

THE AQUINAS'S CRITICISM OF THE COSMOLOGICAL MODELS OF THE 13th CENTURY: A STEP IN THE DEVELOPMENT OF SCIENTIFIC SKEPTICISM

*La crítica de Tomás de Aquino a los modelos cosmológicos del siglo XIII:
un paso en el desarrollo del escepticismo científico*

Ana Maria C. Minecan
Universidad Complutense de Madrid

ABSTRACT

This article analyzes the treatment of natural philosophy in the work of Thomas Aquinas from the point of view of assimilation of the Aristotelian physical *corpus*. It focuses primarily on the Aquinas's defense of the conception of the fallibility of the natural reason, the provisional and revisable character of all physical theories, the necessity of intercultural dialogue to discover the truths about nature, and Aquinas's role in the development of the skeptical attitude in scientific research of the mobile's world.

Keywords: Thomas Aquinas, philosophy of nature, medieval physics, medieval Aristotelianism, cosmological models, natural reason, fallibility.

RESUMEN

El presente artículo se centra en analizar el tratamiento de la filosofía de la naturaleza en la obra de Tomás de Aquino a partir de su asimilación del *corpus* físico aristotélico. El estudio aborda la defensa del Aquinate de la concepción de la falibilidad de la razón natural, el carácter provisional y revisable de todas las teorías físicas, la necesidad del diálogo intercultural para hallar las verdades acerca de la naturaleza y su papel en el desarrollo de la actitud escéptica respecto a la investigación científica del mundo de los móviles.

Palabras clave: Tomás de Aquino, filosofía de la naturaleza, física medieval, aristotelismo medieval, modelos cosmológicos, razón natural, falibilidad.

The study of the Aristotelian cosmology defended by Thomas Aquinas in his comments and original works supposes one of the most unknown elements in his intellectual production even nowadays. His works about metaphysics, ethics or politics have been studied deeply in the contemporary historiography; his positions about the fundamentals of physics have not been focus of interest having a scarce number of works devoted to them.

Despite this lack of attention, the reformulation made by Aquinas about the natural architecture exposed by Aristotle in his treatises about «the things that own in themselves their principle of motion», is an essential key in the western thought, because after the assimilative process which followed the condemnations of the *Syllabus* in 1217, this became the doctrinal basis of the Church in all issues related to the origin, constitution and organization

of the created world. This was the scheme that the beginners of new modern science had to face and destroy,¹ as it can be inferred from the texts of Copernicus² and Galileo.³

The focus on the Aquinas's cosmological works could not be more necessary where the history of philosophy and science tried to offer a proper vision on the beginnings of what Kunh called Copernican revolution.⁴

To understand the importance of Aquinas's thought in the development of a new way of understanding physics we have to highlight those points in which the Dominican assimilated without changes the Aristotelian physical scheme or simply accepted it to defend the christian dogma, but also we have to look beyond his commentator role and try to undercover the points where Thomas Aquinas showed himself as an original author and significantly critic regarding the current physical theories at his time.

1. OPENING TO DIALOGUE

One of the main traits that characterize the Angelic Doctor was his extensive knowledge of the precedent philosophical tradition. His intellectual production shows an impressive wisdom, which is evident, firstly in his solid knowledge of the main Christian, sources especially Augustine of Hippo. Nevertheless, his heterogenic character outstands there where is possible o confirm that his thought basis were not limited his own religious and cultural framework.

1 Cfr. KOYRÉ, Alexandre, «Aristotelismo y platonismo en la filosofía de la Edad Media», *Estudios de historia del pensamiento científico*, Ed. Siglo XXI, Madrid, 1977, pp. 16-40.

2 Copernicus refers directly to elements taken from the Aristotle's physical structure such as the homocentric spheres, the geocentrism or the circular and regular character of the movement by the celestial bodies. «Itaque nolo Sanctitatem tuam late, me nihil aliud movisse, ad cogitandum de alia ratione subducendorum motuum sphaerarum mundi, quam quod intellexi, Mathematicos sibi ipsis non constare in illis perquirendis. (...) Alii namque circulis homocentris solum, alii eccentricis & epicyclis, quibus tamen quaesita ad plenum non assequuntur. Nam qui homocentris confisi sunt, etsi motus aliquos diversos ex eis componi posse demonstraverint, nihil tamen certi, quod nimirum phaenomenis responderet, inde statuere potuerunt». NICOLAUS COPERNICUS, *De revolutionibus orbium coelestium*, Norimbergae, J. Petreium, 1543, f.5-6.

