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On Karol Wojtyła's Aristotelian Method Part I Aristotelian Induction (ἐπαγωγή) and Division (διαίρεσις)

Abstract: This is the first of a two-part study treating Karol Wojtyła's Aristotelian methodology. The study shows that Wojtyła's *inductive* and *reductive* methodology is identical with the Aristotelian method of proceeding from what is better-known to us in *experience* (ἐμπειρία/*empeiria*) to what is better-known to nature by way of induction (ἐπαγωγή/*epagoge*) and analysis (ἀνάλῦσις/*analusis*) or division (διαίρεσις/*diairesis*). By a rigorous presentation of this Aristotelian methodology here in Part I, the logical form and force of Wojtyła's method is properly disclosed and appreciated in Part II. Wojtyła's method utilizes the logical forms of *reductio ad impossibile* and reasoning on the *hypothesis* of the end, or effect-cause reasoning, which is special to the life sciences and the power-object model of definition. By this methodology, Wojtyła obtains definitive knowledge of the human person that is necessary and undeniable: he discloses the εἶδος (*eidos*) or *species* of the person in the Aristotelian, Thomistic, and Phenomenological sense of the term.

Keywords: Karol Wojtyła, method, induction, reduction, Aristotle, definition, division, person, act, philosophical anthropology

I. Introduction

In *The Acting Person*, Karol Wojtyła sets down and utilizes a twofold philosophical methodology that is the synthetic integration of Aristotelian and Thomistic (1) *induction* and (2) the *phenomenological method* of bracketting (ἔποχή/*epoche*) and *eidetic* analysis.[1] Commentators on *The Acting Person* have rightly noted the difficulty in understanding this twofold methodology, and its complexity is well shown in their exegetical presentations of the text.[2] One issue drawing a great deal of attention from Thomistic commentators has been the problem of the compatability and unity of the classical *realist*, Aristotelian-Thomistic methodology with the phenomenological method, that is, the ἔποχή/*epoche*, first forumulated by Edmund Husserl and, supposedly, equivalent to *idealism*. The compatability of these two methods has already been shown in that Husserl's ἔποχή and subsequent *eidetic* analysis are not an idealism and that phenomenology is fundamentally and historically realist in its origin.[3] The *Phenomenologi-*

[1] See, Karol Wojtyła*, The Acting Person*, tr. Andrezej Potocki, ed. by Anna-Teresa Tymieniecka, in *Analecta Husserliana* (Dordrecht, Holland: D. Reidel Publsihing Company, 1979), 10, 5–7, and, especially 13–18.

[2] See, for example, Kenneth L. Schmitz, *At the Center of the Human Drama: The Philosophical Anthropology of Karol Wojtyła /Pope John Paul II* (Washington, DC: The Catholic University of America Press, 1993), 61–62; and, Jameson Taylor, "The Acting Person in Purgatory: A Note for Readers of the English Text," in *Logos: A Journal of Catholic Thought and Culture*, Volume 13, Number 3, Summer 2010, 77–104, on 78. For exegetical presentations of Wojtyła's methodology showing its complexity, see, again, Schmitz, *At the Center of the Human Drama*, 58–89; Rocco Buttiglione, *Karol Wojtyła: The Thought of the Man Who Became Pope John Paul II*, tr. Paolo Guietti and Francesca Murphy (Grand Rapids, MI: William B. Eerdmans Publishing Company, 1997), 117–128; Jarosław Kupczak, O.P., *Destined for Liberty: The Human Person in the Philosophy of Karol Wojtyla/John Paul II* (Washington, D.C.: The Catholic University of America Press, 2000), 49–94; Peter Simpson, *On Karol Wojtyła* (Wadsworth, 2001), 10–18 and 23–45; Miguel Acosta and Adrian J. Reimers, *Karol Wojtyła's Personalist Philosophy: Understanding Person and Act* (Washington DC: The Catholic University of America Press, 2016): Acosta generally treats Wojtyła's method at 32–40, while Reimers focuses on Wojtyła's method from "experience" at 41–48; finally, Rev. Grzegorz Hołub, Tadeusz Biesaga SDB, Jarosław Merecki SDS, and Marek Kostur, *The Polish Christian Philosophy in the 20th Century: Karol Wojtyła* (Krakow: Ignatianum University Press, 2019), 29–42.

[3] Showing that Husserl conceives phenomenology as an Aristotelian science presupposing the existence of its subject-genus, I have demonstrated that his method is not equivalent to idealism and that, in fact, as Husserl himself has stated, phenomenology is fundamentally realist. See, Daniel C. Wagner, "On the Foundational Compatibility of Phenomenology & Thomism," *Studia Gilsoniana*, vol. 10, no. 3 (July–September 2021): 579–607. ISSN 2300–0066 (print) ISSN 2577–0314 (online) DOI: 10.26385/SG.100323. My approach follows and is inspired by Robert Sokolowski, who has shown the way to the proper interpretation of Husserlian phenomenology as realist. See, Robert Sokolowski, *Introduction to Phenomenology* (New York: Cambridge University Press, 2000), especially 21 and 216. As treated in the article, the following scholars have sought

cal fold of Wojtyła's method, thus, stands on firm realist ground and permits of the fertile synthesis with Aristotelian and Thomistic methodology that he has masterfully provided in *The Acting Person*.[4]

Another issue, which in comparison has received very little attention, pertains to the precise *logical* nature of Wojtyła's Aristotelian methodology, *induction* and *reduction*,[5] and its connection to the phenomenological method. To be sure, commentators have performed the service of reporting or presenting the order of Wojtyla's *exercise* of this methodology in *The Acting Person*, and some have given helpful descriptions of the method using traditional Aristotelian and Thomistic terminology.[6] However, a rigorous presentation of the Aristotelian logical methodology that Wojtyła calls *induction* and *reduction*, *per se*, is needed for proper understanding of the Polish Philosopher's *magnum opus*.

In accord with Aristotle's use of the term μέθοδος/*methodos*—meaning literally, *after* (μετά) a *road*/*path*/*way*/*via* (ὁδός)—to disclose a *method* is to exhibit in precise logical *form* the kind of intellectual activity and reasoning that, *after*

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to distance Wojtyła's phenomenological methodology from that of Husserl, which they interpret as equivalent to idealism, often, in effect, reducing it to a mere rhetorical device: Schmitz, *At the Center of the Human Drama*, 68; Kupczak, O.P., *Destined for Liberty*, 75; Williams, L.C., "What is Thomistic Personalism?" in *Alpha Omega*, VII, n. 2 (2004, 163–197), 170; and, Miguel Acosta and Adrian J. Reimers, *Karol Wojtyla's Personalist Philosophy: Understanding Person and Act*, 21.

[4] Inspired by Sokolowski and Wojtyła, I have recently added to the tradition of synthesizing realist (Husserlian) phenomenology and Thomism in my "Penitential Method as Phenomenological: The Penitential ἐποχή," in *Studia Gilsoniana* 7, no. 3 (July–September 2018): 487–518.

[5] Wojtyła does not explicitly label reduction as Aristotelian in the Introduction to *AP*. The fact will be demonstrated in this study.

[6] Kenneth L. Schmitz, *At the Center of the Human* Drama, 65–89. Schmitz rightly identifies the method with "analysis" (65–66) and induction with concept formation (70). Buttiglione correctly identifies induction with concept formation in *Karol Wojtyła: The Thought of the Man Who Became Pope John Paul II*, 124-125. At 69–74, Kupczak very well presents Wojtyła's method of induction as Aristotelian and Thomistic. He rightly identifies it as concept formation, and he directly ties it to Aristotle. Miguel Acosta and Adrian J. Reimers, *Karol Wojtyła's Personalist Philosophy: Understanding Person and Act,* 32–40 and 41–48. As treated by Acosta at 32–35, see also, María José Franquet, *Persona, Acción y Libertad. Las claves de la antropología de Karol Wojtyla* [Person, Action and Freedom. Keys to Karol Wojtyła's anthropology] (Pamplona: Eunsa, 1996), 139–140, and Rodrigo Guerra López, *Volver a la persona. El método losó co de Karol Wojtyla* [Turn to the person. The philosophical method of Karol Wojtyła] (Madrid: Caparrós Editores, 2002), 301–309. Rev. Grzegorz Hołub, Tadeusz Biesaga SDB, Jarosław Merecki SDS, and Marek Kostur, *The Polish Christian Philosophy in the 20th Century: Karol Wojtyła*, 29–42. On 35, the authors well note that, "Wojtyła became an empiricist of the genetic Aristotelian-Thomistic philosophy and modified his understanding in positivist and empirical trends." While they do not treat of the logical methodology *per se*, Grzegorz Holub and Piotr Stanislaw Mazur give an extremely helpful treatment of Wojtyła's *exercise* of inductive reasoning/division in *The Acting Person*, showing that the inner and outer dimension of personal experience are (i) irreducible to eachother, (i) co-dependent, (iii) and distinct. See, "The Experience of Human Being in the thought of Karol Wojtyla" in *Filosofija Sociologija* (2017), T. 28. Nr. 1, 73–83.

one exercises it, is the *way* into knowledge of principles or conclusions.[7] Unless such a reflective, logical account of the method being used is given, the logical force entailed in the exercise of the account will not be appreciated. This, of course, is why philosophy has traditionally commenced with the formal study of grammar and logic—a fact reflected in the very organization of the texts of Aristotle from antiquity.[8] In formulating a method to rigorously study a given subject, one must first be able to identify the modes of reasoning one is utilizing. Second, one must express the kind of certitude they obtain: probabilistic/dialectical, unqualified necessity, qualified necessity of constraint, or hypothetical/conditional necessity.[9] To begin, then, a clear account of Wojtyła's Aristotelian *inductive* and *reductive* method *per se* is needed so that its logical force can be properly appreciated. Further, precisely because a complete and clear account of Wojtyła's Aristotelian method is lacking, there is confusion and error regarding this methodology.[10] Some commentators miss the logical force of Wojtyła's

[7] See, especially, Aristotle's comments on method (μέθοδος) in *Nicomachean Ethics* at I.1 (1094a1-3), I.2 (1094b10-11), I.2 (1094a22-26), and again at V.1 (1129a3-6), in conjunction with his treatments of induction and division as the means by which the first principles of a science, that is, definitions, are obtained in *Posterior Analytics* I.3, 18 and II.1-14 and 19, which will be treated in detail presently.

[8] In his organization of the Aristotelian corpus in the 1st century B.C., Andronicus of Rhodes, thus, placed works of logic and grammar at the beginning (*Topics*, *Categories*, *Prior* and *Posterior Analytics*, *On Interpretation*, and *On Sophistical Refutation*). Since A.D. 200, beginning with the Peripatetic commentator, Alexander of Aphrodisias, this collection of texts has been referred to as the "Organon," as in 'instrument' for obtaining proper knowledge.

[9] These forms of necessity are from Aristotle's logic, as will be shown in this study, below. I use the phrase "qualified necessity of constraint" to refer to the kind of necessity that Aristotle attributes to non-middle termed, *reductio ad impossibile* argumentation.

