

Paper Title: God's mark on Nature. A Trinitarian approach.

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This paper was prepared for «Science and Religion: Global Perspectives», June 4-8, 2005, in Philadelphia, PA, USA, a program of the Metanexus Institute ([www.metanexus.net](http://www.metanexus.net)).

Abstract:

The objective of this communication is to reflect on Natural Sciences from the point of view of Trinitarian Theology, in which Nature is considered as a trace or vestige of a creative God. The paper begins with a discussion of some representative texts on this teaching (by saint Augustine, saint Thomas Aquinas and saint John of the Cross), providing a distinction between trace and image. The image of God in human beings is recognized in *memory*, *intellect* and *will*, while *mode*, *species* and *order* reflect the trace of God in the rest of Nature, since each appears to explain the way of being of each object, the form in which it appears or its complete movement. The Augustinian *ordo amoris* (the order or law of love) is developed as a theological and physical foundation that may give meaning to the ultimate purpose of every natural movement.

After presenting the main ideas and the immediate consequences of this theory, the paper revises some basic postulates of the Natural Sciences, such as gravity in Physics, electronic affinity in Chemistry and evolution in Biology, with the aim of attributing meaning to movement beyond mere mechanical causality, and thus to complement and reinforce the dialogue between Science and Theology.

Indeed, gravity is proposed as the first demonstration of Augustinian *ordo amoris* in inert bodies, in the same way that its fall to the center of the Earth is also considered the first movement. The paper then recalls that Isaac Newton did not determine any cause for gravity in his *Principia*, and that he left this important point unresolved in his *Letters to Bentley*.

In addition, a question is posed on the meaning of terms like «electronic affinity», which are used in Chemistry to explain electronic attraction or bond formation. The thesis of Empedocles about *philia* (or love) as the non-material but necessary principle for the union of the elements that constitute each thing, is presented as a valid interpretation that agrees very well with this second step in the universal order of love.

Finally, the proposal of love and intelligence in Nature is developed, considering life as the most complex movement, to say with other authors that evolution is a universal process in which divine activity (or creation) is still occurring, through the constant action of the Holy Spirit as «The Giver of Life». In conclusion, we can recover our wonder at the spectacle of Nature and thus avoid the dangerous «God-of-the-Gaps».

Biography:

J.M. Romero-Baró is Master in Science (Chemistry) at the Autonomous University of Barcelona (1978), Master and Doctor in Philosophy at the University of Barcelona (1989), Professor of Philosophy (Metaphysics and Epistemology) in the University of Barcelona since 1989 and Vice-Chairman of the STIC Barcelona (a LSI of

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Paper:

## **GOD'S MARK ON NATURE A TRINITARIAN APPROACH.**

### INTRODUCTION

It seems appropriate to deal with the action of God on nature at this congress that has as its title “Science and Religion: Global perspectives”, to attempt to see how scientists studying the question can discover this action. If we accomplish this objective, this communication will have demonstrated not just that the dialogue between science and theology is possible but also that this dialogue can serve to mutually complement both these fields of human knowledge.

This dialogue is a need that humanity has probably never ceased to feel down through history, and I consider that there are ideas from the past that can still be useful to us today if we are capable of understanding them in the scientific context in which they were formulated and of formulating them again in the context of science today. In this sense, I believe that some of the theological writings of St. Augustine, St. Thomas Aquinas or St. John of the Cross can have a lot to say to today's scientist, and I am also convinced that much of the writing of today's theologians are perfectly in harmony with them.

It is only fair to recognise that the appearance of that new reality in the field of science which is biological evolution makes it necessary to bring the dialogue between theology and the sciences, particularly biology, up to date. But with the same fairness I believe that advances in the other fields of science have been so spectacular if we compare them with the science of the ancient world that we should feel ourselves equally obliged to bring this dialogue with the other natural sciences up to date. Thus we can go beyond biology and attempt to extend this dialogue with theology to include physics and chemistry, and in this sense I will begin by explaining the thesis of well-known contemporary theologians on God's action on creation and go on to contrast them with the writings of St. John of the Cross, St. Augustine, and St. Thomas Aquinas.

### UNITY AND LOVE IN NATURE

In his work *Theology of Creation in an Evolutionary World*, the theologian K. Schmitz-Moorman is aware of the need for unity in nature in order to explain its

existence, when after analysing the composition of matter and its elements he observes that “life only exists in the all, not in parts. Life is present through the union of parts that cooperate as if they were under a kind of direction, rather than simply reacting between themselves”.<sup>i</sup> God directs this unity of the parts in the all because “God is love in the pure act of uniting”.<sup>ii</sup> In this new theology God does not move atoms towards on another everywhere but rather makes Himself present from the beginning in all He has created, “acting from within the elements”, “calling neighbouring elements to unite”, while His existence is necessary in every moment since otherwise, “without this presence of God’s call, elements would fall back into nothingness”.<sup>iii</sup>

But if God as Love is the condition for the union between the elements, much more so is it the condition for union between human beings, and that Love will find its highest expressions in divine persons. Precisely, “human love, the love we know, may try to give oneself to the other, but it always falls short of this goal. In the Trinity there is no shortcoming of the loving relation. Each person of the Trinity is one with the others in total love. Being united in perfect love beyond all human comprehension, the three divine persons are one God”.<sup>iv</sup> The Trinity is thus the model and the summit of interpersonal relations centred on love.

