, p. 160.
[360] HALL, p. 255.

edition of *Principia* about the universal, subtle and elastic spirit that is the main cause of coherence, gravity, optics and electricity, as well as of animal sensation.[361]

In this chapter we have seen that in the Neo-Platonic tradition there was a branch that defended the substantiality of extension. Proclus is important in this tradition because he tried to explain how the soul, being a principle, Limited and Unlimited, could be the objective basis of this extension. His theory also attempted to explain the immanence of mathematics in nature, quite different from the nominalism of Aristotle and Leibniz. His later followers were the Platonists of Cambridge.

[361] HALL, p. 240. The reference is Newton, I, *Phílosophíae naturalís Príncipia mathematica,* Cambridge, 1713, p. 484.

Chapter VI – The Tradition of Studies in Optics: al-Kindi and Grosseteste.

In the previous chapter we showed a medium that explains the substantiality of space. In this chapter the idea is to show that the same medium was used to explain the interaction between substances, a theory rejected by Leibniz. However, this chapter attempts to show that this tradition of 0ptics was important for Leibniz concerning certain aspects of *Monadology*: the principle of the origin of diversity, the use of the metaphor of mirrors and the appearance of the principle of least action. I will put forward a general view that the two main figures in the origin of this tradition were al-Kindi and Grosseteste.

We saw in the chapter on Aristotle that his explanation of sensation and the idea of interaction with the environment implicit in his teleological functionalism seemed to conflict with the notion that the organism develops depending only on the internal principles of change already present in its essence or in its substantial form. Aristotle's theory of knowledge was in this sense opposed to Plato's theory of reminiscence of, because it puts great importance on the interaction with environment. The form or species travels in the environment until it reaches the soul of the knower, causing not only sensation but also abstract thinking.[362]

Thus the idea that the objects of perceptions (or intellectual understanding in some cases) generate their forms or species and that these species travel in a medium until they reach a receptor was basically Aristotelian (but also defended by the Atomists). The Stoics adopted this scheme and it was in some sense also present in the Neo-Platonists. We have mentioned also that the *quintessentia* of Aristotle was to be conceived as the substance of the stars. In *On the Generation of Animals* (736b), he suggested that it was from this starry material that the cover of soul, the *pneuma*, was formed. Proclus, as we saw, developed the theme of imagination as a proper faculty of the soul. It is the middle or intermediary link between intellect and matter. Following this a line of research appeared, first in the Arabic world and afterwards in Europe, that connected some of these conceptions of knowledge of Aristotle with the mathematical studies of Euclid and created a tradition of what we can call

[362] This is valid even if we take into account the theory of active intellect of Aristotle, which puts him again in a position similar to that of Plato.

philosophical and scientific research in optics (also called *perspectiva*). To these two main theoretical elements we need to add the Neo-Platonist doctrine of micro-cosmos. In this chapter we will examine some aspects of two representative thinkers of this tradition, al-Kindi and Grosseteste, with some references to others such as Roger Bacon.

al-Kindi lived in Baghdad between 805 and 873 A. D. and is regarded as the father of Islamic philosophy. He was also a scientist, and produced a commentary about the *Optics* of Euclid.[363] He almost directly influenced the mediaeval European philosophers, Robert Grosseteste and Roger Bacon, and also the Renaissance men: Ficino, Bruno and Paracelsus.

I will focus on some parts of the small work called *The rays; theory of magical arts* (or *De radiis stellarum*).[364] In that work, al-Kindi reworked and organised the material furnished by Aristotle, but also coupled it with Euclid's science. From the Neo-Platonists al-Kindi took the conception that this world is a mere reflection of the superior realm, the Intellectual realm. This realm is made equivalent to the celestial (he refers to it as celestial harmony) and therefore is called the sidereal sphere (from Lat. *sider* – star), and it is from there that the sensible world (or world of elements) takes its paradigmatic form. Thus each individual in the sensible world is achieving its own process of emanation, like the stars. In this respect al-Kindi said:

> Thus, (…) the world of elements is an image of the sidereal world ... and it is manifest that each thing of this world, whether it is substance or accident, emits, at its manner, the rays as the source, i.e., the stars. If it were not this way this world will not fully represent the sidereal world.[365]

He said that each thing is an image of the sidereal world. He also explained this notion in terms of mirrors and harmony: "Inversely, the state of each individual thing of this world, fully known, would reflect the total state of the celestial harmony as a mirror, since each thing of this world is like an image of the universal harmony."[366]

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[363] RASHED, R., "Le commentaire par al-Kindi de l'Optique d'Euclide: un traité jusqu'ici inconnu", *Arabic Sciences and Philosophy*, **7** (1) (1997), 3, 5, 9–56.
[364] AL-KINDI, *De radiis; théorie des arts magiques*, trans. Didier Ottavianni, Editions Allia, Paris, 2003.
[365] AL-KINDI, *De radiis; théorie des arts magiques*, p. 23 (the translation from French is mine).
[366] AL-KINDI, p. 23.

From Euclid's *Optics* al-Kindi adopted the theory that the emission and diffusion of light radiation happen according to geometrical laws, the most basic rule being the notion that rays follow a rectilinear path. For al-Kindi the emanation of all substances is a certain kind of light radiation and consequently all events and transformations in reality occur according to the laws of optics. The science of optics, going beyond the mere study of the laws of visible light, becomes a kind of paradigmatic science that comprehends all transformations in nature. The importance of this science is based on the understanding of the idea that all causal actions happen according to a method of "irradiation" following mathematical conditioning. For instance, he said that "The angle of incidence more or less great of a luminous beam involves itself also a difference in the effect of the rays."[367] A careful study of the mathematical laws of light radiation is consequently necessary for understanding the causality working in nature.

The use of mathematics then allows the precise measurement that is necessary to quantify all radiations in general, which includes not only the sensible but also the invisible radiation of the astral or spiritual spheres. This is why al-Kindi used the expression "magic" to designate his science. He wanted to imply that not only manifest but also occult radiation is governed by the laws of science. Thus, magic for him is not any miraculous suspension of laws of nature or action against these laws. Magic is the deepest science because it elucidates by means of ultimate laws the complex network of relationships and causal actions behind or occulted by the appearances of Nature. Thus magic, to be efficacious, needs to follow the precise laws of mathematics.[368]

In the conception of al-Kindi, the occult rays have a physical consistency, a kind of imperceptible or subtle materiality, but despite this subtlety their effect will be certainly sensible and manifest in nature. This subtle and dynamic materiality is the energy itself or *virtus*, the causal link between the subject which is the emitting cause and the subject which receives it and manifests it as effect. The rays are thus the mediating entity or the being intermediary between the emitting cause and the effect produced, according to Proclus'

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[367] AL-KINDI, p. 25.

[368] In the words of Travaglia: "The 'magic' power mentioned in *De Radiis* is not an arbitrary intervention on nature, as it is subject to natural laws. Here 'magic' implies the most complete and the deepest possible knowledge of how nature works – that is, of the multiple interactions which exist between all phenomena." TRAVAGLIA, P., *Magic, Causality and Intentionality, the doctrine of rays in al-Kindi*, Edizioni del Galluzzo, 1999, p. 97.

idea of intermediary entity. The ray is also a middle entity in the sense that it is at the same time the vehicle of transformation and its own content (thus it unites the opposites, matter and form). The effect is the transformation that the rays bring about on the receiving subject. As the content of the rays is linked to the nature of the emitting cause, all three, cause, mediating ray and effect, are linked as a unique reality.

The effects are, however, dependent on many circumstances. Principally, the effect is conditioned by the quality of the subject agent, which means that the rays transmitted convey something of the agent's own nature. In fact, al-Kindi follows the notion present in Aristotle that every entity projects its own nature (its forms or species) outwards by means of rays which transmit this nature to all other entities: "we can say that everything that exists actually in the world of elements emits rays in all directions, which fill in their manner the ensemble of this world. It follows that each place of this world contains the rays of everything that exists in act."[369] The idea is that each individual reproduces the emissive pattern of the stars. Each generates its own images. Thus al-Kindi amplified the Aristotelian doctrine (following the Neo-Platonists), and conceived each being as a centre from which rays emanated at all times and in all directions, thus causing its own peculiar effect in everything in the world. Usually the emission is involuntary, since it is without any conscious direction or purpose. In the words of Travaglia: "Causal power is emitted from everything and though it is not aimed at any particular target, it nevertheless always produces effects. It rather seems that being a cause means exactly this capacity of expanding, even involuntarily, outwards."[370] Furthermore, because each being emits rays and at the same time receives radiation from all other beings, it is both active and passive: "Because the things are so united they act and suffer reciprocally one in relation to the other, thanks to the diffusion of rays, and they produce one in the other a movement in function of the exigency of nature active or passive, as it is evident in numerous cases."[371] The world is this network of radiations coming from each being towards all others. Thus the general effect that each being suffers has its origin in the mutual interaction of all causes of the cosmos. A linear and restricted interaction of one single cause and one single effect is an impossible thing.

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[369] AL-KINDI, p. 24.
[370] TRAVAGLIA, p. 32.
[371] AL-KINDI, p. 27.

We have additional complications because each emitting subject is already the effect or product of a constellation of rays received. Furthermore, the emitting agent suffers the effect produced by the causal reciprocity coming from the recipient subject. This infinite complex network of causes means that the effects produced in the world should be always new, as the same causal pattern can never be reproduced twice. Determinism still exists, but is conditioned by an infinite combination of variables.

The wise man, however, knowing the laws that rule the dynamism of these rays, can voluntarily intervene and direct the rays for a particular purpose. He will know the principles by which the rays interact, how they can be increased by combination and decreased or weakened when they are not in agreement, achieving in this way a manifestation of a certain effect. Magic can happen when the radiations are consciously manipulated with the purpose to produce a desired effect.

The magician does not possess a special or privileged power, but rather his efficacy comes from his conscious knowledge of how to use the powers appropriately that would otherwise work unconsciously and in an unfocused way. He knows that the intentionality of man, which associates imagination, desire and faith, is able to produce rays that may affect and even move things in the material world. Finally, the capacity of man to intervene directly in the world is based on the notion that he himself is a micro-cosmos: "The man thus, by having its being correctly proportioned, is like the world itself. This is why we call him micro-cosmos and that he receives, as the world, the power to induce a movement in one matter appropriate to his action, under the condition of having elaborated in his soul an imagination, an intention and a particular certitude."[372]

Thus the magician can make his soul into a clear mirror reflecting the entire world and have the ability to produce clear images, which are those that project stronger rays. Thus magical practice implies that the magician must first produce the necessary change in himself.[373] This change will be the production of a clear image of the reality that he wants

[372] AL-KINDI, p. 35.
[373] In the words of Travaglia: "… the magician must produce the necessary change inside himself, which he would like to produce externally". Travaglia, Pinella, *Magic, Causality and Intentionality. The doctrine of rays in al-Kindi*, Sismel – Edizioni del Galluzzo – 1999, p. 39.

to make real: “Hence, when the man conceives by imagination a corporeal thing, this thing receives an actual existence according to the species in the imaginative spirit.”[374]

As a corollary of the theory that he is a micro-cosmos, the change represented in the image will be reproduced in the external world. The intelligible or imaginative matter in the mind of the magician is the same matter which is the foundation of exterior reality. This continuity between the matter of the soul of man and the matter of the universe is the same substantial matter that Henri More discussed centuries later, that makes possible the doctrine of micro-cosmos. Thus, the real image reflects the mental image, since they are in fact equal:

> ... the mental and the real image follow together because they are of the same species, provided that their respective matters have the inclination to receive this form and that the other accident necessary for the engendering of this thing contribute, in function of the place and time. Right, the first and main accident necessary to the generation of the thing thanks to the model of mental image is the desire of the man who imagined that the thing exists.[375]

This is a very radical theory of interaction, because it begins by allowing not only action at a distance but ultimately that the whole cosmos is a mere extension of the individual, and subject to her or his will.