[10] In *At the Center of the Human Drama* (65–67), Schmitz equates reduction with phenomenological analysis, failing to appreciate that it is also Aristotelian division and to explain it as such. He claims that reduction is an approach unique to Wojtyła to be discerned by looking to his own use of the method: "Moreover, his use of the terms "reduction" (*AP* 78, 82), "interpretation," and "understanding," take their meaning from his distinctive use of them in the analysis that follows (*AP* 15–18)." Schmitz also does not clearly explain the role and relation of judgement or "insight," (by which I take him to be referring to Aristotle's νοῦς/*nous*) to Aristotelian induction (see, 70). Finally, as a matter of textual method, he does not treat Wojtyla's exposition on induction and reduction in the Introduction of *AP*. In *Karol Wojtyła: The Thought of the Man Who Became Pope John Paul II*, Buttiglione shows confusion regarding "Aristotelian-Thomistic induction," implying that it is usually taken to entail the error of abstraction (reduction/equation of the particulars to abstract universal meaning) while Wojtyła's method does not entail this error (125). St. Thomas explicitly rejects this error in *Summa Theologiae* I, qq. 84–85. As Buttiglione provides no textual sources, it is unclear to whom he is referring. Further, at 126, he contrasts reduction to induction in such a manner as to hold that the former is not Aristotelian and Thomistic (whereas, as will be shown below, it is): "As we have seen, the stabilization of the object of experience is obtained through induction. It is this which, in general, gives us the connection person/action or, better, gives us the person as subject of the action. This connection, however (*and here lies the difference from traditional Thomism*), needs to be further

account of the essence of the human person entirely, portraying it as though Wojtyła's intent was that we determine whether his account is true or false merely by "seeing" or judging it in relation to our own expereince.[11] If this is all the logical force of Wojtyła's account, it hardly seems necessary for him to describe his method in Aristotelian or phenomenological terms and it would be hard to take his work as philosophically serious. In order to fully appreciate the logical force of Wojtyła's accomplishment of disclosing the essence of the human person and avoid confusion and error, thus, this two-part study will show that Wojtyła's *induction* and *reduction* are the Aristotelian methods of induction (ἐπαγωγή/*epagoge*) and division (διαίρεσις/*diairesis*) or analysis (ἀνάλῦσις/*analusis*). Here, Part I, offers a careful and textually rigorous presentation of the Aristotelian methodology for obtaining definitions—itself often misunderstood and under-appreciated.[12] This presentation will provide the foundational Aris-

unveiled if we want to grasp the person in his dynamic essence. The Aristotelian-Thomist induction must be followed by a reduction (which is not exactly the same as the usual phenomenological reduction) if we want to do adequate justice to the existential depth of the person." Emphasis added. Finally, he does not define reduction in the terms of Wojtyła or Aristotle, which is needed for understanding.

[11] See, Rocco Buttiglione, *Karol Wojtyła: The Thought of the Man Who Became Pope John Paul II*, 127: "The force of the conviction of reduction does not lie in the logical strength which compels assent, but in the exactness of the description of the fundamental structures of experience which give rise, in anyone who has lived it, to the recognition that the thing is exactly as it is described. The assent arises in this case from the recognition that one's own experience of life is adequately expressed by the phenomenological description, and in such a way as to be at the same time judged and corrected." Of course, Buttiglione has a point to the extent that it is true that proper understanding of another philosopher's accomplishments requires "mapping" the concepts, etc., onto one's own experience so that one can "see it for one's self," as it were. However, given that he is explicitly using Aristotelian induction and division (as will be shown, below), Wojtyła's accomplishments in defining the human person, in terms of intellectual assent of the audience capable of understanding, rise to the level of a necessity of constraint and/or hypothetical necessity, in accord with Aristotle's canons for the principles of a science at *Posterior Analytics* I.2.

[12] See, Daniel C. Wagner, φύσις καὶ τὸ ἀνθρώπινον ἀγαθόν: *The Aristotelian Foundations of the Human Good* (Dissertation, available through ProQuest, 2018), Chapter 2, especially 118–126. Jonathan Barnes holds that Aristotelian works dealing with contingent matters, for example, *Physics*, *De Anima*, and *Nicomachean Ethics*, cannot constitute proper Aristotelian sciences. See, "Aristotle's Theory of Demonstration," *Phronesis* (1969), 14.2, 123–152; and, *Aristotle: A Short Introduction* (Oxford: Oxford University Press, 1982), 38–39. Barnes arrives at this view partly by reducing Aristotelian science to the mathematical sciences, and partly because he interprets induction (following Hume), to be a fallacious form of generalization that could not, in principle, achieve knowledge of first principles in accord with the canon of *APo* I.2. See his *Commentary*, in *Posterior Analytics*, tr. by Jonathan Barnes (Oxford: Clarendon Press, 2002), 271. Barnes interpretation has been widely influential. There is an older tradition going back to J. Burnet, *The Ethics of Aristotle* (London: Methuen, 1900), which is also the source of much confusion. Burnet reduced Aristotle's method for obtaining knowledge of definitions or first principles to dialectic as set out in the *Topics*. As dialectic only produces probabilistic knowledge, it cannot be

totelian terms of methodology necessary for proper understanding of Wojtyła's method. This being accomplished, it will be shown in Part II that, in line with Aristotle's position that the source of proper knowledge in art (τέχνη/*techne*) and science (ἐπιστήμη/*episteme*) is the knowledge state of *experience* (ἐμπειρία/*empeiria*), Wojtyła commences *The Acting Person* by taking an experiential, better-known to us concept of the person, and then proceeds to use the Aristotelian logical method of division to obtain a refined, better known-to-nature conception of the essence of the human person, that is, the εἶδος/*eidos* or *species* in the Aristotelian, Thomistic, and Phenomenological sense of the term. As treated by Aristotle, and here in Part I, the logical method of division utilizes two forms of reasoning: (i) a *reductio ad impossibile* form that works by showing the necessity of assenting to a meaning on the ground that a contradiction will otherwise follow, and (ii) *hypothetical* form that works by showing that on the hypothesis or condition of some end or effect, some other attribute is necessary or fitting. The former form, in accord with *Posterior Analytics* II.13–14, is used for setting out generic and specific differences of all kinds, and it provides us with necessary knowledge of a factual experiential sort. Part II of this study will then discolose Wojtyła's use of this methodology. Wojtyła uses the first form where he seeks to establish the irreducibility of terms and their meaning in analysis of experience, for example, the *inner* and *outer experience* of the person. The latter form, in accord with Aristotle's accounts of division in *De Partibus Animalium* I–II.1 and *De Anima* I.1, also constitutes a form of causal explanation, and it is used by Wojtyła in his rigorous connection of the acts of the person, given in experience, to their dynamic powers, for example, consciousness. Both logical forms of reasoning, as will be shown, produce a necessity, requiring intellectual assent by any audience that understands the meanings of the terms. Simple *reductio* reasoning produces what will be called here a logical *necessity of constraint*, while division by the power-object model produces a *hypothetical* or *conditional necessity*.[13] By disclosing Wojtyła's Aristotelian methodology in this manner and clearly identifying the formal necessity it produces, his important contribution to perennial philosophy of integrating Aristotelian-Thomism and Phenomenology will be augmented and developed. This contribution is significant, as Wojtyła himself has given such brief and limited account of his method

the means by which the philosopher or scientist proceeds to grasping the first principles or premises with necessity. Burnet then assumes that Aristotle's method for obtaining primary definitions in works like the *Ethics* is dialectical, resulting in the view that there is no necessity in the account. As has been shown elsewhere, this is certainly not how Aristotle conceives of his method. See, chapter 5 of *The Aristotelian Foundations of the Good*.

[13] I am inspired to describe Aristotle's method for dividing animals into essentially different kinds as *the power-object model of division* by William A. Wallace. See, *The Modeling of Nature* (Washington, D.C.: The Catholic University of America Press, 1996), especially pages 31, and 157–189.

in *The Acting Person*. Toward the end of his Introduction to *The Acting Person*, Wojtyła notes that "the reader himself will readily recognize all the influences and borrowings in this work."[14] Accordingly, this work is offered in service to those studying the thought of Wojtyła who have a need for a deeper understanding of the foundational Aristotelian methodology, to which Wojtyła is indebted.

II. Aristotle's method of Induction (ἐπαγωγή) and Division (διαίρεσις)[15]

Aristotle first gives a general account of induction (ἐπαγωγή/*epagoge*) and division (διαίρεσις/*diairesis*) in *Posterior Analytics*.[16] As the primary subject matter of the work is science (ἐπιστήμη/*episteme*) conducted *after analysis* and achieved through the demonstrative syllogism, that is, formally valid and sound deductive argument, and as he is clear that a logical method must be formulated in light of the particular subject-genus being studied (there is no "one size fits all" method, as it were, for the many fields of knowledge[17]), he spends little time on the topic of induction and division in *APo*—though what precious little he does say is of profound importance. He then provides additional comments on subject specific inductive methodology and division relevant to our inquiry in *Physics, De Partibus Animalium*, *De Anima,* and *Nicomachean Ethics*, that is, the particular sciences related to philosophical anthropology. Here, we will set out his conception of induction and division in these texts, in order to see clearly how Wojtyła appropriates them in *The Acting Person*.[18]

At the outset of *APo*, Aristotle divides reason (λόγος/*logos*) into two forms: (1) the syllogism (συλλογισμός/*sullogismos*) and (2) induction (ἐπαγωγή/*epagoge*). While the former is constituted by deductive reasoning from better-known

[14] *AP*, 22.

[15] Significant portions of the treatment of Aristotle on induction and division, here, are taken from chapter 2, 3, 4, and 5 *The Aristotelian Foundations of the Human Good*.

[16] Here after, the work is referred to as *APo*, for its Latin title, *Analytica posteriora*.

[17] On this point in Aristotle, see *De Anima* I.1 and *Nicomachean Ethics* I.1-3. A very helpful treatment of the topic is given by James G. Lennox in "Aristotle on the Norms of Inquiry," in *HOPOS: The Journal of the International Society for the History of Philosophy*," vol. 1, no. 1 (Spring 2011).

[18] Here, I offer a synthetic treatment of Aristotle's conceptions of induction and division ordered to understanding the method of Karol Wojtyła. For a comprehensive presentation and defense of the interpretation given here, by rigorous analysis and exegesis of the original Greek text, taking into account commentary literature, see Daniel Wagner, *The Aristotelian Foundations of the Human Good*, chapters 2–5.

premises to a conclusion, the latter, Aristotle tells us, works by "critically-exhibiting the universal (καθόλου/*katolou*) through that being manifest in particular."[19] Since the terms by which we define individual being or substance (οὐσία/*ousia*) in the world, that is, genus, species, and difference,[20] are universals, and since Aristotle says here that *induction* is said to constitute a type of reason which produces an apprehension of the universal from the particulars, it is clear that induction will be the method of reasoning by which we define beings or substances. We know, then, at the outset, that induction is a method for defining.

In the order of knowing on the way to obtaining definitions, Aristotle holds that understanding proceeds in two stages: (1) intellect begins with what is prior and better-known to us, which is constituted by the particular beings given in sense-perceptive experience and proceeds to (2) what is better-known to nature or without qualification, which is constituted in universal knowledge of scientific principles and conclusions.[21] Thus, after sense-perception of particular be-

[19] *Posterior Analytics*, I.1 (75a5-9): ὁμοίως δὲ καὶ περὶ τοὺς λόγους οἵ τε διὰ συλλογισμῶν καὶ οἱ δι' ἐπαγωγῆς· ἀμφότεροι γὰρ διὰ προγινωσκομένων ποιοῦνται τὴν διδασκαλίαν, οἱ μὲν λαμβάνοντες ὡς παρὰ ξυνιέντων, οἱ δὲ δεικνύντες τὸ καθόλου διὰ τοῦ δῆλον εἶναι τὸ καθ' ἕκαστον. Or, "It is the same [i.e., that instruction and learning are from prior knowledge,] concerning reasoning acts (λόγους), both those which are through syllogism and also those which are through induction (ἐπαγωγῆς), for both produce learning through what is priorly known, the former [by] assuming—as from those who agree [to accept premises]—and the latter [by] critically-exhibiting (δεικνύντες) the universal (καθόλου) through that being manifest in particular." Some translators and commentators have equated the *induction* Aristotle here refers to with dialectical reasoning as set out in the *Topics*. See, Hugh Tredennick, *Posterior Analytics*, in Loeb Classical Library (Cambridge, MA: Harvard University Press, 1960), footnote b, 24–25; and G.R.G. Mure, *Posterior Analtyics*, in *The Basic Works of Aristotle*, ed. Richard McKeon (New York: Random House, 1941), 110, who actually adds "dialectical" into the text of his translation, though there is no form of διαλεκτικός/*dialectikos* in the Greek text. This is a serious error in interpretation. As will be shown, induction is the method by which the first principles of a science are known as necessarily true, while dialectic only produces a probabilistic certitude (*APo* I.2, 72a9). Thus, Aristotle does not take inductive processes of concept formation and division as dialectical. My translation and interpretation is in line with that of Apostle, who also has helpful comments on the topic. See, *Aristotle's Posterior Analytics*, tr. Hippocrates G. Apostle (Grinnel, IA: The Peripetetic Press, 1981), page 1 and the corresponding note 6, on page 77. For more on this issue, see also, *The Aristotelian Foundations of the Human Good*, 128 and footnote 118.