Thus it is not difficult to conclude that God’s action on the world takes place through the action of the Holy Spirit, the personification of divine Love. “Discovering love as the fundamental creative force opens a view that might be considered a very fitting way for God to act. We confess God to be Love, and even if we consider the creative action especially as the action of the Holy Spirit, this would at least fit meaningfully into theological discourse, since the Holy Spirit has often been considered the uniting force of love in trinitarian speculations”.<sup>v</sup>

We can find this same desire to point to the action of God’s love in creation (starting with the Big-Bang and all that follows) in the work of the Australian theologian Dennis Edwards entitled *The God of Evolution* when, referring to the Holy Spirit as the Life-Giver, he tells us: “In an evolutionary framework, I would suggest that it is the life-giving and completing Spirit who is the power that enables creatures to transcend themselves. It is the Life-Giver who enables the movement of the unfolding of the early universe from the Big-Bang, the beginning of nuclear processes in stars, the formation of our planetary system, the emergence of life on Earth, and the evolution of self-conscious human beings”.<sup>vi</sup> We will have occasion to return to this author later.

The vision of the creative action of God in nature is also present in the author who affirms, “The world is a product of the omnipotence and wisdom of God and is thus consistent and admirable in itself. But it is at the same time a reflection of His beauty and plenitude and thus a dazzling mark, a glorious insinuation and proclamation of God.”<sup>vii</sup> And like earlier authors he can affirm that “the new structures that appear in matter, the emergence of life and of new and more complex forms of it, and, in general, the entire admirable reality of evolution should alert us today to the presence of the spirit in the heart of reality”.<sup>viii</sup>

Another perspective consists of affirming that though “it must be taken into account that creation is a *creatio continua*, in other words that, in the first place, God maintains in being the creation made in the beginning and does not abandon it to the mechanical operation of the laws that He established for it (Deism)”, nonetheless “we cannot reduce providence solely to this conservation of creation simply because this

world has been created in Christ and for Christ [...] to carry out His plan for the salvation of men in Christ”.<sup>ix</sup>

Logically, the texts cited above coincide as to the need to stimulate traditional theology to explain the innovation in science represented by evolution, and their explanations are often complementary. Thus D. Edwards agrees with K. Schmitz-Moormann that “traditional theology never needed to explain how the cosmos could have developed until it produced within itself something radically new, such as life or consciousness. In this new theology the universe is understood as a dynamic system. It is creative. It is self-regulating. Nature is understood as having within it the creative capacity to shape the universe. [...] The Divine Being acts from within creation.”<sup>x</sup>

#### ST. JOHN OF THE CROSS AND THE “MARK” OF GOD IN CREATION.

Speaking of the mark, the vestige or of the “passage” of God through nature, one cannot help but remember St. John of the Cross when, in the first poems of his *Spiritual Canticles* he has the soul in love with God speak thus: “Seeking my love,/ I will head for the mountains and for watersides;/ I will not gather flowers,/ nor fear wild beasts;/ I will go beyond fortresses and frontiers.// O woods and thickets/ planted by the hand of my Beloved!/ O green meadow,/ coated, bright, with flowers,/ tell me, has he passed by you?// Pouring out a thousand graces,/ he passed these groves in haste,/ and having looked at them,/ with his image alone,/ clothed them in beauty.”<sup>xi</sup> In these verses the poet affirms that he has not seen God, Whom he searches for, full of love, but he deduces His passage in the trail (mark, trace) of beauty that He has left behind, as if it were a perfume or a visiting card. Is the poet perhaps also telling us that, lacking the presence of the Beloved, he contents himself with the traces that He has left behind by contemplating nature? Does not the soul in love content himself with knowing that his beloved has been where he is now and with breathing in the perfume left behind?

Let us delve somewhat deeper into these texts, making use of the analyses and commentaries that the author himself offers us in the form of the “Declarations” that follow each of the poems. The introduction to the declaration of the fourth poem urges us to discover God through his mark on nature “because after the exercise of knowing oneself, this consideration of creatures is the first step on this spiritual path of learning to know God, considering His greatness and excellence as made manifest in them, as when the Apostle (Romans. 1, 20) writes: *Invisibila enim ipsius a creatura mundi, per ea quae facta sunt, intellecta, conspiciuntur*, which is as if to say: the invisible things of God and of the soul are made known through visible and invisible created things”.<sup>xii</sup> And when he says, *O woods and thickets!* He calls forests those elements, which are: earth, water, air and fire; because just as these very pleasant forests are populated by a density of creatures, which are here called densities due to the great number and great differences there are in them in each element: on the earth innumerable varieties of animals and plants; in the water innumerable types of fish; in the air a great variety of birds; and the element of fire which concurs with all of them for their stimulus and conservation; and thus every sort of animal lives in its element and is fixed and planted in it as in its forest and the region where it was born and grew up. And in truth, so did God order when creating them, commanding the earth to produce plants and animals and the sea and the

waters the fish and the air became the home of the birds (Gen.1). And thus the soul, seeing that He so ordered and made things, gives the following verse: *Planted by the hand of the Beloved.*<sup>xiii</sup>

