

18

John Buridan on Scientific Knowledge

Whether It Is Possible to Comprehend the Truth about Things

Concerning the second book we ask *whether it is possible for us to comprehend to truth about things*.

It is argued first that it is not, on the part of the senses. [Some standard skeptical arguments from the relativity of sense-perception, optical illusions and the like are omitted here.]

The senses can be deceived, as it is commonly said, and it is certain that the species of sensible things can be preserved in the sense organs in the absence of these things, as it is stated in [Aristotle's] *On Sleep and Waking*. And then we judge that which is not there to be there, and that is why we err on account of the senses. And the difficulty is greatly increased by what we believe in our faith; for God can form in our senses the species of sensible things without these sensible things, and can preserve them for a long time, and then[, if He did so,] we would judge those sensible things to be present. Furthermore, you do not know whether God, who can do such and even greater things, wants to do so. Hence, you do not have certitude and evidentness about whether you are awake and there are people in front of you, or you are asleep, for in your sleep God could make sensible species just as clear as, or even a hundred times clearer than, those that sensible objects can produce; and so you would formally judge that there are sensible things in front of you, just as you do now. Therefore, since you know nothing about the will of God, you cannot be certain about anything.

Next, it is argued on the part of the intellect that our intellect is dependent on the senses for its understanding; therefore, if we do not have certitude by means of the senses, as has been argued, then we do not have it by the intellect either.

Furthermore, the intellect has to be moved by external things if it is to understand them, but this is impossible, because the mover has to be nobler than the thing moved, as stated in Book 3 of the *De Anima*. And the species of sensible things, before they could reach the intellect, have to pass through a number of intermediaries, such as the interior senses, the common sense and imagination. And it is quite possible that in these intermediaries they become distorted, and so they cannot represent things to the intellect with certitude.

Again, it is argued with regard to the [first] principles that these principles become known through experience; but experiences are deceptive as is clear from Hippocrates. And we prove

in the second place that they *are* deceptive. Experiences do not have the force to conclude a universal principle, unless by means of induction over many [singular cases]. But a universal proposition never follows by induction, unless the induction covers all singular cases of that universal, which is impossible. Indeed, let us assume that whenever you touched fire, you always felt it to be hot; therefore, by experience you judge the next fire, which you have never touched, to be hot too, etc., and so finally you judge that every fire is hot. Let us assume, then, that by God's will whenever you touched a piece of iron, then you felt it to be hot. It is clear by parity of reasoning that when you next see a piece of iron that is in fact cold, you will judge it to be hot, and that finally you will judge every piece of iron to be hot. And these would be false judgments, although at that point you would have just as much experience about iron as you now in fact have about fire.

Again, by Plato's reasoning, if the intellect never knew a first principle, and it happened on it, it would no more assent to it than to its opposite, in accordance with his example about the fugitive slave and his master [who would not be able to recognize his slave if he had never seen him]; therefore, we shall not be certain about the first principles.

[. . .]

Again, a conclusion or an effect cannot be known through its cause, or a cause through its effect, because the cause is not contained essentially or virtually in its effect. And an effect cannot be known through its cause, because causes are lesser known to us. And if you say that they are better known by nature, then that is beside the point, because we are inquiring about our learning and not about nature's. But it seems that we can never have evident knowledge about one thing through another, because there is no evidentness, except by reduction to the first principle, which is grounded in contradiction.¹ However, we can never have a contradiction concerning two diverse things: for let us assume that they are A and B; then it is not a contradiction that A exists and B does not exist, or that A is white and B is not white. Therefore, there will never be an evident inference concluding that A exists from the fact that B exists, and so on for other cases.

[. . .]

The opposite is argued by [the authority of] Aristotle, who says that [the comprehension of truth] in one way is easy and in another way is difficult, and so he regards it as possible. And the Commentator argues as follows: that for which we have a natural desire is possible; for nothing that is founded in nature is in vain. But we do have a natural desire for knowledge, and consequently for the certain comprehension of truth, as Aristotle said in the preface of this work; therefore, etc.

To clarify the question, we have to explain its terms. I will discuss incomplex truth in detail in connection with the other books. But here I am only concerned with complex truth, on account of which a proposition is said to be true. And we can disregard spoken and written propositions, for these are said to be true or false only because of the true or false mental propositions they represent, just as a urine sample is said to be healthy or sick because it signifies the health or sickness of an animal.