Grosseteste: Follower of Kindian Elaboration.

In the Middle Ages, long before More, the English bishop Grosseteste, following the Kindian lead, stressed the metaphysical role of light as a source of extension and also of all causal action.[376] In fact, for Grosseteste, God was the primordial fountain of light or the *Lux Suprema*. At the same time, the light was taken as the instrument used by Him to produce the Universe. There is, therefore, a simultaneous presence of two different meanings of light in Grosseteste: the religious accent and the scientific intention. Both these motivations

[374] AL-KINDI, p. 36.
[375] AL-KINDI, p. 37.
[376] The only difference in terminology: when al-Kindi speaks of rays, Grosseteste speaks of light.

are also behind the whole tradition of scientific optics in Europe: from Roger Bacon, Witelo, Dietrich, Pecham, Leonardo da Vinci until the time of Kepler and Newton.

Grosseteste equated light with the prime matter discussed by Aristotle. He considered light as the first corporeal form, and thus the basis for extension and spatial dimensions.[377] Like prime matter, it is the most simple thing and consequently not subject to further impressions, being for this reason incorruptible and immutable (that is, perfect).[378]

Thus, the essence of Light is simplicity and, considered as omnipresent prime matter; this simplicity assures the unity of the whole cosmos. But this unity, being a characteristic of the divine and perfect oneness also, somehow, accounts for the perfection of the processes of nature. Furthermore, this simplicity also has methodological consequences. Grosseteste was interested also in the principle of economy, *lex parsimoniae*, a principle which he took from Aristotle and it was later called Ockham's razor.[379] Thus, for Grosseteste, to explain the workings of the universe the simpler hypothesis must be chosen and this hypothesis is light, whose nature is also to follow the simplest way, the minimum path. Thus light (or *lux*, which has a broader sense than our visible light*)*, is to be considered the general and simplest cause behind the multiplicity of phenomena in nature. It is the principle of unity and perfection in Nature, but also of differentiation and diversity: the *species et perfectio* of all beings.

To explain the manner in which light, being a simple entity, could produce a diversity of phenomena, Grosseteste, following al-Kindi, appealed to the mathematical behaviour of light. The laws of optics should account for all scientific explanation. But optics, in its turn, necessarily required the study of geometry, for light propagates according to strict geometrical laws. He wrote:

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[377] GROSSETESTE, *On Light*, Milwaukee, Marquette U. P., 2000. Those are the characteristics that Aristotle attributed also to his quintessence, with the difference that Aristotle relegated its entity only to the superlunary world. CROMBIE, A. C., *Robert Grosseteste and the Origins of Experimental Science*, Oxford, Clarendon Press, 1961, p. 116.

[378] In fact, the connection of these terms is present in Ptolemy, as the later commentator Simeon Seth wrote: "Ptolemy says in his *Optica* that the visual *pneuma* is something of ether, belonging to the quintessence" LINDBERG, David C., *Theories of Vision from al-Kindi to Kepler*, University of Chicago Press, 1996, p. 15.

[379] CROMBIE, p. 145. Using the same words of Grosseteste, Bacon said: "Aristotle says in the fifth book of the Metaphysics that nature works in the shortest way possible, and the straight line is the shortest way of all." According to Crombie this principle appears in *Comm. Post*, i, 17, f, 17 vb.

> The usefulness of considering lines, angles and figures is the greater because it is impossible to understand natural philosophy without these. They are efficacious throughout the universe as a whole and its parts, and in related properties, as in rectilinear and circular motions. They are efficacious also in cause and effect (in *actione et passione*), and this whether in matter or in the senses, and in the latter whether in the sense of sight, where their action properly takes place, or in other senses, in the operations of which something else must be added on top of those which produce vision … For all causes of natural effects have to be expressed by means of lines, angles and figures, for otherwise it would be impossible to have knowledge of the reason (*propter quid*) concerning them. This is clear in this way: a natural agent propagates its power (*virtutem*) from itself to the recipient (*patiens*), whether it acts on senses or on matter. This power is sometimes called species, sometimes a similitude, and is the same whatever it may be called; and it will send the same power into sense and into matter, or into its contrary, as heat sends the same thing into the sense of touch and into a cold body.[380]

Thus the explanation of phenomena required a clear recognition of two factors: the agent and the recipient, of action and passivity. The light or power coming from the agent is qualified in many ways by lines, angles and figures to achieve its proper effect in the recipient. Basically the idea is that light, which is both power (*virtus*) and form (*species),* travels in straight lines and varies its action according to the angle at which it reaches the recipient surfaces. Light is both species and power, conception which is in accordance with the Neo-Platonic framework which describes the ultimate reality by the double One/Good and the related human faculties understanding/will (*aspectus/affectus*).

The *patiens* is the recipient of the power, and acquires the character of obstacle that produces the repercussion of the rays of light. In this way all the effects in nature are produced. Thus Grosseteste explained the nature of an echo (as he took sound as light incorporated in subtle air), the rainbow, and the reflection of light from a mirror as

[380] Quoted by CROMBIE, p. 110.

examples of repercussion of *lux*, an explanation which is an example of the use of *lex parsimoniae* and of the hierarchical subordination of sciences:

> But the echo is the repercussion of sound from an obstacle, just as the appearance of images is the repercussion of a visual ray from the surface of mirror and a rainbow is the repercussion or refraction of the rays of sun in a concave aqueous cloud.[381]

The appearance of images in the mirror can only happen because there is dispersion of rays from all things (the radiation sources) in all directions, achieving the multiplication of the original essence. In fact, the theory of Grosseteste supposed that a single point of light, by auto-diffusion, could propagate itself instantaneously in straight lines in all directions without loss of substance, by means of radiating lines.[382] The visible images, which are nothing more than reflection of the rays in that obstacle which is the surface of the mirror (*speculum),* only makes manifest that virtual multiplication of the source of light. Thus, for Roger Bacon, knowledge of the laws that produce the multiplication of species is necessary and "the laws of these multiplications are known only through perspective."[383] The optical appearances or images in mirrors, and in the souls considered as mirrors,[384] are determined by their position and so the differences are a consequence of such geometrical factors as the distance of the object and the angles of incidence of the rays.[385] It is clear that the multiplication occurs not only because there are multiple centers of irradiation, but because each recipient, being like a mirror, reflects the received radiation in its turn. Thus all subjects are, like a mirror, active and passive at the same time; they are cause as well as effect (*actione et passione).*

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[381] CROMBIE, p. 113.

[382] This propagation would consequently generate bodies in the form of spheres of light of any size. Grosseteste says: "For light of its very nature diffuses itself in every direction in such a way that a point of light will produce instantaneously a sphere of light of any size whatsoever, unless some opaque object stands in the way." LINDBERG, p. 97.

[383] Bacon discussed the multiplication of species of different kinds, heat, magnetism, light. LINDBERG, p. 99.

[384] Grosseteste mentioned as an example the senses in the previous quotation.

[385] CROMBIE, p. 144. Roger Bacon wrote: "Every multiplication is either with respect to lines, or angles or figure." Opus Majus, iv, ii. 2.

Grosseteste understood vision as follows. He thought that the soul, by means of the eye, must receive forms of the visible object. Thus Grosseteste understood sight as a passive power, since the forms coming from the environment were impressed on the soul. In this case the aspect of a mirror that is stressed is the capacity of reception of the visible image by the mirror. We can see this in a passage of Avicenna, a follower of al-Kindi:

> The eye is like a mirror, and the visible object is like the thing reflected in the mirror by the mediation of air or another transparent body; and when light falls on the visible object, it projects the image of the object onto the eye ... If a mirror should possess a soul, it would see the image that is formed on it.[386]

But the soul also projects an out-going visual radiation, and therefore vision is a process both active and passive.[387] When vision is considered an active power, the supposition is that some visual rays are emitted by the eyes onto the object, to achieve the process of perception. Perception cannot be only a passive process because it implies that everything in the field of vision is seen at the same time and equally. Thus an active part of the process was necessary to explain the selectivity and acuity of the object seen within the visual field. But the active part of the process can also be compared to a mirror. In this case what is highlighted is not the reception of rays, but their reflection. In fact, as is the case with concave mirrors, they can reflect or refract rays so as to converge them in such way that they may be concentrated at a specific point, the focus. Thus rays gather strength, producing an increase or intensity in light or heat and making more evident their character of power or *virtus.* Thus the burning mirror concentrated the rays to a point to produce fire. In this respect Grosseteste praised the triangle as the best figure, because it represents the focusing of a radiating force.[388] The concave mirror is therefore a useful analogue for the process of perception since it implies the active powers of soul, that is, it can be understood

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[386] LINDBERG, p. 49.
[387] LINDBERG, p. 101.
[388] McEVOY explained it better: “Nature is sparing and finds simpler means better. As for figures, the pyramid represents the strongest and the best action. Compared with individual, straight lines of force radiating from every point on the surface of the agent to the nearest point on the surface of the patient, the pyramid, whose base is the entire surface of the agent, has great effect, as it focuses its whole *virtus* into a cone which finds its point on the patient's surface, and consequently acts on it with greater force.” McEVOY, James, *The Philosophy of Robert Grosseteste* , Clarendon Press, Oxford, 1982, p. 170.

in terms of will, intention, appetite and outgoing energetic power: *intentio, extensio, protensio, appetitus (*etc*).*[389]

In fact, Grosseteste recognised that it is due to this intentionality in the process of perception that the soul's capacity to understand (*aspectus*) is inseparable from the dynamic dimension of mind (*intentio, appetitus, affectus, virtus).*[390] This is manifest in the account that understanding implies the abstractive (or selective) process or the use of *virtus intellectiva, or nous.* The *nous* is an Aristotelian concept and so it is not a surprise that Grosseteste believed that he was following Aristotle.[391] Thus selection (abstraction) goes together with *affectus* and goodness is always attached to understanding.[392]

Grosseteste understood that he was developing a theory of Aristotle, as we have already mentioned. It is well known that Aristotle taught that the sensation is already a first degree of abstraction, since the organ apprehends the *specie sensibilis* without taking in the matter of the object. In the soul the abstracting process (by the *virtus* of the *nous)* continues, and even the most abstract thinking is impossible without the species (images or phantasms) whose very origin is sensation.[393] Aristotle also stressed the importance of the medium or intermediary stance between the object and the observer.[394] Thus, material bodies irradiate the sensible forms or species in this medium and afterwards these species reach the sensible organ and then the soul. The sensation implies this common medium in which the forms or species selected travel until they reach the percipient.[395] Obviously this medium implies a previous continuity that allows that in the soul the external appearances (which are already the *species sensibilis*) may be translated into *phantasmata*, the images or phantasms of the soul. As reflections in the mirror of the soul, the *phantasmata* imply a

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[389] McEVOY, p. 349.
[390] In this sense Couliano said that Ficino gave to the radiations of al-Kindi the name of Eros. COULIANO, I. P., *Eros et Magie a la Renaissance,* Flammarion, Paris, *1984,* p. 166. Perhaps a more modern term could be conativity
[391] He saw this theory in *De generatione animalium,* LINDBERG, p. 136.
[392] In this sense McEVOY wrote: "An important expansion is given to the notion of *intelligentia* later in the *Hexaemeron* when it is diversified into the *memoria*, *intelligentia* and *amor* of *De Trinitate*, …" p. 304. And: "Here already one can distinguish the beginning of a trend which was to achieve its perfect expression only in the *Ecclesia Sancta*, namely to stress the strongly affective character of *intelligentia*, and to identify its activity with the summit of unitive love." p. 305.
[393] McEVOY, p. 262.
[394] He said in *Anima419a 12–22:* "For vision occurs when the sensitive faculty is acted upon; as it cannot be acted upon by the actual color which is seen, there only remains the medium to act on it, so that some medium must exist; in fact, if the intervening space were void, not merely would accurate vision be impossible, but nothing would be seen at all." Quoted by LINDBERG, p. 7.
[395] McEVOY, p. 340.