The declaration of the fifth poem tells us that “what is contained in this poem in essence is that God raised up all these things with great ease and speed and in them left some trace of what He is, not only giving them being out of nothingness but granting them as well innumerable grace and virtues, beautifying them with an admirable order and the indispensable dependence that some have of others”.<sup>xiv</sup>

After this series of introductory comments, what St. John of the Cross understands as the “trace” of God in His creation appears with greater clarity, when he says that, “Passing through the groves is to raise up the elements, which here are called groves; through which he passed scattering a thousands graces, since he adorned them with all the creatures, which are full of grace; and beyond that he scattered the thousand graces in them, giving them the virtue to be able to coincide in the generation and conservation of them all. And it says that He passed because *the creatures are like the trail of God’s passage*, through which can be traced His grandeur, power and wisdom and other divine virtues”.<sup>xv</sup>

Finally, on commenting the last three verses – which we have italicized – he tells us that “with only this figure of His Son, God looked at all things, which was to give them natural being, communicating to them many graces and natural gifts, making them finished and perfect, as is said in Genesis (Gen. 1, 31) in these words: *God looked at all the things that He had made and saw that they were good*. Seeing them as very good was to make them very good in the Word, His Son”.<sup>xvi</sup> And closing his declaration the saint tells us that “wounded the soul in love [...] by this trace that he has seen in creatures [...] of the beauty of his Beloved and anxious to see that invisible beauty that brought about this visible beauty, he speaks the following verses:

*“Ah, who has the power to heal me?/ Now wholly surrender yourself!/ Do not send me /any more messengers; /they cannot tell me what I must hear. As the creatures gave the soul signs of his Beloved, showing him thus the mark of His beauty and excellence, love swelled within him and hence grew the pain he suffered for His absence, for the more the soul knows God, the stronger his desire and longing to see Him”*.<sup>xvii</sup>

#### “IMAGE” AND “TRACE” OF THE TRINITY IN CREATION

Returning to the idea of the “mark” or “trace” of God in creation, we will analyse the action of the Trinitarian God on nature. Father Ramón Orlandis Despuig S.J. (1873 – 1958) wrote in a text that was unpublished until a short time ago:<sup>xviii</sup> “St. Thomas following in the footsteps of St. Augustine, established the elements that constitute the perfection of every created being. These elements are three: ‘mode’, ‘species’ and ‘order’. This ternary enumeration, which is not given great importance in the exhibition of the synthesis of Thomist thought, in our view is one of the principle milestones which must be understood by anyone who wishes to follow the Angelic Doctor in the development of his thought on the ontological plane as well as on the psychological, moral and spiritual. In it we discover a fundamental conception which is constantly applied throughout the saint’s doctrine.”

I consider that in fact this supremely important metaphysical principle runs through the whole of St. Thomas's work and can even today throw light on the natural sciences insofar as it takes all nature – and with it the human being – as the creation of God, having the same similarity to its Creator as the work to its maker, so that, concurring with the expression of St. John of the Cross cited above, a knowledge of nature permits us to advance in our knowledge of God, while at the same time the knowledge of God permits us to better understand nature.

It would be a very good idea to begin by clarifying the terms with which we refer to the presence of the Trinity in creation, distinguishing between “trace” and “image”.

On thinking about the relationship between causes and effects, St. Thomas points out that “Every effect in some degree represents its cause, but diversely. For some effects represent only the causality of the cause, but not its form; as smoke represents fire. Such a representation is called a *trace*: for a trace shows that someone has passed by [from cause to effect] but not who it is. Other effects represent the cause as regards the similitude of its form, as fire generated represents fire generating; and a statue of Mercury represents Mercury; and this is called the representation of *image*”.<sup>xix</sup>

Thus we can reserve the term “image” (*imago Dei*) for the effect that has such a close causal relationship with the Trinity that there is a communication in terms of form with It, and “trace” or “mark” for the effect that has a lesser relationship with the cause and when that communication of the form does not exist. In this way, in being an “image” of the Trinity the human being has a certain formal appearance, similarity or likeness to It, to the point that we can say –without it being a euphemism – nothing less than that the human being is destined to be “seat of the Holy Spirit”, while as “trace” or “mark” nature only reveals that the Trinity has passed through it – which is much – but without having come to stay in or inhabit it.

Following St. Augustine's doctrine regarding the three Persons of the Trinity (according to which the Father gives Being, the Son is the Word, the manifestation of understanding, and the Holy Spirit is the Love that informs the will), it can at once be seen that the human being as a creature (being) that possesses memory, understanding and will has, thanks to these characteristics, a close relationship of similitude with the Trinity through the Father, the Word and the Holy Spirit respectively. Hence in the human being the reflection of the Trinity in creation is an image that appears in the memory (of a being), the understanding and the will in the form of faculties of the soul. The mode, species and order of the human being as creature will be, respectively, his memory, his understanding and his will. And in the mutual interaction of those three faculties, through memory the human being knows of himself who he *is*, through understanding he *tells* his fellows what he knows, and through the will he *desires* that being and understanding that he communicates with his words, in a reciprocal relationship that illuminates the varied and deep paths of reflection in the human consciousness.<sup>xx</sup>

In reading the text referred to by Fr. Orlandis we can find three passages in which he studies the trace of the Trinity in creation.<sup>xxi</sup> In the first St. Thomas wonders “If the reason of good consists in mode, species and order”, and responds in the affirmative, in the same way as in the last text he wonders (in conjunction with this) “If privation of the mode, species and order is an effect of sin” and also answers in the affirmative.