1 "The first principle" in question is the principle of non-contradiction: nothing can both be [an F] and not be [an F] at the same time.

Furthermore, I assume for the time being that the truth of a mental proposition is nothing other than the true mental proposition itself, although the name “true” and “truth” connote that a proposition of this sort conforms to the things it signifies in the way explained elsewhere.

Next we should see what we are supposed to understand by the comprehension of truth. And in view of the foregoing it should be clear that the comprehension of truth is the comprehension of a true proposition.

The comprehension of truth can be taken in three ways. In one way the comprehension of truth is nothing but the formation or existence of a proposition in the soul, and then again the comprehension of a true proposition is nothing but the true proposition itself, and it is clear that this is possible. Thus we have to conclude that in this way the comprehension of truth is possible for us.

In another way the comprehension of truth is taken for the adherence or assent by which we assent or adhere to a true proposition, and it is again obvious that this is possible for us to do. Indeed, we can not only assent to true propositions, but we often assent to false ones as well, namely, when we stubbornly persist in a false opinion. Therefore, we should conclude that the comprehension of truth is still possible for us in this way.

However, on the basis of the foregoing objections one might wonder if this sort of assent to the truth would be possible for us with certitude. And then we should note that assent to the truth with certitude requires the firmness of truth and the firmness of assent.

Now the firmness of truth is possible; in one way absolutely, as in the case of the proposition “God exists,” which can in no situation [*in nullo casu*] be falsified. But there is also firmness of truth with the assumption of the common course of nature [*ex suppositione communis cursus naturae*], and in this way it is a firm truth that the heavens are moving and that fire is hot, and so on for other scientific conclusions, notwithstanding the fact that God would be able to make cold fire, which would falsify the proposition that every fire is hot. Thus it is clear that the firmness of truth is possible.

But the firmness of assent is that whereby we adhere and assent to a proposition without fear of the opposite [*absque formidine ad oppositum*] and this can take place in three ways.

In one way, [it proceeds] from the will, and in this way Christians assent and adhere firmly to the articles of Catholic faith, and even some heretics adhere to their false opinions, so much so that they would rather die than deny them, and such is the experience of the saints who were willing to die for the faith of Christ. And so it is clear that in this way the firmness of assent is possible for us.

In the second way, firmness proceeds in us from natural appearances by means of reasoning, and in this way it is still possible for us to assent not only to truth but also to falsity. For many people believing and holding false opinions take themselves to have firm scientific knowledge, just as Aristotle says in Book 7 of the *Ethics* that many people adhere to what they opine no less firmly than to what they know.

In the third way, firmness proceeds in us from evidentness. And it is called the evidentness of a proposition absolutely, when because of the nature of the senses or the intellect man is compelled, though without necessity, to assent to a proposition so that he cannot dissent from it. And this is the sort of evidentness that the first complex principle [the principle of non-contradiction] has, according to Aristotle in the fourth book of this work. Evidentness is taken in another way not absolutely, but with the assumption that things obey the common course of nature, as was said earlier. It is in this way that it is evident to us that every fire is hot or that the heavens are moving, although the opposite is possible by

God's power. And this sort of evidentness is sufficient for the principles and conclusions of natural science. Indeed, there is an even weaker kind of evidentness that suffices for acting morally well, namely, when someone, having seen and investigated all relevant facts and circumstances that man can diligently investigate, makes a judgment in accordance with these circumstances, then his judgment will be evident with the sort of evidentness that suffices for acting morally well, even if the judgment is false, because of some insurmountable ignorance of some circumstance. For example, it would be possible for a magistrate to act well and meritoriously in hanging a holy man because from testimonies and other legal evidence it sufficiently appeared to him concerning this good man that he was an evil murderer.

Therefore, we conclude as a corollary that some people speak very wrongly [*valde mali/male dicunt*], wanting to destroy the natural and moral sciences on the grounds that their principles and conclusions are often not absolutely evident, but can be falsified by supernaturally possible situations. Because such sciences do not require absolute evidentness, but the above-mentioned kinds of non-absolute or conditional [*secundum quid sive ex suppositione*] evidentness suffice. Therefore, Aristotle correctly points out in the second book of this work that mathematical exactitude is not to be sought in all sciences. And since it has become clear that the firmness of truth and firmness of assent are possible for us in all the ways discussed above, therefore, we should conclude what was sought, namely, that the comprehension of truth is possible for us with certitude. And then we should respond to the objections [. . .]