3 Therefore Galileo started the first day of his *Dialogue concerning the two chief world systems* with a direct reference to Aristotle's *On the heavens*. «E perché, collocando il Copernico la Terra tra i corpi mobili del cielo, viene a farla essa ancora un globo simile a un pianeta, sarà bene che il principio delle nostre considerazioni sia l'andare esaminando quale e quanta sia la forza e l'energia de i progressi peripatetici nel dimostrare come tale assunto sia del tutto impossibile; attesoché sia necessario introdurre in natura sustanze diverse tra di loro, cioè la celeste e la elementare, quella impassibile ed immortale, questa alterabile e caduca. Il quale argomento tratta egli ne i libri del Cielo, insinuandolo prima con d iscorsi dependenti da alcuni assunti generali, e confermandolo poi con esperienze e con dimostrazioni i particolari. Io, seguendo l'istesso ordine, proporrò, e poi liberamente dirò il mio parere; esponendomi alla censura di voi, ed in particolare delsignor Simplicio, tanto strenuo campione e mantentore della dottrina Aristotelica». GALILEO GALILEI, *Dialogo sopra i due massimi sistemi del mondo tolemaico e copernicano* a cura di Libero Sosio; Nuova universale Einaudi 110, Einaudi Editore, Torino, 1970.

4 The link between the critical attitude of the philosophers from late Middle Ages and the development of new proposals typical from the first moments of the modern science was highlighted clearly by Kunh «Si la percepción de la anomalía desempeña un papel en la aparición de nuevos tipos de fenómenos, no deberá sorprender a nadie que una percepción similar, aunque más profunda sea un requisito previo para todos los cambios aceptables de teoría. Creo que en este punto, las pruebas históricas son absolutamente inequívocas. El estado de la astronomía de Ptolomeo era un escándalo, antes del anuncio de Copérnico. Las contribuciones de Galileo al estudio del movimiento dependieron estrechamente de las dificultades descubiertas en la teoría aristotélica por los críticos escolásticos». KUHN, Thomas S., *La estructura de las revoluciones científicas*, trad.Contin, A., Fondo de Cultura Económica, Madrid, 1962. p. 113.

The Dominican showed a deep knowledge about presocratic philosophers theories, who he called «philosophers of nature» as well as the essential figures of late Greek and Roman thought. Among the Greek outstand overall Plato and Aristotle as the two pillars of Aquinas's thought. His intellectual aspirations also took him to look further and read works by Hebrew and arab authors considered heretics by christianity; for instance his continuous references to Algazel, Avicen, Averroes and Maimonides's theories.⁵

This aim in the use of sources which are external to the the christian tradition defines one the main features of his cosmological work characterized by the usage of a wide range of proposals and alternatives provided by philosophy on the dynamic configuration of nature. On this, Aquinas defended, as main feature of the correct development of a science like the physics, the need of establishing the truths about the natural through a fluent dialogue with all the previous thinkers who had supported theories regarding to this without paying attention to their cultural or religious background.

The value given by Aquinas to this obligation is evident on his aim to have the best translation of such works. His conviction led him to order versions based on the recently recovered greek text to the Flemish translator William of Moerbeke⁶ –specialized in philosophical, medical and scientific texts.⁷

Fr. Wilhelmus Brabantinus, Corinhiesis, transtulit omnes libros naturalis et moralis philosophiae de graeco in latinum ad instantiam fratris Thomae. Item transtulit libros Procli et quaedam alia.⁸

In this sense, Thomas Aquinas's concerns not only were oriented to the variety and multiplicity of sources but also he wished that such sources had an adequate philological quality to be used as the foundation in his research about nature.

2. CHRISTIAN WISE'S DUTIES

One second reason which can explain Aquinas's great interest in deepening and know about the knowledge of precedent philosophers lies in his conception of wisdom as a labour closely related to the scientific knowledge of the world, –face to Augustine's *noli foras ire*–,⁹ and in the true task of the intellectuals conceived as a duty of educating and training themselves¹⁰ in the new university context.

5 Cfr. GÓMEZ NOGALES, S., «Santo Tomás y los árabes», *Miscelánea Comillas: Revista de ciencias humanas y sociales*, Vol.33, N.63, 1975. pp. 205-250.

6 Cfr. SERRANO, José Egidio, *Tomás de Aquino a la luz de su tiempo: una biografía*, Ediciones Encuentro, Madrid, 2006. pp. 20-38.

7 Cfr. VERBEKE, G., «Moerbeke, traducteur et interprète ; un texte e un pensée», BRAMS y VANHAMEL W. (eds.), *Guillaume de Moerbeke : Recueil d'études à l'occasion du 700e anniversaire de sa mort (1286)*, Leuven University Press, Louvain, 1989. pp. 1-22

8 *Lautentii Pignon catalogi et crónica, accedunt catalogi Stamsensis et Upsalensis scriptorum* O.P., cura Meersseman G., Roma, 1936. n. 33, p. 62. While the details about the collaboration between Aquinas and William of Moerbeke are controversial in contemporary historiography, we can assume here provisionally the news about this order collected in *Stams' catalogue* (1307-1312).

