

Can we compare Aquinas' Philosophy with Modern Science?

Juan José Sanguineti

Pontificia Università della Santa Croce
sanguineti@pusc.it

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Abstract

A comparison between Thomas Aquinas' philosophy and modern science is possible and can be fruitful. Some aspects of his natural worldview are incompatible with our scientific knowledge but others are quite compatible and relevant for a sound philosophical interpretation of scientific achievements. The article briefly explores this issue in cosmology, evolutionary theory (especially the problem of contingency and indeterminism) and neuroscience.

Keywords: Thomistic Natural Worldview, Contemporary science, Natural Philosophy, Cosmology, Creation, Evolution, Indeterminism, Chance, God's Providence, Neuroscience

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1 INTRODUCTORY REMARKS

Why can we think of a possible relationship between Aquinas' philosophy and modern science? And what can be the interest of making such a comparison?

What can be the purpose of this operation?

There is a long tradition of drawing comparisons between the philosophy of Aristotle and Aquinas, especially between their natural philosophy, and the achievements of modern science, and particularly in Thomistic philosophers of nature (consider Hoenen, Selvaggi, Maritain, Wallace, and others). In many issues, from the point of view of a Thomist, this is understandable, since natural philosophy in Aristotle and Aquinas represented a synthesis of the physical world in their time, within the framework of the Ancient natural sciences — physics, biology —, as well as mathematics and astronomy. Such a synthesis constituted in Aquinas a very successful and insightful organic unity in continuity with metaphysics and theology. Now, it is possible to relate this global vision of the physical universe to the contemporary understanding of nature obtained from modern sciences. This can be done from a historical point of view in order to ascertain the differences, but also to discover some possible common points, or even the possibility to get a new insight of nature which could be philosophically fruitful.

Historical and scientific comparisons are helpful if properly done. They need to preserve the divergence of the approaches, especially if the comparison is accomplished between very distant systems of thought. It is necessary, moreover, to recognize the various levels not only between the terms of the comparison, but even inside each one of them. There are various levels in Aquinas philosophical writings, and obviously in contemporary science. For example, one thing is quantum physics as such, and another is the range of its different philosophical interpretations. Basically the comparison is possible because philosophical positions are not incommensurable, in the Kuhnian sense, and even in science it is controversial if there can be an absolute incommensurability between views and concepts in different scientific paradigms.

Taking account of many possible comparative networks between the scientific Thomistic corpus, including Aristotle's as a background, and all that we currently know thanks to modern science, in this paper I will briefly mention some elements that could be relevant for the discussion.

The underlying basis that makes possible the comparison we are talking about is twofold: naturalism and rationalism, taken in a broad and non reductive sense. Let us consider both points.

a. Naturalism: the Aristotelian scientific enterprise takes natural explanations seriously because it views nature as intelligible and deserving investigation according to multiple causes. The primacy of God's causality does not eliminate the validity of secondary causes. Nature cannot be understood from above, i.e. from only primary causes. It can be properly known from below, i.e. from the analysis of their proximate causes. Therefore, sciences are relatively autonomous, and cannot be deduced from metaphysics nor from theology.

b. Rationalism: following the Greek tradition, Aristotle and Aquinas are con-

vinced that reason, the faculty capable of discovering the order between natural things, is the instrument humans can use to disclose the principles of nature and consequently to put order in human life and also in nature through technological interventions. According to this idea of nature and science, I dare to say that there is a real continuity between some Thomistic views and modern science. The big change, the scientific revolution, was mostly methodological, and obviously this led to many discoveries and promoted the successful alliance between science and technology.

The main areas in which comparisons between Aquinas and modern science have been made by many authors are epistemology (theory of science), cosmology (the universe, creation), evolutionary biology, and neuroscience¹. The comparison can be purely historical, but Thomists are interested in something more: is it possible to understand modern science using Aristotelian and Thomistic principles, for example, the four causes, the theory of substance and essence, the soul as the principle of life, and so on? If this is the case, then we need to remove from these principles their instantiation in clearly false examples belonging to the old science, for example, the theory of the four elements, the distinction between heavenly and earthly bodies, or the thesis of the circular movement of heavenly bodies, as well as geocentrism.

