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## ***Dialogue between Specialities, an Historical Approach***

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Modernity is commonly considered as a new world where a new philosophy emerged as a triumph of reason above superstition, and where a new science made technological progress in front of misery.

Nevertheless, specialization of knowledge damaged communication between peoples. Of course, a single individual is not able to know every detail of every speciality. But the issue is deeper. For instance, why every educated people would not be able to understand basic principles of operation of a mobile phone, an everyday life instrument? Why science is so often considered like black magic by non scientists?

### **1. Antiquity and Middle Ages – Comparison with modern science**

Science and Philosophy are commonly considered today as two separated worlds. This was not the case in Antiquity and Middle-Ages, when philosophy was considered as the universal science. Science was as scientific as today – including for instance experimental basis and application of mathematics – but a same man was able to be at the top of three or four of the following domains: theology, philosophy, physics, biology, mathematics and high tech innovation, in order to improve material conditions of life on this planet. Diversity was compatible with unity.

#### **Some ancient and medieval innovations**

We just said science was as scientific as today – including experimental basis and application of mathematics.

For instance, in the Antiquity, the Roman balance applied a simple and accurate mathematical equation; and this balance was useful for business and very popular. Archimedes was able to design parabolic mirrors, applying the equation of reflection angles of light, and equations of conic curves. We could remember also the Pythagorean theorem, the mathematical knowledge of music, astronomy, etc.

Middle Ages industry invented for instance forging hammers driven by a camshaft, to reduce human painful efforts and improve blast furnaces efficiency. Compasses were used for navigation in the 13<sup>th</sup> century, and mechanical clocks appeared in the 14<sup>th</sup> century on Paris churches. Glasses for myopia correction appeared in Italy in 1280's.

As a conclusion, as said by a French historian: "Our science, modern and contemporary, is older than previously thought: we need change of scale, and consider almost three thousand years where we considered three centuries. <sup>1</sup>"

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<sup>1</sup> Michel SERRES, *La naissance de la physique dans le texte de Lucrèce*, Editions de Minuit, Paris, 1977, 4<sup>ème</sup> page de couverture.

## Nature as a cause

### Nature

All of these innovations were based on contemplation of nature, summarised in a single Greek word: *Physics*. Things have a "principle of being and acting," and this is their nature. For example:

- When you drop a stone, it falls down.
- When you drop a piece of wood inside water, it goes up to the surface of water.
- The fire burns. A tree grows.
- An animal breathes, walks. A man thinks, speaks, smiles.

### Change

"Nothing is lost, nothing is created, everything changes." So:

- something is kept, conserved in any change, subject of change,
- "trans-formation" is passing from one form to another form.

Thus, "everything happens naturally from the subject and the form. <sup>2</sup>"

### Appearances and substance

Furthermore, things are manifested to us by their appearances: colour, contour, hardness, temperature, etc.

These properties are nothing by themselves but manifestations of the presence, of the existence of a thing, which exists by itself. It may be a house, a car, etc.

Appearances are arrangements, modalities of the substance. Appearances may change while substance is conserved. For instance, a house is white, but it may be painted again in yellow.

### Four causes

"We do not consider we know things before we understand the why of each of them. <sup>3</sup>"

First, "cause is said from the reality which is inherent in a thing that is done. This way, the bronze of the statue, the silver of the cup, is called **material cause**. <sup>4</sup>"

"In another way, the form and style, the essential formula is called **form**. <sup>5</sup>" For a statue of marble, its shape is such as the represented person, who serves as a model for the artist.

The form, the **formal cause** is the principle of organization of matter, the internal structure that makes the thing is.

**Efficient cause** is called "the first principle from which occurs the change. <sup>6</sup>"

To make a statue, a block of marble and a model are not enough for a statue to arise spontaneously.

It should also be a sculptor, who should be equipped with a chisel and a hammer. The efficient cause exists necessarily before the effect.

The efficient cause is also called the engine, the mover, cause of the movement, while the amended thing, which suffers the action of the engine, is called the driven.

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<sup>2</sup> ARISTOTLE, *Physics*, Book I, chap. 7, 190 b 20.

<sup>3</sup> ARISTOTLE, *Physics*, Book II, chap. 3, 194 b 19.

<sup>4</sup> ARISTOTLE, *Physics*, Book II, chap. 3, 194 b 24-25.

<sup>5</sup> ARISTOTLE, *Physics*, Book II, chap. 3, 194 b 26.

<sup>6</sup> ARISTOTLE, *Physics*, Book II, chap. 3, 194 b 29-31.

The **final cause** is the purpose of the thing, and therefore its reason for being. This cause is first as an intention, as a goal of the agent, and last in its execution. The organs of a living perform a function that is clearly their goal: lungs serve for breathing, the heart is there in order to make circulation of blood, and blood brings food to the cells.

### Search for causes by Pierre-Gilles de Gennes

All we just said was understood four centuries before Christ, and this is completely coherent with very modern scientific method, of the 21<sup>st</sup> century. Here is how used to work Pierre-Gilles de Gennes, a French Nobel Prize in Physics. He explains how he did scientific research:

"I try first to feel the phenomenon, to detect the mechanisms that control it, which important parameters are involved. In research, you are often stopped at this level.