St. Thomas begins the first question by taking a text by St. Augustine –which we will use intensively – as a possible argument against the identity of being and good: “mode, species and order seem to say reason for being, since the book of *Wisdom* (11 ,21) says, ‘*You set out all with number, weight and measure*’, to which list are reduced, species, order and mode, since as St. Augustine says in *Super Gen.ad litteram*, IV, 3, ‘*the measure of all things sets the mode, number gives the species of everything and weight brings to each thing stillness and stability*’”, to which St. Thomas responds saying that “these three things are only said of a being insofar as it is perfect, insofar as it is good”.<sup>xxii</sup> In other words, mode, species and order, far from saying of the being anything other than goodness, confirm it, affirming three times over that it is the work of God.

The text of *Wisdom* that St. Augustine follows indicates that the finite manifests itself precisely in number, weight and measure, and for that reason Fr. Orlandis continues with the explanation of this text saying that “St. Thomas also accepts the identification of these three elements that constitute the perfection of any entity with the ‘number’, ‘weight’ and ‘measure’ according to which the Holy Scriptures says that God made all things. Measure is the mode, because measure sets the specific mode of being. Number is species because, as Aristotle says, species are like numbers; thus just as the addition of a unit constitutes a new number, so the addition of a differential note constitutes a new species. Weight is order because weight brings the entity to movement or to rest; it is what inclines a being to action, to its end, or to another entity”.<sup>xxiii</sup>

It is worth trying to clarify a bit more this trilogy of the trace of God in nature because I consider that it is useful for today’s science.

We can begin with the first affirmation: *measure* (of being) gives the *mode* (of being). In other words, all things that are (in other words, entities, all that which has being), have *their own measure and their own way or mode of being*, and as no measure of being is exactly the same as another measure of being, the result of this is that no being is exactly the same as any other, even within the same species. And as this operation of creation is strictly valid for each individual, it can be affirmed with no fear that an insect (or a hair) is in principle different from another insect (or another hair) if we take the trouble to examine it with sufficient attention. Hence the variety of species and subspecies in the three kingdoms and the non-identity of individuals. This principle of differentiation can be extended to molecules.<sup>xxiv</sup>

The second affirmation tells us that that received form, the *species*, is like *number*. We could say that it is like the numbered, counted quantity, so that each one of the quantities that differ from a unit is qualitatively different (is also distinguished) from the other numbered quantity. “Form,” Fr. Orlandis points out here, “is what causes an entity that is singular, realised and subsistent to be that entity, characterised by certain specifically differential aspects”<sup>xxv</sup>, so that to be “such” or to have “such a quality” distinguishes one species from another and makes it cognizable. Thus the species is the principle of formal or qualitative distinction, since form is the exterior aspect, what we see of things, that by which we know what they are and that which distinguishes them from others.

The third affirmation of the trilogy tells us that *weight* is related to *order*, since in the Aristotelian terminology we are referring to weight leads to natural movement or to repose and because action is the act or result of that natural movement and, as is well known, for Aristotle the natural being moves by itself, in search of its “natural place”.

Without doubt this relation of *order* with weight and with movement is the most important aspect for our exposition because it deals with the action of God in nature that science can only come to know by studying movement. To understand with precision this third relationship we can begin by saying that form itself tends to work because it is act; and working or action is the end itself (objective and finish) of movement. Thus all nature is informed by the principle of teleological movement (finalist): nothing more absurd than to think of movement without end, and that end is the repose or rest of movement. And putting it inversely, without an end, without repose, what is movement for?

But not only does movement exist for an end, but that end is itself the cause of that movement. In effect, in the second of the three references cited by Fr. Orlandis, St. Thomas writes that “God has a threefold causal relation with the creature, namely, efficient, final and exemplary. Then too the creature is said to be good depending on its relation with God in a threefold causal reason. Since as it is compared with God as with the *effective* cause, it has the *mode* set by God for it; as it is compared with Him as with *exemplary* cause, it has species; and as compared with Him as with *end*, it has *order*.”<sup>xxvi</sup> In other words, above all, God creates (is effective cause) giving measure to all entities and making all things with unique and with measure. In the second place, God is the foundation (or first model) of the truth of all things, by which we know forms (is exemplary formal cause). And in third place things move with the end of returning to the Creator from which they emerged, and their goodness arises therefrom (God is final cause).

#### THE “ORDER OF LOVE” IN NATURE

Let us further develop the correspondence between *order* and *weight*. The phrase is from St. Augustine himself, “because Thou hast made us for you and our heart is restless until it rests in Thee,”<sup>xxvii</sup> recognising in it that not only are we children of God but that we will not rest until we know Him, in other words, until we have reached that end that makes the Creator the goal of all creatures.

St. Augustine’s too is the expression, “*Pondus meum amor meus; eo feror, quocumque feror*: my weight is my love; it takes me wherever I am taken”,<sup>xxviii</sup> in which he recognises that only God is the stillness and rest that we desire. A few lines above he writes: “The body, due to its weight, is moved toward its place. The weight is not just downward, but also toward its place. Fire strains upward, the stone downward. They act due their weight, they go to their place.”<sup>xxix</sup> Thus as weight carries bodies to repose when they rest on earth, so also our love and our desire only cease when they rest in God. In this way weight is the dynamic principle that through movement brings things to repose.