A very helpful and modern distinction, unknown to the Ancients, was used by many philosophers, for example Maritain, in order to avoid bad comparisons between Aquinas and modern science. This is the distinction between philosophy and science. Aristotle, followed by Aquinas, distinguished between metaphysics, physics and mathematics, or between metaphysics and particular sciences. Physics was fused, rather than confused, with philosophy of nature. Today we clearly distinguish between physics and philosophy of nature, but this distinction had no sense even in the seventeenth century. This creates new problems, which were not present in Aristotle's and Aquinas' horizon. Nobody would say today that the theory of elementary particles is philosophical.

The comparison between what we nowadays consider as scientific knowledge and old science in Aristotle or Aquinas – not philosophy – is possible, but has little philosophical interest. We could only say, in this respect, that the Ancient science, if not completely mistaken, was propaedeutic for modern science. But some coincidences and anticipations could be simply anecdotic and with little significance (for example, regarding the old theories of spontaneous generation of living beings in relation to evolutionary theory).

In the prospected comparison, sometimes it is emphasized the antagonism between the old and the new. Old science would amount to be, in this sense, a formidable obstacle for the progress of science. In most cases, I think, the obstacle is sociological. The more prestigious is an author or a scientific view, the more dangerous could be for future revisions. Aristotelianism was an obstacle for the

rise of modern science not because of its principles, but because Aristotelians took the explanations of his master, covering all kind of topics, as immune to critique.

2 ASPECTS OF COMPATIBILITY

In the following considerations I will suggest some possible elements of agreement or disagreement between Thomistic philosophy and contemporary science, using the method of putting questions that can shape a more precise geography of the possible comparisons. I will take loosely the distinction between science and philosophy, unless it will be clearly relevant.

I. Which are the aspects in the Thomistic natural worldview incompatible with modern science, and what is their significance in philosophy? As for the evaluation, notice that the incompatibility can be absolute, partial, essential, important, surmountable, and so on. Compatibilism and incompatibilism not always are to be drastically opposed. The following points can be discussed and better refined. They intend to be only inspiring and guiding.

Incompatible elements	Philosophical significance
Geocentrism	Not essential
Qualitative physics, not mathematical	Important
Earthly and heavenly bodies	Not essential
Deficient mechanics, lacking the notions of force, mass, inertia, energy	Important
No distinction between science and philosophy	Surmountable
Essentialism	Disputable. There is a need to clarify the sense of 'knowing the essence'
Conceptual approach, empirically poor	Surmountable
Dogmatism, not hypothetical view	Incorrect in many aspects
Purely phenomenical approach, not using mathematics, and lacking experimental tests	Important, but surmountable
Non atomic view of nature	Surmountable
Ptolemaic astronomy, Euclidean geometry	Not essential
Static vision of nature, not evolutionary	Important, but surmountable

The selected items clearly indicate the distance between the Thomistic worldview and the modern one. But the majority of them pertain to the scientific description of material things, which radically changed in modern times and even more in the last century and decades.

Now we can try to ascertain whether there are some philosophical issues of the Thomistic worldview which could be seen as compatible with modern science. Since they are philosophical, they are general but profound, and can be separated from the specific description of the world. Moreover, sometimes they can be enlightening for overcoming reductionism, which is a constant 'philosophical' temptation accompanying the achievements of modern science (for ex., mechanism, derived from the new science of mechanics). Reductionism is the view that takes some scientific approach as definitive and essential, excluding other views as inessential or unproductive. Reductionism in some way transforms science in philosophy, not acknowledging the partiality of science. To hold that natural science is all that we can seriously know of nature is equivalent to take science as a philosophy, since it is an essential interpretation of 'what there is'. But this is a dangerous assumption, because many different aspects (and layers) of reality cannot be understood with only one methodological approach.

II. Which aspects of Thomistic philosophy are compatible and even useful for a philosophical interpretation of modern scientific achievements? The point I am putting forward is not only mere compatibility, but also speculative relevance. A real Thomistic philosopher, I suspect, does not attempt to simply look for a confirmation of his principles in the new domains discovered by modern science. The interesting question is not, for example, to confirm the principle of causality facing the special difficulties which can be drawn from problems raised by quantum mechanics. More than that, quantum mechanics, as any other new scientific paradigm, could be the occasion for a richer development of the metaphysical principles inherited from Aquinas' philosophy.