Either you have a lot of experimental information and you do not know what they mean; then you try various methods to move forward but without understanding what you are doing.

Either you have a digital mastering of the problem: you rebuild the phenomenon in question by computing but including so many factors, possible causes, that you find again the phenomenon but without having acquired a fact of culture. You make it again, but, basically, **you do not know how it works...**

I always try to find a kind of simple schematic, which includes the main facts, but nothing else, which is understandable in a few lines or few pages, far from the heavy system of equations that one teaches to our kids from bachelor level.

They give the impression that everything is solved from equations. Of course, these equations are requested, but they are only instruments used with others to advance the subject. They are not the source of knowledge. <sup>7</sup>"

**Science, physics, can not be reduced to equations. They include an understanding of causes.**

## Physics and Mathematics

Let us move back to Aristotle: "Natural bodies [i.e. physical] have surfaces and volumes as well as lengths and points, objects the mathematician considers. <sup>8</sup>"

**Mathematic** study the quantity, the numbers contained in material things, while **Physics** study matter and form, causes and types of causes.

Physics is not reduced to mathematics: many and essential scientific claims are clearly qualities, irreplaceable ... such as:

- The sky is blue.                      The device works.
- It smells bad.                         The train is guided by the rails.

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<sup>7</sup> Pierre-Gilles de GENNES, "*Nous ne sommes pas des oracles*", in « Sciences et Avenir », Paris, décembre 1991, p. 22.

<sup>8</sup> ARISTOTLE, *Physics*, Book II, chap. 2, 193 b 24-25.

- The moon revolves around the earth.
- The moon revolves around the Earth because of Earth's gravity field.
- The cat is dead. Man is a rational animal. Etc.

Return now to the 21<sup>st</sup> century. Invention patents include very few equations, sometimes no one, but a lot of figures and text. What is required to make a valid patent is an innovative idea (how it works, efficient cause) and a usefulness for an application (final cause).

Nowadays, two university professors of quantum physics explain how they give to their students "a systematic and early introduction of qualitative and heuristics methods of physics, as they are used daily in the laboratory, but often not disclosed in classrooms. <sup>9</sup>" This shows a serious lag between on one hand the real scientific research, and on the other hand the taboos, the "politically correct".

According to our two professors:

"Physics is to be tough in the very terms used by its practitioners.

Research work in quantum physics is never limited to (and often does not include) solving a Schrödinger equation.

Rather than to do calculations, the researcher must think *quantum*. <sup>10</sup>"

As a conclusion, please do not reduce the doctor, the engineer ... to a mathematician. In his job, as a professional, he looks for causes and has a wisdom.

## Continuity and ultimate cause

So now, how things work?

The **place** where a thing is may be known by answering the question: "Where is it?" The place is something distinct from the localized thing, and it contains it: "The place is the surface of the body containing, immediately contiguous to the body located. <sup>11</sup>"

"When we perceive the anterior and posterior, then we say there is **time**.

Because time is the number of movements along anterior and posterior. <sup>12</sup>"

For example:

- the number of trips of the pendulum of a clock,
- the number of alternations of light and night (days)
- the number of renewals of the cycle of seasons (years), etc..

Two things are adjacent if they touch together, if their places are touching.

"The **continuous** lies between things from which something unique is produced by the contact...

for example by a bolt, by glue, by contact, by a push..." <sup>13</sup>

Thomas Aquinas says:

"Any moved thing is moved by another one...

Now, if the thing which is the mover is moved itself

it must also be driven by another, and this one by another.

But we can not continue ad infinitum...

So it is necessary to reach a first mover which itself is not driven by any other, and such a being is called God. <sup>14</sup>"

Thus, God is considered as the **first mover** of all other natures.

<sup>9</sup> Jean-Marc LÉVY-LEBLOND, Françoise BALIBAR, *Quantique*, Interéditions, Paris, 1984, p. XIV.

<sup>10</sup> J.M. LÉVY-LEBLOND, F. BALIBAR, *Quantique*, cit., p. XV.

<sup>11</sup> THOMAE AQUINATIS, *In IV Phys.* 1.6.

<sup>12</sup> ARISTOTLE, *Physics*, Book IV, chap. 11, 219 b 1.

<sup>13</sup> ARISTOTLE, *Physics*, Book V, chap. 3, 227 a 14-17.

<sup>14</sup> THOMAS AQUINAS, *Theological Somme*, 1<sup>st</sup> P., Q. 2, a. 3.

Cf. *In VIII Phys.*, Lectio 9. Cf. ARISTOTLE, *Physics*, Book VIII, chap. 5.

## Human knowledge

Previous step was to know how things work.  
Next step is to know how us, men, know how things work.

This begins by observation through our five **senses**:  
touch, view, audition, olfaction, taste.

Then occurs **imagination**, that is to say making an image in our brain.  
The image is the re-presentation of an external thing.