certain unity between the perceiving subject and the perceived object. In this sense Grosseteste is following what Randall called "Aristotle's empiricism". Randall explained: "For Aristotle, knowledge comes from observing the world and reflecting upon what can be observed, not as the Platonists held, from an immediate inner "intuition" or intellectual vision of a supposed intelligible realm."[396] Randall quoted the following passage from *De Anima* (432a7–9) to support this view: "Without sensation a man would not learn or understand anything: at the very time he is actually thinking he must be seeing a sense image."[397]

These notions are consistent with Grosseteste's framework, which implies that all things are originated from the same first corporeal form, which is light. This commonality of origin provides a basis for the postulation of continuity between the subject and object. This continuity McEvoy explained thus: "There is a point where matter meets the immaterial. In sensation, a material form generates a species in a sense-organ, and both form and species are united in a judgment by the purely immaterial intentionality of the soul."[398] The object or material thing is itself an emanating entity, and as such it is made of the same corporeal form (the light) as the subject. The light is at the same time the species (form) and the medium (matter) that conveys the species until and through the soul without disruption of continuity. The perception is thus constitutive of the subject, as Parmenides' precept stated, that to think is to be, and its version in Plotinus, that to contemplate is to create.

Thus, for Grosseteste, the implication is that the soul and the body, or soul and external world, must form a continuous entity and not simply two strange beings juxtaposed. And he consistently followed one aspect of Proclus' Platonism and supported the idea that mathematics is not only an external abstraction from aspects of the physically real, but it is also in the very internal texture of the natural world. In any case abstraction achieved by the soul cannot be interpreted as negation of the immanent mathematical structure of reality. In fact, if the abstract thought is really accompanied by the phantasms

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[396] RANDALL, p. 95.

[397] Aristotle's doctrine is, however, full of difficulties. How to conciliate this notion with the doctrine of separate intellect? He seems to have been going in the opposite direction also when he evaluated the theory that thinking has the same characteristic of sensation in *Anima* 427a 17: "Indeed the ancients go so far to identify thinking and perceiving; (...) They all look upon thinking as a bodily process like perceiving, and hold that like is known as well perceived by like ...".

[398] McEVOY, p. 381.

(or by *phantasia*, imagination) whose origin is the *species sensibilis*, the whole process is dependent on the continuity between the two spheres, the subjective and the objective or external world. Thus the doctrine of species achieves continuity between the intellect (the abstract) and the senses or between the corporeal and spiritual. In this sense Roger Bacon says:

> And this power is called "likeness", "image", and "species" and is designated by many other names, and it is produced both by substance and accident, spiritual and corporeal ... This species produces every action in the world, for it acts on sense, on the intellect, and on all matter of the world for the generation of things.[399]

Ultimately the doctrine of micro-cosmos can be explained in terms of the theory of multiplication of species. I found this in a short quote from Leonardo da Vinci. He expounded in two phases the doctrine of multiplication of species: "each body by itself alone fills with its images the air around it, and ... the same air is able, at the same time, to receive the species of countless other bodies which are in it." And from this fact that each object sends its species in all directions and the following consequence that all images converge at each point of the medium, he then enunciated the doctrine of All in All (the doctrine of micro-cosmos) so important for the Neo-Platonists: "... that the species are throughout the whole and all in each smallest part; each in all and all in the part."[400] Thus Leonardo explained the Neo-Platonic doctrine of All in All, in terms of multiplication of rays across a medium. In fact, this view is the very opposite of that notion that Plotinus defended and Leibniz shared. In Plotinus, as we have seen, the medium does not play a role. In his doctrine, it is the unity of individuals (or individual souls) that makes them like micro-cosmos because of their analogy with the unity of the All.

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[399] LINDBERG, p. 113. Although this theory is inspired by Aristotle, it is not exactly what Aristotle thought. He evaluated the theory that thinking has the same characteristic of sensation in *Anima* 427a 17: "Indeed the ancients go so far as to identify thinking and perceiving; (...) They all look upon thinking as a bodily process like perceiving, and hold that like is known as well perceived by like ...".

[400] LINDBERG, p. 156.

Leibniz

The tradition developed by al-Kindi of studies that take light as an object of both metaphysical and scientific interest has many interesting aspects to compare with Leibniz's philosophical project . Thus, the world pictured by al-Kindi is a network of radiations coming from each being towards all others and the general effect in each being is the mutual interaction of all causes of the cosmos. The determinism is therefore produced, but is conditioned by an infinite combination of variables. The world presented by al-Kindi is very similar to the picture presented by Leibniz in his *Monadology*, although I did not find any explicit reference to al-Kindi in my readings of the German philosopher. Leibniz obviously tried to avoid the consequent determinism, on the grounds that it destroys the liberty of both God and man. In Leibniz's view all depends ultimately on the freedom of God to choose the best world. It is because of this dependence that even Leibniz's principle of sufficient reason, which says that nothing happens without a cause, cannot be considered to be a statement of complete determinism. But once God had chosen which world to create, the world created will be an infinite collection of compossible individuals. This infinity precludes the access of human knowledge of the precise causes of things. But according to Leibniz's principle of sufficient reason, this impossibility is due more to the complexity of an infinite combination of variables than any basic principle of uncertainty ruling the world. However, because the world is such a network of compossibles there is no strong basis for the affirmation of the freedom of individuals that Leibniz desired to make. In this sense H. W. B. Joseph said:

> Leibniz endeavored in his theory of substance to exalt the independence of the individual: but the unity of the world to which divers substances belong could then only be retained by abolishing, *in ordine ad Deum*, or between the notions of these individuals, the independence ascribed to them in their existence.[401]

Besides, and as a consequence of this last idea, Joseph defends the thesis that the system of relations between the monads is independent of the creative act of God.

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[401] JOSEPH, H. W. B., *Lectures on the Philosophy of Leibniz*, Oxford, Clarendon Press, 1949, p. 107.

This rigorous network of relations is, in some sense, that presented by al-Kindi. In al-Kindi, however, it is the idea of imaginative matter that explains the continuity or connection between any individual and the external world (other individuals), a continuity that allows for the effectiveness of magic. This is a theory that tries to explain the causality of magic in this mundane world.

This problem is related to another point of contact between al-Kindi and Leibniz. al-Kindi made an appeal to optics (*perspectiva*) to account for causal explanation and diversification. This is a very important and constant theme in Leibniz. As early as 1676, he referred to mirrors as a metaphor for the creative activity of God: "The most perfect being is that which contains the most. Such being is capable of ideas and thoughts, for this multiplies the varieties of things like mirrors."[402] However, in the *Monadology* it is the monads that are like mirrors. In paragraph 56 Leibniz wrote.

> Now this connexion or adaptation of all created things to each and of each to all, means that each simple substance has relations which express all the others, and, consequently, that it is a perpetual living mirror of the universe (Theod. 130, 360.).

We have also the associated notion of monads as points of views and or subjects with a specific perspective of a city.[403] Thus Leibniz continued, in paragraph. 57"

> And as the same town, looked at from various sides, appears quite different and becomes as it were numerous in aspects [*perspectivement*]; even so, as a result of the infinite number of simple substances, it is as if there were so many different universes, which, nevertheless are nothing but aspects [perspectives] of a single universe, according to the special point of view of each monad (*Theod*. 147).

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[402] LEIBNIZ, *Selection from Paris notes*, 1676, Loemker, p. 159.
[403]LEIBNIZ, *Monadology*, paragraph 56. "Now this connexion or adaptation of all created things to each and of each to all, means that each simple substance has relations which express all the others, and, consequently, that it is a perpetual living mirror of the universe. (Theod. 130, 360.)".

We have seen Grosseteste affirming that souls are affected according to the same rules of optical geometry and so are similar to the device of a mirror. As a mirror the soul is a place of "echo", which at the same time receives rays (is passive) and reflects them (is active). We see the strong presence of the optical analogy in Leibniz as early as 1670:

> If God did not have rational Creatures in the world, he would have the same harmony, but devoid of Echo, the same beauty, but devoid of reflection and refraction or multiplication. On this account, the wisdom of God required (*exigebat*) rational Creatures, in which things might multiply themselves. In this way one mind might be a kind of world in a mirror, or a diopter, or some kind of point collecting visual rays.[404]

This view is amplified in the *Monadology* where not only rational creatures but all substances are compared to mirrors. There, as we have seen, they reflect their different position, like different perspectives of a city (§ 57). But the meaning of this idea of living mirrors is a rather elaborated notion of perspective. We have seen that, for Grosseteste, the theory of vision has two dimensions: the perception has a passive aspect, which implies that everything is in the field of vision at same time and equally and an active aspect, which explains the selectivity and acuity of the object seen within the visual field.

In some sense this conception also occurs in Leibniz's notion of a living mirror. It was a central notion in Leibniz that the monad, being like a mirror, reflects the whole universe. For this reason he needed a theory of the unconscious, since for the monad this totality, which is the infinite world, must be perceived confusedly. But all monads have, however, a set of privileged perceptions which constitute their individuality or point of view. Sometimes Leibniz seemed to be saying that perceptions are like (a focusing) mirror that concentrates rays, thus forming a distinguished perception. Thus, in the *Principles of Nature and Grace* he said:

> But when the monad has organs so adjusted that by means of them the impressions which are received, and consequently also the perceptions which

[404]In MERCER, p. 218, from *Elements of Natural Law* 1669/1670.

> represent these impressions, are heightened and distinguished (as for example when the rays of light are concentrated by means of the shape of the humors of the eye and act with great force), then this may amount to *sentiment*, that it is to say, to a perception accompanied by memory – a perception of which there remains a kind of echo for a long time, which makes itself heard on occasion.[405]

This example of perception is valid for animals, or a monad called soul. But Leibniz went further. He said that in human perceptions there is present a distinct characteristic called apperception, and we may interpret this as being their principle of intentionality. Thus, also in the *Principles of Nature and Grace,* he differentiates the perception, the state of the monad representing external things, from the apperception which is the reflexive knowledge of this internal state: "So it is well to make a distinction between perception, which is the inner state of the monad representing external things, and *apperception*, which is consciousness or the reflective knowledge of this inner state itself and which is not given to all souls or any soul all the time."[406] The apperceptions are only part of a human experience of perception, because when, for example, they are sleeping, a person has only perceptions.[407] Also, as he explained on many occasions, a clear perception is made of many imperceptible petite perceptions.[408] We then have three kinds of monads: those with bare perceptions; those with feeling and those with apperceptions. In all these three kinds of monads individuality is achieved by a precise position or a precise point of view that a monad occupies, which is its perspective.

