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Man's Ability to Understand His Own Understanding: Aquinas, Kant and Modern Physics

I. (Introduction)

What is the purpose of exploring the nature of the human intellect? Thomas Aquinas says that by knowing the nature of the human intellect, we can also understand the relation (*proportio*) of our intellectual acts to the external things which are cognized by these acts, and thus make true judgments about the things. In fact, any claim to truth is based on the intellect's self-knowledge (which can be more or less comprehensive). In other words: It is possible to get to know the truth through the acquisition of self-knowledge, or through understanding the inner workings of the soul. The better my soul knows itself, the better it can understand from its perceptions and thoughts how external things truly are.

In modern philosophy, it has often been doubted that man has the ability to reach the truth by understanding his own understanding. Thus, in his *Meditations*, Descartes doubts whether there is really something corresponding to the ideas in my mind. He only manages to soothe this doubt by proving that God exists and that God is veracious. But Descartes' famous self-transparency of the mind is strictly limited to the mind itself and does not include the relation of the mind to the things.

With Kant, the rupture with the old idea of self-reflection is even more radical. In order to avoid the doubt which torments Descartes, Kant recommends adhering to the phenomena—how things appear to us. Finding out how our cognitive apparatus works is only possible through looking at the results of its workings, as delivered by the sciences. And it is precisely this restriction in the Kantian system which leads to the impossibility of understanding how things are in themselves.

In this paper, I will analyze the truth-revealing power of self-cognition as presented by Thomas and as rejected by Kant. I hope that through this contrastive technique, some very important traits of the traditional account will become visible, and that the meaning of these old philosophical systems will become more apparent—a meaning which has often been obscured by contrasting them unfairly with modern systems, i.e. in ways dominated by modern criteria.

II. (Kant)

The modesty of Kant's epistemology was very appealing to his readers. But from the point of view of a historian of medieval philosophy, this modesty is also somewhat destructive. Hegel was among the first to notice this, and he summarized Kant's philosophy with the following words:

Theoretically the Kantian philosophy is the “Illumination” or *Aufklärung* reduced to method; it states that nothing true can be known, but only the phenomenal.¹

Brentano, another critic, writes in *On the Existence of God*:

Kant believes it is possible to assure only the knowledge of objects of experience. And he abandons all inferences to transcendental things.²

And he goes on:

This is exactly what must have established the belief that a proof of God’s existence is impossible, since the skeptic (*scil.* Hume) and his opponent (*scil.* Kant) were found to be agreed on this point.

So we already see where the destructive force is. Cognition, traditionally characterized by a triadic relation between the external thing, the act of the intellect and the objective representation, is essentially reduced to that member which is ontologically weakest: the objective representation.

What has happened to the other two members? The whole observer side of our cognitive processes is essentially hidden, and it reveals itself only through imprinting its structure upon our experience. The “representation of the *I*” is “in itself perfectly empty,” and

we cannot even say that it is a concept, but merely a consciousness that accompanies all concepts. By this *I*, or *he*, or *it* (the thing), which thinks, nothing is represented beyond a transcendental subject of thoughts = *x*, which is known only through the thoughts that are its predicates, and of which, apart from them, we can never have the slightest concept, so that we are really turning round it in a perpetual circle, having already to use its representation, before we can form any judgment about it. And this inconvenience is really inevitable, because consciousness in itself is not so much a representation, distinguishing a particular object, but really a form of representation in general, in so far as it is to be called knowledge, of which alone I can say that I think something by it.³

This representation of the *I*, or consciousness of self, does not imply any knowledge:

The consciousness of self is thus very far from being a knowledge of the self.⁴

That the information we can gain about our transcendent self is not knowledge is best illustrated by the fact that this information is not useful as an instrument to go beyond experience in the direction of the things in themselves—the other member of the cognitive relation which Kant effectively drops. At least traditionally, as we will see, knowledge of the nature of our intellect and of its relation to the given object will allow us to state how the thing is in itself. In other words: If we know about the workings of our cognitive apparatus, then we can see the world as it really is because we are able to understand our experience as experience of external things. Or again in other words: The world as it really is only appears once we reflect upon the cognitive process; this reflection is the prerequisite for the dichotomy between the thing as it appears to us and the thing in itself. But as Kant does not allow this reflection, or does not believe in it, the thing in itself remains hidden.