Then occurs **abstraction** of one aspect or another one from the thing known.  
For example, the height of the tree, its mass, its colour,  
its round or sharp form according to its species: an oak is round, a poplar is sharp.

From this a **concept** is formed in our intelligence: length, sharp or round...  
The concept in human intelligence arises from the understanding of a nature,  
a principle of being and acting of the thing known.  
For instance, a poplar is sharp, an oak is round.

This way, the known thing is outside from man's intelligence;  
and the knowledge of the thing is inside man's intelligence.

Now, the concept is generally **universal**:  
a same nature is shared by several individuals,  
for instance by several poplars on the roadside

Then, and only now, we are able to make **deductions**, syllogisms.  
For instance: If  $(A \Rightarrow B \text{ and } B \Rightarrow C)$  then  $(A \Rightarrow C)$ . This is "formal logic".

From the abstract concept,  
such operations in the human soul  
are no longer physical but spiritual acts  
of an intelligence that exceeds the animal.  
This is a life of a spirit, the **spiritual soul**.

This leads directly to the **fifth way**  
for the knowledge of existence of God:  
"We see that things deprived of knowledge,  
as natural bodies act for a purpose;  
this is shown by the fact that always or most often,  
they act in a same way, to achieve the best.

Hence it is clear that it is not by chance,  
but under a specific trend  
they reach their goal.

But what is deprived from knowledge  
may not tend towards a goal  
if not led by a knowledgeable and intelligent being,  
by which all natural things are directed towards a final end.  
And this being, we call him God. <sup>15</sup>"

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<sup>15</sup> THOMAS AQUINAS, *Theological Somme*, 1<sup>st</sup> P., Q. 2, a. 3.

## 2. Crisis of Immanentisme

As a matter of fact, a philosophical crisis occurred before the end of Middle Ages, during the fourteenth century, and ideologies emerged, building walls between science and literature, reason and belief, rationalism and empirical knowledge, and nowadays for example between mathematicians and physicists, or technical engineers and business managers, etc.

What was the beginning of the problem? What was its cause? Where does it come from?

### 14<sup>th</sup> century: the refusal by Ockham

Causes of this problem seem to derive from the will of some philosophers and theologians to forbid physics to be a way for a knowledge of the existence of God.

They considered this was not compatible with God's transcendence above men. According to them, *only* Christian revelation would be able to meet such a challenge.

Now, understanding nature leads to an ultimate cause, a first mover, who is God. Thus, these thinkers refused to consider nature as a principle of being and operation of things.

Now, normally, a concept, a word, represents a nature. Then, they pretended it is only a "mental habit", a "subjective intention of the soul".

On one hand, they considered God as unintelligible, capricious. On the other hand, they considered man as the source of the intelligibility of things:

- they refused the discovery of nature from senses, imagination, abstraction,
- they pretended to reduce physics to mathematics, quantities, equations.

This was a great disaster for physics - still nowadays, for philosophy - still nowadays, for theology - still nowadays, and built walls between these domains.

### Human knowledge

According to Aristotle or Thomas Aquinas, definition of a new human concept is understood as the result of a discovery: the discovery of the principle of being and operation of the thing defined.

Now, according to this new way of thinking, definition of a new concept is understood as a more or less pure will of one human mind, depending only on himself, and thus isolating him from others, who made a different choice.

This was called "immanentisme" from the Latin "in manere", be with oneself.

This seems to me as the highest problem against dialogue.

### View on God

Ockham says that God is all powerful. And thus he might want evil. God could order to man to do evil. He could also send the right man to hell and reward the guilty man for his crime.

There is a Muslim source to the idea of any arbitrary power of God: As said by Benedict XVI in his Regensburg address: "For the Muslim doctrine ... God is absolutely transcendent. His will is not linked to any of our categories,

even that, which is to be reasonable...  
God is not bound even by his own word,  
and nothing obliges him to reveal the truth to us.  
If that was his wish, the man should be idolatrous." <sup>16</sup>

Ockham was brought before the papal court in Avignon for judgement on his ideas. Once a sentence was pronounced against them, he fled from Avignon and spent the rest of his life slandering Popes. This way, he stopped any dialogue with the authority of the Church about his own philosophical ideas.

### View on sciences

Ancients already understood each thing has its own place, and its own time. Then after, and only after:

- Euclid formulates his fifth proposition: when we measure the angles of a triangle, we see the sum of the angles is one hundred eighty degrees.
- We observe also constant relationship between different movements. For instance, a year includes about three hundred sixty five days.

This results from observation, with a limited precision and a limited scope, resulting from the limited accuracy and scope of observations this comes from. This includes no dogmatic claim.

But now, Ockham dogmatizes all of this, as coming from man's intelligence. He develops this in his own comments on Aristotle's Physics Books, and claims to be an Aristotelian. Unfortunately, his dogmatization will be later considered as coming from Aristotle, for instance by Galileo.

### Ockham's heir

During history, many ideologues have founded an ideology that has persisted through centuries. The particular strength of Ockham may lie in some originality: he founded not one but two ideologies, non compatible with each other.