I point out some items regarding this problem. The evaluation indicates the relevance of the principles if we want to face the philosophical problems posited in the new scientific domains.

Compatible items	Relevance
Naturalism	Full continuity
Autonomy of sciences	Epistemic continuity
Empirical and rational inquiry	Some continuity
Causal explanations	Continuity in some regards
Inductive and deductive method	Continuity in some regards
Appeal to principles	Logical continuity
Determinism but also indeterminism. A place for chance in nature	Continuity in contemporary science
Timeless cosmology (everlasting cosmic spheres)	Agreement with timeless cosmologies (pre-Big Bang)
Contingent universe	Continuity in some regards

I will consider two points of this diagram, the first in relation to cosmology, the second regarding the problem of determinism or indeterminism in an evolutionary world.

2.1 *Cosmology and the origin of the universe*

In its initial presentations, Big Bang cosmology, today universally accepted and including the inflationary extensions, seemed to demonstrate the absolute origin of time from an initial point, a cosmic singularity. Many authors – believers – associated the cosmological origin of time to the ‘moment’ of the divine creation of the universe according to Genesis. But this agreement was weakened when a number of scientists hypothesized a ‘previous’ (not to be understood temporally) quantum background from which several big-bang-like events could have been produced, even infinite. Our temporally initiated universe would be, then, only one of the innumerable ‘multiverses’. The hypothesis cannot be empirically tested, but neither can be excluded. The happy coincidence with the revealed truth of creation was no longer sustainable.

Here is where Thomistic metaphysics of creation becomes relevant for a correct interpretation of the scope of cosmological models. Thomas Aquinas held, as we know, that the eternity of the world invoked by Aristotle was not inconsistent with the created condition of the universe, because creation out of nothing is not a temporal causal relation, but a permanent ontological dependence of creatures from the Creator.

Nothing prevents what always exists from needing something other to exist, inasmuch as it has its being not from itself, but from another².

It is possible to see the biblical progressive account of creation along different phases, as the formation of the earth, plants, animals, humans, in an overall agreement with the scientific 'narration' of the evolutionary universe, being able to claim from both sides that our universe was born. Nevertheless, the total ontological dependence from God, i.e. the metaphysical notion of creation, does not force to understand the creative *ex nihilo* in a temporal way. According to Thomas Aquinas, the backward analysis of transformations and generating preceding causes does not require a stop in a beginning in the past:

It is not impossible that man could be generated by man infinitely (*in infinitum*)³.

This point is held by Thomas only as a theoretical possibility, in agreement with his thesis that supports the compatibility of an infinite series of generations with its timeless dependence from an essential cause. The reason is that generative causation is not a complete causation, but only partial: the efficient cause of transformations (read: evolution) is not a complete cause. It is a cause of becoming (*feri*), not a cause of being (*esse*). Ancestors are partial causes, not essential causes, and they could be infinite (in theory). The causes of *feri* are previous in time, because they cause through movements, and this requires time:

The efficient cause operates through movement, and therefore precedes in time its effect⁴.

This is the deep reason that enables Aquinas to accept the theoretical possibility of the everlasting cycles of time in the Aristotelian model of the universe, which in no way is incompatible with its created condition.

So the absolute beginning *in esse* is not necessarily the beginning of an initial instant far back in time:

There is no incompatibility between being created by God and existing since ever⁵.

This point is helpful in order to avoid false apologetics from both sides, i.e. from theology as well as from atheism. The satisfaction of seeing in the Big Bang a confirmation of creation or, on the contrary, the annoyance with which some atheists interpreted the Big Bag cosmology as something that would force them to believe in God, encompassed a misunderstanding of the truth of creation.

The same can be said in relation, for example, to Stephen Hawking's claim that a cosmological quantum-gravity model avoiding the initial singularity renders meaningless the idea of a Creator. Hawking was not a theologian, but he was always worried with the explanation of the origin of the universe through the appeal to God. Even when he believed in the absolute temporal beginning of

the universe, he imagined God simply as deciding the boundary conditions that enabled the appearance of our universe. A pre-existing quantum-gravity framework seemed to him a self-sufficient reality capable of producing our universe. Hawking attempted to intervene in theology from his cosmological approach. If this is done, then an inverse relation is also possible, i.e. to intervene from the theological point of view in some cosmological conclusion apparently disclaiming a theological thesis.