¹ Georg Wilhelm Friedrich Hegel, *Lectures on the History of Philosophy: Medieval and modern philosophy*, translated by E. S. Haldane, Lincoln NE: University of Nebraska Press, 1995, p. 426 (= Hegel-Werke vol. 20, p. 333).

² Franz Brentano, *On the existence of God: lectures given at the Universities of Würzburg and Vienna (1868–1891)*, edited and translated by Susan F. Krantz, Dordrecht: Martinus Nijhoff, 1987, p. 63 (§ 69).

³ Immanuel Kant, *Critique of Pure Reason*, A (= Riga, 1781) 345 sq. / B (= Riga, 1787) 403 sq.

⁴ *Ibid.*, B 158.

But Kant's philosophy is not only negative, "teaching us never to venture with speculative reason beyond the boundaries of experience".⁵ As he explains in the preface to the second edition of the *Critique of Pure Reason*,

a critique that limits the use of speculative reason is, to be sure, to that extent negative, but because it simultaneously removes an obstacle that limits or even threatens to wipe out the practical use of reason, this critique is also in fact of positive and very important utility, as soon as we have convinced ourselves that there is an absolutely necessary practical use of pure reason (the moral use), in which reason unavoidably extends itself beyond the boundaries of sensibility, without needing any assistance from speculative reason, but in which it must also be made secure against counteraction from the latter, in order not to fall into contradiction with the latter.⁶

Thus, after having liberated the sphere of the "things in themselves" from the intrusion of speculative reason, we can explore it with practical reason. We cannot describe (speculatively, or by just observing) how things are in this sphere. Rather, we have to explore it with practical reason. Consequently, we have to be satisfied if this exploration leads us only to "object[s] in the idea, and not in reality," or to "regulative principles," as Kant explains with respect to a "Being which is the only and all-sufficient cause of all cosmological series":

If, *thirdly*, the question is asked, whether we may not at least conceive this Being, which is different from the world, in *analogy* with the objects of experience? our answer is, *Certainly we may*, but only as an object in the idea, and not in the reality, that is, in so far only as it remains a substratum, unknown to us, of the systematic unity, order, and design of the world, which reason is obliged to adopt as a regulative principle in the investigation of nature.⁷

Thus, maintaining the idea of such a Being is mainly for the sake of "the systematical unity of all natural knowledge".⁸

The Kantian system implies the accusation that the old systems present man with a certain order without explaining how the observer-theorist himself was able to understand or see this order. Now Kant denies that we are able to see any order which exceeds the empirical world, and claims that we do not have the powers to describe the framework in which this empirical world is embedded. And after having thus liberated the space beyond the empirical world from the claims of speculative reason, Kant demonstrates that it is practical reason alone which can explore this space, and that everyone—by utilizing reason—has the chance to grasp the regulative principles dwelling there.

The advantage is that through diminishing the demands (in terms of powers of observation) that can reasonably be put upon any knowledge which exceeds the phenomenal world, every person can achieve such knowledge. The illusion that there is a trick making it possible to see the framework around the phenomenal world is destroyed. This illusion had been used by some people to gain power over others, who—feeling that they are not able to see the same things themselves—had no choice but to leave very important decisions in the fields of religion and morality to the authorities. But now, with the diminished demand, Kant claims that everyone can understand these regulative principles governing the realm of freedom.

⁵ Ibid., B XXIV.

⁶ Ibid., B XXV.

⁷ Ibid., A 696 sq. / B 724 sq.

⁸ Cf. *ibid.*, A 674 / B 702.

III. (Thomas Aquinas)

In fact, the order of the world plays an important role in Scholastic philosophy. Thomas interprets *Genesis* 1, 31, “And God saw everything (*cuncta*) that he had made, and, behold, it was very good,” as follows:

Of the singulars, it had been said that they are good. Because the singulars are in their nature good; but at the same time, everything (*omnia*) is very good because of the order of the universe, which is the ultimate and noblest perfection in things.⁹

We have to note here the fine difference between ‘good’ (singulars) and ‘very good’ (order of the universe) – so the goodness of the order is greater than the goodness of the singulars. And there is a second premise, namely that God’s perfection is better mirrored if the parts of the universe are not homogenous and similar, but diverse and heterogeneous. With these two premises, one could explain why evil does not necessarily reduce the perfection or beauty of the universe, but might also increase it.¹⁰

This explanation, in the form which Leibniz gave to it, was famously ridiculed by Voltaire, who could not believe that we are living in the best of all possible worlds. And combined with the increase in participation and transparency which the political systems have seen since then through the Enlightenment, one tends to share Voltaire’s view that the old cosmological optimism was sometimes used by those who are in the key positions within the said order to justify existing conditions.