9 AGUSTÍN DE HIPONA, *Obras de San Agustín, IV, Obras apoloéticas: De la verdadera religión*, La Editorial Católica, Madrid, 1975, XXXIX,72.

10 «Oportet igitur veritatem esse ultimum finem totius universi; et circa eius considerationem principaliter sapientiam insistere». TOMÁS DE AQUINO, *Liber de veritate catholicae Fidei contra errores infidelium seu Summa contra Gentiles*, t. 2-3. Ed. P. MARC, C. PERA, P. CARAMELLO, Marietti, Taurini-Romae, 1961, I, 2. (From now C.G.) 1,2.

The study of wisdom is the most perfect, sublime, profitable and cheerful of all human studies. More perfect certainly, therefore, the man who insofar devotes himself to the study of wisdom has already somehow the true blessedness.¹¹

The respect shown by Aquinas towards physical doctrines, which were alternative to that current christian worldview, was supported by a conception about human being distinguished by Aristotle like the obligation of developing intensively the rational knowledge about reality. Face against other activities such as politics, war, work or praying, the intellectual activity was enhanced by Aquinas as the highest and the closest to the Divinity.¹² *On the Heavens* Aquinas highlighted that we must feel a respectful attitude for those who devoted their entire lives on studying such difficult and hidden issues like the study of nature.

[...] the very desire to attentively set forth difficult and occult things and give their cause, and to inquire into all the aspects, without omitting anything, will perhaps be seen as a sign either of a deep-rooted stupidity, causing one to be unable to distinguish between what is easy and what is difficult, or else as a sign of «great promptitude.» i.e., of great presumption, causing one not to know the measure of his ability with respect to the search for truth. And although some deserve rebuke on this point, it is not a just thing to condemn all investigators indiscriminately. Rather we should first have regard to two things. First, we must look for the motive, which induces a man to speak of such things: Is he doing it out of love for the truth or in order to show off his wisdom? Secondly, we must consider how one is in assenting to the things he asserts: Does he have a weak certitude about them like the common run of mankind, or does he know them more firmly, i.e., above the general run? When, therefore, a person can attain to a knowledge of necessary causes with greater certitude than the general run of man, he who finds such necessary reasons deserves our thanks rather than a rebuke.¹³

This consideration of physicist is directly linked to Aquinas's tendency to defend and enhance philosopher's image in times of serious disturbance when philosophers were the target of many prosecutions and condemnations.

In this sense philosopher's efforts to lead men from the sensible pleasures to honesty, to teach them that there are major goods which go beyond the sensible, whose flavour, much milder, is only enjoyed by those who devoted themselves to the virtue in active and contemplative life.¹⁴

This attitude combined with the scholarly ambiance of the recently established University of Paris and nourished by the unceasing arrival of new texts, allowed the Angelic Doctor to develop his proposals in an ideal framework to flower a new conception of physics.

11 «Inter omnia vero hominum sutida sapientiae studium est perfectius, sublimius, utilius et iucundius. Perfectus quidem, quia in quantum homo sapientiae studium dat, intantum verae beatitudinis iam aliquam partem habet». *C.G.* I, 1.

12 «(...) nomen autem simpliciter sapientis illi soli reservatur cuius consideratio circa finem universi versatur, qui item est universitatis principium; unde secundum Philosophum, sapientis est causas altissimas considerare». *C.G.* I, c.2.

13 SANCTI THOMAE AQUINATIS, *Opera omnia iussu impensaque Leonis XIII P. M. edita, t. 3: In libros Aristotelis De caelo et mundo expositio* (Ex Typographia Polyglotta S. C. de Propaganda Fide, Romae, 1886) p. 1- 257. II lect 7 n 364. (From now *In De Coelo*.) In English <<http://dhspriority.org/thomas/DeCoelo.htm#2-7>>.

14 «Secundum etiam hunc modum philosophis cura fuit, ad hoc ut homines a sensibilibus delectationibus ad honestatem perducerent, ostendere esse alia bona his sensibilibus potiora, quorum gustu multo suavius qui vacant activis vel contemplativis virtutibus delectantur». *C.G.* I,5.

The influence of Aristotle's anthropology is evident there where Thomas Aquinas asserted that properly speaking, the name of wise must be given to those that are devoted to the study of the end of the universe and the beginning of all the beings. According to the Philosopher's words, wise is for Aquinas, that who is devoted to the highest things, being the highest among them the first motor of the universe.¹⁵ Defining the divinity through one of the main categories of the Aristotelian physics¹⁶ reveals the first and most evident link between the duties of the christian wise and the physical science. Nevertheless, the importance of Aristotle's thought and his thesis about the natural is essentially revealed in the new consideration of man's knowledge abilities.