In response to [the argument about the deceptiveness of the senses] I say that if the senses are naturally deceived, then the intellect has to investigate whether there are people there or not, and it has to correct the judgments of illusion; but if God absolutely miraculously intervened, then we should conclude that he can do so; therefore there is only conditional evidentness here, which, however, suffices for natural science, as has been said.

In response to the next objection I concede that the intellect depends on the senses for its first, simple apprehension. But later on the intellect can form complex concepts, such as affirmations and negations [*potest componere et dividere*], and can discern beyond the discernment of the senses. Thus, to what was said, namely, that the thing cannot move the intellect because the mover has to be nobler than the thing moved, I respond that this has to be understood as concerning the principal mover, such as the agent intellect, but it is not true for all movers. And to the claim that the species passing through several media can be distorted, I reply that in a well-disposed medium they are not distorted [*non alienantur in peius*]; rather, they are refined in the inner senses, in order to represent their objects better or more clearly [*ad minus/melius vel purius*].

To the next objection, which says that experiences are not sufficient for concluding a universal principle, I reply that this is not a formally valid inference, but the intellect, on account of its natural inclination to the truth, predisposed by experiences, assents to a universal principle. And one may concede that experiences of this sort are not sufficient for absolute evidentness, but they are good enough for the type of certainty that suffices for natural science. Furthermore, there are also other principles, which, based on the inclusion or incompatibility of their terms, do not need experience [for their verification], such as the first principle; indeed, this is evidently true: "A chimera exists or it does not" or "A goatstag exists or it does not" or "Man is an animal," provided the signification of the terms is known.

To the other objection I reply that the effects are known by means of their causes as to the reason why [*propter quid*] the effect is, because the cause is better known even to us than

the reason why the effect is. Likewise, a cause is known through its effect as to whether it is [*quia est*], because the effect bears some similitude to the cause, and so it can represent its cause along with the natural inclination of the intellect to the truth. And when it is said that a thing cannot conclusively be known from another, I deny this, and I say that there is a virtual infinity of self-evident principles [*principia per se nota*], through the senses, or through experience, or through the inclusion of terms without having to be proved by means of the first principle. Indeed, in the *Posterior Analytics* Aristotle proves that there are nearly as many indemonstrable principles as there are demonstrable conclusions.

* * *

The Differences between Knowledge and Opinion

8.4.4 Their differences

(1) Now, then, in order to bring out the differences between knowledge and opinion, we say that knowledge differs from opinion first because every [act of] knowledge has to occur with certainty and evidentness, as is clear by its nominal definition, but it is not possible for opinion to be like this. (2) The second difference is that every [act of] knowledge has to be of a true proposition, but not every opinion is such. (3) The third difference is that we cannot have knowledge of first principles by demonstration, but we can have opinion concerning them based on dialectical argument.

The fourth part is about the differences between knowledge and opinion. It contains three sections. (1) The first states the difference that knowledge [but not opinion] has to occur with certainty and evidentness. I say, therefore, first, ‘with certainly’. For certainty requires two things, one on the part of the proposition that is assented to, namely, that it be true; for it is not certain belief on the basis of which we assent to something false, but rather it is uncertain and deceptive; and it is clear that, taken in this way, certainty is required for knowledge, for that which is false we do not know. Another thing is required on our part, namely, that our assent be firm, i.e., without doubt or fear of the opposite side; and this is also required for knowledge, since a doubtful and fearful assent does not transcend the limits of opinion. For if someone assents to a proposition fearing [that] the opposite [may be true], he would never say that he knows that it is true, but rather that he takes it or believes that it is.