We would like to claim that notwithstanding the political aims for which such theories have been used, one cannot generally say that theologians and philosophers presented such an order in a purely authoritative way. Rather, they explained how man can see himself as embedded in an overarching order through a more or less mysterious ability called reflection. They even thought that this ability played an essential role in man’s ability to understand things and to act freely.

It seems to us that one of the most intriguing consequences which man’s ability of reflection brings about is the fact that the realism of Scholastic philosophy (medieval and early modern) was not at all naive. Thomas explains in *De veritate*, q. 1 a. 9 co. that realism (i.e. knowledge of the truth) is founded in the claim that man can understand his own act of thought and the “proportion” of this act to the thing. It is through this ability to reflect (which pertains to the human intellect because its light is derived from divine truth) that access to the thing ‘as it truly is’ is secured:

It has to be said that truth is in the intellect and in the senses, but not in the same way. In the intellect, it is in two ways: first as a consequence of the intellectual act, and second as cognized by the intellect: It follows the intellect’s operation, insofar as the intellect’s judgment is of the

⁹ Thomas Aquinas, *Summa contra Gentiles*, lib. 2 cap. 45 n. 10: “Hinc est quod dicitur Gen. 1-31: vidit Deus cuncta quae fecerat, et erant valde bona: cum de singulis dixisset quod sunt bona. Quia singula quidem sunt in suis naturis bona: simul autem omnia valde bona, propter ordinem universi, quae est ultima et nobilissima perfectio in rebus.”

¹⁰ For this topic, cf. Wolfgang Hübener, “‘Malum auget decorem in universo.’ Die kosmologische Integration des Bösen in der Hochscholastik,” in: Id., *Zum Geist der Prämoderne*, Würzburg: Königshausen & Neumann, 1985, pp. 110–132. Hübener describes three different positions: Albert the Great says that the world would be better if there was no evil at all. Thomas Aquinas says that the world would be better if there was no evil of fault (*malum culpae*), but that the evil of punishment (*malum poenae*) and the evil of nature (*malum naturae*) increase the beauty of the universe. Another disciple of Albert the Great, Ulrich of Strasburg (Ulricus de Argentina), says that no kind of evil diminishes the perfection of the universe.

thing according to what it is (*de re secundum quod est*). But it is cognized by the intellect insofar as the intellect reflects upon its act, thereby not only cognizing its act, but cognizing also its act's proportion to the thing (*proportionem eius ad rem*). Now the proportion cannot be cognized unless the nature of the act is cognized, and the nature of the act cannot be cognized unless the nature of the active principle is cognized, i.e. the nature of the intellect, which has the nature to conform to things. So the intellect cognizes the truth by reflecting upon itself.¹¹

The question which Thomas wants to answer here is how truth is in the intellect. He distinguishes two ways: In a sense, truth is already in the intellect when it cognizes a thing according to what it is (forming the quiddity of a thing). But truth can also be in the intellect as something known. And for this to happen, the intellect needs to reflect upon its operation, and it needs to understand the operation's "proportion" to the external thing. For this purpose, the operation's nature and the nature of the operation's active principle, i.e. the intellect, are required.

So it is through the human intellect's ability to reflect upon its acts that access to the thing 'as it truly is' is secured. If we now endeavor to find out how reflection works, it is not very helpful to emphasize the contrast between the Aristotelian conception of self-knowledge and the Platonic-Augustinian conception of self-knowledge by claiming, for example, that an Aristotelian conception like that of Thomas "excludes the consideration of the soul as an immediate object of cognition and, consequently, as a possible starting point for the cognition of the world."¹² Such a distinction tends to obscure the fact that there is a mutual dependence between our cognition of things and our cognition of the soul, and to overlook the foundational role which our knowledge of the soul has with respect to any kind of judgment due to the fact that this knowledge includes the "proportion" of the soul to the things (which the Cartesian self-transparency does not).