It is in this emphasis on perspective that Leibniz can be posited as a true follower of that doctrine that mediaeval philosophers called the multiplication of species. In Leibniz, the notion of perspective is useful because, together with the affirmation of the production of diversity it introduces also the implicit idea of mathematical ordering. He said in paragraph 58 of *Monadology:* "And by this means there is obtained as great variety as possible, along with the greatest possible order; that is to say, it is the way to get as much

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[405] LEIBNIZ, *The Principles of Nature and of Grace based on Reason*, 1714, Loemker, p. 637.
[406] LEIBNIZ, *The Principles of Nature and of Grace based on Reason*, 1714, Loemker, p. 637.
[407] What is not in the field of human consciousness (or attention) is also perception.
[408] "A great stupefying roar, as for example, the murmur of a large assemblage, is composed of all the little murmurs of individual persons which are not noticed at all but of which one must nevertheless have some sensation; otherwise one would not sense the whole." LEIBNIZ, *Reflections on the Doctrine of a Single Universal Spirit*, Loemker, p. 557.

perfection as possible." (Theod. 120, 124, 241 sqq., 214, 243, 275.). Thus the idea is that the greatest diversity comes from the interplay of reflections of living mirrors, and in this case also diversity is created by the mathematical laws of perspective (the laws of optics). From this union of greatest diversity and order we have perfection or goodness. This notion is related to an idea dear to Leibniz, that God looks for the greatest effect with the simplest mean or for the maximum effect with the minimum effort. Thus the title of section V of the *Discourse* is: "Of what the rules of the perfection of the divine action consist; and that the simplicity of the means is in balance with the richness of the effects."[409]

Thus, while the idea is of Pythagorean inspiration, it seems that Leibniz connected it with the *lex parsimoniae*, first enunciated by Aristotle but discussed in Grosseteste. Leibniz has an important role here because he gave mathematical expression to this principle. It is the mathematical principle of optimal form, called the principle of least action, which was made known to the public by Maupertius (who claimed to be its author).[410]

The association of the principle of economy with the behaviour of light is, however, as we have seen clearly, present in Grosseteste, who in turn is following the indication of other thinkers linked to Aristotle, for example, Ptolemy. The basic ancient idea was that nature selects the shortest way, and so, in the case of reflection, light passes from any point in its course before incidence, to any other in its reflected course, by the shortest path. Leibniz improved this conception. He denied that nature selects the shortest and fastest route, but maintained that it selects the easiest way, which should not be confounded with the other principle. The resistance with which the light passes through the different transparent media serves to measure this easiest way. The ray always pursues that route in which the sum of the computed difficulties is the least; and, according to this method, *de maximis et minimis*, he found the mathematical rule which is confirmed by experience. Leibniz thought that because the laws of refraction and reflection describe the best path,

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[409] In the section he said : "When the simplicity of God's way is spoken of, reference is specially made to the means which he employs, and on the other hand when variety, richness and abundance are referred to, the ends and effects are had in mind." LEIBNIZ, *Discourse*, section 5, Loemker, p. 296.

[410] In this respect, Catherine Wilson said: "Maupertius presented himself in 1746 as the discoverer of the Law, which he regarded not simply as regulative or heuristic principle, but as proof for the existence of God. Although his statement of it was elaborated in better detail than Leibniz's remarks on the importance of maximum and minimum quantities in physics, Leibniz had clearly anticipated Maupertius in a published paper of 1682 and in numerous statement thereafter, including the *Specimen Dynamicum*, the first of which had been published in 1695, where he argued that the 'architectonic' qualities of theories provided evidence of a divine architect and a realm of final causes" in JOLLEY, *Cambridge Companion to Leibniz*, p. 454.

which is the behaviour of light, these laws are themselves the best choice of law among an infinite number of possible laws.

This route is the optimal route chosen by nature, having as its criterion the principle of economy, from a set of many other less perfect possibilities. Loemker said that Leibniz believed that this was a mediating knowledge between the truth of reason and truth of facts, and that this middle knowledge was primarily God's, the mathematical formula of maxima and minima being a mere analogy of it. Leibniz thus conceived of this mediating knowledge as the architectonic principle used by God to construct the world. Unlike the idea of geometric determination, where contrary means contradictory, the contrary of this architectonic determination is still possible, but implies imperfection.

Leibniz, and afterwards Maupertius, thought that this principle could account for the presence of finalism in nature. In Leibniz, this is discussed clearly in the work about optics: *Tentamen anagogicum: an anagogical essay in the investigation of causes* of 1696.[411] In both authors we have the suggestion that this principle is behind the finalism that we see in the forms of plants and animals. Concerning the dispute of the principle of final causes sustained by the ancient philosophers and rejected by moderns like Descartes who defended mechanical explanations, Leibniz insisted the laws of mechanism are themselves derived from finalist principles. Thus the ideas of the best possible world, finalism and mechanics are all associated in Leibniz to provide a scientific explanation of the world consistent with theological premises. In this sense Loemker says:

> The principle of the best possible is therefore not merely a pious assumption but a principle of mathematical necessity which provides a telic element in our scientific methods and principles. It rests on the perfection of God and the limitation necessary in a spatial and temporal order. Since not all possibilities can be actualized, the best possible compossibles will exist, that is, the greatest possible perfection with the least qualifying conditions.[412]

[411] LEIBNIZ, *Tentamen anagogicum: an anagogical essay in the investigation of causes*, 1696, Loemker, p. 477.
[412] LEIBNIZ, Loemker, p. 27.

This is true but it needs to be added to the passage of Loemker that, for Leibniz, God chooses the best possible freely and not necessarily.[413] Consequently, the finalism of Leibniz, as we have already seen, cannot be considered to have been derived from blind necessity, but only from spontaneous creative intelligence.

But in the sense that he associates finalism with perfection, Leibniz is very similar to the tradition we just discussed. Grosseteste said that light is '*species* and *perfectio*', for it accounts both for the form and the perfection of this form. The light is an instrument of God responsible for the form of the subject and will select the best, given the set of influences of a certain subject at a certain time and location. In fact, this set of influences is itself projecting species (the formal dimension of light) that, therefore, strikes a subject from all sides. In both Leibniz and Grosseteste we have a re-statement of the functionalism of Aristotle, in which the function and form of the animal is determined by the animal in its relationship with the environment. And this relationship is formed by means of the species.

Leibniz said that this kind of relationship is contingent. But we can see that it is a contingent event only in the sense that is impossible to discern all the variables or the infinite configuration of rays that determine that event and because this possible world depends ultimately on the free choice of God. God could have created a different universe in which there would be a different configuration or a different system of relations between the substances. But, as Joseph showed, once a certain world is created, its system of relations is determined, since it does not leave space for random causation, that is, causes that could be outside the network of causes. Probably Leibniz would not accept this interpretation because it removes again his distinction of necessary (blind) and intelligent (finalist) causes.

The principle of least action gained importance in modern science as it is said to be the foundation of both theory of relativity and quantum physics. Even here we again have a discussion about final causes. In this sense Max Planck, the discoverer of quantum of action, wrote:

[413] LEIBNIZ: "… God assuredly always chooses the best, this does not prevent something less perfect from being and remaining possible in itself, even though it will never happen, for it is not impossibility but imperfection which causes God to reject it." LEIBNIZ, *Discourse of Metaphysics*, Loemker, p. 310.

> Thus the photons which constitute a ray of light behave like intelligent human beings. Out of all possible curves they always select the one which takes them most quickly to their goal....It [the principle of least action] made its discoverer Leibniz and soon after him his follower Maupertius so boundlessly enthusiastic, for these scientists believed themselves to have found in it a tangible evidence for a ubiquitous higher reason ruling all nature.[414]

The sympathy of Planck towards Leibniz is also explained because Planck posited the principle of uncertainty which says that contingency is the basis of all events in reality, a principle which was not, however, accepted by all physicists. Einstein, for instance, a reader of Spinoza, did not accept it.[415]

The position of Leibniz concerning the doctrine of multiplication of species seems, however, to be very complicated. It is totally in opposition to the doctrine that "monads have no windows". As an exposition of the doctrine of perception and abstraction in Aristotle, it is in opposition to the Platonic theory of reminiscence, which seems to be more in accordance with the theory of monads. It is clear that Leibniz rejected any kind of influx, as is shown in those passages where he treats the communication of substances. In a text of 1696 he said: "the way of influence is that of popular philosophy; but as we cannot conceive of material particles which can pass from one of these substances to another, we must abandon this idea."[416] In another passage he wrote:

> I don't assent to the vulgar notions that the images of things are conveyed by the organs of sense to the soul. For it is not conceivable by what aperture or by

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[414] PLANCK, M., *Scientific autobiography and other papers*, trans. Frank Gaynor, New York, Philosophical Library, reprinted by Greenwood Press, 1968, p. 178.

[415] The remark of Einstein: "God doesn't play dice with the universe," is well known. It is quoted, for example, in Max Born "*Einstein's Statistical Theories*" In *Albert Einstein Philosopher-Scientist*, ed. Paul Arthur Schilpp, New York, Tudor, 1953, pp. 161–177. Einstein made many references to Spinoza, for example: "Certain it is that a conviction, akin to religious feeling, of the rationality and intelligibility of the world lies behind all scientific work of a higher order. The firm belief, which is bound up with deep feeling, in a superior mind revealing himself in the world of experience, represents my conception of God, which may, therefore be described in common parlance as 'pantheistic'" (Spinoza). EINSTEIN, *The World As I See It*, London, 1955, p. 131.

[416] LEIBNIZ, *Second explanation of the system of the communication of substance*, 1696, Wiener, p. 118.

> what means of conveyance these images can be carried from the organs to the soul.[417]

He explained that the monads do not need such influx and he turns to the doctrine of essence (derived from Aristotle) to justify this point:

> I don't believe that a system is possible, in which the monads act on each other, because there seems no possible way of explaining such action. I add that an influence is also superfluous, for why should one monad give another what it already has? For this is the very nature of substance, that its present should be big with the future …[418]

Interestingly, Leibniz recognised that Aristotle was the ultimate origin of the doctrine of impressions and in this case he put himself on the side of the Platonists, whose doctrine of reminiscence is more consistent with his notion that monads do not have windows. He said in the *Discourse*:

> Aristotle preferred to compare our souls to tablets that are still blank but upon which there is a place for writing and maintained that there is nothing in our understanding which does not come from the senses. This conforms more with popular notions, as Aristotle usually does, while Plato goes deeper.[419]

Thus in Leibniz himself we can see the same tension that we pointed out in Aristotle: a defence of the doctrine of the essence and at same time a defence of the doctrine of final causes (heavily dependent on the environment).

Besides, it is possible that Leibniz also considered light as the principle that explains forms and finalism in nature but this position seems to also contradict the general framework of his system, because he espoused a dualism of mechanism and immaterial non-interactive monads. Leibniz's reply to Clark's fifth letter is worth quoting here, as

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[417] Quoted by RUSSELL, B., *A critical exposition of the philosophy of Leibniz*, p. 135.
[418] Quoted by RUSSELL, p. 262.
[419] LEIBNIZ, *Discourse of Metaphysics*, section 27, Loemker, p. 320.

Clark was trying to defend Newton's theory of attraction (gravitation) . Almost at the end of his life, Leibniz regarded any explanation involving any intangible or non-mechanical causes in a very ironical and hostile way:

> Or are perhaps some immaterial substances or some spiritual rays, or some accidents without substance, or some kind of *species intentionalis*, or some other 'I know not what', the means by which this is pretended to be performed? (…) That means of communication, says he, is invisible, intangible, not mechanical. He might well have added inexplicable, unintelligible, precarious, groundless and unexampled.[420]

Leibniz seems, however, to have admitted that abstract thought is accompanied by material images. But he never attached himself to a true continuity between the two and rather, appealed to a certain parallelism between mind and body to explain this matter:

> I find … that there is never any abstract thought which is not accompanied by some images and material traces, and I have established a perfect parallelism between what happens in the soul and what takes place in matter. I have shown that the soul with its functions is something distinct from matter but that it nevertheless is always accompanied by material organs and also that the soul's functions are always accompanied by organic functions which must correspond to them and that this relation is reciprocal and always will be.[421]

In this chapter we have seen how the tradition of optics studies initiated by al-Kindi and Grosseteste had an ambiguous impact on the thinking of Leibniz. On one side, it was the basis for his doctrine of the diversification of monads (monads considered as mirrors of the universe), and is even related to his creation of the principle of least action. But on the other side, this doctrine of rays and reflecting entities (mirrors) seems to be in direct

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[420] LEIBNIZ, Leibniz's reply to Clark's fifth letter, section 45, Loemker, p. 716.
[421] Quoted by COUDERT, p. 150. The text is *Reflections on the Doctrine of a Single Universal Spirit*, from 1702.

confrontation with his central principle of the incommunicability of substances (“monads have no windows”).