And I also say ‘with evidentness’ so as to indicate that difference [between knowledge and] that credulity that we believers ought to have concerning the articles of Catholic faith, e.g., that God is triune. That credulity has the greatest degree of certainty on the part of the proposition, for it is a maximally true proposition that God is triune. And it should also be the firmest, without any fear on our part, in accordance with the Athanasian Creed [*Symbolum*], at the end: “This is the Catholic faith. Everyone must believe it, faithfully and firmly; otherwise he cannot be saved.”² But it is compatible with this perfect certainty that because

2 *Symbolum* “*Quicumque*” (“Athanasianum”), in *Enchiridion symbolorum*, ed. H. Denzinger and K. Rahner (Barcelona: Herder, 1957), chaps. 39–40, pp. 17–18. Inc.: “Quicumque vult salvus esse, ante omnia opus est, ut teneat catholicam fidem, quam nisi quisque integram inviolatamque servaverit, absque dubio in aeternum peribit. Fides autem catholica haec est, ut unum Deum in Trinitate, et Trinitatem in unitate veneremur. . . . Expl.: Haec est fides catholica, quam nisi quisque fideliter firmiterque crediderit, salvus esse non potest.”

of the lack of evidentness we do not properly have knowledge of [the content of] these articles. Improperly speaking, however, there is evidentness, because the cognitive power by its nature, along with its concurrent circumstances, is disposed to assent to the truth.

That a man can have firm credulity even concerning nonevident, unknown things, without any fear [of the opposite alternative], is clear from Aristotle, who in bk. 7 of the *Ethics* says: "Some people are no less convinced of what they opine than others of what they know."³ And this firmness of assent without any fear of the opposite arises in us in three ways: first, by evidentness, and this is scientific assent; in another way on the basis of will, backed by the authority of the Sacred Scripture, and this is the Catholic faith of the saints who choose to die to sustain it; and in the third way, [the firmness of assent arises] from some false appearance, along with the will's being confined by it, as is the case with stubborn heretics, who also choose to die to sustain their false opinion.

It is true that, because of the aforementioned requirements demanded by the concept [*ratio*] of knowledge, some people, wanting to do theology, denied that we could have knowledge about natural and moral [phenomena].⁴ For example, we could not know that the sky is moving, that the sun is bright and that fire is hot, because these are not evident. God could annihilate all these, and it is not evident to you whether He wills to annihilate them or not; and thus it is not evident to you whether they exist. Or God could put the sky to rest or remove light from the sun or heat from fire. And finally, they say that it is not evident to you concerning the stone you see as white that it is such that it is white, for even without the whiteness and the stone God can create in your eye an image [*species*] entirely similar to the one you have now from the object; and thus you would make the same judgment as you do now, namely, that there is a white stone here. And the judgment would be false, whence it would not be certain and evident; and, consequently, it would not be evident even now, for it is not evident to you whether God wills it so or not.⁵

But these objections are solved on the basis of bk. 2 of the *Metaphysics*. For there Aristotle says: "Mathematical exactitude is not to be demanded in all cases, but only in the case of those things that do not have matter; for this reason this is not the method of natural science."⁶ And consequently the Commentator remarks on this passage⁷ that one need not demand the kind of belief in natural demonstrations [found] in mathematics. We shall therefore declare that there are many diverse kinds of certainty and evidentness.

For there is the certainty and evidentness of divine wisdom, to which no created cognition can attain.

And in the genus of human cognition there are several kinds of certainty as well as of evidentness. For as far as we are concerned, certainty or assent should not be called that

3 Aristotle, *Nicomachean Ethics* VII.3.1146b29–30.

4 The allusion is clearly to Nicholas of Autrecourt.

5 Nobody could demand a clearer statement of the demon argument made famous in modern philosophy by Descartes. For the conceptual relationships between the demon argument and fourteenth-century nominalism see G. Klima, "Ontological Alternatives vs. Alternative Semantics in Medieval Philosophy," *S. European Journal for Semiotic Studies* 3–4 (1991); 587–618.

6 Aristotle, *Metaphysics* IV.3.1005b19–22.

7 *Aristotelis Metaphysicorum libri XIII cum Averrois Cordubensis variis in eosdem commentariis*, in Averroes, *Aristotelis Opera cum Averrois Commentariis* (Venice, 1562–74; reprint, Frankfurt am Main: Minerva, 1962), f. 35vb K: "Et non oportet hominem quaerere ut modus fidei demonstrationibus naturalibus sit sicut modus fidei in mathematicis." The critical text's *sit nec* here obviously has to be emended to this edition's *sicut*. Indeed, this reading also appears in several codices according to the critical apparatus.

of knowledge, unless it is firm, without any fear [of falsity]. But as far as the proposition is concerne one sort of certainty is that which pertains to a proposition so firmly true that it, or one similar it, can by no power be falsified. And in this way we should certainly concede, as they have argued, that it is impossible for us to have such certainty about an assertoric categorical affirmative proposition, unless it consists of terms suppositing for God, or, perhaps if we admit natural supposition, of which we spoke elsewhere. But this sort of certainty is not required for natural sciences or metaphysics, nor even in the arts or morality [*prudentia*]. Another sort of human certainty on the part of the proposition, however, is that of a true proposition that cannot be falsified by any natural power and by any manner of natural operation, although it can be falsified by a supernatural power and in a miraculous way. And such certainty suffices for natural sciences. And thus I truly know, by natural science [or knowledge, *scientia*] that the heavens are moved and that the sun is bright.