3. THE FALLIBILITY OF REASON

On Aquinas's texts, we can frequently find the idea about human reason is remarked by a weakness, which must be supported in the invocation of the divine favour as the ultimate guarantee of success in the search of the truth. Nevertheless, is possible to notice in his writings a significative increase in the confidence on the reason and the senses as autonomous faculties, which are able to cooperate in understanding reality. Face to his predecessors, Aquinas recovered the Aristotle's epistemological optimism by means of the defense of the idea that the human being, with his own strength, can reach truth and the certainty regarding the natural world.¹⁷ This vindication about the reach of reason was supported by Aquinas through an essential epistemological dichotomy.¹⁸ Thomas supported the existence of two types of truths: those which exceed the capacity of the human reason —mostly related to qualities owned by the divinity and collected literally in the Holy Scriptures—, and the truths attainable by the natural reason¹⁹ While the approach of these two levels is not original compared to previous developments, they were of great importance in Aquinas's works the derived and implied consequences. The first conclusion drawn by Thomas Aquinas of this division was the realization that the supreme truths should be taken by absolute and infallible. These truths were mainly of two kinds: those literally spelled out in the *Scriptures* and those declared as ineffable. It was, in both cases, the statements contained indisputable predicates because all ineffable interpretation would have supposed committing heresy, or because issues like the essence of divinity were considered unattainable by human reason. The only attitude that should be shown by the wise respect to them was the unrestricted acceptance and resignation for the points which were declared unknowable.

If therefore the human mind understands the substance of a thing, stone, for example, or triangle, nothing will be intelligible in it that exceeds the capacity of the human reason. But this certainly is not done with God. Because the human mind cannot come

15 Cfr. VELDE, Rudi A., «Natural Reason in the Summa contra gentiles», DAVIES, Brian, *Thomas Aquinas: Contemporary Philosophical Perspectives*, Oxford University Press, Oxford, 2002, pp. 128-130.

16 «Finis autem ultimus uniuscuiusque rei est qui intenditur a primo auctore vel motore ipsius. Prmus autem auctor et motor universi est intellectus». *C.G.* I, 2.

17 Cfr. HUGHES, Christopher, *Aquinas on Being, Goodness and God*, Routledge, New York, 2015, pp.18-20.

18 «Duplici igitur veritate divinorum inteligibilium existente, una ad quam rationis inquisitio pertingere potest, altera quae omne ingenium humanae rationes excedit, utraque convenienter divinitus homini credenda proponitur». *C.G.* I,4.

19 «Quod autem sint aliqua intelligibilium divinorum quae humanae rationis penitus excedant ingenium, evidentissime apparet». *C.G.*, I, 3.

naturally to its substance as our knowledge in this life has its origin in the senses and, therefore does not fall under the action of meaning cannot be grasped by the human mind, unless as deduced from the sensible.²⁰

Thus, concerning the supernatural truths, the course of any investigation was limited or even forbidden. All critical approach was inappropriate, futile and dangerous as these were questions whose knowledge did not rely on the efforts of human reason but in divine revelation.

So the same thing would be a great stupidity that the ignorant pretended to judge them as false propositions from a philosopher, just, and more, he will be a very foolish man suspected as false, since reason cannot grasp, which has been revealed by the mystery of the angels.²¹

The second conclusion indicated that, due to its fallible origin, the assertions from the reason should always remain under the shadow of doubt in contrast to the previous ones. However, if everything concerning the divinity was well endowed with the highest ontological and epistemological superiority, this field discussion showed significantly more sterile than that related to the insecure human reason. Precisely the unstable and temporary nature of the fruits of natural reason was that which allowed the physical knowledge was analyzed, corrected, refined and extended without restrictions. But not only this, but to the extent of the fallible can only be amended through rational argument, the realm of the alien to the supreme truths showed the optimum space that could turn into a proper effort of the intellectual faculties of the human being. In this sense, the affirmation of the fallibility of reason in its natural use, an idea that at first might seem a simple legacy of epistemological pessimism that characterized the prevailing neoplatonism in the time of Thomas Aquinas, was transformed into his work in one of the key levers for the revitalization of physical thought.

This field of knowledge was led by a second capital circumstance: The *Bible* was silent on issues relating to natural mechanisms. Physical science started to become one of the fields of study that could consider a greater number of alternative theories because the biblical text fundamentally full of ethical and political content, did not have any physical theory clearly systematized that could be sanctioned by orthodoxy but mere references, vague and highly susceptible to be interpreted allegorically.²² A set of critical issues —such as the temporary creation— were clearly identified in the sacred texts, but the explanation of the causes, principles and elements, as well as the way they interact to give rise to nature that provided the greeks had no point of comparison in christian heritage.²³ Paradoxically, the biblical silence

20 «Unde si intellectus humanus, alicuius rei substantiam comprehendit, puta lapidis vel trianguli, nullum intelligibilem illius rei facultatem humanae rationis excedet. Quod quidem nobis circa Deum non accidit. Nam ad substantiam ipsius capiendam intellectus humanus naturali virtute pertingere non potest: cum intellectus nostri, secundum modum praesentis vitae, cognitio a sensu incipiat; et ideo ea quae in sensu non cadunt, non possunt humano intellectu capi, nisi quatenus ex sensibilibus earum cognitio colligitur». *C.G. I, 3*.