[20] See: *Categories*, 5.

[21] *Posterior Analytics*, I.2 (71b33-72a5). πρότερα δ' ἐστὶ καὶ γνωριμώτερα διχῶς· οὐ γὰρ ταὐτὸν πρότερον τῇ φύσει καὶ πρὸς ἡμᾶς πρότερον, οὐδὲ γνωριμώτερον καὶ ἡμῖν γνωριμώτερον. λέγω δὲ πρὸς ἡμᾶς μὲν πρότερα καὶ γνωριμώτερα τὰ ἐγγύτερον τῆς αἰσθήσεως, ἁπλῶς δὲ πρότερα καὶ γνωριμώτερα τὰ πορρώτερον. ἔστι δὲ πορρωτάτω μὲν τὰ καθόλου μάλιστα, ἐγγυτάτω δὲ τὰ καθ' ἕκαστα· Or, "There are two senses of 'prior' and 'better known.' For that which is prior by nature is not the same as that which is prior in relation to us, nor is that which is better known [by nature] the same as what is better known in relation to us. I mean by 'prior' and 'better known' in relation to us those things that are nearer to sense-perception (τὰ ἐγγύτερον τῆς αἰσθήσεως), whereas by 'prior' and 'better known' in the unqualified sense (ἁπλῶς) I mean those things that are further [from it]. Those things which are most universal (καθόλου) are the fur-

ings in the world, human beings use an inductive process of reasoning to acquire proper, universal definitions. These definitions then serve as the premises of demonstrative syllogisms constituting the highest level of universal, scientific understanding. The definitions, which are the principles (ἀρχαί/*archai*) of scientific understanding, come in the form of *axioms*, and then the *hypothesis* and the *thesis*. An axiom is a principle necessary for any knowledge inquiry—so it generally assumed in all the sciences—as for example, the principle of non-contradiction. A *hypothesis* (ὑπόθεσις/*hupothesis*) is a statement including a definition and an existential claim. For example, 'There *is* a unit (i.e., something indivisible with respect to quantity).' A thesis (ὁρισμός/*horismos*), on the other hand, states a meaning or whatness (τί ἐστι/*ti esti*), but makes no existential claim, for example, 'A unit is what is indivisible with respect to quantity.'[22] These definitions provide the inquirer with the first principles or premises to be used in scientific demonstration.

Aristotle defines scientific knowledge as knowledge of the cause the fact that is necessary, that is, it cannot be otherwise than it is.[23] He explains that this kind of knowledge is acquired as a state from the reasoning act of a demonstrative, deductive syllogism, the paradigm of which is the middle-termed categorical syllogism.[24] Because of the fact that the only way in which the conclusion of the deductive syllogism will necessarily be true—so that the argument is both valid

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thest [from sense perception], whereas the particulars (καθ' ἕκαστα) are nearest [to it]." Cf., *Physics* I.1, which will also be treated below.

[22] *Posterior Analytics*, I.2 (72a18-24): θέσεως δ' ἡ μὲν ὁποτερονοῦν τῶν μορίων τῆς ἀντιφάσεως λαμβάνουσα, οἷον λέγω τὸ εἶναί τι ἢ τὸ μὴ εἶναί τι, ὑπόθεσις, ἡ δ' ἄνευ τούτου ὁρισμός. ὁ γὰρ ὁρισμὸς θέσις μέν ἐστι· τίθεται γὰρ ὁ ἀριθμητικὸς μονάδα τὸ ἀδιαίρετον εἶναι κατὰ τὸ ποσόν· ὑπόθεσις δ' οὐκ ἔστι· τὸ γὰρ τί ἐστι μονὰς καὶ τὸ εἶναι μονάδα οὐ ταὐτόν. Or, "I call a thesis being taken as either part of contradictory statements, such as that something is the case or that it is not the case, a hypothesis, and that without reference to such [i.e., existence] a definition. For a definition is a thesis; for the mathematician sets down that a unit is what is indivisible with respect to quantity; but this is not a hypothesis, for what a unit is and that a unit exists are not the same thing." Below, to avoid confusion on account of the contemporary meaning of "hypothesis," I will refer to hypotheses and "definitions" as definitions.

[23] *Posterior Analytics*, I.2 (71b9-12): Ἐπίστασθαι δὲ οἰόμεθ' ἕκαστον ἁπλῶς, ἀλλὰ μὴ τὸν σοφιστικὸν τρόπον τὸν κατὰ συμβεβηκός, ὅταν τήν τ' αἰτίαν οἰώμεθα γινώσκειν δι' ἣν τὸ πρᾶγμά ἐστιν, ὅτι ἐκείνου αἰτία ἐστί, καὶ μὴ ἐνδέχεσθαι τοῦτ' ἄλλως ἔχειν. Or, "We think ourselves to know scientifically (Ἐπίστασθαι) a particular thing without qualification, and not in the sophistic manner according to accident, when we think we know the cause on account of which the thing is—*that it is its cause*—and that this cannot be otherwise."

[24] *Posterior Analytics*, I.2 (71b16-19): Εἰ μὲν οὖν καὶ ἕτερος ἔστι τοῦ ἐπίστασθαι τρόπος, ὕστερον ἐροῦμεν, φαμὲν δὲ καὶ δι' ἀποδείξεως εἰδέναι. ἀπόδειξιν δὲ λέγω συλλογισμὸν ἐπιστημονικόν· ἐπιστημονικὸν δὲ λέγω καθ' ὃν τῷ ἔχειν αὐτὸν ἐπιστάμεθα. Or, "Now, whether there is another manner of knowing (ἐπίστασθαι), we will say later, but [for now] we say that knowledge (εἰδέναι) is through demonstration. With respect to 'demonstration,' I mean a scientific syllogism; and, with respect to 'scientific,' I mean precisely that by which the possession is itself scientific knowledge."

and sound—if the premises are known with necessity to be true, it becomes immediately clear that the primary premises of scientific demonstration must, *inter alia*, *necessarily* be true.[25] Further, and because all knowledge cannot be through the demonstrative syllogism, lest there be an infinite regress in understanding making scientific knowledge itself impossible, it is necessary that Aristotle set down another form of reasoning that is not in the form of the middle-termed syllogism, but is yet still productive of an understanding of first principles or definitions that is necessarily true.[26] This form or reasoning, Aristotle tells us, precisely, is induction, which proceeds from what is better-known to us, that is, the particulars of sense-perception, and is a qualified form of demonstration.[27] Primary definitions (ὅροι/*horoi*) are grasped as necessarily true, then, not by demonstration in the unqualified (ἁπλῶς/*haplos*) sense (i.e., through a middle termed demonstration), but through induction—the second type of reasoning act he had mentioned at the outset of *APo*—which is qualified, or as he says, "not without qualification" (οὐχ ἁπλῶς/*ouk haplos*). It "is impossible," so says Aristotle, "to seek theoretical knowledge (θεωρῆσαι) of the universal [i.e., the definition], except through induction (μὴ δι' ἐπαγωγῆς)."[28]

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[25] *Posterior Analytics*, I.2 (71b20-23): "εἰ τοίνυν ἐστὶ τὸ ἐπίστασθαι οἷον ἔθεμεν, ἀνάγκη καὶ τὴν ἀποδεικτικὴν ἐπιστήμην ἐξ ἀληθῶν τ' εἶναι καὶ πρώτων καὶ ἀμέσων καὶ γνωριμωτέρων καὶ προτέρων καὶ αἰτίων τοῦ συμπεράσματος· οὕτω γὰρ ἔσονται καὶ αἱ ἀρχαὶ οἰκεῖαι τοῦ δεικνυμένου." Or, "Accordingly, if scientific knowledge (τὸ ἐπίστασθαι) is as we have stated, it is *necessary* (ἀνάγκη) that demonstrative science (τὴν ἀποδεικτικὴν ἐπιστήμην) be from principles that are *true*, primary, immediate, better known, prior to and also causative of the conclusion; for in this manner the principles (αἱ ἀρχαὶ) will be the proper belongings [i.e., essential attributes] of what is shown."

[26] See footnote 27, immediately below.

[27] *Posterior Analytics*, I.3 (72b25-32): "κύκλῳ τε ὅτι ἀδύνατον ἀποδείκνυσθαι ἁπλῶς, δῆλον, εἴπερ ἐκ προτέρων δεῖ τὴν ἀπόδειξιν εἶναι καὶ γνωριμωτέρων· ἀδύνατον γάρ ἐστι τὰ αὐτὰ τῶν αὐτῶν ἅμα πρότερα καὶ ὕστερα εἶναι, εἰ μὴ τὸν ἕτερον τρόπον, οἷον τὰ μὲν πρὸς ἡμᾶς τὰ δ' ἁπλῶς, ὅνπερ τρόπον ἡ ἐπαγωγὴ ποιεῖ γνώριμον. εἰ δ' οὕτως, οὐκ ἂν εἴη τὸ ἁπλῶς εἰδέναι καλῶς ὡρισμένον, ἀλλὰ διττόν· ἢ οὐχ ἁπλῶς ἡ ἑτέρα ἀπόδειξις, γινομένη γ' ἐκ τῶν ἡμῖν γνωριμωτέρων." Or, "It is clear that it is impossible to demonstrate in a circular manner, if it is required that demonstration be from premises that are better-known; for it is impossible that the same premises be at one and the same time both prior and posterior—unless there is another meaning [of prior and posterior], as in [the sense of] those things which are [prior] in relation to us as distinct from those which are prior and posterior without qualification, and indeed this [former] is the manner in which *induction* (ἐπαγωγὴ) produces knowledge (ποιεῖ γνώριμον). But, if this is so, then knowledge in the unqualified sense (τὸ ἁπλῶς εἰδέναι) has not been well defined, but it is twofold. Or, rather, the other form of demonstration is not without qualification (οὐχ ἁπλῶς), but [is qualified as it] comes to be from what is better-known in relation to us."