Precisely, in a Thomistic view, one can say that Hawking's self-contained universe perhaps is not impossible theoretically, but that it is not a primary all-explaining principle, making unnecessary the appeal to a personal Creator. Its necessity is not absolute. Thomas Aquinas could say that it was a kind of primary matter – ruled by quantum laws and energy, but without order – endowed with a necessity *ab alio*. There is no absolute reason to postulate that this primordial framework contains the necessity of its own existence, as the Anselmian necessary being was constrained to exist in order to avoid contradiction. Hawking's metaphysical position in some way goes back to the Presocratics (with some additional mathematical Platonism).

2.2 *Determinism and indeterminism in an evolutionary world*

Facing the evolutionary picture in the configuration of the universe, but especially in the appearance of life on earth and its biological growth and differentiation, the intriguing question is whether this evolution is necessary and predetermined in its causes or whether it is contingent and then subjected to many chances, for example the existence of favorable environmental conditions that allow the emergence and flourishing of natural potentialities in living beings.

If the latter is the case, and it seems to be so, at least in life evolution, then teleology in nature seems to be self-induced. The evolution does not seem to follow a predetermined path, but shows itself as a self-selective accidental process, with many possibilities, therefore a contingent process, including elements of necessity, potentialities but also *per accidens* events. This is not incompatible with finalism. Once we have an emerging species developing in nature, it behaves as an end in itself, while survives until it disappears. I don't see this feature of evolution as chaotic or completely opposed to teleology, unless we have a rigid deterministic view of teleology.

This is another point where Thomistic natural theology could be relevant in philosophical problems connected with evolution. The appeal to God as the first Cause does not entail a deterministic view of natural causality, if we understand by 'deterministic view' the fact that everything that happens is absolutely necessary and couldn't have been otherwise (thinking, for example, that if today rains,

this should have been absolutely predetermined in its causes, and to change this would constrain to change the initial conditions of the universe).

According to Thomas Aquinas, God created necessary secondary causes of the natural events, but also contingent secondary causes, which could fail in the production of their effects. Therefore, random events are not incompatible with the design of the Creator⁶. Chance does not mean absence of causality and it can be understood as causality *per accidens*, in the sense that the proper *intentio* or natural effect of a cause contains a collateral effect which is outside the scope of the natural cause, for example, when a stone falling from a mountain kills an animal. A random effect is, then, an effect – favorable or not favorable for a teleological system – caused by another system – underlying, or environmental – which is not controlled by the former.

In the Aristotelian and Thomistic physical context, random effects are normal in earthly living individuals. In an evolutionary framework, the possibility of chance has very important consequences, since it allows the emergence or destruction of species. Chance is, thus, crucial for the history of nature.

It is not easy to accept such a possibility from a deterministic approach. It seems that, if admitted, it would imply that there is no real necessity in the configuration of living systems. The problem is irrelevant as far as we remain in the inanimate world, but is dramatic in the history of living systems. This could be related to the 'anthropic principle' that seems to imply that cosmic initial parameters, though possibly infinite, are just those that exactly fit within very narrow margins if a chance should be given for the appearance of life on earth.

If nature evolves so contingently, up to the point that it can be said that we are born 'by chance', though not without precise conditions (but this feature at the individual level was always considered normal), then the problem for a believer is how to reconcile God's creative intention with the evolution of a contingent world, especially regarding the appearance of *homo sapiens*. And even for a non believer this is a problem concerning the very sense of the evolving universe. An accidental world, in which life is not necessary and even improbable, seems to be pointless.

The extraordinary perfection of the universe, especially in the realm of living beings, despite its contingency, constitutes the classical basis for the argument of the divine intentional creation. According to the fifth way in Aquinas for the demonstration of God's existence, the presence of regular order and admirable outcomes in the universe, very obvious at least in life (which today we know to be improbable from the perspective of physical laws), indicates a 'rational' order which must be attributed to an Intelligent first Cause.

But now the problem posed is how can one figure out the way whereby God creates and guides an indeterministic evolving universe? Two extremes seem to be inappropriate. One is the reductive view of confining God to the only first

creative intervention, letting evolve the universe on its own with ‘indifference’ (deism, non interventionism).