21 «Sicut igitur maximae amentiae esset idiota qui ea quae a Philosopho proponuntur falsa esse assereret propter hoc quod ea capere non potest, ita, et multo amplius, nimiae stultitiae est homo si ea quae divinitus Angelorum ministerio revelantur falsa esse suspicatur ex hoc quod ratione investigari non possunt». *C.G. I,3*.

22 Cfr. METHUEN, C., «Interpreting the Books of Nature and Scripture in Medieval and Early Modern Thought: An Introductory Essay», VAN DER MEER, J., y MANDELBRÖTE S., (eds.) *Nature and Scripture in the Abrahamic Religions: Up to 1700*, Vol.1, Brill, Leiden, 2008, pp.179-218.

23 Cfr. OTTEN, Willemien, «Nature, Body and Text in the Early Medieval Theology: From Eriugena to Chartres», TRESCHOW, M., OTTEN, W., HANNAM, W., (eds.), *Divine creation in ancient, medieval and early modern thought*, Brill, Leiden, 2007, pp. 235-256.

about the natural world, was one of the reasons for the lack of interest in the Early Middle Ages about natural issues by early christian, became in the late medieval period the condition for possibiliting new physical developments.

Therefore, the fact that the physical issues were not part of the scope of the supreme truths turned out nature science in one of the less dependent on dogmatic demands on research. In this sense, there were issues not considered by the authority of Revelation fact that opened a new space for research. Thus, the idea of the fallibility of reason, coupled with the few references in the *Bible* regarding complex physical issues resulted in a profound philosophical dialogue reinforced by positions inspired by Aristotelian epistemology in the work of Thomas Aquinas.

The sphere of natural reason, as it was understood by the Dominican, shows a second advantage which complements the explanation of the original of his attitude. According to Aquinas, the second type of truths to which we have referred not is accessible only for christian but was also hit by the ancient philosophers, guided by the natural light of reason.

This implies, therefore, the acceptance of the existence of a set of shared knowledge valid beyond time and religions. For Thomas Aquinas is that natural reason, common to all human beings, which allows effective reality of a field in validation of philosophical knowledge. The discursive logic and argumentation are an universal language by which people make the connection and exchange of ideas between the christian wises and past philosophers.

However, its usefulness is not limited to the field of natural questions but the importance of natural reason is also evident in the extent that is the only possible way to dialogue with pagans and heretics and help further the spiritual fulfillment of the obligations of the christians. To the extent that pagans did not know the *Scriptures* and heretics did not granted them authority is absurd refer to them to try to convince or refute their positions.

Secondly, because some of them, for example, Muslims and pagans do not agree with us to admit the authority of some part of *Holy Scripture*, for which they could be convinced and against the Jews we can dispute for the *Old Testament* and against heretics because of the *New*. But these do not support either. Therefore, we resort to natural reason, that all are forced to accept, even though the divine thing can fail or be fallible.²⁴

The only way to solve this problem is to recognize the insufficiency of revealed texts in certain issues and the need to go beyond their contents in the search for natural truths. It is still, clearly, that for Thomas Aquinas the christian does not just investigate and study the *Scriptures* to become wise. Thorough knowledge exceeds topics that are treated in the *Bible* he must go to other sources, divided between different peoples and religions, to account for the structure of reality.

This attitude, which can describe almost revolutionary against his medieval predecessors-with the clear exception of Arab thinkers who show the same tendency²⁵- meant the entrenchment of a radical change in the conception of knowledge in Latin Europe. Heiress of greek

24 «Secundo, quia quidam eorum, ut Mahumetistae et Pagani, non conveniunt nobiscum in auctoritate alicuius Scripturae, per quam possint convinci, sicut contra Iudaeos disputare possumus per vetus testamentum, contra haereticos per novum. Hi vero neutrum recipiunt. Unde necesse est ad naturalem rationem recurrere, cui omnes assentire coguntur. Quae tamen in rebus divinis deficiens est». C.G. I, 2.