These **two ideologies** began to battle each other from the very first successors of Ockham. Each one justifies to be aggressive, not opened mind, rejecting dialogue with the other one, by the danger in front of the aggressive attitude, not opened mind, rejecting dialogue... from the other one.

On the **religious side**, theologians like Martin Luther reduced Christian Revelation to the *Sola Scriptura*, to be interpreted by each subjective mind, rejecting the Magisterial of the Church. He were terrorised in front a supposed arbitrariness of divine judgment, considering virtues as no uses, and concluding: "Pecca fortiter and ama fortius".

On the **scientific side**, dogmatization of scientific ideas led to consider them as intrinsic "evidences" of the human spirit:

- only one absolute time:  
the one of the revolution of the sphere of stars around the earth within one day,
- only one absolute space, that of Euclid.  
This view was closed to the progress of science.

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<sup>16</sup> BENOIT XVI, *Foi, raison et université*, Le discours de Ratisbonne, 12 septembre 2006.

## Hegel

As a consequence some centuries later, and according to Hegel, knowledge is ultimately reduced to the knowledge of the operations of intelligence: "For Hegel, **self - knowledge** is not a starting point, but the outcome of this process, which includes all reality. This is a result which, however, is not separable from the process, but that is the process itself, and all reality - Nature and Spirit - are the essential moments of this process. <sup>17</sup>" The process of acquiring knowledge is identified with the thing known.

Hegel looked for a so-called "objectivity" in the process of dialectical contradiction between the various "subjectivities" of talking peoples. He intends to call "truth" that "**intersubjectivity**", state of the fight between men at a given moment. What a poor view on dialogue...

As a matter of fact, confrontation of ideas between men all disconnected from reality does not give any more truth than individual ideologies they come from...

Moreover, "... if this philosophy establishes a principle which embodies this subjectivity and converts it into supreme canon of certainty, **the notion of dialogue itself losses any meaning.** The impossibility to communicate is the most visible consequence of the culture established on the principle of immanence. Once lost the function of real things, each mind becomes a closed world on himself, in the full independence of the formal consistency of its reasoning. <sup>18</sup>"

Thus, immanentisme corrupts the meaning of words, because a word no longer refers to a same external object that everyone is talking about, but refers to different concepts that different people have developed, **isolated from things and thus isolated from other peoples.**

Already in the Bible, the story of the **Babel Tower** is the story of men who all spoke a same language and understood each others. But one day they decided to build a tower high enough to climb to heaven and attain an absolute knowledge, a divine knowledge. God, observing their company decided to confuse their language so that they can not understand each others, and they were forced to abandon their business and separate from each others. This story teaches so graphically that claim of humans to raise an absolute knowledge by their own forces has resulted in misunderstanding between them.

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<sup>17</sup> Alfredo CRUZ PRADOS, *Historia de la filosofía contemporanea*, EUNSA, Pamplona, 1987, p. 36.

<sup>18</sup> Carlos CARDONA, *Metafísica de la opción intelectual*, RIALP, Madrid, 1973, pp. 98-99.

### 3. Modern Culture

#### Scientific modern discoverers

##### Mechanics and Astronomy

Despite these ideologies, science continued to progress: modern culture faces these issues.

For instance, **Domingo de Soto**, a Theologian of the Council of Trent, explained the movement of a heavy falling body is uniformly accelerated according to the equation:  $x = \frac{1}{2} \cdot g \cdot t^2$ , where  $x$  the vertical distance recovered by the body,  $g$  its acceleration and  $t$  the time. This formula was later copied by Galileo.

Then, **Nicolas Copernicus**, a priest from Cracovia, made an analysis of trajectories of planets, roughly circular around the sun. His analysis was entirely based on Ancient Ptolemy observations, thus entirely compatible with Ptolemy description.

Later, **Galileo Galilei** claimed to be a Copernican. But he claimed also a contradiction between Ptolemy and Copernicus, saying:

- according to Ptolemy: sun turns around earth,
- according to Copernicus: earth turns around sun.

As a matter of fact, there is no contradiction between these two affirmations, as soon as they apply to two different movements:

- the first one within one day,
- the second one within one year.

Thus, it is right to say that sun turns around earth. Saying it is false is a severe **slander** against all Antiquity and Middle Ages science.

According to Galileo, God placed knowledge within two books:

- the book of mathematics on the one hand,
- the Book of Scripture on the other hand.

This does not include any book of nature... Thus, what are our five senses for? And which relationship could it be between the two Galileo books? None. As a matter of fact, Galileo was a mathematician and a theologian, but a poor physicist.

Later, **Robert Hooke** understood that both falling bodies on the earth, and celestial bodies movements, are governed, are *caused* by a same kind of "gravitational field", which exists, continuously extended around stars or planets. This gravitational field is noted  $g$ , and equals:  $g = \text{Constant} \cdot M / d^2$  where  $M$  is the mass of the star or planet, and  $d$  the distance from the centre of the star or planet. This is "universal gravitation".