It is true that the soul according to Thomas has no direct access to itself, and in this sense, he quotes—within a *sed contra* argument—Aristotle's idea that the soul knows itself *sicut et alia*, "like any other thing."¹³ Furthermore, cognition always starts with material things, and self-cognition has as its prerequisite the cognition of a material thing—because the intellect has no actuality (and therefore no intelligibility) before thinking some (other) thing. The starting point has to be something which is actually intelligible:

As it is in the nature of our intellect, according to the state of present life, that it looks to material and sensible things, our intellect thinks itself insofar as it becomes actualized through the *species* which are being abstracted by the light of the agent intellect. This <abstraction of the *species*> is

¹¹ Thomas Aquinas, *De veritate*, q. 1 a. 9 co.: "Dicendum, quod veritas est in intellectu et in sensu, sed non eodem modo. In intellectu enim est sicut consequens actum intellectus, et sicut cognita per intellectum. Consequitur namque intellectus operationem, secundum quod iudicium intellectus est de re secundum quod est. Cognoscitur autem ab intellectu secundum quod intellectus reflectitur supra actum suum, non solum secundum quod cognoscit actum suum, sed secundum quod cognoscit proportionem eius ad rem: quae quidem cognosci non potest nisi cognita natura ipsius actus; quae cognosci non potest, nisi natura principii activi cognoscatur, quod est ipse intellectus, in cuius natura est ut rebus conformetur; unde secundum hoc cognoscit veritatem intellectus quod supra seipsum reflectitur."

¹² Cf. Theodor W. Köhler, "Philosophische Selbsterkenntnis im Mittelalter. Der Paradigmenwechsel im 13. Jahrhundert," in: *Geistesleben im 13. Jahrhundert*, ed. by Jan A. Aertsen and Andreas Speer, (*Miscellanea mediaevalia* 27), Berlin and New York: de Gruyter, 2000, pp. 54–67, here p. 64.

¹³ Cf. Thomas Aquinas, *Summa theologiae*, I^a q. 87 a. 1 s. c.: "Sed contra est quod dicitur in III de anima, quod *intellectus intelligit seipsum sicut et alia*."

the act of intelligible things, and through them <the act> of the possible intellect. So our intellect cognizes itself not through its essence, but through its act.¹⁴

Thomas here adheres to the principle stated by Aristotle in book IX of the *Metaphysics* that things are only intelligible insofar as they are actual.¹⁵ Now the question is: Is the intellect actual (i.e. actually thinking) by nature? An Aristotelian such as Thomas has no choice but to deny this, because it would make the soul's connection to the body unnecessary and even obstructive, and it would make our sense-based occupation with the empirical world superfluous. Now, according to Thomas's translation of the Platonic conception of understanding into Aristotle's scheme of act and potency, the claim that the soul thinks through participation in Platonic ideas which are naturally implanted into it (*naturaliter inditae*¹⁶) would imply that the soul is by nature always actualized, even if it does not always think. Thomas explains this oddness with the example of something which is actually light (and thus should go up), but is hindered by a ceiling (as the soul is hindered from understanding by the distraction of the senses).¹⁷

So the actualization of the intellect is an absolutely necessary prerequisite for it to become intelligible, and thus for any self-knowledge of the intellect. The intellect is actualized through the abstraction of *species* from material things, for which the light of the agent intellect is the efficient cause. But the act which results from this process is nothing more than a prerequisite. It just opens the possibility that the intellect knows itself. How this self-knowledge is then gained is not trivial. The reason for this is that the intellect's self-knowledge is neither merely a subjective certainty, concerning only the intellect's inner events, nor completely exterior in the sense that the intellect has to use sensual perception to know itself (for example, by listening to the words which it has fashioned). Rather, it is in the middle, describing how my experience is brought about (what its active principle is, etc.) and how the experience relates to the thing as it is. This is why Thomas can say that "the intellect cognizes the truth by reflecting upon itself."¹⁸ Self-knowledge, in this sense, guarantees neutrality or makes it possible.