25 Cfr. IQBAL, Muzaffar, *Science and Islam*, Greenwood Press, Westport, 2007, pp.9-20.

interest to know and discuss the views of their opponents—so intensely exercised by Aristotle in his treatises—and the fascination felt by philosophers who developed their activity under the Islam,²⁶ the vision of Thomas managed to win and survive, despite difficulties, fostering an atmosphere of appreciation for scientific dialogue which marked the first steps towards modernity. While Thomas Aquinas supported part of his advocacy of dialogue with other thinkers in the bounden duty of every Christian to uphold the principles of the orthodoxy, such an argument is revealed as a flimsy excuse to justify the enormous curiosity that our thinker showed about the technical details of the previous physical theories. It is evident that the texts of natural philosophy from Greeks raised and discussed a number of issues that went far beyond the issues on the nature provided by the *Scriptures*. Discussion of issues as the theory of the combination of elements, nature of the space or the movement of the planets by the Dominican is a clear sign that Thomas Aquinas was driven by a desire that exceeded mere compliance of spiritual obligations. Here, hiding behind the necessary glorification of God's work, the Angelic Doctor was immersed in an innocent study of complex natural controversies.²⁷

4. PREDICTABILITY OF THEORIES

We would offer a partial view of the thought of Thomas if we limited ourselves to expose only one of the obligations entrusted by our author to the true wise. For Aquinas, the Christian intellectual should not be limited to the study of wisdom, whatever its origin, but their work will also require defending divine truth and challenge any opposite errors.²⁸ This need to combat any attack against Catholic faith tells us that we have here a dialogue marked by the controversy that was developed through a method that was essentially based on refutation which sought to save Christian doctrine.

Taking therefore confidence of divine mercy to pursue the office of wise, even exceeding our own strength, we intend to show, as we possibly can, the truth that professes the Catholic faith, eliminating the opposite errors.²⁹

However, the defence of the principles of the Christian religion and, with them, the characteristics of divine creation had a surprising result in the thought of Thomas Aquinas directly linked to the importance of correction in the study of the physical.

For Aquinas the investigator of nature cannot be neglected without risk of missing divinity. That is, to the extent that the Christian dedicated to know the world of mobile bodies, any incorrect theory regarding that involves lies about God's work. Physicist has to strive to know the real structure of nature and its mechanisms if he does not want to fall into sin.

Considering creatures is necessary not only for the instruction on truth but also to dispose of errors; because errors about creatures are away from the truth of the faith to the extent that they are opposed to the true knowledge of God.³⁰

26 Cfr. RAMÓN GUERRERO, R., *Filosofías árabe y judía*, Editorial Síntesis, Madrid, 2001.

27 Cfr. NIKOLAIDES, E., *Science and Eastern Orthodoxy*, The Johns Hopkins University Press, Baltimore, 2011, pp. 30-35.

28 «Convenienter ergo ex ore Sapientiae duplex sapientis officium in verbis propositis demonstratur: scilicet veritatem divinam, quae antonomastice est veritas (...)». *C.G.* I, 2.

29 *C.G.* I, 2.

30 «Est etiam necessaria creaturarum consideratio non solum ad veritatis instructionem, sed etiam ad errores excludendos. Errores namque qui circa creaturam sunt, interdum a fidei veritate abducunt, secundum quod verae Dei cognitioni repugnant». *C.G.* II, 3.

The obligation of not missing the truth about the product of divine action behaves, in the work of Aquinas, as a very effective mechanism of control and evaluation regarding the quality of research into physics. The desire to not belittle through defending God's creation false premises, led the wise to leave the fanciful speculation and careless acceptance of inconsistent theories to search for a rigorous method capable of providing reliable conclusions about the true working of nature.

With this is evident the falsity of certain sentence by some who said that it does not matter to the truth of the faith the opinion that everyone can have about the creatures, provided that you think rightly about God as St. Augustine explains in the book the origin of the soul; because the error on creatures leads to a false opinion about God (...) Therefore the *Scripture* threatens to those who err about the creatures with the same penalties as the infidels when he says in the *Psalms*: Because they have not understood the works of the Lord, the works of their hands, you will destroy them and will not build them.³¹

Again, in an unexpected place, we find traces of one of the capital ideas that characterized the development of modern physics: the critical attitude and the belief in the need to review carefully the validity of theories. While in this moment the Middle Ages physicist did not have a scientific community to address to; it could be noted the existence of an absolute authority which required seriousness, precision and commitment to the work of study. An omniscient and omnipresent authority before whose court every christian should account. An authority with whom the researcher compromised not only his prestige but also his salvation. These traits inform us about the first steps in the emergence of a new kind of thinker,³² whose work was characterized by a set of rules and obligations that many authors have erroneously described as unique to the Modernity. In our opinion, this is due to the simplistic tendency to relate certain features of modern physical science with the necessary emancipation of wise regarding religious context. This statement is false, therefore the fact that such trends began to take shape centuries before the official start of Modern Science-as intended to demonstrate this article- as by the fact that the degree of separation between physics and religion did not occur even throughout much modern times.³³

5. THE CRITICISM OF CURRENT COSMOLOGICAL MODELS

At this point, and once established some features regarding the essentials of Thomas Aquinas's physical thought, it's time to show how far from being satisfied with the current cosmological schemes in his time, our author showed in his writings and demanded a sceptical attitude toward their quality and validity.