Chapter VII – Nicholas of Cusa and Leibniz

In this chapter I will discuss some notions of Nicholas of Cusa, the last philosopher I want to examine in the comparative study of Leibniz. I will argue here that Cusa consistently developed consequences of the Neo-Platonic doctrine of the micro-cosmos that Leibniz could not attain, due to Leibniz's compromise with the principle of contradiction. Cusa opened a path that led to Bruno, Spinoza and ultimately to Hegel.

Cusa is only one link between mediaeval Neo-Platonism and renaissance Neo-Platonism. Other important philosophers are part of this transition. But Cusa is present in this dissertation because he provides central notions that can be used for the analysis of certain key aspects of the philosophy of Leibniz. Chronologically, he comes before Henri More, but for the purposes of this thesis he is to be treated here for the purpose of conclusion.

D. J. B. Hawkins, who wrote an introduction to *Of Learned Ignorance,* tells us that with his notion of *coincidentia oppositorum*, of reconciliation of the contraries in God, he is representative of the philosophy of paradox.[422] Hawkins said that the notion is evidently derived from Meister Eckhart. This may be true, but we have seen that Proclus recognised a striking paradoxical similarity between the notions of One and of Matter. Thus the convergence of these two concepts was recognised well before Eckhart. Cusa insists on the paradoxical nature of his investigation because its object, the ultimate reality or the *maximum absolutum*, which is infinite, is totally incommensurable with the experience of limited beings, and therefore is ultimately incomprehensible.

Of Learned Ignorance was conceived in three parts. The first relates to the *maximum absolutum*, which is God; the second is concerned with the sum of all limited entities which he calls *maximum contractum* and the third part is dedicated to the entity that achieved the identity of *maximum absolutum* and *maximum contractum*; this is the human nature by means of Christ, the Incarnated Word.

[422] CUSA, Nicholas of, *Of Learned Ignorance*, Translated by German Heron, London, Routledge & Kegan Paul, 1956. p. x.

Basically, Cusa thought in terms of the two Pythagorean/Platonic incommensurable realities: the realities of the sphere of dyad (degrees of more or less, subject to number) and realities of the sphere of monad (equality, truth and the ultimate reality, God). For Cusa, all things of the universe, as limited beings, are without the perfect equality or unity of God. In their case, the equality is a matter of degree. Number, Cusa said, "owes its existence to our power of comparing and distinguishing."[423] Things are consequently subject to the category of numbers, and this explains the importance given by Pythagoras to quantity and proportion (1, 1), since these qualify a limited thing:

> … for this reason the infinite as infinite is unknown, since it is away and above all comparison. Now while proportion expresses an agreement in some one thing, it expresses at the same time a distinction, so that it cannot be understood without number. Number, in consequence, includes all things that are capable of comparison ... That is why Pythagoras was so insistent on maintaining that in virtue of numbers all things were understood.[424]

Thus, because the universe implies a plurality, it necessarily implies the necessity of numbers, since without numbers, we cannot have distinction, hierarchy, relationship or harmony, factors that organise the plurality of things in the universe.[425]

Nicholas of Cusa argued that there is no gradation from the finite to the infinite and so the maximum cannot be found between the thing of more and less. Thus, although the connection between species is made by degrees, the maximum, God, is never reached. For the same reason, in the world there is neither a maximum nor a minimum in perfection. In fact by the doctrine of coincidence of opposites, only in the infinite does the act also coincide with the potency.[426] In this sense Cusa wrote:

> We find that one thing is more in act, another more in potency; yet these differences of degrees do not exist without ever reaching an absolute maximum

[423] CUSA, *Of Learned Ignorance*, p. 16.
[424] CUSA, p. 8.
[425] CUSA, p. 14.
[426] CUSA, pp. 129 and 112.

> and the absolute minimum, for the maximum and the minimum act are identified with the maximum and minimum potency; they are the Absolute Maximum properly so called ...[427]

Thus the role attributed by Aristotle to matter, which is to be the potency of everything, Cusa attributed to God which he said is the unity or complication of all reality. The world is only the explication of the limited forms of the same reality.

Cusa adopted the solution given by the Neo-Platonists to the problem of One-Many: each individual entity of the universe is a micro-cosmos, each part of it is a contracted form of the All. To explain this he used the simple formula: “God is in all things in such a way that all things are in him” but he elaborated.[428] He wanted to suggest that God, by the intermediary of the universe, is in all things:

> Only by the way of contraction is the universe in things; in fact it is restricted by each actually existing thing to be actually what each thing is. Everything actually existing is in God, for He is the act of all. Act means perfection and realization of what was possible. Since the universe restricted is in each actually existing individual, then evidently God, Who is in the universe, is in every individual and every individual actually existing is, like the universe, immediately in God. To say 'that everything is in everything' is the same as saying that God, by the intermediary of the universe, is in all things and that the universe by intermediary of all things, is in God.[429]

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[427] Cusa explains this coincidence also on p. 95: “In consequence, they (the Peripatetics) have said that all things are contained potentially in absolute possibility. The boundless infinite character of absolute possibility arises at once from its having no form, and from its aptitude for all forms; e.g., the possible forms that may be given to a piece of wax are limitless: the form of a lion, hare or anything at all. Yet it is an infinity that is opposite of God's, for it is through want that it is infinite whereas God's infinity is by abundance, since in God all things are God in act. We, on the contrary, have discovered ... that it would be impossible for possibility to be absolute ... Absolute possibility, in consequence, in God is God and outside him there can be no question of absolute possibility; for all, apart from God, is necessarily limited, so that no thing could be found which is absolute possibility.”

[428] CUSA, p. 83.

[429] CUSA, p. 84.

It is this doctrine that, as we have seen, was basically present in both Plotinus and Proclus. But Cusa also openly asserted the notion of the coincidence of opposites. Cusa deduced that the minimum in the Universe will ultimately be (paradoxically) the maximum, or God, and so they cannot be really opposites. In the sphere of infinite or unlimited, the opposites of extreme greatness and extreme littleness must coincide, and this is the same as saying that the All must be immanent in the minimum. Cusa wrote:

> Consequently the absolute maximum is one and is all; all things are in it because it is the maximum. Moreover, it is all things for this reason that the minimum at once coincides with it, since there is nothing that can be placed in opposition to it.[430]

Thus he affirmed that the plurality or diversity of things is mathematically determined (or limited) and, as limited, they are incommensurable with the infinite (totality). But at the same time he affirmed that as far as the infinite is immanent in things, they must in some sense coincide with it. These are not contradictory statements because Cusa had already warned of the paradoxical character of his enquiry.

For this reason it was important for Cusa to show the paradoxical sense of the concept of unity to prove his point. The minimum in number, he said, is the smallest possible and this is a unity, since there is nothing less than it (the minimum implies already that we must consider it as infinitely small). But on the other side, the unity is also the maximum because the maximum excludes the possibility of duality, which implies division, and consequently the existence of any other similar being (thus negating its character of maximum). It is all that it can be, and consequently it is perfection, similar to God or God himself. Thus in the concept of unity we see that the minimum coincides with the maximum.[431]

Cusa also illustrated the principle of coincidence of opposites by using geometrical analogies. For instance, he said that in the infinite the maximum of straightness coincides with the minimum of curve. In the infinite also the line does not differ from the point. Like

[430] CUSA, p. 9.
[431] CUSA, p. 15.

the point, the line also has the character of indivisibility. This is important, as the infinite line is the essential explanation of all lines:

> The essential explanation of the finite line is the infinite line and there is no doubt that in the infinite line there is no difference between the two-feet line and the three-feet line. In consequence, there is only one essence of the two lines and the diversity of things or of lines is not essential (for there is only one essence) but accidental, arising from the fact that they do not equally share the essence.[432]

Here again we have the idea that numerical diversity disappears in the realm of the infinite or totality. Cusa wanted to assert that in the infinite we do not have any kind of dualities, as they are merged in a comprehensive unity.

The doctrine of the coincidence of opposite was also important for Cusa, because it is the basis for convergence between Greek philosophy and Christian theology. He saw both as branches of the same tree, and discussed the convergence of the Neo-Platonic doctrine of "everything is in everything" and the Christian doctrine of the Holy Trinity.

In fact, for Cusa, to say that "everything is in everything" is equivalent to saying that "God is in all things in such a way that all things are in him", which is, in its turn equivalent to: "the Father is in Me and I in the Father as the Son says" which is the dogma that he repeats when he is discussing his geometrical metaphors.[433] For Cusa, the Father and the Son have a nature in common. The human nature is present in both of them, and so there is equality between them. Besides, the connection between them is achieved by the Holy Ghost, which he call Infinite Connection. Thus he explained: "... the beginning of a creature is due to God's being Father, its completion to God's being Son and its fitting in with the order of the Universe to God's being the Holy Spirit."[434]

Cusa thought the minimum was equivalent to the Son, as he enunciated the notion of coincidence of opposites in terms of the Trinity and stressed the limitation of reason to understand this identification:

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[432] CUSA, p. 37.
[433] CUSA, p. 43.
[434] CUSA, p. 56.

> It has already been most clearly established that the maximum is one, for the minimum, maximum and connection are one; unity itself is the minimum, the maximum and the connection; if that is so, it becomes evident that a philosophy which would understand the necessity of the maximum unity's being a trinity could only do so by means of simple intuition, for no help that the imagination and reason can lend would be any avail here.[435]

In the third and last part of his book he developed the idea that the most perfect form of unity is the union of creator and creature, or the union of minimum and maximum in act (and not merely potency). He remembered that human nature was called the microcosm by the ancients and as the summit of creation it should be raised in union with the maximum. For Cusa, Christ was the manifestation of this union. But what I want to stress here is that the coincidence of opposites does not rule out the necessity of the connection (the Holy Spirit for Christians or World Soul for the ancients).

Knowledge According to Cusa

For Nicholas of Cusa then, God is the infinite unity, and this is what makes the ultimate reality paradoxical or even incomprehensible. The equivalence or the coincidence between unity and infinity is the principle that also allows the achievement of the equivalence between unity and plurality, identity and diversity, and distinction and non-distinction. He said, for example, that:

> The reconciliation of contradictories is beyond reason, so to every name reason naturally opposes another; e.g., reason naturally opposes plurality or multitude to unity. God is not called ‘Unity’ in this sense, but ‘Unity in which distinction, plurality and multitude are all identified’[436]

[435] CUSA, p. 24.
[436] CUSA, p. 54.

In another passage he argued that absolute maximum is all things since it is one with the minimum and, consequently, it is the cause of diversity: "When we consider the diversity of things we are at a loss to see how the unique absolutely simple essence of all things is also the distinct essence of a particular thing; yet we know that it must be, for our ignorance that is learning has shown to us that, in God, identity is diversity."[437]

In the realm of discursive reason, which deals with limited things that are subject to degrees of more or less, we have grounds for making distinctions. But in the sphere of the infinite we are supposed to reach indifference between distinction and non-distinction. Cusa wrote:

> … instead of regarding distinction and non-distinction as contradictories in theology, we must previously consider them in their infinitely simple principle in which there is no difference between distinction and non- distinction. We will then have a clear idea of how trinity and unity are one and the same. Where, in fact, distinction is non-distinction, unity is trinity.[438]

Cusa said that the *Maximum Absolutum* is beyond our understanding, which is fundamentally unable by any rational process to reconcile contradictories.