Then came **Isaac Newton** who copied and trafficked Hooke's mathematical formula, but did not understand what physically happens. Newton denied the existence of gravitational field, and affirmed an action at a distance, without any intermediary. This was an Ockhamist interpretation, which pretends to reduce a physical issue to a mathematical equation.

Newton claims :

- an "absolute space, without relation to external things, which remains always similar and immovable <sup>19</sup>",
- and a "true and mathematical time, with nothing outside flowing uniformly."<sup>20</sup>

This was later taken up by **Immanuel Kant**.

<sup>19</sup> Isaac NEWTON, *Les principes mathématiques de la philosophie naturelle*, Blanchard, Paris, 1966.

<sup>20</sup> Isaac NEWTON, *Les principes mathématiques de la philosophie naturelle*, cit.

Newton appears in biographies as an aggressive polemicist, enemy of all scientists of his time. With a genius like Robert Hooke, who offered him several times by letters to establish a dialogue, he always replied by the negative. For against, he took advantage of what Hooke had revealed to him - about universal gravitation - to publish it under his own name! There ensued an Homeric controversy - because of this robbery - but also because Newton had totally perverted Hooke's discovery by reducing it to current ideologies. Nowadays science, and especially education, is still suffering from this perversion.

### Light, Electromagnetism, Chemistry

In another area, **Willebrod Snell** wrote the law of refraction of light when it passes for instance from air to water (or glass) according to:

$A \cdot \sin(a) = B \cdot \sin(b)$  where:

- A and B are constants, characteristics respectively of air and water (or glass),
- a and b are angles of light direction respectively in air and in water (or glass).

This was later copied by Descartes.

Then **Faraday** and **Maxwell** discovered electromagnetism as a strong synthesis between electricity, radio waves, light, nowadays applied in electric machines, radars, microwaves ovens, mobile phones, computers, X-rays, gamma rays, etc. All this synthesis applies Aristotelian physical continuity, against Newton ideologies.

In the area of chemistry, **Lavoisier** and **Dalton** distinguished better chemical elements, made of corpuscles.

### Relativity and Quantum Physics

In 1905, **Albert Einstein** formulated Special Relativity, explaining electromagnetism against Newton. The same year, he founded Quantum Physics. In 1916, he formulated General Relativity, explaining Hooke's gravitational field as something which exists, against Newton.

This way, Einstein restored dialogue between different sciences. What was the direct consequence? This was said by John-Paul II himself: "I participated in numerous meetings with scientists, mostly physicists, who, after Einstein, have opened up their mind dramatically to the theistic interpretation of the world. <sup>21</sup>"

Then **Niels Bohr** rejected dialogue by imposing an ideology, called "Copenhagen School interpretation", which "excommunicated" all those who refused it, including Einstein himself. Thus Einstein end his life isolated in Princeton, despite he was the greatest physicist of his century.

Nevertheless, continuity between corpuscles was later shown a new time by **Louis de Broglie** and **Erwin Schrödinger**, explaining chemistry against Newton and Bohr.

### Conclusion

Every speciality is a human community where men try to develop a common language for their speciality. Nevertheless, due to ideological reactions, this language remains very often non compatible with languages from other specialities.

Modern history shows how great scientists faced ideologies and made great discoveries, leading to improved relationships between mechanics, astronomy, electricity, chemistry, quantum physics, etc.

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<sup>21</sup> JEAN-PAUL II, *Entrez dans l'Espérance*, PLON MAME, Paris, 1994, p. 289.

## The Church: knowledge of God from nature

In the mean time, great philosophers and theologians, especially popes, explained again how God may be known from nature.

Pope **Benedict XVI** said:

"The faith of the Church has always held that between God and us, between his creative spirit and our created reason there exists a real analogy... God does not become more divine when we push him away from us... the truly divine God is the God who has revealed himself as logos and, as logos, acted for us with love. <sup>22</sup>"  
And thus, we have the possibility of a dialogue with him, while he is the LOGOS.

The **first Council of Vatican** said:

"The Church holds and teaches that God, beginning and end of all things, can be known with certainty by the light of human reason from created things: "Since the creation of the world, his invisible perfections are revealed to the intelligence, by his works <sup>23</sup>" <sup>24</sup>".  
"If someone says that the unique and true God, our Creator and Lord, can not be known with certainty through his works by the natural light of human reason, he is anathema. <sup>25</sup>"

Pope **saint Pius X** said:

"I profess that God, the beginning and end of all things, can certainly be known, and thus demonstrated by natural light of reason "by what has been done <sup>26</sup>"  
by the visible works of creation, **as a cause by his effects.** <sup>27</sup>"

Pope **Benedict XVI** said:

"A purely positivistic culture, who would reject as non scientific, but subjective, the question concerning God, would be the capitulation of reason, renunciation of its highest possibilities and thus a failure of humanism, whose consequences would be very serious. <sup>28</sup>"

We may conclude with **Carlos Cardona**:

"If he (the immanentist man) denies the reality (even if only "for me") from anything that is not my thought, I am trying to convert my thought into an absolute ("I") and this is contrary, not only separated, from the faith: I made me a god (for me).  
How can I tolerate after a God (known) that is not myself?  
Put in this form, the cogito [of Descartes] is a deification of the individual mind. <sup>29</sup>"

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<sup>22</sup> BENOIT XVI, *Foi, raison et université*, Le discours de Ratisbonne, 12 septembre 2006.