Numerous fragments of *On the Heavens* introduce us to how the Dominican corrected the theories of Aristotle on various points of natural reality. In this regard it is

31 «Sic ergo patet falsam esse quorundam sententiam qui dicebant nihil interesse ad fidei veritatem quid de creaturis quisque sentiret, dummodo circa Deum recte sentiatur, ut Augustinus narrat in libro de origine animae: nam error circa creaturas redundat in falsam de Deo sententiam (...) Et ideo illis qui circa creaturas errant poenas sicut infidelibus Scriptura comminatur, dicens in Psalmo: quoniam non intellexerunt opera Domini et in opera manuum eius, destrues illos et non aedificabis eos». *C.G.* II, 3.

32 Cfr. LE GOFF, *Los intelectuales en la Edad Media*, Editorial Gedisa, Barcelona, 1985. pp. 104-108.

33 BONO, J.J. «From Paracelsus to Newton: The Word of God, the Book of Nature, and the Eclipse of the Emblematic World View», FORCE James E., POPKIN, R. H., (eds.) *Newton and Religion: Context, Nature and Influence*, Springer, Berlin, 1999. pp. 45-76.

noteworthy that although Aristotle was an authority highly appreciated by Aquinas, his positions were not taken by indubitable because like all the things claimed by human beings about the physical world were needed of questioning and correction. A good example is the problem of the brightness of the planets. In *On the Heavens* Aristotle argued that the planets do not twinkle. Thomas Aquinas instead- taking the position maintained by Simplicius-claims that it must be said that mostly do not scintillate because Mercury twinkles itself.

The Sun, meanwhile, not only twinkles but has a rotary rotation. The origin of twinkle is, according to Thomas, the fact that our eyes cannot perceive perfectly the reality seen. That is, it seems that the Dominican believes that stars do not really twinkle but this impression in the case of fixed stars is due to the our distance from them and in the case of the Sun is because of the superiority of its clarity.³⁴

Of those things that are far away from us we cannot have a true judgment. But the heavenly bodies are not so far from us by the amount of local distance, but much more because few of their accidents fall under our senses and is natural for us to know the nature of anything from sensitive accidents.³⁵

However, this precaution against inaccuracies and errors in the exposition of natural phenomena was not limited to the Aristotelian texts but it was extended by Aquinas on the widely accepted models in the thirteenth century. Warning of the unsafe nature of many of the assumptions which form these systems, he stressed especially in astronomical matters, the empirical limitations and the absence of sufficient information about their accidents prevents to hold an absolute certainty about them.³⁶

Another telling example is the analysis that Thomas proposed on the movement of the stars relative to a reference point of the subject observed. Aquinas claims that the apparent movement of the stars could not be explained if they were at total rest all of them and the earth from which the physicist investigates them. The apparent movement must find its cause in the displacement of the observed or also in the observer.

And so some, supporting that the stars and all heaven were in rest, established that the land they inhabit moved from West to East on the equinoctial poles once a day; and thus, our movement gives the impression that the stars move in the opposite direction; it is said that this view was supported by the Heraclitus the Pontic and Aristarchus.³⁷

34 «Et dicit bonum esse inquirere de his dubitationibus: subdit autem: et ad eam quae ad plus intelligentiam. Quam quidem litteram Alexander dicit esse defectivam; et est subintelligendum quod ea quae circa hoc excedunt nostram intelligentiam, oportet magis suscipere, quam amplius quaerere per nos ipsos. Non autem est consuetudo Aristotelis, quamvis sit breviloquus, defectivis locutionibus uti, ut simplicius dicit. Et ideo ipse sic exponit: quod de his bene se habet quaerere, sed hoc non ad quoslibet pertinet, sed solum ad eos qui plus intelligunt. Averroes autem in suo commento exponit secundum hoc, ut intelligamus quod inquirere de his quaestionibus et in se bonum est, et etiam ad hoc est utile quod homo magis ac magis intelligat: qui enim se exercitat circa intellectum difficilium, magis potest intelligere alia». *In De coelo* II lect12 n.407.

35 «(...) idest de corporibus caelestibus longe a nobis existentibus; cum tamen de his quae sunt elongata a nobis, non possimus habere certum iudicium. Corpora autem caelestia non ita sunt longe a nobis tanto, idest secundum quantitatem localis distantiae; sed multo magis eo quod pauca accidentium eorum cadant sub sensum nostrum; cum tamen connaturale sit nobis quod ex accidentibus, idest sensibilibus, deveniamus ad cognoscendam naturam alicuius rei». *In De coelo* II, lect.4.

36 *In De coelo* II, lect.7.

37 Et ideo quidam, ponentes stellas et totum caelum quiescere, posuerunt terram in qua nos habitamus, moveri ab occidente in orientem circa polos aequinoctiales qualibet die semel; et ita per motum nostrum videtur

On the other hand, the explanations given by the ancient regarding the anomalous movement of the planets did not seem to convince Thomas, who distinguished between that apparently seem to explain the facts and their truth.