[28] *Posterior Analytics*, I.18 (81a38-81b9): "It is also manifest that if some sense-perception (τις αἴσθησις) has been lacking, then, necessarily, the particular [corresponding] science (ἐπιστήμην) would have also been lacking, because it could not have been established, since learning is either by induction (ἐπαγωγῇ) or demonstration (ἀποδείξει), and demonstration is from the universal, while induction is from the part, but it is impossible to seek theoretical knowledge

Aristotle describes the process of induction in general terms in his famous genetic accounts of knowledge at *APo* II.19 and *Metaphysics* I.1. The ultimate source of knowledge is an "inborn capacity (δύναμις/*dunamis*) of discernment (κρῐτῐκός/*kritikos*), which is called sense-perception (αἴσθησις/*aisthesis*)," and which all animals possess.[29] Along with sense-perception, some animals possess also the capacity of memory, that is, the retention (μονὴ/*mone*) of the perceived (τοῦ αἰσθήματος/*tou aisthematos*) in the soul.[30] After sense-perception and memory, Aristotle notes that a further "distinction arises that for some [animals], out of such remaining [perceptions/memories], there comes to be reason or a reasoned-account (λόγον/*logon*)."[31] Human beings, then, are different in kind from other animals as possessing the faculty of reason.[32]

(θεωρῆσαι) of the universal, except through induction (μὴ δι' ἐπαγωγῆς) (and even those expressions from abstraction will be made known by induction, because some things belong to each genus, even though they are not separate, insofar as each is such and such a kind of thing), and it is impossible to have learned inductively (ἐπαχθῆναι) except in possessing sense-perception. For sense-perception is of particular things; though it is not possible to establish a science of them [i.e., the *particular qua particular*]; for neither [is there reasoning] from universals without induction, nor [are there universals] through induction without sense-perception." Or, Φανερὸν δὲ καὶ ὅτι, εἴ τις αἴσθησις ἐκλέλοιπεν, ἀνάγκη καὶ ἐπιστήμην τινὰ ἐκλελοιπέναι, ἣν ἀδύνατον λαβεῖν, εἴπερ μανθάνομεν ἢ ἐπαγωγῇ ἢ ἀποδείξει, ἔστι δ' ἡ μὲν ἀπόδειξις ἐκ τῶν καθόλου, ἡ δ' ἐπαγωγὴ ἐκ τῶν κατὰ μέρος, ἀδύνατον δὲ τὰ καθόλου θεωρῆσαι μὴ δι' ἐπαγωγῆς (ἐπεὶ καὶ τὰ ἐξ ἀφαιρέσεως λεγόμενα ἔσται δι' ἐπαγωγῆς γνώριμα ποιεῖν, ὅτι ὑπάρχει ἑκάστῳ γένει ἔνια, καὶ εἰ μὴ χωριστά ἐστιν, ᾗ τοιονδὶ ἕκαστον), ἐπαχθῆναι δὲ μὴ ἔχοντας αἴσθησιν ἀδύνατον. τῶν γὰρ καθ' ἕκαστον ἡ αἴσθησις· οὐ γὰρ ἐνδέχεται λαβεῖν αὐτῶν τὴν ἐπιστήμην· οὔτε γὰρ ἐκ τῶν καθόλου ἄνευ ἐπαγωγῆς, οὔτε δι' ἐπαγωγῆς ἄνευ τῆς αἰσθήσεως.

[29] See *APo* II.19 (99b34-35): φαίνεται δὲ τοῦτό γε πᾶσιν ὑπάρχον τοῖς ζῴοις. ἔχει γὰρ δύναμιν σύμφυτον κριτικήν, ἣν καλοῦσιν αἴσθησιν· Or, "And it is manifest, indeed, that this [kind of capacity] belongs to all animals. For they possess an inborn capacity of discernment, which is called sense-perception."

[30] *Posterior Analytics* II.19 (99b36-37): ἐνούσης δ' αἰσθήσεως τοῖς μὲν τῶν ζῴων ἐγγίγνεται μονὴ τοῦ αἰσθήματος, τοῖς δ' οὐκ ἐγγίγνεται. Or, "for some of the animals, however, the sense-perceptions having come to be, the perceived also comes to remain, and for others they do not come to remain."

[31] *Posterior Analytics*, II.19 (99b37-100a3): ὅσοις μὲν οὖν μὴ ἐγγίγνεται, ἢ ὅλως ἢ περὶ ἃ μὴ ἐγγίγνεται, οὐκ ἔστι τούτοις γνῶσις ἔξω τοῦ αἰσθάνεσθαι· ἐν οἷς δ' ἔνεστιν αἰσθομένοις ἔχειν ἔτι ἐν τῇ ψυχῇ. πολλῶν δὲ τοιούτων γινομένων ἤδη διαφορά τις γίνεται, ὥστε τοῖς μὲν γίνεσθαι λόγον ἐκ τῆς τῶν τοιούτων μονῆς, τοῖς δὲ μή. Or, "And for those [animals] in which these [memories] do not come to be, either the whole or [at least] concerning those [memories] that do not come to be, there is no kind of knowledge outside of sense-perception; in those animals, however, in which the sense-perceptions remain, there is the possession of something else in the soul. And from many such [memories] having come to be, there immediately arises a certain distinction, that for some, out of such remaining [perceptions/memories], there comes to be a reasoned-account (λόγον), while for others this is not the case."

[32] That Aristotle holds that λόγος sets humans apart from other animals is clear from *Metaphysics* I.1, (980b25-8), where distinguishes humans from other animals that have but little of experience, as having λογισμός. Cf. David Bronstein, "The Origin and Aim of *Posterior Analytics* II.19" *Phronesis* 57 (2012), 29–62. 41.

Reason allows humans to form the knowledge state of *experience* (ἐμπειρία/*empeiria*):

> From sense-perception, then, comes to be memory, precisely as was said, and from many memories of the same thing comes to be experience (ἐμπειρία/*empeiria*); for the many memories (with respect to number) are one experience.[33]

Immediately, Aristotle conveys the proper meaning of *experience*, equating it with the apprehension of a universal, and he asserts that it is the source (ἀρχή/*arche*) of knowledge both in the arts and in science:

> And from experience or every universal being established in the soul—the one in relation to the many, which *one* would be the same in all the many particulars—[is] the principle of art (τεχνή) and science (ἐπιστήμη): if it concerns production, art [and], if it concerns being, science.[34]

In the parallel account at *Metaphysics* I.1, Aristotle is careful to qualify that experience (ἐμπειρία/*empeiria*) is not the same thing as science (ἐπιστήμη/*episteme*) and art (τεχνή/*techne*), "but rather, for human beings, science and art depart through experience."[35] Experience, he notes, is constituted when we know 'that something is the case,' or the fact' (τὸ ὅτι/*to hoti*) while art and science know also 'the account of why it is so' or the cause (τὸ διότι καὶ τὴν αἰτίαν/*to dioti kai ten aitian*).[36] Between the *APo* II.19 and *Metaphysics* I.1 account, it is apparent that "experience" itself has two stages: (1) basic concept formation allowing for apprehension of particulars by a better-known meaning, and then (2)

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[33] *Posterior Analytics,* II.19 (100a3-6): Ἐκ μὲν οὖν αἰσθήσεως γίνεται μνήμη, ὥσπερ λέγομεν, ἐκ δὲ μνήμης πολλάκις τοῦ αὐτοῦ γινομένης ἐμπειρία· αἱ γὰρ πολλαὶ μνῆμαι τῷ ἀριθμῷ ἐμπειρία μία ἐστίν. Animals possess something of experience, though it is not rational and proceeds by acts of calculative association. This topic is beyond our scope.

[34] *Posterior Analytics,* II.19 (100a6-9): ἐκ δ' ἐμπειρίας ἢ ἐκ παντὸς ἠρεμήσαντος τοῦ καθόλου ἐν τῇ ψυχῇ, τοῦ ἑνὸς παρὰ τὰ πολλά, ὃ ἂν ἐν ἅπασιν ἓν ἐνῇ ἐκείνοις τὸ αὐτό, τέχνης ἀρχὴ καὶ ἐπιστήμης, ἐὰν μὲν περὶ γένεσιν, τέχνης, ἐὰν δὲ περὶ τὸ ὄν, ἐπιστήμης.

[35] *Metaphysics*, I.1 (981a1-3): καὶ δοκεῖ σχεδὸν ἐπιστήμη καὶ τέχνη ὅμοιον εἶναι καὶ ἐμπειρία, ἀποβαίνει δ'

ἐπιστήμη καὶ τέχνη διὰ τῆς ἐμπειρίας τοῖς ἀνθρώποις· Or, "And, roughly speaking, experience (ἐμπειρία) seems to be similar to science and art (ἐπιστήμη καὶ τέχνη), but rather science and art take their point of departure for humans through experience."

[36] *Metaphysics*, I.1 (981a28-30): οἱ μὲν γὰρ ἔμπειροι τὸ ὅτι μὲν ἴσασι, διότι δ' οὐκ ἴσασιν· οἱ δὲ τὸ διότι καὶ τὴν αἰτίαν γνωρίζουσιν. Or, "Those with experience have grasped that something is the case, but not the account of why it so. But those [with science or art] know also the account of why it is so and the cause." For a similar reading—that those with art know the causes of their production, and are thus not to be equated with the man of mere experience, see Bronstein, "The Origin and Aim…," 48.

judgement of the fact that the particulars are in some manner with necessity.[37] As will be shown presently, this second stage requires induction as an active form of reasoning, as it was described in *APo* I.3. There is first a rise, then, from initial sensation of the particulars to the formation of universal concepts signifying the particulars, followed by the use of reason and the constitution of factual knowledge (*experience*) used in sense-perceptive judgements.[38] After the formation of such universals, which are principles, premises, and definitions, intellect is capable of using demonstrative reason to obtain knowledge of the cause. As we already know, the form of reason pertaining to the first stage is induction.[39] However, further reflections show that induction itself is a complex, multi-stage process, in need of special attention.

Like its Latinate translation, "induction" (*in* + *ducere*), "ἐπαγωγή/*epagoge*" literally means a 'leading-into.' The term indicates, thus, the sources or beginnings of knowledge—that is, the manner in which unqualified knowledge is 'lead-into.' The answer to the question, 'how is knowledge lead into?' for Aristotle, is complex.[40] In one sense, it is clear that sense-perceptive induction does not involve a reflective use of reasoning (though it does involve intellect). Rather, it is constituted by the intellect gathering up, as it were, a singular universal meaning from the particulars of sensation themselves. This sense of induction then means basic formation of concepts. In another sense, however, induction must be a form of reflective reasoning leading into necessary knowledge of definitions (*universals*) as the principles of scientific demonstration. This is induction as division, since it divides kinds as we have seen, in terms of genus, species, and differentia. Sound interpretation of induction, then, *requires* a distinction between two senses or orders of induction: (1) induction as sense-perceptive concept formation and (2) induction as division. Each order is characterized by an activity that 'leads into' the production of a 'universal.' That there are two senses of induction is confirmed and illucidated by Aristotle's comments on method in the opening lines of the *Physics*, where he describes the process of

[37] In order for experience to provide a premise that is a proper ἀρχή for scientific knowledge in accord with the canon of *APo* I.2, it must be the case that it constitutes necessary knowledge of the fact, which is, again, how we find Aristotle describing the state at *Metaphysics* I.1, in conjunction with the questions of scientific inquiry set down at *APo* II.1.

[38] Apostle's interpretation of this text is along the same lines. See, note 17 in his *Commentary*, 298.

[39] This point is further stated at *Posterior Analytics*, II.19 (100b3-5): "δῆλον δὴ ὅτι ἡμῖν τά πρῶτα ἐπαγογῇ γνωρίζειν ἀναγχαῖον χαὶ γὰρ ἡ αἴσθησις οὕτω τὸ χατόλου ἐμποῖει…" Or, "It is indeed clear that we must come to know the first principles by way of induction, for sense-perception also produces in us the universal in such a manner."

[40] W. D. Ross has sought a singular meaning of ἐπαγωγή in the *Analytics*, *Topics*, and *Rhetoric* without proclaiming success. See, *Aristotle's Prior and Posterior Analytics* (Oxford: Clarendon Press, 1949), 481–483. Ross sees as the only commonality between the various senses a move from particular judgment[s] to a general one, 305.

moving from what is better-known to us to what is better-known to nature in the study of nature. Here, he draws an explicit distinction between two senses of universal (καθολου/*katholou*), which then demands our corresponding distinction between two senses of induction. Aristotle indicates that, methodologically, we move from what is better known to us, which is the indistinctly grasped universal (καθολου/*katholou*) of sense-perception, through the process of dividing (διαιροῦσι/*diairousi*)[41] the principles (ἀρχαὶ) and elements (στοιχεῖα) of this whole to achieve proper knowledge:

> What is first manifest and clear to us, rather, are things taken together without distinction. Later, the elements and principles come to be known by the division of these. Therefore, it is necessary to advance from the universals (ἐκ τῶν καθόλου) to the particulars (ἐπὶ τὰ καθ' ἕκαστα). For the whole (τὸ ὅλον) according to sense-perception (κατὰ τὴν αἴσθησιν) is better known (γνωριμώτερον), and the universal is a certain whole—for the universal embraces many things as its parts.[42]

Sense-perceptive induction leads to the production of a universal meaning that is basic concept formation: sensation of the particular and memory lead to an initial attaching by the intellect of universal meaning to a set of particulars.[43] On the other hand, the induction characteristic of division, leads to the apprehension of the universal better-known to nature with necessity through some type of formal reasoning (λόγος/*logos*). The reasoned account of induction as division must come to constitute a definition (ὁρισμος/*orismos*) which is an expression of universal characteristics and of the essence (τὸ τί ἦν εἶναι/*to ti en einai*) of a perceived class of beings.