<sup>23</sup> LA BIBLE, *Épître de saint Paul aux Romains*, chapitre 1, verset 20.

<sup>24</sup> PREMIER CONCILE DU VATICAN, Constitution dogmatique *Dei Filius* du 24 avril 1870, chap. 2, in Heinrich DENZINGER, *Symboles et définitions de la foi catholique*, Cerf, Paris, 1996, n. 3004.

<sup>25</sup> PREMIER CONCILE DU VATICAN, Constitution dogmatique *Dei Filius* du 24 avril 1870, canons, in Heinrich DENZINGER, *Symboles et définitions de la foi catholique*, Cerf, Paris, 1996, n. 3026.

<sup>26</sup> LA BIBLE, *Épître de saint Paul aux Romains*, chapitre 1, verset 20.

<sup>27</sup> Saint PIE X, *Motu proprio Sacrorum antistitum* du 1<sup>er</sup> septembre 1910, Serment antimoderniste, in Heinrich DENZINGER, *Symboles et définitions de la foi catholique*, Cerf, Paris, 1996, n. 3538.

<sup>28</sup> BENOÎT XVI, *Discours au Collège des Bernardins* du 12 septembre 2008.

<sup>29</sup> Carlos CARDONA, *Metafísica de la opción intelectual*, RIALP, Madrid, 1973, p. 98.

## 4. Returns to Ockham in the twentieth century

### Facing scientism

The so-called modern "scientist" mentality considered that science had fortunately replaced Ancient philosophies and religions. The result was a severe damage for Christianity. Scientism claims mathematics are sufficient to explain the world, and therefore there is "no need for God."

During the twentieth century, in this context, a movement sought to make a place for Christian religion, seeking to create for it a space of freedom far from "science", trying to separate:

- on one hand a "science of nature",
- and on the other hand a "philosophy of nature".

Accepting as true the "mathematical - materialistic scientist" view, some thinkers tried to formulate a "philosophical – spiritualist" view apart from the former.

They tried to formulate "something else", which could be more or less defined as including:

- what does not fall within the "mathematical - materialistic" view,
- what is essential to support Christian faith, i.e. the philosophy of Thomas Aquinas, but without its physical base, considered as non correct due to a supposed "modern science contradiction".

### Trying to discover again Middle Ages

The romantic 19<sup>th</sup> century rediscovered Middle Ages, and Henri Bergson revolted against dominant ideologies, thereby opening the door to the study of Middle Ages thought, so decried in earlier times.

This way, Pierre Duhem discovered the scientific richness of Middle Ages and wrote about it a real encyclopaedia. All the joy of his discovery, he also recognized quite rightly, beginning during the 14<sup>th</sup> century, many philosophical ideas still conveyed by modern culture, and which were not present in previous centuries.

Thinking probably do something apologetic for Middle Ages and for Christianity, he believed that these new philosophical ideas of the 14<sup>th</sup> century were the source of the scientific development of later Middle Ages and modern times, and, this way, Middle Ages had made something essentially new for science. This idea was taken up among others by Stanley Jaki or Mariano Artigas. For instance, "for him [Duhem] physics and in general the science of phenomena must use purely mathematical legality of phenomena, without any research of causality."

Indeed, reduction of physics to mathematics is intolerable for physicists.

In view of Duhem, Etienne Gilson spoke about the 14<sup>th</sup> century in these terms: "A central fact whose importance should not escape to the historian of philosophy occurred at the same time: the first discoveries of modern science were done in the same environment where dissociation between reason and faith occurred. "

As a matter of fact, the first Ockhamist ideologies were immediately applied to sciences, which were this way perverted, as philosophy and theology. What is new is not science but perversion of science.

## Jacques Maritain

Following Galileo and many others, Jacques Maritain was convinced of the falsity of the Aristotelian science, and that when a "modern scientific revolution" occurred, "a new discipline, of inexhaustible fertility has made known its rights. <sup>30</sup>"

According to Aristotle and saint Thomas, physics are in harmony with mathematics, each one at its own place. Then, Ockham pretended to reduce physics to mathematics. Like many others, Maritain thought that physicists would not have used mathematics earlier to the end of Middle Ages: "It was a new epistemological species... One may say that this science which has known a so great success during the past three centuries is a progressive making mathematical of sensitive things. <sup>31</sup>" Maritain is engaged in Ockham's reductionism: "The aim of science is the mathematical interpretation of the sensitive nature. <sup>32</sup>" As a matter of fact, we already shown how wrong it is.