In the following passage St. Augustine extends the idea of the order of love to nature as a whole saying that “if we were animals, we would love the carnal life and what it is according to the sensation of that life [...]. In the same way, if we were trees we could not love anything with sensible movement, although it would almost seem that we would desire that which would make us fruitful in a more fertile and abundant way. If we were stones, or wind, or flame, or something of the sort, without life or sense whatever, even so we would not lack a certain desire for our places and for our order, *since movements of bodies are like the loves of bodies, they move downward due to gravity or upward due to*



*lightness. Thus just as the soul is led on by love so the body is borne by weight to all those places to which it is taken*".<sup>xxx</sup>

In other words, we can speak of *love* (desire) thinking in the same way of animal desire as of vegetable growth or the fall of physical bodies. Let us observe how in this last case, that of "inert" bodies, St. Augustine identifies weight with movement and love, so that it could well be said that the "law" or "order" of love (the Augustinian *ordo amoris*) runs through all of creation, endowing it with a capacity for relationship that permits its subsistence. Even matter appears to be endowed (dowry: gifted, gift) with a principle (that of falling or rising) which allows it to move and thus relate to its material environment.

I believe that we would not be at all ill-advised to think of this gift (that of the "order of love" present in inorganic nature) as something that God granted it at the moment He created it. While keeping things in perspective, weight would be the gift that makes the mineral capable of moving in its environment, just as charity would be the gift that enables the human being to found a city on a lasting foundation. So we could thus establish that the order or law of love is to be found present in all nature, though in each case this love adopts a different terminological variant, whether in the sensible life of the animal, vegetable nutrition, the fall of a stone or the rising of the air. In each case, St. Augustine tells us, nature searches through movement for its own place in which to rest, and properly speaking we do not call this love but rather movement of the soul.

Having analysed with some detail this "order of love" as a mainstay of creation, let us attempt to analyse the natural sciences of today (physics, chemistry and biology) to see if we can still find today some trace of that order of love in the created universe, presupposing, of course, that nature is created and that our present knowledge of those sciences is compatible with the thesis of God as Creator. As a result of that analysis, this thesis will permit us to review some aspects of the metaphysical or meta-empirical (hence philosophical or theological) interpretations that have been offered to explain the causes of movement down through the history of the natural sciences.

## THE ORDER OF LOVE IN PHYSICS

It is well known that Newton inquired as to the cause of gravity throughout his life, without ever finding a satisfactory answer. In the "General Scholium" of his *Principia*, Newton declared that "Hitherto I have not been able to discover the cause of those properties of gravity from phenomena, and I frame no hypotheses".<sup>xxxii</sup> This Scholium was not included until the second edition, in 1713, thus the letters that appear below, written previously and for private use, cannot be considered representative of Newton's theological convictions.

In an intense exchange of letters with R. Bentley, Newton affirmed that "for the Cause of Gravity is what I do not pretend to know, and therefore would take more Time to consider of it", distancing himself from Epicureanism by stating "That Gravity should be innate, inherent and essential to Matter, so that one Body may act upon another at a Distance through a *Vacuum*, without the Mediation of any thing else, by and through which their Action and Force may be conveyed from one to another, is to me so great an Absurdity, that I believe no Man who has in philosophical Matters a competent Faculty of

thinking, can ever fall on it. Gravity must be caused by an Agent acting constantly according to certain Laws; but whether this Agent be material or immaterial, I have left to the Consideration of my Readers”.<sup>xxxii</sup>

Some of Newton’s theological theses were very controversial, perhaps because they did not put sufficient distance between God and the world by affirming that God originated the movement of the solar system and set its orbits,<sup>xxxiii</sup> acting *as if* His body occupied all space,<sup>xxxiv</sup> or identifying Him with ether.<sup>xxxv</sup> In his essay in the book *Physics, Philosophy and Theology: A Common Quest for Understanding*, Michael Buckley studied the contribution of Newton’s philosophy to the appearance of atheism in the Europe of the 18<sup>th</sup> century and concluded affirming that “The problem with the *Newtonian Settlement* is not that philosophy was present, but that the religion was absent. [...] Inference cannot be substitute for experience. [...] To attempt something else either as foundation or as substitute, as did the *Newtonian Settlement*, is to move into a progress of internal contradiction of which the ultimate resolution is atheism”.<sup>xxxvi</sup>

If we analyse the text cited, we observe in the first place that by bringing theology so close to science (mechanics) the “Newtonian settlement” in fact excluded religion, which the author understands as a personal experience much richer than what science could provide. Thus we can affirm that no logical inference can replace any experience, much less the complex and varied religious experience, so that it is very probable that on replacing the *experience* of God (religion) with the *theory* of God (theology as derived from geometry and mechanics) the result would be the negation of the transcendent thesis and the immanent affirmation (again Epicurean) of mechanics.