καθόλου/*katholou* here means, as Aristotle indicates, a universal that is given by sense-perception (184a25), but which, relatively speaking, constitutes a conceptual classification of a set of particulars in an indistinct, not fully divided manner. Aristotle gives the example of an initial better-known to us concept of what is circular or spherical, and the child's concept of all men as 'father' and

[41] διαιροῦσι, from the verb διαιρέω, means, literally, 'to take apart,' 'cleave/divide;' and so, for obvious reasons, it is also used to mean 'define.'

[42] *Physics* I.1 (184a21-26): ἔστι δ' ἡμῖν τὸ πρῶτον δῆλα καὶ σαφῆ τὰ συγκεχυμένα μᾶλλον· ὕστερον δ' ἐκ τούτων γίγνεται γνώριμα τὰ στοιχεῖα καὶ αἱ ἀρχαὶ διαιροῦσι ταῦτα. διὸ ἐκ τῶν καθόλου ἐπὶ τὰ καθ' ἕκαστα δεῖ προϊέναι· τὸ γὰρ ὅλον κατὰ τὴν αἴσθησιν γνωριμώτερον, τὸ δὲ καθόλου ὅλον τί ἐστι· πολλὰ γὰρ περιλαμβάνει ὡς μέρη τὸ καθόλου.

[43] For an account of the compatibility of Aristotle's claim that knowledge of nature begins with the sense-perceptive universal with his claim in *APo* I.2 and II.19 that knowledge begins with the particular, following Sts. Albert and Thomas Aquinas's commentary on the texts, see Daniel C. Wagner and John H. Boyer, "Albertus Magnus and St. Thomas on What is 'Better-Known' in Natural Science," *Proceedings of the American Catholic Philosophical Association*, vol. 93, 2019. In short, there is no contradiction because Aristotle uses 'universal' and 'particular,' as should be apparent here, in multiple senses. He is describing the rise to knowledge at different points.

all women as 'mother'. Having percieved particular circular/spherical objects, and having been taught the term referring to them, one can judge such objects in sense-perception to be circular/spherical and state the case—even while one is not capable of expressing a proper definition (one knows that it is curved and without corners, but cannot state that it is a figure with a limit equidistant from a single point). Similarly, recognizing what is masculine in his father and all men and what is feminine in his mother and all women, the child has a vague idea of the similarity, and calls them all by father and mother. Starting from these conceptions of experience, refinement in attainment of clear and accurate definitions is possible.[44] The question that must be answered now is, what is the form of reasoning utilized that constitutes induction after basic concept formation?

First, as simple concept formation and the perceptive judgement that follows on it, there is not a logical necessity to sense-perceptive induction. In this initial form, induction is not reasoning (so applying necessity would be a category error), but it is simply the judgement that some universal meaning belongs to the particular (and this could be accidental, a property, or essential). However, the intellect quickly moves by the use of *reductio ad impossibile* reasoning to establish the fact that a universal meaning is necessary with reference to the set of particulars it signifies. Aristotle provides as an example of this most basic form of inductive reason at *APo* I.1, describing a student who comes to know this triangle inscribed in this semi-circle as possessing the universal property of

[44] Commenting on these passages, St. Albert the Great has noted two senses of universal (καθόλου/*katholou*): that of (i) the unqualified universal expressed in the proper definition, and (ii) that of what is given of a subject through sense-perception (a range of attributes mixed together and undistinguished generically and specifically). Attributing the distinction between these two sense of universal to Avicenna, St. Albert utilizes it in his commentary on the *Posterior Analytics* in order to solve the apparent contradiction between *APo* II.19 and *Physics* I.1. See, Albertus Magnus, *Posteriorum Analyticorum* I, tract 2., c. 3, p. 28: "uno scilicet modo prout confusum et mixtum in particulari: et hoc modo in signis citius sentitur universale, quam particulare per sensum: quia citius sentiuntur signa substantire, quam animalis: et citius signa animalis, quam hominis: et citius signa hominis, quam Socratis. Potest etiam accipi universale in sua puritate, in qua separatum est a particulari : et hoc modo non est nisi in intellectu, sicut in ante habitis dictum est, et est propinquum intellectui et longinquius a sensu, sicut hic dicitur." Or, "Indeed, in one manner [the universal] is considered just as indistinct and mixed in regard to the particular. And in this manner, what is universal is perceived in the appearances (*in signis*) more easily through sensation than what is particular: because the signs of substance are more readily perceived than those of animal; and the signs of animal are more readily perceived than those of man; and the signs of man are more readily perceived than those of Socrates. [In a second manner], the universal can also be taken in its purity according to which [manner] it has been separated from the particular. In this manner [the universal] does not exist except in the intellect, as has been said according to our prior considerations, and it is near to the intellect and further from sense perception, as has been said here." I translated this passage and treated St. Albert and St. Thomas Aquinas's solution to this puzzle with John H. Boyer in our "Albertus Magnus and St. Thomas on What is 'Better-Known' in Natural Science."

having internal angles equal to two right angles. Here, the student has already obtained knowledge of the universal characteristic in the basic sense, that is, his intellect has gathered the meaning of triangle through perception (this happened when he was taught). This universal is the potential for the student to be brought/led into (ἐπαγόμενος/*epagomenos*) knowledge *that* the sensed particular is in fact a triangle.[45] Aristotle, then, takes the perceptive and intellectual judgment that the particular belongs under the universal (*triangle*) as an inductive process.[46] On this account, then, *induction* would mean the recognition that a particular is such and such a kind through a priorly grasped universal. In this first clear notion of induction, then, it is closely linked to sensation of the particular—as we anticipated—and the perceptive knowledge that follows when the intellect understands the particular as belonging to a universal class. These factors together, that is, pre-existent knowledge of the universal and the perceptive judgment of the particular belonging to the universal, allow the student to draw the conclusion: "this triangle has internal angles equal to two right angels."[47] This process can be expressed in the following syllogism:

> P1: Every Triangle (a) has internal angles equal to two right angles (b).
> P2: This here (c) is (a) a triangle.
> Therefore, this triangle (c) possesses internal angles equal to two right angles (b).[48]

In this syllogism, the second premise is apprehended by an inductive process, which refers to the *judgment* of the intellect that 'this is a triangle,' which follows on prior knowledge of what a triangle is and the perception of the attributes immanent in the particular and captured by that universal meaning. This knowledge, along with the prior knowledge of the property 'internal angles equal to two right angles,' allows the student to draw the deductively valid conclusion. It is important to note at this point that it would not be reasonable,

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[45] *Posterior Analytics*, I.1 (71a19-21): ὅτι μὲν γὰρ πᾶν τρίγωνον ἔχει δυσὶν ὀρθαῖς ἴσας, προῄδει· ὅτι δὲ τόδε τὸ ἐν τῷ ἡμικυκλίῳ τρίγωνόν ἐστιν, ἅμα ἐπαγόμενος ἐγνώρισεν. Or, "For one knew beforehand *that* every triangle has angles equal to two right angles; but *that* this here in this semicircle is a triangle, the one being led to know (ἐπαγόμενος) came to know together [with his prior knowledge]."

[46] Here, he uses the participial form of the verb ἐπάγω, which is clearly close in its meaning ('a bringing on') to ἐπαγωγή. Cf., Richard McKirihan, "Aristotelian Epagoge in *Prior Analytics* 2.21 and *Posterior Analytics* I.I," *Journal of the History of Philosophy*, Vol. 21 (1983)5-9. As McKirihan points out, this account of induction maps on to Aristotle's comments at *Prior Analytics* II.21, where it is taken as the apprehension of a particular instantiation of a universal meaning.

[47] *Posterior Analytics*, I.1 (71a19-25).

[48] Cf., Richard McKirahan, Jr., "Aristotelian Epagoge in *Prior Analytics* 2.21 and *Posterior Analytics* I.I, 5.

in a sense, for the student to doubt knowledge that 'this is a triangle'—that, in fact, there is already a necessity involved in this claim, if the proper reasoning only be expressed. The necessity lies in the fact that the particular given in sense experience in fact possesses immanently the meaning of triangle, so that to deny the judgement of the student would constitute a contradiction in the very meaning or sense of experience. In its most basic sense, then, sense-perceptive induction after basic concept formation is a process of reasoning that attaches a meaning to a set of particulars by *reductio*. In one sense, the student does know with necessity by induction that this here is a triangle: he knows the definition of triangle and he knows this meaning as exhibited in this particular. Only an untenable and radical form of sense-perceptive skepticism—in violation of the principle of non-contradiction—would question the truth of this proposition (i.e., 'that this here is a triangle').[49] On the other hand, there is a legitimate question, of which Aristotle is aware, as to how the student knows that the definition of triangle presupposed is necessarily an accurate definition of the object triangle. How does he know that the definition itself is necessarily true, in the sense of capturing *per se* or *essential* attributes? It is one thing to show by *reductio* that a meaning belongs to a particular. On the other hand, it is another thing to show that a meaning properly defines and captures the essence of a particular. As Aristotle expresses at *APo* I.4, the whole point of scientific enquiry is move from better-known to us knowledge to refined or proper knowledge, precisely, by connecting the subject of inquiry to its essential attributes. Aristotle answers to how this is accomplished in his treatment of division, in the second book of *APo.*

Aristotle commences book II of *APo* by setting down four questions of scientific inquiry, which allow for the production of a completed science constituted by a subject-genus, principles, and conclusions.[50] These questions determine, along with the subject, the methodology of a science. The questions are as follows: regarding a particular subject of inquiry, we can inquire into (1) "the fact?" (τὸ ὅτι/*to hoti*) that it is in some manner, (2) "the reasoned fact?" (τὸ διότι/*to dihoti*), which is to say the causal explanation as to why it is in some manner, (3) "whether it exists?" (εἰ ἔστι/*ei esti*), as in such cases of a centaur

[49] For a defense of the sense-perceptive realism held by Aristotle, St. Thomas Aquinas, and in Husserlian phenomenology, see Daniel C. Wagner, **"**The Logical Terms of Sense Realism: A Thomistic-Aristotelian & Phenomenological Defense," in *Reality*, issue 1, vol. 1, Spring 2020.

[50] *Posterior Analytics*, I.10 (76b11-16: "πᾶσα γὰρ ἀποδεικτικὴ ἐπιστήμη περὶ τρία ἐστίν, ὅσα τε εἶναι τίθεται (ταῦτα δ' ἐστὶ τὸ γένος, οὗ τῶν καθ' αὑτὰ παθημάτων ἐστὶ θεωρητική), καὶ τὰ κοινὰ λεγόμενα ἀξιώματα, ἐξ ὧν πρώτων ἀποδείκνυσι, καὶ τρίτον τὰ πάθη, ὧν τί σημαίνει ἕκαστον λαμβάνει." Or, "For every demonstrative science is concerned with three things: (1) those things which it supposes to exist (and these are the genus, concerning which it inquires into the attributes belonging to it itself properly); (2) what are called the common axioms, from which primaries it demonstrates; and (3) third, the attributes (τὰ πάθη), the meaning (τί) of which signifying each it assumes."

or god, and (4) "what is it?" (τί ἐστιν), which is to say, the definition. We can already see the significance of the first question for our account of induction, as mentioned above, since one sense of experiential knowledge is constituted by knowledge of the fact. This is the principle of art and science. Achieving higher clarity regarding this question and question four, or the definition, will give us the foundational understanding of the method of division that we seek.[51]

Aristotle holds that the definition of the being in itself of something is immediate, that is, grasped without a middle term (ἄμεσος/*amesos*), and it is a principle (ἀρχή/*arche*) of a science.[52] On the way to giving an account of how this type of definition is to be obtained through division in chapters 13–14, Aristotle draws an important distinction in II.10 between the *nominal* and *proper* definition. This is a technical development allowing Aristotle to say more clearly what it is that is better known to us as the point of departure for obtaining knowledge of what is better known to nature. A nominal definition is constituted when a knower is able to apply a name to a class of individuals by knowing something of their properties, though he cannot yet express properly what the essence of the individuals unified by the term is.[53] The nominal definition is essential to Aristotle's conception of scientific discovery, and his empirical epistemological view that knowledge does not occur in an *a priori* vacuum. Knowledge begins where knowers already have a general, though less distinct, experiential grasp of some class of individuals in the world after basic concept formation. A name, given in a distinct language and culture, already signifies some beings in the world, for example, 'triangle,' 'circular,' or 'mother,' or 'father,' or 'nature,' etc., and a person participating in that culture and language can apprehend the name and its meaning via sense-perceptive induction. This is adequate to allow one engaged in rigorous scientific inquiry to point out members of the class that the name signifies, study them in detail through observation and experiment, and properly define them.[54] Through division of a less distinct, nominal conception, one can then arrive at a refined definition grasped with necessity.