But if the objective of all philosophers, the absolute truth, cannot be attained in its entirety, for the ontological truth is the truth about an ultimate paradoxical reality, nonetheless, a progress in the search of this truth is possible, progress which is endless, as its object is itself infinite. Cusa used a geometrical metaphor to explain this aspect:

> The relationship of our intellect to the truth is like that of polygon to a circle; the resemblance to the circle grows with multiplication of angles of the polygon; but apart from its being reduced to identity with the circle, no multiplication even if it were infinite, of its angles will make the polygon equal to the circle.[439]

[437] CUSA, p. 102.
[438] CUSA, p. 43.
[439] CUSA, p. 11.

As limited things, belonging to the sphere more or less, our intellect is also a thing of degree, even when searching for the ultimate truth. This ultimate truth is in act only in God.

Cusa and Leibniz

Most of the time, Cusa deduced the consequences of the Neo-Platonist doctrine in a very consistent way. In this sense he is worth comparing with Leibniz, who was working with similar premises. In comparing the results of both philosophers, we see that Leibniz agreed with Cusa in important aspects but also sometimes disagreed with him. This is in a sense amazing, as Leibniz most probably read *Of Learned Ignorance*, which appeared more than a century before him. We can see a version of the doctrine of coincidence of opposites when Leibniz said, as an example of his law of continuity, that rest may be considered as an infinitely small velocity, or that equality may be considered as an infinitely small inequality.[440] Also:

> ... the Law of Continuity, first formulated by me, by virtue of which the law for bodies at rest is in a certain sense only a special case of the universal rule for moving bodies, the law of equality is in a certain sense a case of the law of inequality, the law of curves is likewise a subspecies of the law of straight lines ...To this also belongs that method of proof, long famous in geometry, by means of which from any hypothetical assumption which is first made a contrary notion will immediately emerge, so that what was first viewed as a subclass of defined general class is shown to be contrary and disparate to it.[441]

We have seen that the curve and the straight line are opposites in the Pythagorean table presented by Aristotle. In another text Leibniz was ready to supply another example in which he demonstrated the coincidence of these opposites. Mandelbrot referred to this text:

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[440] "... rest may be considered as an infinitely small velocity ... equality may be considered as an infinitely small inequality." *On True Method in Philosophy and Theology*, 1686, Wiener, p. 67.
[441] LEIBNIZ, *Metaphysical Foundations of Mathematics*, 1715, Wiener, p. 211.

> In 'Euclides Prota' ... which is an attempt to tighten Euclid's axioms, he states ... 'I have diverse definitions for the straight line. The straight line is a curve, any part of which is similar to the whole, and it alone has this property not only among curves but among sets.'[442]

According to Mandelbrot, Leibniz, following this metaphysical line announced the beginning of topology.

Nonetheless, he warned that the expressions meaning that opposites coincide (or rather that the "extremes meet") go too far.[443] He also recognised, in section 9 of the *Discourse of Metaphysics*, that his theory of substance implied "notable paradoxes." In Coudert's book a phrase of Leibniz can be found that substantially recalls the doctrine of Cusa. In a document called *Of Man, Happiness, God and Christ* he wrote: "God, a maximum of infinity, a minimum of indivisibility … Christ the center of eternal life."[444]

Despite these similarities, the factor which certainly moved Leibniz away from the principle of coincidence of opposites is his commitment to the Principle of Identity (or of contradiction), and certain theological relations attached to this Principle. It will be necessary to summarise this commitment to clarify his differences from Cusa.

We remember that it was Aristotle who related the principle of identity (or contradiction) to the inquiry of the being-as-such. We have already stressed that Merlan argues that the principle of contradiction was based on an ontological rather than an epistemological basis. Thus, to refute those who did not accept the principle of contradiction, (the Protagoreans), claiming the evidence of the ever-changing flux of the sensible world, Aristotle argued in the *Metaphysics* that above the realm of the sensible there is a realm free from change.[445] And he argued also that its study is Theology, the true wisdom which deals with this realm of the changeless and immaterial. Thus, what cannot

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[442] HIRANO, Hideaki, *Cultural Pluralism and Natural Law* 1997. published on the Internet: <www.t.hosei.ac.jp/~hhirano/academia/leibniz.htm>. The reference is MANDELBROT, Benoit, 1977, *Fractal Geometry of Nature,* Freeman, 1977 p. 419. Even the differential equations invented by Leibniz can be seen as expressions of the doctrine of the coincidence of the opposites, since in this calculus the maximum effect is expressed as a function of the minimum.

[443]He wrote: "Expression like "Extremes meet" go a little too far, e.g., when we say that the infinite is a sphere whose center is everywhere and circumference nowhere. Such expressions must not be taken too strictly or literally." Extract from a letter to Canon Foucher, Journal des Savants, 1692, Wiener, p. 72.

[444] COUDERT, Allison, *Leibniz and the Kabbalah*, Dordrecht, Kluwer Academic Publishers, 1995, p. 129.

[445] ARISTOTLE, *Met.* (5, 1010a1–3; 25-35).

change remains in identity with itself and, therefore, the principle of identity was ultimately derived from the changeless Divine realm. According to Merlan the ontological formulation of the principle, "for the same thing is impossible to be and not to be", would be translated in the epistemological terms "contradictory attributes may not be affirmed of the same object in the same respect and at the same time."[446] Leibniz, like Aristotle, the logician (and mathematician), was united to the theologian, in support of this principle, which he considered the highest principle of eternal truths. For in Leibniz, as he expounded well in his letters to Clarke, God is the perfect immaterial unity and therefore free from the multiplicity of space.[447] He also has the most perfect mind and in his mind the principle of identity (or of contradiction) stands as the most important necessary truth. And we can say that this principle is the main foundation of Leibniz's system, structuring both the truths of reason and truths of fact.

Concerning truths of reason, this principle is manifested in analysis, which consists of reducing the propositions to identities by a certain number of steps and thus achieving a demonstration. Thus, as Loemker explained, demonstrations are defined by the possibility of reduction to identity: "two terms are identical if one can be substituted for the other without distortion of meaning. If they cannot, the reason is either contradiction or inadequacy."[448] The inability to carry out this reduction would imply a falsity or contradiction (self-contradiction) and consequently it would be an impossibility. Thus identities result in truth and contradictions in falsity. This principle was claimed valid mainly for necessary propositions such as those used in mathematics: "The great foundation of mathematics is the principle of contradiction or identity, that is, that a proposition cannot be true and false at the same time and therefore A is A and cannot be non-A." [449]

But the principle of identity returns also in truths of fact to show that all predicates of a certain subject, its perceptions, are a coherent part of its individual and complete concept. Ultimately, by his doctrine of substance, all the chains of attributes would be predicated on only *one* subject. This means that the series of predicates of the subject or (perceptions of

[446] MERLAN, p. 166. In his work Merlan, however, showed the problematic reading of Metaphysics, since Aristotle, in parts of the book, attacked the doctrine of opposites, so important for the Pythagoreans and Neo-Platonist (and not very consistent with the Principle of Identity), and in other parts he seems to be supporting it.
[447] LEIBNIZ, *Third letter to Clarke*, section 3, Loemker, p. 682.
[448] LEIBNIZ, Loemker, p. 24.
[449] LEIBNIZ, *Second letter to George Louis*, Loemker, p. 677.

the substance) follows, like the law of a series, from the nature of the subject, and there is the identity of the entire series of predicates with the complete subject. Here the paradigm is also reduction to identity as performed by arithmetic, for example, when a simple sum can be understood as saying that the predicate "is the sum of two and two" is contained in the subject "four." Leibniz used this logic of inclusion of predicates and believed that in this case a proposition is true if it is present in the subject. If it is not thus contained it may not finitely imply a contradiction, but only that the proposition pertains to another possible individual concept, and so will ultimately lead to a contradiction.

This theoretical strategy is important, for it allows us to understand that despite the fact that the substances have an historical dimension and therefore they are "capable of uniting inconsistent attributes and are thus capable of change (i.e., having an attribute at one time not at another) ...", these transformations are nonetheless ruled by the concept of the individual, which is another aspect of the principle of identity.[450]

But here Leibniz took a short step away from the principle of identity, because he understood that a complete analysis was not always possible. The analysis of empirical or of truths of fact would imply an infinite number of steps necessary to reduce the proposition to identity and thus it could be possible only for an infinite intelligence, that is, God. But this possibility is the origin of Leibniz's principle of sufficient reason, which says that everything must have an explanation and nothing happens without a cause. Thus the process of analysis can begin with confused concepts and move in the direction of distinct ones, achieving a progress toward a better explanation. Leibniz created the principle of sufficient reason to maintain that all propositions can only virtually be reduced to identities. In recognising this progressive aspect of knowledge we arrive at a certain connection between Leibniz and Cusa, following the indication of Rescher:

> Analysis of certain propositions will not result in explicit identities; they are only virtually identical, in that their analysis comes closer and closer to yielding, but never actually yields, an actual identity. There can be no doubt that Leibniz's views on this, however greatly indebted to his work on the infinitesimal calculus, were influenced by the teaching of Nicholas of Cusa (in

[450] RESCHER, N., *Leibniz: an introduction to his philosophy*, Oxford, Blackwell, 1979, p. 13.

> Chaps. i–ii of *De docta ignorantia)* that truly accurate reasoning about matters of fact would require an infinite number of inferential steps between the premises and the ultimately desired conclusion, so that the human intellect can only approach, but never attain, the ultimate precision of truth (*praecisio veritatis*).[451]

Perhaps it would be more correct to say on this matter that the point of contact between Leibniz and Cusa is double: his infinitesimal calculus itself is nothing more than a sophisticated version of the Pythagorean problem of polygonal approximation of the circle mentioned by Cusa, and he followed Cusa in its applying this approximation as an analogy of the infinite and graduated progress of perceptions of the soul toward truth.

This seems to be sound. But Leibniz kept the domains of the principle of identity because these transformations are nonetheless ruled by the concept of the individual. Consequently, the principle of identity is used here to justify the notion of the concept of the individual, and his associated notion that it does not admit external denominations or external influx (or that the monad has no windows to the external world).

Loemker drew attention to the fact that Couturat found it very important to observe that Leibniz deduced most of his basic principles: sufficient reason, the identity of the indiscernible, the internality of denominations, continuity, the analytic nature of propositions, and his concept of individuality, from the law of identity.[452] However, Wiener noted that the philosophy of Leibniz is full of dualities: the kingdom of nature and of the kingdom of grace; the contingent truth of fact and the necessary truths of reason; the order of mechanical causes and order of final causes; the empirical and the rational elements in knowledge, to which we can add the duality of dimensionless unity and extension, and the duality of the external and internal (the basis of his claim that the monads have no windows).[453] I consider that these dualities are a direct consequence of his misuse or overuse of the principle of identity in the form that establishes the dichotomy: either A or non-A.

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[451] RESCHER, p. 23.
[452] LEIBNIZ, Loemker, p. 20.
[453] LEIBNIZ, Wiener, p. XLVI.