Thus St. Augustine’s thesis on the order of love in nature would help us to give meaning to the formulation of Newton’s universal law of gravity and also to give meaning to the Epicurean theses on movement as an intrinsic property of matter, by saying that movement comes *after* that first law of love as order of the world (the first cause), which is the first and principal law to which it could be conceded that the other laws (second causes) such as the universal law of gravity or the laws of mechanics, are subject.<sup>xxxvii</sup>

On the other hand, I believe that within the framework of *ordo amoris* it is not necessary to displace God in the face of the advance of the natural science, thus avoiding falling into the error of the *God-of ignorance* or the *God-of-the Gaps*, since I do not see any reason why God as first cause should be less worthy today of admiration and praise for the appearance of the dew or the formation of clouds than He was thousands of years ago for the psalmist,<sup>xxxviii</sup> simply because today we better understand those meteorological phenomena in terms of variations of atmospheric density and temperature which in our physics (or meteorology, as science) act as secondary causes. Could not the religious relationship of the human being with God be more securely inscribed within the framework of constant admiration that is awakened by nature through an aesthetic or metaphysical experience – a *personal experience*, which is authentic and hence irreplaceable by any *theory* –with less risk of “moving in a progressive internal contradiction” as M. Buckley believes occurred with the “Newtonian settlement”?

If we remember that in the Augustinian trilogy love occupies the place of the Holy Spirit and “Lord and Giver of life” we will also be in a position to understand that the field of physics is primarily governed by the Love of God,<sup>xxxix</sup> and also that for current theology that first law of love that St. Augustine speaks of and that St. Thomas defends

with him is again “It is the Spirit who is at work in the evolution of life on Earth over the last three and half billion years. [...] In terms of our contemporary understanding of our universe, this traditional teaching would mean that God is present to every particle of every one of the more than a hundred billion galaxies that make up our known universe. God is interiorly and intimately present in all that God creates. [...] The Creator Spirit is present in every flower, bird and human being, in every quasar and in every atomic particle, closer to them than they are to themselves, enabling them to be and to become.”<sup>x1</sup>

## THE ORDER OF LOVE IN CHEMISTRY

When at the beginning of his *Metaphysics* Aristotle reviewed his predecessors' contributions to philosophy, he observed that Anaxagoras and Empedocles deserve to hold a special place among those who concerned themselves with the principles of nature, because along with the well-known material elements, both of them postulated the need to use non-material elements to explain movement: Anaxagoras suggested understanding (*noûs*) and Empedocles love or friendship (*philia*) and hate.<sup>xli</sup> The metaphysical leap that, in Aristotle's judgement, these two authors' study of nature took permits us to go beyond the blind mechanics that is implicit in the idea that movement is intrinsic to material. We can consider, with Aristotle, Empedocles and Anaxagoras, that it is necessary to go beyond material to find the motor principal or agent that moves these elements: that joins or separates them (Empedocles), and even more that gives a reason (Anaxagoras) or explanation of the very need for this joining or separation of the elements in order to provide what they compose. As is obvious, we wonder about the reasons or final causes for movement in nature. We do not wonder so much about the *what* or *why* of that movement (the questions science asks) but about the *why* or the *conditions* of that movement (the metaphysical or meta-scientific – and also theological – questions asked by philosophy).

Chemistry today refers to the reactivity of the elements of the Periodic Table saying, in general terms, that the most electropositive elements (on the left of the Table) have a tendency to lose the electrons that are gained by the more electronegative elements (on the right of the Table) forming ionic or covalent links with the total electronic charge distributed more or less uniformly depending on the electro-negativity of each element. Some authors prefer to define as electronic “affinity” that electro-negativity or capacity to gain electrons through which the atomic orbitals are filled following Pauli's principle of exclusion, according to which there cannot be any electron (any particle in general) with four quantum numbers that are the same.

The question then is that beyond this mechanical orbital building up (*Aufbau*), the most profound reason for the chemical linking lies in this electronic “affinity” or *philia*, which would explain the fact that an element is more or less thirsty for electrons. In this way we would recover the need for a metaphysical (non-material) principle to explain the movement of material elements: that of love or friendship (*philia*) which Empedocles employs with the same intention.

With regard to the recovery of the other principle, Anaxagoras's understanding or *noûs*, we can anticipate that the reason for this *philia* would in turn be justified by divine foresight, providence (*pró-noia*)<sup>xlii</sup> or wisdom (*sophía*) which the love that Empedocles

speaks of would use as the instrument for its designs or plans. Thus in this context it would not be too bold to bring together the meanings of the words *prónoia* and *sophía* with Anaxagoras's *noûs*. However, we will leave for later the development of the significance and personification of divine wisdom in the sense of the Holy Scriptures.

#### THE ORDER OF LOVE IN BIOLOGY

The area of life studied by biology is where the order of love has more possibilities of being demonstrated, since it is a field that is much more extensive and complex than those studied by physics or chemistry, and especially because in it there appears the problem of evolution, of the variation of the object being studied. We are not going to even try to demonstrate now that life is the highest manifestation of material complexity in nature in movement – a complexity that physics and chemistry helps us to understand – but rather, on the basis of the complexity of life itself, I would consider that it is simply *impossible to reduce* to Chemistry and Physics.