The other extreme is the recourse to several divine interventions throughout the history of nature, in order to guide evolution in a certain direction and therefore to remedy the lack of purpose of pure indetermination. This second ‘solution’ seems *ad hoc* and it is rather odd. Why should God create indeterministic processes just to supply the lack of order with continuous interventions? But then the temptation is to imagine God as providing some very precise initial conditions of the universe in order to see realized a specific design, in such a way that a real indeterminism should be ruled out, or it could be attributed to our ignorance of hidden causal elements underlying the course of the events.

Can Thomas Aquinas help us to solve this problem? Not directly, in my view, because this was not a problem in the cosmological context of the Ancients, though some of them could accept the possibility of an evolutionary course of the universe, as we can read in Aquinas when he agrees with some reading of the first chapter of the Genesis inspired in Saint Augustine⁷.

A possible solution could be to investigate how God’s providence intervenes in human affairs and consequently in their relationship with biological, climatic or more general physical conditions. The notion of divine providence has no sense if worldly events were all pre-determined. If some happenings are contingent, not necessary, the divine providence means that God takes care of what is going on and can act in some way or another, not only through miracles but also via ordinary secondary causes, in order to reach some desired effect, for example to protect somebody in a trip or in the case he or she faces certain risks (to contract a disease, etc.). This is obviously the basis of the utility of prayers. Aquinas claims that prayers would be useless if everything should happen with an absolute necessity⁸.

Thomas’ concern here tends primarily to defend God’s immutability:

We do not pray to alter the divine disposition, but to impetrate what God determined to be fulfilled through the prayers of the saints⁹.

This can be done thanks to the timeless divine vision and action in the world. God does not act from the past, and then He cannot see things projected in the future. There is no future for Him. Thus, the Creator can arrange the successive order of things to happen taking account of the prayers he decides to accomplish, not at the beginning of time, but timelessly, though this is hard to imagine because we are not living in the eternity.

I suggest that the Thomistic account of divine providence, prayers and natural indetermination could be applied not only to human daily affairs and to history, but could be transferred to the evolution of life on earth addressed in some way

to the appearance of man, in accordance to a clear divine design. This seems to be necessary if we want to preserve real contingency in the biological evolution making it compatible with God's plans.

But how can we imagine God's providential action, apart from miracles, over nature and not only over human free actions (this latter point is not the object of my considerations)? Granted that the display of natural causations endowed with many potentialities in a pluralistic environment is capable of producing a variety of landscapes characterized by complexity, something which is contingent but also admirable and very telling of God's grandeur, do we need to invoke special divine actions in order to accomplish a creative plan at least addressed to the appearance of man in the context of evolution?

The answer to this question, I want to suggest, appeals to the model of the divine providence in human history and also in the life of each person. The most that can be said in this regard is that the Creator knows what is going on, knows its potentialities and risks, and guides the course of the events according to some plan which is very rich and inscrutable, with multiple facets which we certainly ignore. Moreover, in human history God takes account in advance of human free responses to his plans, and consequently he arranges or permits many situations, knowing also how to obtain good things even from evil and dramatic situations. But it is helpless to try to determine concretely *how* God acts in his providence (unless we imagine that He arranges things in a deterministic way, which is what we want to avoid).

Consider, for example, this very simple case. If I pray that a headache will go away and I am heard by God, and if this is not a miracle, how did God arrange the course of events in order to do for me this favor? I don't think we need to suppose a special divine intervention in the initial conditions of the universe in order to fulfill my petition. Anyway, divine favors – not miracles – cannot be empirically tested (and most prayers regard favors, not miracles). Something similar could be said of God's providence on the earthly conditions that make possible life, especially human life, with all its risks, some of which depend on human responsibility.

Obviously the problem subsists and is open to farther debate. God's interventions of this kind are mysterious, and perhaps it is good for us to be ignorant of these divine actions, because in this way we are invited to be intellectually humble and to trust more in God, especially regarding the future of the Earth and of the whole universe. The only divine plan we certainly know is his revelation culminating in Christ, and probably this is enough for us.