After denying that the essence of a body is extension, Leibniz supported his point of view, insisting that extension is only a phenomenal or imaginary entity which results from the repetition of more basic substances, the monads, which are the real entities.[454] Thus we have here a duality of appearance (phenomena) and reality. This duality is a fact even if Leibniz has assured us that appearance is a well-founded phenomenon. Concerning this position, Leonhard Euler (1707–83), the leading mathematician of the eighteenth century, made a fair diagnosis of the doctrine of extension of Leibniz. Thus he said that the partisans of the doctrine of monads are:

> … obliged to affirm that bodies are not extended, but have only an appearance of extension. They imagine by this they have subverted the argument adduced in support of the divisibility in infinitum. But if body is not extended, I should be glad to know from whence we derived the idea of extension; for if body is not extended, nothing in the world is, since spirits are still less so. Our idea of extension, therefore, would be altogether imaginary and chimerical (…) In effect, they (the monadists) admit that bodies are extended; from this point (they) set out to establish the presupposition that they are compound beings; and having hence deduced that bodies are compounded of simple beings, they are obliged to allow that simple beings are incapable of producing real extension, and consequently that the extension of bodies is mere illusion. An argument whose conclusion is a direct contradiction of the premises is singularly strange: The reasoning sets out by advancing that bodies are extended; for if they were not, how could it be known that they are compound beings – and then comes to the conclusion that they are not so. Never was a fallacious argument, in opinion, more completely refuted than this has been. The question was, Why are bodies extended? And, after a little turning and winding, it is answered, Because they are not so. Were I to be asked, Why has a

[454] "For the extended signifies but the repetition and continued multiplicity of what is spread out, a plurality, continuity, and coexistence of parts, and consequently, it does not suffice to explain the very nature of the substance spread out or repeated, whose notion is prior to that of its repetition." Wiener, p.104; "Extension is an attribute, the extended, however, or matter is not substance but a plurality of substance." Wiener, p. 164.

> triangle three sides? And I should reply that it is a mere illusion – would such a reply be a deemed satisfactory?[455]

Thus extension is the starting point to prove the existence of the components, but once he has arrived at the idea of these components, the monads, Leibniz denies the reality of extension. This vicious circle described by Euler is a direct consequence of Leibniz's insistence on maintaining the duality unity-real and multiplicity-unreal (imaginary) which is the basis of his *Monadology*.

But another inconsistency appears when Leibniz says that relations, which are the cause of the extension, are subjective and imaginary. In fact, if perception is of extended things, it is difficult to understand how such perceptions can be the foundation of individuality of monads. Thus, Leibniz says that only the monads are real but their individualities are based in their unique series of perceptions. However, the perceptions are subjective and imaginary and then it is difficult to see that what is not real (the imaginary) can be the cause of a real entity's individuality.

Thus we can say that Leibniz did not follow his principle of identity to its fullest consequences, thus leaving his system full of those unsolved dualities. The consequence of these dualities is the resulting contradiction and inconsistencies. Thus in maintaining these dualities he failed to achieve his own definition of thinking: the perception of the unity in the diversity: "Thinking is nothing other than the perception of a relation or more briefly, the perception of many things at same time or the one in the many."[456]

Cusa escaped these dualities when he affirmed the principle of the coincidence of opposites. He was also affirming an identity, but this identity is rather paradoxical, as it affirms two contradictory attributes at the same time. In doing this he escaped the "bad" contradiction of Leibniz.

However, *Of Learned Ignorance* would be more consistent if Cusa, like Leibniz, had not compromised with Christian theology. His careful differentiation between God and the universe (called by him maximum contracted) seems also to be influenced by his care to preserve Christian dogma and avoid the dangers of the heresy of pantheism. He says that

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[455] Quoted in BELL, J., *The Continuous and the Infinitesimal in Mathematics and Philosophy*, Polimetrica, Milano, 2005, pp. 104 and 105.
[456] In MERCER, pp. 320 and 321.

the universe must be finite, as its matter does not allow it to be infinite, an explanation in contradiction with the principle of the coincidence of opposites (by which matter or possibility must be also infinite).[457] In fact, if the universe is the totality of minimum, this totality must be, in the last resort, coincident with the maximum. However, we can understand this tension in Cusa because the Christian orthodoxy, supported in the metaphysics of Aristotle, understood that God, the first cause, was perfect and, consequently, transcendent and separated from his creation, the world. Christian theology defended this thesis despite the fact that it is not very consistent with the doctrine of the Trinity, which implies that the divinity is immanent and so not altogether separate from the world.

Historically it was Giordano Bruno, who had great admiration the Cardinal Cusa and embraced the core of his doctrines, who deduced more plausible consequences for the doctrines developed by Cusa.[458] Bruno not only affirmed the infinity of the universe but also assumed the pantheist corollaries of the concept of unity (or interpreting in this way the Christian doctrine of Trinity), and conceived of God as the universe itself, sometimes qualifying God as the active principle, which, together with the passive principle or matter, formed one only substance, the totality or universe itself.[459] These are, in essence, the same points defended later by Spinoza, who also conceived of God as Nature (*God sive Natura)*

[457] He said. on p. 71: "Therefore, from the point of view of God's infinite or limitless power, the universe could be greater; but from the point of view of possibility or matter, which is incapable of actual infinite extension, it cannot be greater" and on p 96: "Our conclusion is that there is a rational explanation and necessary cause of universe's being finite, which means that the world – merely a finite being – necessarily owes its existence to God, for He is the Absolutum Maximum."

[458] In his review of Carriere's book of, Whittaker said of Bruno: "His doctrine of the perfection of all things in relation to the whole and from the point of view of intellect is Spinozistic rather than Leibnizian. The principle of "the coincidences of contraries" derived immediately from Nicholas of Cusa, by which he combines the opposites terms of his pantheism – indivisible intellectual unity to which the mind aspires and the infinite multiplicity of a universally animated nature, has obvious resemblances with the dialectic of Hegel", WHITTAKER, Thomas, "Review of Die Philosophische Weltanschauung der Reformationszeit in ihren Beziehungen zur Gegenwart of Morris Carriere", in *Mind*, vol. 12, n. 47, Jul., 1887, p. 460. Regarding the relationship between Bruno and Spinoza, Hegel wrote: "Jacobi caused great attention to be paid to Bruno, more specially by his assertion that the sum of Bruno's teaching was the One and All of Spinoza, or really Pantheism; on account of the drawing of this parallel Bruno obtained a reputation which passes his deserts." HEGEL, *Lectures On The History of Philosophy*, vol. 3, p. 122.

[459]Bruno wrote: "God is infinite in the infinite, everywhere in all things, not above, not without, but most present, as entity is not outside natural things, as there is no goodness outside that which is good". Quoted by WHITTAKER, p. 456.

or as the active part of Nature, *natura naturans* and matter, the passive one, as *natura naturata*.[460]

But the interference of religious dogma seems to be more damaging for the philosophy of Leibniz than for that of Cusa. Cusa probably could have taken advantage of the ambiguity within Christian dogma. Thus when Leibniz said that the most eternal truth is the principle of identity: A = A and that it is false that A = non-A (forming a dilemma: either A or non-A is true), Cusa said that his fundamental philosophical truth, supported by the mystery of Trinity, is the principle of the coincidence of opposites A = non-A (equivalent to both A and non-A are true). This is, in some sense, the direct denial of the principle of contradiction: "for the same thing is possible to be and not to be", and this was asserted as a fundamental metaphysical truth (a necessary truth) and not as a truth valid only for the realm of existence (a contingent truth). [461]

Leibniz, in fact, considered both the ideas of infinite number or infinite whole to be impossible or contradictory. Thus, having defined that quantity is the number of parts, Leibniz will later deny that we can have an infinite number, that is, an infinite composed of parts.[462] He says through the words of Philarete: "But one can doubt with reason if we have an idea of infinite whole or of an infinity composed of parts, for a compound cannot be an absolute." [463]

The theory of monads will not involve the contradictions of an infinite number or an infinite quantity, as Joseph explained, because monads will not constitute a true whole or unity. As discrete entities the summation of monads will always form only an aggregate. Thus we can say that Leibniz never really adopted the solution presented by Plato in the second hypothesis of *Parmenides* (where the division of the unity or whole produces other unities or other wholes). Joseph explained:

> If they (the monads) constitute a whole, it would be a whole in which you could never arrive to the original parts; and that is impossible, and is the paradox involved in the composition of the continuous. In the same way it is impossible

[460] SPINOZA, *Ethica* I, prop. XXIX.
[461] A position that is similar to Heraclitus' philosophy.
[462] LEIBNIZ, *Dissertation on the art of Combination,* 1666, Loemker, p. 76.
[463]LEIBNIZ, *Conversation of Philarete and Ariste* … 1711, Loemker, p. 626.

> there should be an infinite *number* of them, for a number implies that it have been counted. What we ought to say is that there are more than any number can express. Leibniz finds in the actual innumerability of the monads a reason why the world cannot be the body of God, or God the soul of the world; for it prevents them having a true unity.[464]

Here we have again the nominalism of Leibniz, for numbers are not in things themselves but in the counting mind. But it is not this nominalism that is the problem here. We can see that it is the infinity of the monads (their innumerability) that prevents them from forming a true unity in the Whole. In this sense we can say that Leibniz did not accept the lesson of Cusa that infinity is only another aspect of unity.

Moreover, another consequence of the notion of the coincidence of opposites is the development that in the infinite the line does not differ from the point and, like the point, it has the character of indivisibility. Bruno followed Cusa in this aspect, and even extended it, asserting the doctrine that each dimensionless point is at the same time an infinite extension. This kind of paradoxical statement aroused scepticism among defenders of rationalism at the time of the Enlightment, obviously, because it goes against common sense. Thus Bayle said against the conception of Bruno: "Is anything more contrary to our understanding than to hold that an infinite extension is all present in each point of space and that the infinite number doesn't differ from unity?"[465]

This notion that each dimensionless point is at same time an infinite extension is in direct contrast with Leibniz's idea of dimensionless metaphysical atoms. The unit of Leibniz was necessarily dimensionless; if it were otherwise, it would not follow the principle of contradiction, which is the foundation of mathematics.

But Spinoza was following the same form of reasoning as Bruno when he defended the notion that extension is a substance and that it has an indivisibility required by the definition of substance. We remember that contrary to Descartes, Leibniz replied that extension is not substance (and therefore cannot be the essence of bodies), since by

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[464]JOSEPH, *Lectures on the Philosophy of Leibniz*, p. 139. The reference of Leibniz quoted by Joseph for this subject is C. J. Gerhardt, *Die philosophischen Schriften*, von G. W. Leibniz, 1875–90, ii, pp. 304–5.
[465] BAYLE, M. P. *The Dictionary Historical and Critical of Mr. Bayle*, New York, London, Garland, 1984, p. 157.

definition a substance must be a unified being and extension is infinitely divisible. What is divisible cannot remain a unity. This argument was his reply also to Spinoza: "it is astonishing also that Spinoza, as was seen above (...) seems to deny that extension is divisible into and composed of parts."[466] Leibniz was ready to accept that the abstract line is not composed. Such a line is only a relation of distance, and as a relation it is indivisible.[467] The problem appears, Leibniz said, because we confuse the sphere of the ideal with the actual. But the problem with this argument is that this duality cannot remain consistent (as the argument of Euler shows). By the doctrine of coincidence of opposites we are allowed to deduce that this duality does not exist. In our exposition about al-Kindi we explored his belief that the intelligible matter of the soul of an individual and the intelligible matter that was the substance of universe were the same. There was the belief in no separation between the external and internal. Following this notion, ultimately, the duality between the (Aristotelian) external impression and the (Platonic) internal intuition disappears.