Given the empirical limitation of our scientific knowledge, what light can be shed by Theology? On speaking of Chemistry we postulated the need for an Intelligence that foresaw and ordered the movement and combination of elements in the world. Hence Anaxagoras's *noûs* and Empedocles's *phília* again become necessary principles, and they can both be recovered at the same time, since intelligence, understanding or wisdom are also love in the Trinitarian theology cited above as developed by St. Augustine, who makes them different attributes of the same Creator-God: God Is and is understanding and love. In effect His understanding and love is the wisdom that the Scriptures speak of when they give it the highest praise, saying “Who has measured the waters in the hollow of His hand,/ measured heaven with a span,/ and calculated the dust of the earth in a measure,? Weighed the mountains on scales,/ and the hills on a balance?/ Who has directed the Spirit of the Lord,/ or as His counsellor has taught Him?/ With whom did He take counsel,/ and who instructed Him,/ and taught Him in the path of justice?/ Who taught Him knowledge,/ And showed Him the way of understanding?”<sup>xliii</sup> Providence, intelligence or the wisdom of God thus comes before any work, before all creation. And there is no reason to suppose that this providence has disappeared from the world. On the contrary, we can continue believing as firmly as ever that it continues to act in it.

Evolutionism can be included as part of this concept of the constant action of God in the world when it is understood as the ongoing unfolding of life, as a continuation of creation, particularly when we think of God the Holy Spirit as the “Giver of life”, though we should not separate this divine attribute from that of God the Father as Creator of the world, so that though God inspires the world with life, it is no less true that He creates and sustains space, the atoms and matter: creation in its entirety and life, love and intelligence within it chant together the glory of one God that manifests Himself in manifold ways.

In this sense D. Edwards expresses himself when, through the medieval Persian mystic Rumi, he locates the power of love in each and every one of the dimensions of creation: “Know that it is waves of Love that make the wheel of the heavens turn. Without Love, the world would not be animated. How can an inorganic thing be

transformed into a plant? [...] Every atom is seized by that Perfection and hastens towards it... That haste says implicitly 'Glory be to God!'"<sup>xliv</sup>

For Dante Alighieri as well, Love "which moves the sun and the other stars"<sup>xlv</sup> is a wheel that keeps the whole universe in movement, including the human will. With this verse on the supremacy of Love – which here also represents the Holy Spirit – he ends his work.

## NOTES

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<sup>i</sup> KARL SCHMITZ-MOORMAN (In collaboration with JAMES F. SALMON, SJ), *Theology of Creation in an Evolutionary World*, The Pilgrim Press, Cleveland, OH, 1997, p. 43 (The Universe as Process of Becoming).

<sup>ii</sup> *Ibid.*, p. 48.

<sup>iii</sup> *Ibid.*, p. 123 (God, Creator of the Evolving Universe).

<sup>iv</sup> *Ibid.*, p. 132.

<sup>v</sup> *Ibid.*, pp. 123-124.

<sup>vi</sup> EDWARDS, Dennis, *The God of Evolution. A Trinitarian Theology*, Paulist Press, New York/Mahwah, N.J., 1999, p. 90 (Evolution and the Holy Spirit). The author follows Karl Rahners Theology.

<sup>vii</sup> ARMENDÁRIZ, LUIS MARÍA. *Hombre y mundo a la luz del Creador*, Ediciones Cristiandad, Madrid, 2001, p. 365 (The cosmos as proclamation of God).

<sup>viii</sup> *Ibid.*, pp.155-156 (Traces of the Spirit in creation).

<sup>ix</sup> SAYÉS, JOSÉ ANTONIO. *Teología de la Creación*, Ediciones Palabra, Madrid, 2002, pp. 118-119 (Divine providence).

<sup>x</sup> D. EDWARDS, *Jesus and the Cosmos*, Paulist Press, New York/Mahwah, 1991, pp. 37-38.

<sup>xi</sup> *Cántico espiritual*, (“Spiritual Canticles”) canticles 3, 4 and 5. Italics are mine. See S. JUAN DE LA CRUZ, *Obras completas*, Editorial Monte Carmelo, Burgos, 2000. pp. 694-695.

<sup>xii</sup> *Ibid.*, p. 727.

<sup>xiii</sup> *Ibid.*, p. 728.

<sup>xiv</sup> *Ibid.*, pp. 730.

<sup>xv</sup> *Ibid.*, p. 731. Italics are mine.

<sup>xvi</sup> *Ibid.*

<sup>xvii</sup> *Ibid.*, pp. 732-733.

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<sup>xviii</sup> ORLANDIS DESPUIG S.J., Ramón. «Elementos de la perfección creada» (Elements of Created Perfection), en *Pensamientos y ocurrencias*, Editorial Balmes, Barcelona, 2000, pp. 377-384, p. 377.

<sup>xix</sup> *S.Th.* I, q.45, a.7, in c.

<sup>xx</sup> ST. AUGUSTINE, *De Trinitate*, Books IX, X, XI, *passim*.

<sup>xxi</sup> *Loc. cit.*, p.378. The three most important texts on this teaching are: *S. Th.* I, q.5, a.5; *De Veritate*, q.21, a.6; y *S. Th.* I-II, q.85, a.4, though Fr. Orlandis does not comment on this last text.

<sup>xxii</sup> *S.Th.* I, q.5, a.5.

<sup>xxiii</sup> «Elementos...», *cit.*, p.379

<sup>xxiv</sup> Using mass spectroscopy techniques we can find differences in molecules that are structurally identical: the water on the surface of the ocean contains less deuterium than at the bottom of the sea, the ethylic alcohol obtained in the fermentation of barley contains less carbon 13 than that obtained by fermenting corn, etc.

<sup>xxv</sup> «Elementos...», *cit.*, p.382.