But it need not be true the assumptions that they reached; although once made such assumptions, saved the appearances, however there is no need to say that these assumptions are perhaps true because the appearance of the stars can be explained otherwise, which is still not understood by men. However, Aristotle uses these assumptions as true in dealing with the qualities of movements.³⁸

As noted by Sanguinetti, Thomas's position on these question is shows an exemplary scientific wisdom regarding the situations in which the lack of experience and a clear testimony to the independence of some aspects in the thought of Thomas as regarding the particular sciences of his time.³⁹

(...) As in astronomy the reason goes in favour of the eccentric and the epicycles whereby, alleged this position can explain the sensible appearances on celestial motions: no that this reason itself proves enough perhaps it might also explain with another position.⁴⁰

On the other hand, as alleged by Elders, the rejection of Aquinas natural philosophy as outdated and totally useless is due to a simple, superficial and generally incorrect criticism⁴¹ general consideration by Aquinas about Aristotelian systems and Ptolemaic hypothesis as applicable to many cases but necessarily replaceable by a better explanation,⁴² along with the requirement that they must only be supported while they do not cause difficulties,⁴³ it reveals a way of understanding the scientific activity no longer modern, but contemporary. Physical science has as goal true knowledge about the natural, knowledge that differs from these partially successful hypothesis.

There are two ways in which reason intervenes to explain one thing: one way to prove enough some fundamental, like in the natural sciences, where sufficient reasons are given to show that the sky moves with uniform speed. Otherwise reasons are submitted, being not enough to prove a radical truth, but such as that, once supposed the radical truth, they show their consistency with subsequent effects, and thus in astronomy it is

nobis quod stellae in contrarium moveantur; quod quidem dicitur posuisse Heraclitus Ponticus et Aristarchus». *In De coelo II lect.11.*

38 «Illorum tamen suppositiones quas adinverunt, non est necessarium esse veras: licet enim, talibus suppositionibus factis, apparentia salvarentur, non tamen oportet dicere has suppositiones esse veras; quia forte secundum aliquem alium modum, nondum ab hominibus comprehensum, apparentia circa stellas salvantur. Aristoteles tamen utitur huiusmodi suppositionibus quantum ad qualitatem motuum, tanquam veris». *In De coelo, II lect.17.*

39 SANGUINETI, J.J., *La filosofía de la ciencia según Santo Tomás*, Eunsa, Pamplona, 1977, p. 17

40 TOMÁS DE AQUINO, *Opera omnia iussu impensaue Leonis XIII P. M. edita, t. 4-5: Pars prima Summae theologiae* (Ex Typographia Polyglotta S. C. de Propaganda Fide, Romae, 1888-1889). I, q.32, a.1, ad2. trad. BARBADO VIEJO, Francisco en TOMÁS DE AQUINO, *Suma teológica, I. Tratado de Dios es uno*, Biblioteca de Autores Cristianos, Madrid, 2010. (From now as *STh.*)

41 ELDERS, L., *The philosophy of nature of St. Thomas Aquinas*, Peter Lang, Berlin, 1997, p. 133.

42 «(...) licet talibus suppositionibus factis apparentia salvarentur, non tamen oportet dicere has suppositiones esse veras; quia forte secundum aliquem alium modum, nondum ab hominibus apprehensum, apparentia circa stellas salvantur». *In De coelo, II lect, 17, n.451.* Esto mismo lo sostiene además en *In De coelo, I lect. 3. n.28.*

43 TOMÁS DE AQUINO, *Opera omnia iussu impensaue Leonis XIII P. M. edita, t. 3: In libros Aristotelis Meteorologicorum expositio* (Ex Typographia Polyglotta S. C. de Propaganda Fide, Romae, 1886), p. 323-421. I lect.11, n. 68.

said about eccentrics and epicycles, because once made this assumption we can explain sensible appearances of the movements of the sky; and however this reason is not demonstrative, because perhaps they could be explained also basing on another hypothesis.⁴⁴

The recovery of the Aristotelian *corpus* gave the Latin Medieval Europe a method for science and a set of new issues to answer. The foundation of universities and the promotion of text translation provided an optimal space for the exchange of knowledge, the dissemination of new theories and the contact among diverse viewpoints. The whole of christian dogmas constituted, meanwhile, a rival against which the contents of Aristotelian physics which required adaptation and redefinition in a new intellectual framework.

Finally, Thomas Aquinas symbolized the figure of the christian wise, due to his profound knowledge about Aristotle's thought and about his own religious tradition, which is torn between the demands of his faith and the consequences of philosophy, producing a work that would mark the Western physical thought for more than three centuries.

Fecha de recepción: día 7 de febrero de 2016

Fecha de aceptación: día 9 de septiembre de 2016

44 *STh.I*, 32, 1 ad.2.