Ultimately, the notion of unity of Cusa is a return to the notion defended by the first Pythagoreans and later repeated by Melissus, that unity is at the same time infinity or that the Limited is at the same time Unlimited. Thus infinite multiplicity or divisibility cannot be used as an argument against unity, at least in a metaphysical discussion of the ultimate realities. This kind of argumentation is clear, for example, in Bruno who said, almost as the first Pythagoreans did:

> If act doesn't differ from potency, in it necessarily the point, the line, the surface, and the body do not differ. For then that line is surface, since a line by moving can become surface; then that surface is moved and becomes a body, since a surface can be moved and by its flowing can become a body. Necessarily it follows that in the infinity point does not differ from body … And so the point, since it exists with the potency of being a body, does not differ from being a body, where potency and act are one and the same thing. Therefore the indivisible doesn't differ from the divisible (...) If the point does

[466] LEIBNIZ, *Refutation of Spinoza*, 1708, Wiener, p. 488.

[467] "Properly speaking, the number ½ in the abstract is a mere ratio, by no means formed of by the composition of other fractions, though in numbered things there is found to be equality between two quarters and one half. And we may say as much of the abstract line, composing being only in the concretes, or masses of which these abstract lines mark the relations." Quoted by RUSSELL, p. 246.

> not differ from a body, center from circumference, finite from infinite, maximum from minimum, we can securely affirm that the universe is all centre, or that the universe's centre is everywhere and the circumference is nowhere ...„[468]

We can see in this quotation of Bruno that the unity of the point does not differ from extension, that is, that the indivisible doesn't differ from divisible and that this notion has strong resonance with the Neo-Platonic doctrine of All in All, particularly Proclus' version of this doctrine.

The doctrine of Leibniz was that the ultimate essence of reality cannot be extension and that it must be force, his substance being the principle of force and action. But the concept of Grosseteste and More (in some sense prefigured by the Pythagoreans and the Stoics and stated later by Spinoza) is that extension is a mind-like or ethereal (spiritual) extension. In fact, for the Platonists of Cambridge extension is associated with the explanation of the plastic nature that moulds an organic body. Thus this version of the notion of extension includes also the attribute of activity, an association that we can see in Cudworth, who named the plastic natures "entelechy", using the same term used by Leibniz for his substances. Thus Cudworth understood that extension does not necessarily exclude dynamism as was claimed by Leibniz (and Plotinus).

Besides, Leibniz refused More and Newton's notion that space was an attribute of God. In his letters to Clarke Leibniz adduced non-pertinent arguments like this: "I have still other reasons against this strange imagination that space is a property of God. If it be so, space belongs to the essence of God. But space has parts; therefore there would be parts in the essence of God, *Spectatum admissi*!"[469]

At least Leibniz was coherent in denying at the same time extension, the existence of the Soul of the World and communicability to monads. It is true that he said that every

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[468] BRUNO, G., *Cause, Principle and Unity,* trans. Jack Lindsay, London, Background Books, 1962, p. 137.

[469] LEIBNIZ, *Fifth letter to Clarke*, sections 8 and 9, Loemker, p. 702. Probably the expression comes from *Spectatum admissi risum teneatis* (You who are let in to look, restrain your laughter) which is Horace's expression in *Ars Poetica*..

substance has a trace of the divine omniscience and omnipotence of the Creator.[470] Thus everything which a monad does has an effect on every other. But this imitation of divine omnipotence is not really possible because he sustained the belief that the substances did not interact, and that each one is a world apart, as he wrote in section 14 of the *Discourse*.[471]

In fact, it is extension considered as this ethereal substance that would make communication among individuals possible. If Bruno said that each point is at the same time infinite extension, this is equivalent to saying that it is connected with everything. This extension is then a concept that is related to other notions in which the theme of communication appears: the Pythagorean *aither*, the Stoic *pneuma*, the World Soul Platonic, the rays of al-Kindi. This association of extension, force and communication is also important in Grosseteste, for whom the light is at same time the principle of extension and the principle of connection between individuals (because light accounts for the emanation of species). For Cusa, this connection is achieved by the infinite connection, the Holy Spirit.

It is worth noting here that the scientific understanding that ether and space are the same thing was a major scientific event of the nineteenth and twentieth centuries. This means that space is not inert and that it participates and conditions the events happening in itself. Einstein, in this sense, said:

> Today it is possible to indicate the exact point of H. A. Lorentz"s discovery: the physical space and ether are nothing more than two expressions of the same thing. The fields are physical states of space ... Only the genius of Riemann, isolated, and not well recognised in the environment of last century, opens a way to arrive at the new conception of space. He denies its rigidity. The space can participate in physical events. This aspect of Riemann's thought arouses admiration and precedes Faraday and Maxwell's theory of the electric field.[472]

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[470] LEIBNIZ, *Discourse of Metaphysics*, section 9: "It can even be said that every substance in some way bears the character's of God Infinite wisdom and omnipotence, and imitates him as much as it is capable." Loemker, p. 308.
[471] In section 14: "... each substance is a world by itself, independent of everything else excepting God."
[472] EINSTEIN, *Como Vejo o Mundo*, Editora Nova Fronteira Rio de Janeiro, 1981, p. 170.

In this chapter we have shown how Cusa and Leibniz, both professing to be followers of the Neo-Platonic tradition, ended up with very different positions. Cusa's principle of the coincidence of opposites goes against Leibniz's defence of the principle of identity. Cusa seems more consistent with the tradition.

Conclusion

Part of the conclusion of this thesis has already been presented in the previous chapter, which described the failure of Leibniz to follow the consistent interpretation of the doctrine Neo-Platonic doctrine of “All in All”. Cusa competently derived these consequences many years before Leibniz, and from Cusa we can see a branch of the tradition that led to Bruno and Spinoza.

In some sense we can say that Leibniz failed in his eclectic project, that is, in his attempt to integrate modern science with ancient knowledge. This happened partially because he denied the reality of extension and partially because he remained inside the framework of Descartes’ mechanical science. He failed to follow the implication of Newton’s theory of gravitation of, which was connected with the branch of Neo-Platonism represented by Henri More, Cudworth and Barrow. Newton, in this aspect, achieved more success in realising the goal of uniting modern science with ancient knowledge, because he was able to see the limitations of mechanical philosophy and he saw that the theory of gravitation demanded a return to some ideas that the ancients had elaborated. Ultimately, Bruno, Spinoza and the Platonists of Cambridge were part of the same group in the sense that they all supported the substantiality of extension.

But the mistake of Leibniz was, perhaps, the result of a distortion prepared by the appearance of Parmenides’ philosophy, an event that influenced the entire path of philosophy**.** We cannot know if this was the intention of that philosopher but it seems that the notion that unity by definition must be necessarily non-divisible and consequently non-dimensional appeared as a consequence of Parmenides’ poem. Aristotle was important in this move, because he ruled out as contradictory the notion of unity proposed by the first Pythagoreans, a unity that was formed by the union of the Limited and Unlimited. In the view of the Pythagoreans, at least with Philolaus, there was an equality of rights between Limited and Unlimited. With Aristotle, unity (in this case in the place of the limited), was supposed to have priority over multiplicity and this priority is the basis for his theory of substance.

Consistent with this view was the theory of Aristotle that God (or the *intellect agens*) was separated (totally transcendent) from the world (like the monads that do not interact with the world), his doctrine of essence and also his stress on the principle of contradiction.

In contrast to Leibniz, Aristotle had his doctrine of perception, which was the basis for the theories of perception that admit the influx of one subject into another.

Plato, as we discussed in the first chapter, did not seem to have accepted Parmenides' notion of unity of. In his *Parmenides* he seems to have shown the ambiguity in and the different consequences that one could derive from the conception of unity proposed by Parmenides. He showed in hypothesis I that some aspects of the unity proposed by Parmenides would produce an absolute one which would be not a whole of parts and therefore would be without parts (without extension). But in hypothesis II some aspects of Parmenides' concept of unity would produce something like the unity of the Pythagoreans, a whole of parts.

Plato seemed to be criticising Parmenides, and therefore there is scarce evidence that he would agree with combining the two hypotheses in a system as did the Neo-Platonist Plotinus. Plotinus organised into a system the doctrine in which unity does not accept the conjunction with its opposite, a unity that he called the One (derived from the Hyp. I of *Parmenides* – akin to atomic unity) with the doctrine that unity does accept its conjunction with its opposite, a unity that he called the Intellect (derived from Hyp. II of *Parmenides*). This second notion of unity (the whole of parts) was, according to Cornford, like the Pythagorean derivation of numbers, and is related to the Platonic doctrine of "All in All" which appears in the *Timaeus*.

The combination of the atomic doctrine of unity (which is also Aristotelian) with the Platonic theory of "All in All" was a part of the eclectic effort of Plotinus. But the doctrine of "All in All" was logically related to the Pythagorean conception that things are equally Limited and Unlimited and this doctrine was strongly criticised as contradictory by Aristotle, and in some sense considered totally incompatible with the atomic notion of unity, as we showed in Chapter I.

Despite these incompatibilities, the synthesis made by Plotinus was accepted and taken to its final consequences by Leibniz. The result was the system of *Monadology* with its consequent characteristic doctrine of no communication of substances and denial of the

reality of extension. In Leibniz, consequently, we have also the same oscillation between two concepts that are ultimately incompatible, the atomic unity that originated with Parmenides (and was supported by Aristotle) and the system of the doctrine of the monad considered as a micro-cosmos (ultimately a Pythagorean idea). I do not see that it is possible to conciliate these two kinds of unity by the notion of coincidence of opposites. The *Monadology*, then, was in fact the eclectic synthesis of Plotinus taken to its ultimate consequences.

It was with Proclus that we have seen a subtle return to the first Pythagoreans with his theory that the soul, as a middle entity, is to be confounded with mathematical activity and therefore provides a basis to claim the substantiality of extension and immanence of mathematics in reality. Basically, it was this move that inspired the Platonists of Cambridge. Together with this trend we have the tradition of philosophical studies in optics of al-Kindi, Grosseteste and Roger Bacon, which was greatly inspired by Aristotle's theory of perception. In al-Kindi we also have a system very similar to the *Monadology*, in which the universe is seen as an infinite collection of subjects that reflect or mirror each other. The only and important difference is that in this system each subject really influences all others.

In the chapter on Cusa we saw that, consistently following the consequences of the Platonic doctrine of the "All in All", there is no sense any more in the affirmation of Leibniz that "the monads have no windows", because in the infinite all dualities disappear and so the external–internal duality disappears as well. In this sense the Neo-Platonic doctrine of essence is perfectly consistent with the world view presented by al-Kindi.

It is a merit of Leibniz that he stresses the principle of individuation and from this principle he deduces the identity of the Indiscernible. This represents a valuation not only of individuality but also of diversity in Nature. In this aspect his philosophy is complementary to the philosophy of Spinoza, whose doctrines stressed the aspect of universality:

> While Spinoza asserted the universality, the oneness of substance merely … Leibniz, by means of his fundamental principle of individuality, brings out the essentiality of the opposite aspect of Spinoza's philosophy, existence for self,

> the monad regarded as the absolute Notion, though perhaps not yet as the "I". The opposed principles, which are forced asunder, find their completion in each other, since Leibniz's principle of individuation completed Spinoza's system as far as outwards aspect goes.[473]

Yet despite these complementary positions of Spinoza and Leibniz, Spinoza seems to be much more consistent. Spinoza maintained unity and continuity more consistently because he did not split the universe into an infinity of monads. Therefore, he was more convincing in other aspects; for instance, in his defence of pantheism and determinism. Consequently, Spinoza was nearer to the goal of Perennial Philosophy than Leibniz was.

[473] HEGEL, *Lectures on the History of Philosophy; Medieval and Modern Philosophy*, vol. 3, Lincoln and London, 1995, p. 325.

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