3 NEUROSCIENCE AND PHILOSOPHY OF MIND

A third topic regarding the comparisons between the Thomistic view and modern science is neuroscience and the philosophy of mind. I present it briefly but separated from the above issues because I think that here the problem goes beyond the simple question of compatibility or incompatibility.

More than that, in the midst of the current discussions of the philosophy of mind, which are mainly focused on the problem of the relationship between mind and brain, Thomas Aquinas' hylemorphic view offers an alternative interpretation which can be placed between the extremes of drastic dualism and monistic 'neurologism'¹⁰. This view is currently not considered by the authors involved in the discussions. Hylemorphism is ignored, perhaps because it is difficult to understand the unity between what is formal and what is material among authors who only know the scientific method.

Neuroscience is welcomed by Thomists because Aquinas recognizes the role of the brain in the exercise of psychic functions both in cognition and affectivity (appetites and passions). Following the Galenic tradition and Avicenna's medicine, Thomas Aquinas conceives the brain as the organ and seat of the higher sensitive faculties (central sense, imagination, memory, cogitative), each of them localized in one of the brain ventricles, though the universal reason remains incorporeal¹¹.

Dysfunctions in cognitive, appetitive, emotional and behavioral capacities are due and explained by Aquinas by cerebral lesions. Even some aggressive or insane sexual actions are attributed by him not to an immoral behavior but to a specific pathology, following Aristotle¹². In fact, he believes in the existence of physiological predispositions for some virtues or vices¹³.

One may be surprised to read so many naturalistic assertions in Thomas Aquinas, explaining that the brain conditions enable the use of psychic powers. This is because

the sensitive powers are powers of certain corporeal organs. If these organs are injured, necessarily their acts are impeded, and therefore is also impeded the use of reason¹⁴.

Accordingly,

the optimal relationship between the inner sensitive powers, as imagination, memory and cogitative, requires a good conformation of the brain¹⁵.

The degree of intelligence in persons depends in part of good physiological and brain conditions¹⁶. As a consequence

some injuries in certain corporeal organs impede the soul to directly understand itself and other things, as when there is a brain injury¹⁷.

The following text asserts what today is called the 'biological basis' of cognitive and ethical virtues:

According to the corporeal constitution, some people have better or worse dispositions regarding certain virtues, because certain sensitive powers are acts of certain parts of the body, whose conformation helps or hinders such powers in their operations, and therefore the rational faculties, to which those sensitive powers serve. According to this, an individual has a natural aptitude for science, another for fortitude, another for temperance. In this sense, both the intellectual and moral virtues, in terms of a certain inchoative aptitude, are natural to us. But this is not the case regarding their enhancement¹⁸.

This is more than mere compatibilism with modern neuroscience. Though in the details and within an old physiological framework the bioneurological view assumed by Thomas is very far from modern science, the underlying principles that can be seen schematically in the texts quoted above are tenable today and are more naturalistic than what one might think if advocating a spiritualist perspective of human mind.

In this sense, Thomas Aquinas 'neuropsychology', so to speak, constitutes a useful tool for a correct interpretation of the contemporary discoveries in the field of neuropsychology and neuropsychiatry. A Thomist has no reason to be suspicious of modern neuroscience. A Thomist philosopher is very well equipped to dialogue with neuroscientists, more than philosophers following other schools that neglect the importance of natural principles¹⁹. This is because Aristotelians take seriously the importance of natural sciences, as I said at the start of this paper.

The core of Aquinas' philosophy of mind is the substantial unity between human body and soul, which means that higher human operations, like thinking, willing, perceiving and feeling affections are materially rooted in the brain, though in different ways and within specific causal directions.

To be 'rooted' does not mean to interact, but rather to inform and therefore to constitute a dynamic and unitary action. Sensitive operations, such as seeing or speaking, possess a formal dimension (psychic acts) and a material dimension (the neural activations involved in those actions). Intrinsically associated, they constitute one psychosomatic action, not two interactive actions:

To feel is not an action of the soul, nor of the body, but of the compound [of body and soul]²⁰.

Even spiritual human operations, though they are strictly immaterial and not organic, are formally united with the sensitive and material basis, in the sense, for example, that a free movement of my hand, such as greeting, is one single personal action (to greet). If I can use this expression, this is a spiritual-somatic action (containing different parts or dimensions)²¹. This is completely different both from dualistic explanations and from a physicalist reductive view.