<sup>xxvi</sup> *QQ.DD. De Veritate*, q.21, a.6, in c.

<sup>xxvii</sup> *Confessions*, I, 1,1. I follow the translation by Fr. Ángel Custodio Vega, O.S.A. in the critical edition of the Biblioteca de Autores Cristianos (Madrid, 2002, first edition, tenth printing).

<sup>xxviii</sup> *Confessions* XIII, 9,10.

<sup>xxix</sup> At this point, Fr. Custodio Vega tells us in a note (no.8, p. 603): “It would not be difficult to see here an apology for the law of gravity, though not under that name. Newton would surely have had no objection to putting this sentence at the beginning of his works as a motto that is expressive of his thought.”

<sup>xxx</sup> *The City of God*, XI, 28.

<sup>xxxi</sup> «Escolio general», *Principios matemáticos de Filosofía natural*, Ed.Tecnos, Madrid, 1987, p. 621. The first edition of the *Principia* is from 1687. Newton also affirms here (p. 620) that “it surely follows to speak of God in natural philosophy on the basis of these phenomena”. “*Rationem vero harum Gravitatis proprietatum ex Phaenomenis nondum potui deducere, et hypotheses non fingo*”. “*Et haec de Deo; de quo utique ex Phaenomenis disserere, ad Philosophiam Naturalem pertinet*” (*Philosophia Naturalis Principia Mathematica*, in *Isaac Newton Opera quae extant omnia*, facsimile edition of Samuel

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Horsley, London, 1779-1785, p.173 (by Friedrich Frommann Verlag, Stuttgart-Bad Cannstatt, 1964, vol. 3).

<sup>xxxii</sup> «Letters from Newton to Bentley», en COHEN, I.B. (Ed.), *Isaac Newton's Papers and Letters on Natural Philosophy*, Cambridge University Press, Cambridge, 1958, pp. 298 and 303. These letters were written between January and February of 1693.

<sup>xxxiii</sup> “This most beautiful system of the sun, the planets and the comets, could only proceed from the counsel and dominion of an intelligent and powerful Being” (NEWTON, ISAAC. *Principia...*, cit., General Scholium, p.618). “*Elegantissima haec Solis, Planetarum et Cometarum compages non nisi consilio et dominio Entis intelligentis et potentis oriri potuit*” (Horsley edition, vol.3, p. 171).

<sup>xxxiv</sup> “Does it not follow from phenomena that there is an incorporeal, living, intelligent and omnipresent being that *intimately sees things themselves in infinite space as if it were [tanquam] His sensory, perceiving them fully and understanding them totally for their presence before Him?* NEWTON, ISAAC., *Optics*, question 28 (Ediciones Alfaguara, Madrid, 1977, p. 320). “*Does not appear from phaenomena, that there is a Being incorporeal, living, intelligent, omnipresent, who, in infinite space, as it were in his sensory, sees the things themselves intimately, and thoroughly perceives them, and comprehends them wholly by their immediate presence to himself*” (Horsely edition, vol. 4, p.238). See also the controversy between Leibniz and Clarke.

<sup>xxxv</sup> “Attraction as action at a distance across a vacuum without mediation,” Koyré affirms, “was an absurd notion that no one could believe; in addition, he showed with sufficient clarity that that attraction would have to be carried out by something that is not material, *in other words, by God.*” (KOYRE, ALEXANDER. *Études newtoniennes*, Gallimard, Paris, 1968, Chap. IV, Appendix C, p. 189. Italics are mine.).

<sup>xxxvi</sup> “The newtonian settlement and the origins of atheism”, in RUSSELL, ROBERT J., STOEGER, WILLIAM R., S.J., COYNE, GEORGE V., S.J. (EDS), *Physics, Philosophy and Theology: A Common Quest for Understanding*, Vatican Observatory, Vatican City State, 2000, 2<sup>nd</sup> edition, pp. 81-102, p. 99.

<sup>xxxvii</sup> See this subordination of causes in EDWARDS, Dennis, *Jesus and the Cosmos*, op. cit., p. 35.

<sup>xxxviii</sup> “He gives snow like wool,/ and scatters the hoar-frost like ashes” (Ps 147, 16); “Whatever the Lord pleases he does,/ in heaven and in earth,/ in the seas and in all the deeps./ He causes the vapors to ascend from the ends of the earth,/ Who makes lightings for the rain,/ Who brings forth the wind from His treasuries.” (Ps 135, 6-7).

<sup>xxxix</sup> More than for the relationship between master and servant that Newton refers to in his General Scholium: “since *God* is a relative word that refers to servants” (op. cit., p. 618).



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<sup>xl</sup> EDWARDS, Dennis, *The God of Evolution*, cit., pp. 91-92, 94.

<sup>xli</sup> *Metaphysics* I, 3, 4. Aristotle also cites Hesiod, because he puts Love (*Eros*) immediately after the Earth (*Gea*) and the Heavens (*Uranus*) as first principles of the World.

<sup>xlii</sup> *Timaeus* 30 a 1-2.

<sup>xliii</sup> Is 40,12-14. See also Pr. 8, 22-31.

<sup>xliv</sup> EDWARDS, DENNIS, *The God of Evolution*, cit, p. 91.

<sup>xlv</sup> «*l'amor che move il sole e l'altre stelle*». *Divina Comedia*, Paradise XXXIII, v.145.