This error makes a tremendous problem for Christianity. Indeed, triumphant scientism said that science had replaced religion. How could we save religion? How to find an space of intellectual freedom to face materialistic roller? Christians know that without a philosophical basis there is no place for theology. There is no opening to transcendence without a philosophy of nature. Then, how to rebuild a philosophy of nature apart from this alleged "science" that is not called into question?

Maritain wondered: "Is the destruction of Aristotelian explanations of natural phenomena also the destruction of Aristotelian physics as a whole - so the philosophy of nature? And so, should we take us, modern men, instead of the physical understanding of Aristotle... what the modern world called Science? <sup>33</sup>"

As a matter of fact, the Aristotelian explanation of the phenomena of nature are not ruined at all, and here lies the solution. But, because he ignores that, Maritain will look elsewhere for a solution.

In this perspective. Maritain separates:

- on one hand an " empiriologic science"
- on the other hand a "philosophy of nature"

In his opinion: "Empiriologic analysis resolves the known object in observable or measurable elements. It goes from observable to observable, remaining constantly at the level of operation of sense, of possible observations and measurements. <sup>34</sup>"

As a matter of fact, any process of human knowledge leads to intentional possession of the expressed form, understanding the nature, the principle of being and acting of the thing known, the definition of the concept, the reasoning, all of this before returning to observation. These operations are spiritual, not material. For instance, as engineers, my colleagues and I do this everyday. The description of Maritain would rather apply to the knowledge of non-human animals.

Also in his opinion, Maritain says: "The philosophy of nature... is the first wisdom offered to us in the progressive upward movement of our reason. <sup>35</sup>"

Yes, indeed, but it is offered to us first because it is experimental, because it is physics.

To develop his separatist view, Maritain speaks of a "failure of the scientific experimental tools to move to metaphysics or more generally to the ontological level. <sup>36</sup>"

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<sup>30</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 34.

<sup>31</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, pp. 34-35.

<sup>32</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 40.

<sup>33</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 2.

<sup>34</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 73.

<sup>35</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 3.

As a matter of fact, this is view of Ockham. It is absurd to confuse mathematics, which indeed is not able to give us access to the knowledge of God, with the physical experience, which opens minds to causes - and not just to quantities. From this experience is developed philosophy.

Here is specifically what is the attempted separation by Maritain. For clarity, in the following:

- I underlined what Maritain considers as relevant from empiriologic science, or empiriologic analysis,
- and wrote with **bold italics** what Maritain considers as relevant from the **philosophy of nature** or **ontological analysis**.

"Think on the first hand to the definition of a geosynclines in geology, of word blindness in psychology, to the definition of a chemical species, or, in physics, to the definition of mass or energy,

and think on the other hand to the philosophical definitions of the **four causes**, of **transitive action** and **immanent action**, of the **bodily substance** and **operational powers**.

If you compare these two groups of definitions, you will find that they respond to completely different intellectual orientations:

- in the first case, seeking to identify through opportunities for observation and measurement, through physical operations to be performed,
- in the other case we try to define **ontological characters**, by **constitutive elements of nature**, or by an **intelligible essence**.

We are therefore entitled to distinguish between two types of conceptual analysis, and to say that in one case there was an **ontological analysis**, oriented to the intelligible being, and in the other case, an empiriologic or spatial-temporal analysis, oriented to observable and measurable as such. <sup>37</sup>"

As a matter of fact, I would like to answer that:

- A geosynclines is defined by its **cause**, which is folding.
- Word blindness is defined as the impairment of an **operational power**.
- Chemical species is defined as a **constituent element of a nature**, an **essence**.
- Mass is a principle of conservation in chemical transformations, so a material **causality**.
- Observation focuses on accidents of **bodily substance**.
- Measurement is observation of the quantity accident of the **substance**.
- Physical operations to be performed are made according to the **operative powers** of the man who observes.

This clearly shows us that this attempted distinction is entirely artificial.

Maritain accuses the Ancients and Medieval men not to have made this distinction: What "Aristotle called *Physicae*, and saint Thomas *Philosophia naturalis* embraces in its extension both experimental sciences of nature and the philosophy of nature. <sup>38</sup>" Maritain believes this was "from Aristotle himself and also from Ancient scholastics... a severe lack of intellectual haste. <sup>39</sup>" He adds: "They were dealing with only one specific science of

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<sup>36</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 42.

<sup>37</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 71.

<sup>38</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 30.

<sup>39</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 31.

nature... We can say that the Ancients lacked of a tool ... of an appropriate conceptual technique. <sup>40</sup>"

Then Maritain tries to explain why previous centuries would have been so simply: "The issues called today science were not, for scholastic philosophers, a specifically distinct discipline: it was a chapter of philosophy... Absorb all sciences of nature in the philosophy of nature, this was a fault in the area of speculation, and modern centuries made on this point an historic achievement. <sup>41</sup>"

As a matter of fact, Thomas Aquinas considered Aristotle *Physics* as the book of *generalities* about nature, of what is *common* between different natures, and only that. This way he concludes his commentary on Aristotle with the words: "Thus ended the Philosopher *common* considerations on natural things... <sup>42</sup>" Now, Ancients and Medieval men distinguished very well physics (or philosophy of nature) from various particular natural sciences such as psychology, medicine, astronomy, nutrition, music, mechanics, etc. as shown by the specific books they wrote on each of these subjects.