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[51] Aside from following his standard practice of dealing with *aporiai*, Aristotle is also very concerned with the method by which we define causal events, like an eclipse, capturing not only the factual nature of the event, but also its cause (the discussion culminates in II.8). We leave this topic aside, here, as it is beyond our scope.

[52] See, *Posterior Analytics*, II.9 (93b22).

[53] *Posterior Analytics*, II.10 (93b29-32): (93b29-32): Ὁρισμὸς δ' ἐπειδὴ λέγεται εἶναι λόγος τοῦ τί ἐστι, φανερὸν ὅτι ὁ μέν τις ἔσται λόγος τοῦ τί σημαίνει τὸ ὄνομα ἢ λόγος ἕτερος ὀνοματώδης, οἷον τί σημαίνει [τί ἐστι] τρίγωνον. Or, "Since we have said that the definition (Ὁρισμὸς) is an account (λόγος) of what it is (τοῦ τί ἐστι), it is apparent that one [meaning of definition] will be the account of what the name signifies or in another way the nominal account, such as some signification of what a triangle is."

[54] For an excellent treatment of the Aristotelian conception of discovery as the first stage of the scientific research program, see Michael W. Tkacz, "Albert the Great and the Revival of Aristotle's Zoological Research Program," *Vivarium* 45 (Brill, 2007), 30–68.

In *APo*, II.13 Aristotle explains how to properly obtain definitions of beings in themselves by moving from a better-know (nominal) definition to a proper definition: "Let us now set down the manner in which we must seek those things predicated in the definition (ἐν τῷ τί ἐστι/*en to ti esiti*)."[55] In defining we seek those things that belong to a subject in terms of its genera and differentia until we come to the point of indivisibility where the particular *species* is captured through its specific differentia. Defining, then, first requires that we place the subject of study under one or more of the most generic conceptions, that is, categories. We must then seek the "primary commonalities," which are the attributes that specifically differentiate a number of individuals as a species. They are primary because they are most proximate to the individuals as universals—they cannot be divided any further.[56] Thus, Aristotle holds that divisions according to differentia are the most useful and the goal in and of defining.[57]

To show his meaning, Aristotle uses the example of the number three or the triad. The triad is defined as (1) a number, that is (2) odd, (3) prime in the sense that it lacks any factors (numbers that can be multiplied to produce it), and, finally, (4) prime in the sense that it is not composed of other numbers (Aristotle holds that one is not a number, but the principle or measure of number[58]).[59] Here, then, we have multiple differentia set down in order from the more generic to that which is most properly specific, setting the triad apart from other numbers, odds, and primes. Aristotle then expresses that the definition is grasped with necessity[60] and that it captures the being (οὐσία/*ousia*) of what is defined, in the

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[55] *Posterior Analytics*, II.13 (96a22-23): πῶς δὲ δεῖ θηρεύειν τὰ ἐν τῷ τί ἐστι κατηγορούμενα, νῦν λέγωμεν.

[56] *Posterior Analytics*, II.13 (96b15-21): Χρὴ δέ, ὅταν ὅλον τι πραγματεύηταί τις, διελεῖν τὸ γένος εἰς τὰ ἄτομα τῷ εἴδει τὰ πρῶτα, οἷον ἀριθμὸν εἰς τριάδα καὶ δυάδα, εἶθ' οὕτως ἐκείνων ὁρισμοὺς πειρᾶσθαι λαμβάνειν, οἷον εὐθείας γραμμῆς καὶ κύκλου, καὶ ὀρθῆς γωνίας, μετὰ δὲ τοῦτο λαβόντα τί τὸ γένος, οἷον πότερον τῶν ποσῶν ἢ τῶν ποιῶν, τὰ ἴδια πάθη θεωρεῖν διὰ τῶν κοινῶν πρώτων. Or, "It is necessary, whenever one is treating some whole (ὅλον), to divide the genus into the species which are the primary indivisibles, such as number into 3 and 2, and at once to attempt to set down the definitions of these in this manner, such as of the straight line, or the circle, or the right angle, and after having set down some genus, such as whether it is of quantity or quality, to seek to know the distinguishing attributes (τὰ ἴδια πάθη) through primary commonalities."

[57] *Posterior Analytics*, II.13 (96b25).

[58] Cf., *Metaphysics*, XIV.1 (1088a4).

[59] 96a24-96b1.

[60] *Posterior Analytics*, II.13 (96b1-5): ἐπεὶ δὲ δεδήλωται ἡμῖν ἐν τοῖς ἄνω ὅτι καθόλου μέν ἐστι τὰ ἐν τῷ τί ἐστι κατηγορούμενα (τὰ καθόλου δὲ ἀναγκαῖα), τῇ δὲ τριάδι, καὶ ἐφ' οὗ ἄλλου οὕτω λαμβάνεται, ἐν τῷ τί ἐστι τὰ λαμβανόμενα, οὕτως ἐξ ἀνάγκης μὲν ἂν εἴη τριὰς ταῦτα. Or, "Since it has been stated above for us regarding these things that the universal is [constituted through] those things that are predicated in the definition (ἐν τῷ τί ἐστι) (and the universal is necessary), with respect to 3, and also of any other [subject] which we grasp in this manner, grasping those things in the definition (ἐν τῷ τί ἐστι), therefore 3 will be these things from necessity (ἐξ ἀνάγκης)."

sense of its essence (το τί ἦν εἶναι/*to ti en einai*).[61] Most importantly, Aristotle utilizes, here, the *reductio ad impossibile* form of argument to show that the definition he has given necessarily captures the being and essence of the triad. If it did not, it would follow that it merely expressed a genus of the triad, and there would be other individuals with the same meaning that were not a triad. This, however, is impossible and, thus, false. There are no such other numbers *because* every prime after three is in principle composed of other numbers, so that a contradiction would follow were it held to be a prime in the manner of the triad. In this way, the final difference added to the higher genera, in fact, captures what it means essentially to be the triad, and the triad is adequately distinguished from other primes, odds, and numbers.[62] Connecting a defining feature to a subject of inquiry in this manner is demonstration of the fact (τὸ ὅτι/*to hoti*),[63] and a form of syllogistic reasoning, though it is not middle-termed.[64] Thus, in order to know a defining attribute as essentially connected to a subject of inquiry, we must employ the *reductio* method illustrated by the triad example above, and this constitutes a qualified (non-middle-termed) demonstration of the fact. This is an analytic and descriptive processes of reasoning, then, which nonetheless binds the intellect to accept the meaning (universal term/predicate) of the subject with necessity.[65] The Greek terms for necessity, ἀνάγκη/*ananke* and its adverbial form ἀναγκαῖως/*anankaios*, mean 'fate' and they literally pertain to being 'bound,' 'imprisoned,' or 'constrained.' Thus, we can see by this *reductio* reasoning that the intellect is *constrained* to assent in judgment

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[61] *Posterior Analytics*, II.13 (96b1-5): ὅτι δ' οὐσία, ἐκ τῶνδε δῆλον. ἀνάγκη γάρ, εἰ μὴ τοῦτο ἦν τριάδι εἶναι… Or, "and that this is the being [of three], is manifest from the following. For it is necessary, if this is not the essence of three"…, etc.

[62] *Posterior Analytics*, II.13 (96b3-12). Aristotle concludes, at 96b10-14, εἰ τοίνυν μηδενὶ ὑπάρχει ἄλλῳ ἢ ταῖς ἀτόμοις τριάσι, τοῦτ' ἂν εἴη τὸ τριάδι εἶναι (ὑποκείσθω γὰρ καὶ τοῦτο, ἡ οὐσία ἡ ἑκάστου εἶναι ἡ ἐπὶ τοῖς ἀτόμοις ἔσχατος τοιαύτη κατηγορία)· ὥστε ὁμοίως καὶ ἄλλῳ ὁτῳοῦν τῶν οὕτω δειχθέντων τὸ αὐτῷ εἶναι ἔσται. Or, "If this belongs to nothing other than the individual triads (ἢ ταῖς ἀτόμοις τριάσι), then this would be the essence (τὸ εἶναι) of three (for let this also be posited, that the being (ἡ οὐσία) of each thing is [obtained when] whatever lowest [differentia] is predicated of the individuals); thus, and similarly with any other such [subject] whatsoever—having been displayed in this manner—the essence (τὸ εἶναι) will be the same."

[63] Aristotle states this threefold mode of reasoning explicitly at *Posterior Analytics*, II.13 (97a23-26): Εἰς δὲ τὸ κατασκευάζειν ὅρον διὰ τῶν διαιρέσεων τριῶν δεῖ στοχάζεσθαι, τοῦ λαβεῖν τὰ κατηγορούμενα ἐν τῷ τί ἐστι, καὶ ταῦτα τάξαι τί πρῶτον ἢ δεύτερον, καὶ ὅτι ταῦτα πάντα. Or, "In order to establish a definition through division three things must be aimed at, the first of which is to set down those things predicated as in some definition, and then to order these in terms of primary to secondary, and finally [to show] *that* (ὅτι) all of these [are true]."

[64] *Posterior Analytics*, II.13 (96b27-28): χρήσιμοι δ' ἂν εἶεν ὧδε μόνον πρὸς τὸ συλλογίζεσθαι τὸ τί ἐστιν. Or, "They [i.e., divisions from differentia] alone will be useful in this manner for proceeding from syllogistic reasoning (τὸ συλλογίζεσθαι) to the definition (τὸ τί ἐστιν)."