Accordingly, it seems to me to be possible to conclude as a corollary that supernaturally it is possible for my [act of] knowledge, while it remains the same, to be converted into non-knowledge. For as long as the sun and the sky are moving in accordance with all their natural ways, the assent by which I firmly and with certainty assent to the proposition ‘The sun is bright’ is true, evident, and certain natural knowledge [*scientia*], endowed with the evidentness and certainty appropriate to natural science [*scientia*]. I posit, then, that if this [act of] assent, which is knowledge at the present time, remains in me for the whole day, and at nine o’clock God removes light from the sun without my knowing this, then that [act of] assent of mine will no longer be knowledge after nine o’clock, for it will no longer be true, nor will it have a true proposition as its object.

An analogous distinction can be made concerning evidentness as well as concerning certainty. For some human evidentness is such that in accordance with it the cognitive power is compelled either by its own nature or by some evident argument to assent to a truth or a true proposition that cannot be falsified by any power; but this is not required for natural science. Another [type of evidentness] is such that in accordance with it the cognitive power is compelled either by its own nature [or by some evident argument]⁸ to assent to a truth or a true proposition that cannot be falsified naturally, although it could be falsified supernaturally. And this is what is required for natural science.

But that no opinion is of this kind is clear, because this much is signified or connoted by [the term] ‘opinion’, namely, being short of knowledge in not meeting some of these requirements. But then you would ask whether, when I clearly see Socrates running, I know that Socrates is running or whether I merely opine this. And I reply that then I do not opine this, but I know. For everybody speaks in this way: “I know that this iron is hot, for I clearly feel that it is hot,” and “I certainly know that Socrates was running yesterday, for I saw him running.” But this knowledge is not knowledge in the second, the third, or the fourth of the modes distinguished above,⁹ but in the first mode. Nevertheless, that mode is correctly distinguished universally from opinion. And if the assent by which I assent [to the claim] that Socrates runs when I see him running will remain even after Socrates gets out of my sight, this will no longer be knowledge, but opinion. Therefore, this mode of knowledge soon and easily can be changed into opinion.

8 This clause does not appear in the text, but both symmetry and Buridan’s doctrine clearly require it.

9 Aristotle, *Posterior Analytics* I.33.89a39–b9.

(2) The second section states that every [act or habit of] knowledge is [the knowledge] of a true proposition, but not every opinion [is such], since what is false is not known but may well be opined.

(3) The third and final section states that of the first principles one cannot have knowledge by demonstration, for it was said earlier that by 'first' and 'immediate' we mean 'indemonstrable'. But one can have opinion about them by dialectical argumentation. And this is true of many principles that at first had been doubted, until they were made evident by the senses, memory, and experience. For these can be taken to be false, and later opined, on the basis of insufficient evidence, and finally evidently known, when experience has sufficiently been made complete.

Still, lest on account of certain of Aristotle's remarks someone should have an occasion for error in this chapter, it is asked whether it is possible for the same person to have knowledge and opinion of the same thing at one and the same time. And Aristotle responds that in one way this is possible, and in another it is not. In brief, this should be understood so that with respect to that which is immediately knowable and opinable, which is a proposition, it is impossible for the same person to have knowledge and opinion about the same thing at the same time; for it is not possible that you assent to the same proposition with certainty and evidentness and without certainty and evidentness at the same time, although this may be possible successively. But when talking about the remote object of knowledge and opinion, which is a term of which the proposition is composed, or the thing signified by this term, it is possible for me to have knowledge and opinion at the same time about the same thing, for I can so possess a true and necessary proposition, for example, that every man is an animal, and an impossible or a contingent proposition, for example, that every man is a stone or that every man is awake; one I know, whereas the other perhaps I opine. And this is obvious.