## 5. Dialogue

The *Physics* of Aristotle, understood by the medieval classics, is a coherent synthesis:

- on one hand with the great discoveries of physics, ancient, medieval and modern,
- on the other hand with natural theology and with Christian faith.

As against, the decadent scholasticism of late Middle Ages isolated one from the other two ideologies:

- a reduction of physics to mathematics, which led the great controversies of modern science,
- a reduction of Christian faith to an "inner feeling" which led religion wars, agnosticism and atheism.

If we understand the sources of the problem, we can address it.

### How to restore dialogue?

Restore dialogue requires - from all sides - to recognize their own faults, without claiming to defend superior interests of his own side.

For instance, we may remember John Paul II success, about ecumenism, through his courageous repentance for the evils done during history by Catholic peoples.

It is not easy for the "scientist side", supposedly scientific, to recognize that the source of his problems lies in the credulity of lay people who believed rationalist ideologies issued by clerics of the decadent scholastics. It is easier to attribute to Galileo, Descartes and Newton - lay peoples - the paternity of the scientist spirit.

It is not easy for the "spiritualist side", supposedly Christian, to recognize that the source of modern agnosticism is heresy spread by rationalist ideologies

<sup>40</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 32.

<sup>41</sup> Jacques MARITAIN, *La philosophie de la nature*, Téqui, Paris, 1996, p. 33.

<sup>42</sup> THOMAE AQUINATIS, *In Phys. Liber VIII, lectio 23, n°9* : « Et sic terminat philosophus considerationem communem de rebus naturalibus, in primo principio totius naturae, qui est super omnia Deus benedictus in saecula. Amen. »

issued from clerks of the decadent scholastics.

It is easier to attribute to lay peoples the paternity of modern agnosticism.

The result was a conspiracy of silence. with a false paternity attribution of origins, one side considering with was for the best, the other side considering with was for the worst.

But this is an easy lie, a refusal to seek together for real causes of the problem.

There must be dialogue, and this is not matter of demagoguery.

- It is not enough from a "scientist side" to recognize - from a so-called "religion" - a social role of more or less sentimental human solidarity.
- It is not enough from a "spiritualist side" to recognize - from a so-called "science" - a more or less social but only materialistic progress.

A genuine dialogue requires the truth, whatever it may cost.

This was the purpose of this historical approach.

## Three dialogues

### Unity inside each human person

More profoundly, the break made by Ockham's schizophrenic approach "is passing through the heart of every man", as highlighted in Alexander Solzhenitsyn's Gulag Archipelago.

Inside each of us are present these sentimentalism and materialism, which do not want to initiate a dialogue.

Only through a true philosophy of nature, we can have a dialogue with nature, and regain that unity of ourselves.

### Dialogue with others

According to Aquinas, "Philosophy goal is not to know what men think, but what things are. <sup>43</sup>"

If words from men will no more simply refer to their own inner mind, but to same external things, which are in front of everybody, then will occur a new communion in the contemplation of same natures.

A genuine dialogue will be restored between men, which will transcend everybody, but where everybody will find himself again.

### Dialogue with God

Many learned from parents and teachers, since childhood, to converse with God.

Many have lost faith, for lack of rational roots.

Many never had access to Christian faith, not because they would not have heard about Jesus Christ, but simply because they do not know what could mean "Jesus Christ is God", because they do not understand *what is* God.

A genuine philosophy of nature, truly based on sciences, will give them a true sense of divine transcendence, tell them *what is* God.

### Conclusion

Dialogue with nature, dialogue with others, dialogue with God. All of this tries to recompose unity of the mind of every human person, who becomes this way able to initiate a new dialogue with others, from other specialities, and with God.

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<sup>43</sup> THOMAS D'AQUIN, *In de Caelo et Mundo*, I, lect. 22.

## **6. The author. The context.**

Jacques Laeuffer was born in 1958, France.

He is Habilitated to Manage Research (HDR) by the University of PARIS VI and Professor at Ecole Superieure d'Electricite, SUPELEC, Paris.

As an Expert-Engineer for General Electric, Peugeot Citroen, Converteam, he is inventor of 27 patents and author of 75 scientific publications.

He is also author of "Une histoire de la Physique", 143 pages, and animator of conferences about physics and philosophy for 20 years.

In this context, he run a cycle of conferences in Centre Culturel Garnelles, Paris, including 9 courses, from January to April 2008. This cycle was repeated from November 2008 to March 2009. Title was "From sciences to the knowledge of God" and main ideas of this paper come from this cycle.

Students and young professionals participate as an interdisciplinary audience including philosophy, law, business management, art, history, physics, mechanics and electrical engineering, communication engineering, mathematics, software, etc.

Participants include believers and non-believers.

Main universities represented are Sorbonne, HEC, Supelec...

Countries represented include Continental China, Syria, Canada...

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