4 CONCLUSION

In the comparison between Aquinas' view of nature and modern science we pointed out several aspects of discontinuity and continuity. If we pick out the metaphysical principles concerning the creation of the universe and its evolution, together with some psychological and epistemological elements, the philosophy of Thomas Aquinas, taken in a broad sense and without rigidity, seems today to enjoy the advantage of being able to favor a sound interpretation of the achievements of the contemporary scientific worldview. In this paper I illustrated sketchy this issue in some crucial aspects in the field of cosmology, evolution science and neuroscience.

Two centuries ago, two features represented a strong obstacle for a positive relationship between Thomism and modern science. The first was the *mechanist* view of nature, which was perceived as simply competitive with the Aristotelian philosophy of nature. The contemporary scientific account of nature, paradoxically, is not necessarily closed to this philosophy, as long as the latter is not seen as competitive, but as an interpretation situated on a philosophical level.

The second obstacle was the epistemological *positivism*, which created a barrier between science and philosophy, but this is not the case in our time. The temptation today is rather reductionism, which in some way is a heritage of positivism. The epistemological and ontological principles of Thomas Aquinas serve precisely to avoid this temptation.

My initial question was: can we compare Aquinas' philosophy with modern science? I think the answer is, definitely, affirmative. We can do this, and it can be very fruitful, if we agree that the scientific knowledge acquires more sense thanks to the intellectual vision afforded by philosophy.

NOTES

1. See G. Verschuuren, *Aquinas and Modern Science*, Angelico Press, Kettering (Ohio) 2019. He also includes genetics and social sciences. To be more complete, I would add psychology.
2. Thomas Aquinas, *De Potentia*, q. 3, a. 13, ad 1. From now on, references without an author belong to Aquinas. Translations are mine.

3. *S. Th.*, I, q. 46, a. 2, ad 7.
4. *S. Th.* I, q. 46, a.2, ad 1.
5. *De Aeternitate Mundi*, n. 306 (Marietti editor).
6. See *CG*, III, 72, 74, 92. See some discussions on this topic in I. Silva, *Divine Action and Thomism. Why Thomas Aquinas's Thought is Attractive Today*, «Acta Philosophica», 25 (2016), pp. 65-84, and M. Dodds, *Unlocking Divine Action*, Catholic University of America Press, Washington 2012, pp. 109-113.
7. See *S. Th.*, I, q. 69, a. 2; q. 71; q. 72; q. 91, a. 2, ad 1; q. 73, a. 1, ad 3.
8. See *S. Th.*, II-II, q. 83, a. 2.
9. *S. Th.*, II-II, q. 83, a. 2.
10. See E. Feser, *Philosophy of Mind*, Oneworld, Oxford 2006, and my book *Filosofia de la mente*, Palabra, Madrid 2007 (in Italian, *Filosofia della mente*, Edusc, Roma 2014).
11. See *S. Th.*, I, q. 77, a. 4; q. 85, a. 7; q. 91, a. 3, ad 1.
12. See *S. Th.*, I, 84, a. 7; *In VII Ethicorum*.
13. See *S. Th.*, II-II, q. 155, a. 4, ad 2; q. 156, a. 1.
14. *S. Th.*, I, q. 101, a. 2.
15. *Q. De anima*, q. un, a. 8.
16. See *S. Th.*, I, q. 85, a. 7; *Q. De anima*, q. un, a. 8.
17. *De spiritualibus creaturis*, q. un., a. 2, ad 7.
18. *S. Th.*, I-II, q. 63, a. 1.
19. See A. J. Freddoso, *No Room in the Inn*, in «Acta Philosophica», 24 (2015), pp. 15-30. The entire monographic section in this issue is devoted to some aspects of Thomistic philosophy of mind: pp. 11-65 (articles by A. Freddoso, G. Klima, J. O'Callaghan and J. J. Sanguineti).
20. *S. Th.*, I, q. 77, a. 5, sed contra.
21. See my paper, *Can free decisions be both intentional and neural operations?*, in *Moral Behavior and Free Will: A Neurobiological and Philosophical Approach* (eds.), J. J. Sanguineti, A. Acerbi, J. A. Lombo, IF Press, Morolo (Italy) 2011, pp. 179-202.

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