[65] In II.14, Aristotle focuses on the importance of dividing from the more generic to the more specific, all the way to the individuals defined. While important, this is beyond our immediate scope.

to the connection of the attribute to the subject ('the triad is…uncomposed, etc.'), which is also to say that it is known to belong *per se* or essentially. Here, then, we are given a clear and explicit idea of the kind of qualifed form of demonstrative syllogism that Aristotle had in mind in *APo*, I.3, when explaining that the first principles were known through induction as a form of qualified demonstration. By this form of inductive reasoning, Aristotle holds that the practitioner achieves the knowledge state of intellectual-judgment (νοῦς/*nous*). Intellectual-judgment knows first principles with necessity, as we can see, so that it provides the proper premises of demonstration in accord with canon set down at *APo* I.2.[66]

Aristotle uses the method division in various forms for establishing first principles or primary definitions in the particular sciences. Ultimately, as has been stated, all the forms involve *reductio ad impossibile* reasoning. The first and most fundamental form is that which applies to the case of the student from the example in *APo* I.1. There is a necessity to his judgment constituting the second premise of his syllogism, that 'this is a triangle,' because to deny this truth would result in the contradiction of the meaning of experience, namely, that this figure possess immanently this universal meaning. The second form, which we saw Aristotle use in the triad example, works by simply setting down a *definition* (*thesis or hypothesis*) and showing that, such and such principle or universal meaning is necessary, since an impossible contradiction follows otherwise. Let us illustrate, this method, again, by appeal to Aristotle's example of the better-known to us sense-perceptive grasp of what is circular, from *Physics* I.1. Beginning with an experiential concept of what is circular, and then by examining what is circular in relation to other shapes (triangles, squares, rectangles, ovals, etc.), the inquirer can divide what is circular by noting that, unlike other shapes, circular things have a limit that is equidistant from a center point. The necessity of this meaning is grasped by *reductio*: except for what is circular, it is impossible to construct a figure that has a limit equidistant from a center point (any deviation results in another shape), meaning that a figure would have to both be circular and not be circular at the same time to deny the truth of the defini-

[66] *Posterior Analytics,* II.19 (100b9-14): …αἱ δ' ἀρχαὶ τῶν ἀποδείξεων γνωριμώτεραι, ἐπιστήμη δ' ἅπασα μετὰ λόγου ἐστί, τῶν ἀρχῶν ἐπιστήμη μὲν οὐκ ἂν εἴη, ἐπεὶ δ' οὐδὲν ἀληθέστερον ἐνδέχεται εἶναι ἐπιστήμης ἢ νοῦν, νοῦς ἂν εἴη τῶν ἀρχῶν, ἔκ τε τούτων σκοποῦσι καὶ ὅτι ἀποδείξεως ἀρχὴ οὐκ ἀπόδειξις, ὥστ' οὐδ' ἐπιστήμης ἐπιστήμη. Or, "…[since] the principles are better-known than the demonstrations, and science altogether is following on the reasoned-account (μετὰ λόγου) [of the principles], and there could be no scientific knowledge of the principles, and since nothing other than intellectual-judgment (νοῦς) is able to be more true than scientific knowledge, by examination from these facts, it follows that intellectual-judgment (νοῦς) would be [the state of knowledge] of principles, so that a principle of demonstrations is not demonstrated, and so that there would not be scientific knowledge of the principles of science (ὥστ' οὐδ' ἐπιστήμης ἐπιστήμη). On intellectual-judgement as the best rendering of νοῦς/*nous*, see *The Aristotelian Foundations of the Human Good*, Chapter 2, 160–161.

tion. Thus, the definition is necessarily true, though we have not shown this by middle-termed demonstration. Aristotle himself uses this form of the method to obtain intellectual-judgment into the first principles of the general science of nature in *Physics* I. Here, given the better-known fact of sense-perceptive experience that the meaning of *nature* generally includes motion,[67] Aristotle shows that the intelligibility of every natural being flows from the principles of *form* and *privation* (opposites), along with a *subject* (*Physics* I.5-7). On the hypothesis of motion, that is, the existential claim that things of nature exist with the feature of being mobile, the intellect is 'constrained' and 'bound' by necessity to accept these principles. Without a *formal* disposition, a *privation* of the formal disposition, and *subject* undergoing change, the movement of natural being would be impossible, contradicting our sense-perceptive knowledge of nature.

A second method Aristotle uses posterior to experiential concept formation works by demonstratively excluding those attributes that are not common to all the members of a perceived genus until all that remains are attributes which each member of the genus actually possesses and which, in fact, make them to be what they are as the members of that genus. This approach, which I will call *eliminative induction* or *division*, can be used to flesh out the example Aristotle uses at *APo*, I.1, of the student who comes to know this triangle as possessing angles equal to two right angles. In this form of reasoned account, those characteristics that are not generically universal, for example, 'equilateral,' can be demonstrated to be as such, since not all triangles, for example , isosceles and scalene, have three equal sides. The syllogisms follows a simple model: 'whatever does not belong to all triangles, is not universal/generic;' 'but feature x does not belong to all triangles (in virtue of such and such particulars);' therefore, feature x is not universal/generic.' This process of negative demonstration can be continued until only those characteristics that are immanently present or contained in every particular have been isolated and expressed, namely, that a 'triangle' is a plane figure with three straight sides and three angles. Again, the intellect is 'constrained' and 'bound' to assenting to the universal properties of the subject: once one has worked through all the possible attributes of 'triangle,' through each of the particulars, this definition of triangle cannot be denied—it must necessarily be given intellectual assent.[68] Presumably, this is the kind of knowledge, that is, a second act of intellectual-judgment after experience, that

[67] See, *Physics* I.2 (185a12-14): "ἡμῖν δ' ὑποκείσθω τὰ φύσει ἢ πάντα ἢ ἔνια κινούμενα εἶναι· δῆλον δ' ἐκ τῆς ἐπαγωγῆς." Or, "In relation to us (ἡμῖν), however, it must be set down that the things that exist by nature, either all or some of them, are moving. And this is manifest from induction (ἐκ τῆς ἐπαγωγῆς)."

[68] This process also involves a rational exercise of the imagination, which allows us to show 'all possible instances' of triangle. Treatment of this process is beyond our scope. Robert Sokolowski has extremely helpful insights into this topic in his treatment of eidetic intuition and the imagination, in his *Introduction to Phenomenology*, 177–184.

a master of geometry would need to have for the syllogism given at *APo* I.1, in the case of the student, to be materially demonstrative. To be sure, the student already knows with necessity that the perceived figure is a triangle, because it possesses immanently the attributes contained in the definition that he has been taught. However, it is another thing to answer as to how he knows with necessity that this is the meaning of triangle. Once the student has conducted the eliminative form of induction, in this manner, he would know both the definition of triangle and the property belonging to it as proper first principles in accord with the canons of *APo*, I.2. Here, intellectual-judgement (νοῦς/*nous*) is stacked on intellectual-judgement in the rise from sense-perceptive experience to scientific knowledge. Aristotle uses this eliminative form of induction, for example, to define nature properly in *Physics*, II.1, and the soul in *De Anima*, II.1.[69] Looking to those things that are said to exist by nature, namely, plants and animals and their parts, along with the elements, we can set aside all other attributes except that "…each of these possesses, in itself, a principle of motion and rest."[70] Again, in the *De Anima*, and having shown the principles of nature to be (i) matter, (ii) form, or the (iii) complex of the two in natural being or substance, Aristotle can show that the soul must be the *form* (i) of the living being, etc., by eliminative induction or division.[71] Working from the more generic to the more specific (in line with *APo* II.13-14), living beings with soul as a principle of life, fall under the genera of *natural* and then *bodily* beings, and then they are divided in terms of their intrinsic principles into matter and form.[72] Because matter exists as a part and as a whole without life (i.e., there are non-living matter-form complexes or substances), we know the fact that body in either sense could not be soul—it is not sufficient for being living—but rather that it is the subject.[73] It is necessary by this eliminative induction, thus, that the soul as the principle

[69] Aristotle utilizes this second form of reasoned induction in many locations. Other examples of this form of ἐπαγωγή appear in *Physics*, II.8, in establishing the necessity of final cause as nature, V.4, in the definition of place, and at V.11, in the definition of time. Aristotle also uses inductive methods in the definitions of happiness (εὐδαιμονία) at *Nicomachean Ethics* I.4-7, and in his treatment of choice (προαίρεσις) and deliberation (βούλευσις) at III.3.

[70] *Physics*, II.1 (192b13-15).

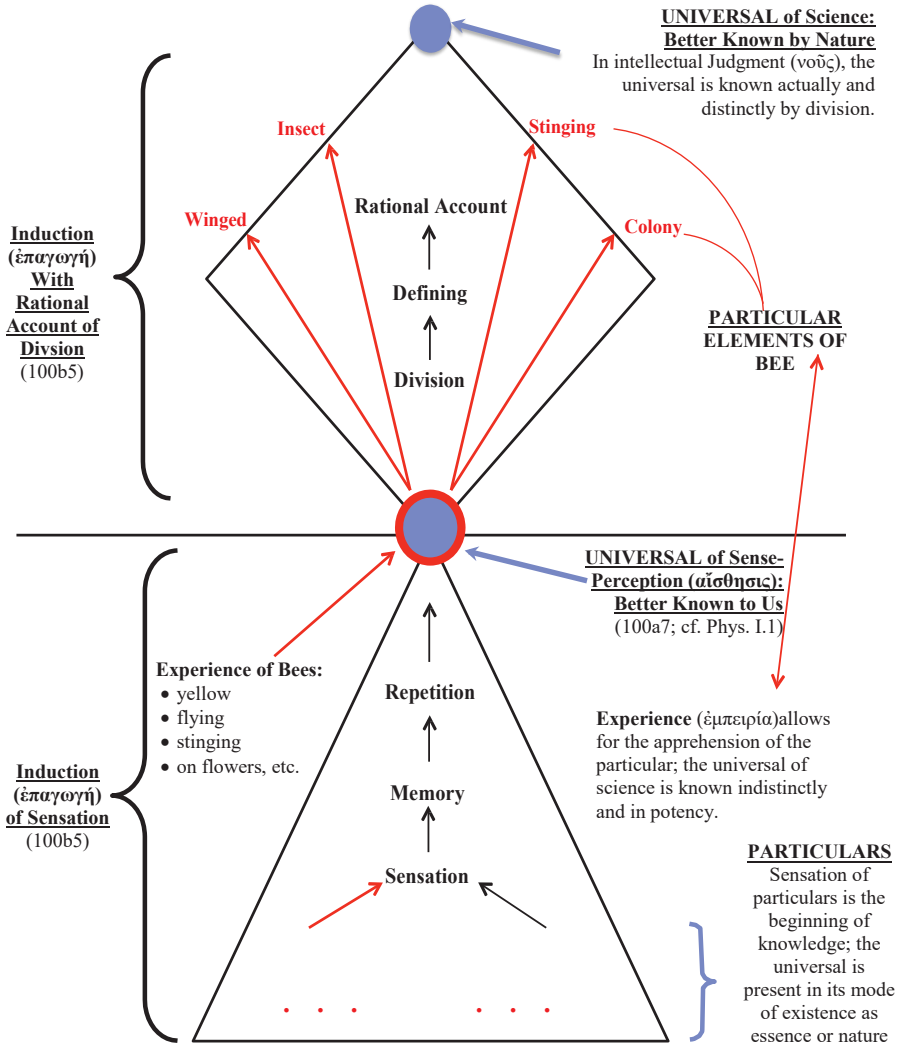
[71] *De Anima*, II.1 (412a3-6): Τὰ μὲν δὴ ὑπὸ τῶν πρότερον παραδεδομένα περὶ ψυχῆς εἰρήσθω· πάλιν δ' ὥσπερ ἐξ ὑπαρχῆς ἐπανίωμεν, πειρώμενοι διορίσαι τί ἐστι ψυχὴ καὶ τίς ἂν εἴη κοινότατος λόγος αὐτῆς. Or, "Let those things having been handed down by our predecessors concerning the soul be sufficiently stated; and, let us return again, as it were, from a fresh beginning, attempting to divide (διορίσαι) the definition of the soul (τί ἐστι ψυχὴ) and what would be the most common reasoned-account or definition (λόγος) of it."

[72] *De Anima*, II.1 (412a11-16).

[73] *De Anima*, II.1 (412a16-19): ἐπεὶ δ' ἐστὶ καὶ σῶμα καὶ τοιόνδε, ζωὴν γὰρ ἔχον, οὐκ ἂν εἴη σῶμα ἡ ψυχή· οὐ γάρ ἐστι τῶν καθ' ὑποκειμένου τὸ σῶμα, μᾶλλον δ' ὡς ὑποκείμενον καὶ ὕλη. Or, "And since it is both a body *and* also of such and such a kind, i.e., as possessing life, the body could not be the soul; for the body does not belong to those things according to [or predicated of] a subject, but rather it is as the subject and the matter."

of being alive be the form (ii) of the body in potential to life—*form* being the only possible principle remaining.[74]

Figure 1. Induction (ἐπαγωγή) in *Posterior Analytics* II.19 and *Physics* I.1[75]



[74] *De Anima*, II.1 (412a19-22): ἀναγκαῖον ἄρα τὴν ψυχὴν οὐσίαν εἶναι ὡς εἶδος σώματος φυσικοῦ δυνάμει ζωὴν ἔχοντος. ἡ δ' οὐσία ἐντελέχεια· τοιούτου ἄρα σώματος ἐντελέχεια. Or, "It is necessary (ἀναγκαῖον), therefore, that the soul be being (οὐσίαν) as the form (εἶδος) of a natural body possessing life in potential. And the being is the actual-fulfillment (ἐντελέχεια); therefore, it [i.e., the soul] is the actual-fulfillment (ἐντελέχεια) of such a kind of body [i.e., one in potential to being alive].