How exactly does this work? In the *Summa theologiae*, Thomas distinguishes two ways in which the intellect knows itself: particular self-cognition (by which an individual perceives that he or she has an intellect) and universal self-cognition (by which an individual understands the nature of the human mind in general):

And this (i.e., that the intellect cognizes itself through its act) occurs in two ways: first, particularly, when Socrates or Plato perceive their having an intellectual soul from the fact that they perceive themselves thinking; second, universally, when we explore the act of the intellect in order to understand the nature of the human mind. But it is true that the judgment and the efficacy of this cognition by which we cognize the nature of the soul pertains to us because the

¹⁴ Thomas Aquinas, *Summa theologiae*, I^a q. 87 a. 1 co.: "Sed quia connaturale est intellectui nostro, secundum statum praesentis vitae, quod ad materialia et sensibilia respiciat...; consequens est ut sic seipsum intelligat intellectus noster, secundum quod fit actu per species a sensibilibus abstractas per lumen intellectus agentis, quod est actus ipsorum intelligibilium, et eis mediantibus intellectus possibilis. Non ergo per essentiam suam, sed per actum suum se cognoscit intellectus noster."

¹⁵ Cf. Thomas Aquinas, *Summa theologiae*, I^a q. 87 a. 1 co.: "Respondeo dicendum quod unumquodque cognoscibile est secundum quod est in actu, et non secundum quod est in potentia, ut dicitur in IX Metaphys."

¹⁶ Cf. Thomas Aquinas, *Summa theologiae*, I^a q. 84 a. 3 arg. 3.

¹⁷ Cf. Thomas Aquinas, *Summa theologiae*, I^a q. 84 a. 3 co.

¹⁸ Cf. Thomas Aquinas, *De veritate*, q. 1 a. 9 co. (see above, p. 4 sq.).

light of our intellect is derived from divine truth, in which the grounds (*rationes*) of all things are contained.¹⁹

The kind of self-cognition we are looking for—the kind that can ground the truth of our judgments—is universal self-cognition. It is only through knowing its nature that the intellect knows its act and its act's relation to the thing.²⁰ Thomas explains this kind of self-cognition in which the intellect can know its own nature with the fact that “the light of our intellect is derived from divine truth, in which the grounds (*rationes*) of all things are contained.” (This may be considered a Platonic-Augustinian element in Thomas' philosophy.)

How hard it has become to grasp the point that man has this ability can be seen in the way many modern researchers treat this aspect of Thomas's philosophy. An example is François-Xavier Putallaz, who in his book *Le sens de la réflexion chez Thomas d'Aquin* collects the most important passages in Thomas's œuvre concerning self-cognition, but then writes:

The reflection by which truth is known cannot be conceived as a super-act, exterior to myself, by which I would judge the thing in itself, my representation and the relation between this copy and its model. That would mean to demand that human intelligence goes beyond its concrete condition, and to allow that it judges itself, its own value. But said reflection is not an act of critical philosophy which would ground the objectivity of knowing. It is the concrete act by which I attain the object, but the object in its similitude, insofar as it is thought. The intellect returns upon itself when it grasps the extra-mental thing, and judges this thing insofar as it is conceptualized.²¹

Putallaz is right in stating that we do not have a bird's-eye view of ourselves and the things we cognize. But he is wrong in saying that we do not judge the thing in itself. As our analysis has shown, Thomas does grant humans the ability to assert the truth about the things as they are in themselves. Otherwise, why would we need a reflexive act? The reflexive act combines the image provided by the direct act with knowledge about the nature of the direct act (based on knowledge of the nature of the intellect) to get to the thing in itself. This is a direct consequence of the intellect's ability to understand itself. The intellect understands its own nature, or meaning, or function, within a complex, overarching order. And through this understanding, it can go beyond its own condition and reach the things. Self-knowledge and knowledge of external things are deeply intertwined.

There are two aspects of Thomas's philosophy which have to be considered in this context. The first aspect is that man's ability to understand himself determines his

¹⁹ Thomas Aquinas, *Summa theologiae*, I^a q. 87 a. 1 co.: “Et hoc dupliciter. Uno quidem modo, particulariter, secundum quod Socrates vel Plato percipit se habere animam intellectivam, ex hoc quod percipit se intelligere. Alio modo, in universali, secundum quod naturam humanae mentis ex actu intellectus consideramus. Sed verum est quod iudicium et efficacia huius cognitionis per quam naturam animae cognoscimus, competit nobis secundum derivationem luminis intellectus nostri a veritate divina, in qua rationes omnium rerum continentur.”

²⁰ Cf. Thomas Aquinas, *De veritate*, q. 1 a. 9 co. (see above, p. 4 sq.).

²¹ François-Xavier Putallaz, *Le sens de la réflexion chez Thomas d'Aquin*, Paris: Vrin, 1991, 185: “La réflexion en effet, par laquelle la vérité est connue, ne peut pas être conçue comme un super-acte, extérieur à moi, par lequel je jugerais de la chose en soi, de ma représentation, et du rapport de cette copie à son modèle; ce serait demander à l'intelligence humaine de sortir de son conditionnement concret en lui permettant de juger d'elle-même, de sa valeur. Mais la présente réflexion n'est pas un acte de philosophie critique qui fonderait l'objectivité du connaître; elle est l'acte concret par lequel j'atteins l'objet, mais l'objet dans sa similitude, en tant qu'être intelligé. L'intellect fait retour sur lui-même quand il saisit la chose extra-mentale, et juge de cette chose en tant que celle-ci est conceptualisée.”

position in the order of the universe. In the hierarchy of essences, an essence is higher, the more interior its emanations are.²² Thus, intellectual beings take the highest positions due to their ability to reflect upon themselves:

Therefore, the highest and most perfect grade of life is that which is according to the intellect: because the intellect reflects upon itself and is able to think itself. But there are different grades in intellectual life. Because the human intellect, even if it can understand itself, takes the first beginning of its understanding from outside, because there is no thinking without phantasm.²³

This confirms the importance of man's ability to reflect upon himself.—The second aspect is that Thomas does not claim that every man knows the nature of the soul to the same extent. He explicitly denies this:

Let us assume that the soul knows by itself what it is; but every man has a soul; thus, every man knows of his soul what it is. But this is false.²⁴

In a passage where he explains the difference between *cogitare*, *discernere*, and *intelligere* in Augustine, he similarly states:

The soul does not always cogitate upon and discern God, nor itself, because if this were the case, everyone knew the whole nature of his soul, at which [knowledge] one hardly arrives even with great effort.²⁵

This is important, because if every man knew the nature of the soul and if—as I have shown—this knowledge enables man to know how things really are, one would have to conclude that every man knows how things really are, which does not seem to be the case. So the qualification which Thomas makes is important to the whole argument about the relation between the intellect's knowledge of itself and its knowledge of external things.

IV. (Conclusion)

My main task was to analyze the truth-revealing power of self-cognition as presented by Thomas and as rejected by Kant. We have seen that, for Thomas, our access to truth is closely linked to the soul's capacity for self-cognition. Man does have the possibility to understand how things truly are, but for this purpose he has to achieve clarity concerning the nature of his soul.

This is just one solution to the problem of the knowability of the world. It is important to mention the Scotistic approach, which we might call the objective approach to

²² Cf. Thomas Aquinas, *Summa contra Gentiles*, lib. 4 cap. 11 n. 1: "secundum diversitatem naturarum diversus emanationis modus invenitur in rebus: et quanto aliqua natura est altior, tanto id quod ex ea emanat, magis ei est intimum." — Cf. François-Xavier Putallaz, *Le sens de la réflexion chez Thomas d'Aquin*, Paris: Vrin, 1991, 288: "Le *Contra Gentiles* IV, c. 11 et la *Somme théologique* I, 87, 1 rappellent différemment que tout esprit, quel qu'il soit, se caractérise par la connaissance (et l'amour) de soi."

²³ Thomas Aquinas, *Summa contra Gentiles*, lib. 4 cap. 11 n. 5: "Est igitur supremus et perfectus gradus vitae qui est secundum intellectum: nam intellectus in seipsum reflectitur, et seipsum intelligere potest. Sed et in intellectuali vita diversi gradus inveniuntur. Nam intellectus humanus, etsi seipsum cognoscere possit, tamen primum suae cognitionis initium ab extrinseco sumit: quia non est intelligere sine phantasmate."

²⁴ Thomas Aquinas, *Summa contra Gentiles*, lib. 3 cap. 46 n. 3: "Si anima per seipsam cognoscit de se quid est; omnis autem homo animam habet: omnis igitur homo cognoscit de anima quid est. Quod patet esse falsum."

²⁵ Thomas Aquinas, *Super Sent.*, lib. 1 d. 3 q. 4 a. 5 co.: "... anima non semper cogitat et discernit de Deo, nec de se, quia sic quilibet sciret naturaliter totam naturam animae suae, ad quod vix magno studio pervenitur."

knowability. The Scotists ensure that things can be known by endowing them with a special kind of being, called intelligible being (*esse intelligibile*). The Thomistic approach, in contrast, might be called the subjective approach to knowability, as it is based on the reflexive structure of the human intellect.

Where are we today? I have started to analyze the natural sciences with the suspicion in mind that, as they mature, these sciences will have to start looking at their own conditions, or at the conditions under which their observations occur. With respect to physics, which is arguably the maturest of the natural sciences, the question would be: Is the knowledge which physics delivers sufficiently described as a knowledge about things, or does it much rather refer to our observations and the relation between our observations and the things observed?

I suggest the following: Physics, as an experimental science, started as a science about celestial bodies and solid terrestrial objects, such as apples. In this respect, physics knowledge is clearly about things, i.e. the laws of physics refer to the things, primarily. But the theories which emerged around 1900, quantum mechanics and the special theory of relativity, provide knowledge about the relation between our observations and the things observed. And by providing this knowledge they make known to us the truth which lies in our observations.

The special theory of relativity starts from the constancy of the speed of light and from there explains how “space and time change in a moving body, according to its speed, as seen by an outside observer. The body becomes shorter along its direction of motion; that is, its length contracts. Time intervals become longer, meaning that time runs more slowly in a moving body; that is, time dilates.”²⁶

Quantum mechanics explains that the state of a system cannot be defined in an observer-independent way.²⁷ The state can only be expressed in the form of a wave function (von Neumann process 2) which indicates the probability for a certain outcome *if a measurement is made*. On the other hand, any measurement, or probing action (von Neumann process 1) will necessarily disturb the system, i.e. change the wave function. The smaller the measured system, the greater is the relative significance of the disturbance, and thus it is not surprising that quantum mechanics was discovered on the atomic and subatomic scale. But in principle it applies to any physical system.

The best-known experiment which illustrates the core principles of quantum mechanics is the double-slit experiment. In the basic version of this experiment, light is sent upon a double-slit, and the result is an interference pattern. This means that light behaves as predicted by classical wave theory (which also applies to water etc.). But if one starts to ask (and to measure) through which of the slits the particles of light (photons) are going, then one destroys the interference pattern. So if one looks at the situation at the particle level (photon), the situation at the macro level (interference pattern) is influenced.

So on the one hand, both theories describe how the observer is involved in the process of measuring, or how he stands *on the same plane* with the system to be measured. This

²⁶ “relativity.” Encyclopædia Britannica. *Encyclopædia Britannica Ultimate Reference Suite*. Chicago: Encyclopædia Britannica, 2011.

²⁷ I follow here the description of Henry Stapp, *Mindful Universe. Quantum Mechanics and the Participating Observer*, Berlin ²2011, chapter 3 (pp. 17-27) and chapter 10 (pp. 55-63).

makes it difficult to speak of a true observation in the classical modern sense (which implies a bird's-eye perspective on the things). But on the other hand, these theories provide the mathematics for describing with great precision how this involvement looks like, and thereby make apparent the truth which lies in an observation. They enable us to consider an observation *as observation*, i.e. insofar as it is detached from the sphere of objects, or insofar as it provides a *true representation of the sphere of objects*. The observation as observation is not causally connected with its object (like the deflection of a pointer); it is not on the same plane with its object, but rather belongs to a different plane.

From this perspective, the special theory of relativity and quantum mechanics introduce a new dimension into physics, which we might call the vertical dimension. Or rather, they make known this dimension. This is an important step, because it shows that the physical world is not causally closed and thus cannot be described in a mechanistic or deterministic fashion. But this step is only possible (and understandable) because man is able to understand his own understanding, which includes that he understands the relation, or proportionality, of his observation to the object. So as a preliminary result, we can say that Thomas provides a better framework for understanding modern physics than Kant, whose system seems to be tailored to classical mechanics.