[75] I am most thankful to Mathew Lance for creatively digitizing this pictorial diagram.

At this point, we now have an understanding of Aristotelian sense-perceptive induction and division as it pertains to the necessary apprehension of attributes connected to particulars being studied in the constitution of universal meanings or definitions. We know that we ascertain essential features (generic, specific, and differential) by *reductio* style reasoning. The rise from sense-perception of the particular to the proper knowledge of universal definition set out by Aristotle in *APo* II.19 and *Physics* I.1 is expressed in Figure 1.

It turns out that, in order to classify and define living beings another distinct form of division is required: division by expression of the power-object relation. As we will be shown in the following part, Wojtyła champions this Aristotelian approach to division, to which we turn now.

Aristotelian Inductive Division in the Life Sciences: *De Anima, De Partibus Animalium*

In *De Partibus Animalium*, Aristotle builds on the account of division he had set out at *APo* II.13-14, expanding the method for the sake of the study of living, animal beings. Further, he connects the account of division to his general account of causal demonstration in natural science in the *Physics*. Following Aristotle, it is helpful to begin with the presentation of causal explanation in the study of animals, as division is ordered toward such explanation.

At *Physics* II.9, Aristotle has already explained the kind of demonstration and demonstrative necessity that belongs to the natural sciences in general. Special attention to this issue was needed there, precisely because, unlike purely abstract sciences such as mathematics, which work, *a priori*, from *definitions* as prior principles and obtain unqualifed or simple demonstrative necessity through their demonstrations, we cannot know the movements of nature as necessary without qualification because we are aware that there is real contingency in nature—which is to say, we are aware that those *movements* that are by nature may be obstructed.[76] Accordingly, and having shown by *reductio ad impossibile* that nature is necessarily teleological in *Physics* II.8, Aristotle distinguishes, in II.9, between the simple or unqualified necessity (ἁπλῶς) characteristic of mathematics, and necessity from a *hypothesis*, *supposition*, or *condition* (ἐξ ὑποθέσεως/*ex hupotheseos*), which is proper to our understanding of natural movement.[77] We cannot, for example, demonstrate *a priori* that given the materials of a house

[76] This is clear, already, from the treatment of fortune and chance in *Physics* II.4-6 and the defense of final cause as nature in II.8.

[77] *Physics*, II.9 (199b34-35): Τὸ δ' ἐξ ἀνάγκης πότερον ἐξ ὑποθέσεως ὑπάρχει ἢ καὶ ἁπλῶς; Or, And it must be asked whether what is from necessity belongs to [natural] things from a hypothesis (ἐξ ὑποθέσεως) or also without qualification (ἁπλῶς)?"

or the seed of the olive tree, or the conception of a human being, there will be, of necessity, a perfected or completed house, tree, or human being. We know such is not necessary without qualification as intervening chance causes could obstruct the movement of the house builder, preventing the house from coming to be, or the ontogenetic movement of the seed or conceptus, preventing the tree or human from achieving the fullness of expression of their essential being.[78] However, we are capable of demonstrating, *a posteriori*, those causes (material, formal, and agent) that are necessary on the *hypothesis*, *supposition*, or *condition* that the house, the tree, or a human being is to be as it is by definition (λόγος/*logos*) and as the end (τέλος/*telos*) of the natural production.[79]

[78] See, *Physics*, II.9 (200b4-8): ἴσως δὲ καὶ ἐν τῷ λόγῳ ἔστιν τὸ ἀναγκαῖον. ὁρισαμένῳ γὰρ τὸ ἔργον τοῦ πρίειν ὅτι διαίρεσις τοιαδί, αὕτη γ' οὐκ ἔσται, εἰ μὴ ἕξει ὀδόντας τοιουσδί· οὗτοι δ' οὔ, εἰ μὴ σιδηροῦς. ἔστι γὰρ καὶ ἐν τῷ λόγῳ ἕνια μόρια ὡς ὕλη τοῦ λόγου. Or, "And the necessity (τὸ ἀναγκαῖον) is equally in the reasoned-account (ἐν τῷ λόγῳ) [or definition of the form]. For, by having defined the functional-act (τὸ ἔργον) of sawing as division such as this, this will not be [i.e., the functional act] unless it possesses teeth such as these; and these will not be, unless they are made of iron. For also, in the reasoned-account or definition (ἐν τῷ λόγῳ), there are some parts precisely as the matter of the definition."

[79] My interpretation follows that of St. Albert the Great, St. Thomas Aquinas, and William A. Wallace. See, Wallace, "Albertus Magnus on Suppositional Necessity," in *Albertus Magnus and the Sciences: Commemorative Essays*, ed. James A. Weisheipl, O.P. (Toronto: The Pontifical Institute of Mediaeval Studies, 1980), 103-128. In explaining these senses of necessity in his *Commentary on the Posterior Analytics*, St. Thomas Aquinas uses the phrases *a priori* and *a posteriori* in this manner. See, *Commentary on the Posterior Analytics of Aristotle*, lib. 1, lect. 42 (87b19-88a17), (Leon. 1.310) "Nam in disciplinis est necessitas *a priori*; in naturalibus autem a posteriori (quod tamen est prius secundum naturalam), scilicet a fine et forma." Or, "For in the [mathematical] disciplines, there is necessity from what is prior (*a priori*), in the sciences of natural things, however, the necessity is from what follows (*a posteriori*) (which, nevertheless, is prior according to nature), namely, from the end and form." The example of the olive tree is also barrowed from St. Thomas Aquinas' *Commentary on the Posterior Analyitics of Aristotle*, lib. 1, lect. 42 (87b19-88a17) (Leon. 1.310): "Unde sic docet ibi Aristoteles ostendere *propter quid*, ut si hoc debeat esse, puta quod oliva generetur, necesse est hoc praeexistere, scilicet semen olivae; non autem ex semine loivae generatur aliva ex necessitate, quia potest impediri generatio per aliquam corruptionem. Unde si fiat demonstratio ex eo quod est prius in generatione, non concludet ex necessitate; nisi forte accipiamus hoc ipsum ess necessarium, seman olivae ut frequenter ess generativum alivae, quia hoc facit secundum proprietem suae naturae, nisi impediatur." Or, "Whence, Aristotle shows there that to demonstrate the reasoned-fact (ostendere propter quid), such as if this is to be, for example if an olive tree is to be generated, it is necessary for this to pre-exist [or be presupposed], namely, the seed of the olive tree; however, the olive tree is not generated from the olive seed from necessity, because impediments of the generative process are possible through some form of corruption. Whence, if demonstration would be made from that which is prior in generation, it would not conclude with necessity; unless, perhaps, we admit that the same be necessary, as the seed of the olive tree frequently is generative of the olive tree, because it produces it according to what belongs to it by nature, unless it is impeded." Finally, Thomas uses the phrase "ex conditione," referring to natural

In *De Partibus Animalium*,[80] Aristotle reiterates that the necessity proper to natural science is that on the hypothesis of the end,[81] and that it is by knowing the essence and the definition of the subject taken as the end that the natural philosopher obtains scientific knowledge. In the productions of the arts, and so also in natural becomings, the pre-defined end allows us to say what is necessary on the hypothesis, that is, a definition coupled with the existential claim (*APo*, I.2), that the end is to be as it is.[82] Aristotle uses the example of the ontogenesis of the human being to make his point:

> Therefore, one must state precisely thus, that since this is *what it was to be* or the essence (τὸ ἦν εἶναι) for the human being, on account of this it possesses this; for it is not possible for it to be without these parts. If not in this way, one must state what is next best, either that generally it cannot be otherwise or, at least, that it is fittingly-good (καλῶς) that it is as such. And these things follow. And since it is in this way, the generation necessarily happens in this manner and it is in this way. Therefore [moreover], this comes to be first of the parts, and then this. And one must speak in this manner similarly about all the things being constituted by nature.[83]

necessity, at *Summa Theologiae*, 1a2ae, q. 13, a. 6, ad. 2, whence I take "conditional" as a synomym for hypothetical.

[80] In my treatment of *De Partibus Animalium*, I am indebted James G. Lennox for his fine translation of *On the Parts of Animals* (Oxford: Clarendon Press, 2001) and for his helpful commentary.

[81] *De Partibus Animalium*, I.1 (639b21-26): Τὸ δ' ἐξ ἀνάγκης οὐ πᾶσιν ὑπάρχει τοῖς κατὰ φύσιν ὁμοίως, εἰς ὃ πειρῶνται πάντες σχεδὸν τοὺς λόγους ἀνάγειν, οὐ διελόμενοι ποσαχῶς λέγεται τὸ ἀναγκαῖον. Ὑπάρχει δὲ τὸ μὲν ἁπλῶς τοῖς ἀϊδίοις, τὸ δ' ἐξ ὑποθέσεως καὶ τοῖς ἐν γενέσει πᾶσιν, ὥσπερ ἐν τοῖς τεχναστοῖς, οἷον οἰκίᾳ καὶ τῶν ἄλλων ὁτῳοῦν τῶν τοιούτων. Or, "What is from necessity does not belong to all things pertaining to nature in the same manner, though almost everyone attempts to bring back their accounts to it, while not having distinguished in how many ways 'necessary' is said.' That [which is necessary] belongs without qualification (ἁπλῶς) to eternal things, while that [which is necessary] from a hypothesis (ἐξ ὑποθέσεως) belongs also to all those things in the process of becoming, as in the productions of art, such as a house or any other such kind of things."

[82] *De Partibus Animalium*, I.1 (639b26-30) Ἀνάγκη δὲ τοιάνδε τὴν ὕλην ὑπάρξαι, εἰ ἔσται οἰκία ἢ ἄλλο τι τέλος· καὶ γενέσθαι τε καὶ κινηθῆναι δεῖ τόδε πρῶτον, εἶτα τόδε, καὶ τοῦτον δὴ τὸν τρόπον ἐφεξῆς μέχρι τοῦ τέλους καὶ οὗ ἕνεκα γίνεται ἕκαστον καὶ ἔστιν. Ὡσαύτως δὲ καὶ ἐν τοῖς φύσει γιγνομένοις. Or, "It is necessary that matter such as this has been present, if the house is to be or any other such end (τέλος), and this must both have come to be and have been moved first, then this, and so on in this manner continuously up to the end (τοῦ τέλους) and that for the sake of which (οὗ ἕνεκα) each thing comes to be and is. It is the same also in those things that come to be by nature."

[83] *De Partibus Animalium*, I.1 (640a33-b3): Διὸ μάλιστα μὲν λεκτέον ὡς ἐπειδὴ τοῦτ' ἦν τὸ ἀνθρώπῳ εἶναι, διὰ τοῦτο ταῦτ' ἔχει· οὐ γὰρ ἐνδέχεται εἶναι ἄνευ τῶν μορίων τούτων. Εἰ δὲ μή, ὅτι ἐγγύτατα τούτου, καὶ ἢ ὅλως (ὅτι ἀδύνατον ἄλλως) ἢ καλῶς γε οὕτως. Ταῦτα δ' ἕπεται. Ἐπεὶ δ' ἐστὶ τοιοῦτον, τὴν γένεσιν ὠδὶ καὶ τοιαύτην συμβαίνειν ἀναγκαῖον. Διὸ γίνεται πρῶτον τῶν μορίων τόδε, εἶτα τόδε. Καὶ τοῦτον δὴ τὸν τρόπον ὁμοίως ἐπὶ πάντων τῶν φύσει συνισταμένων.

Rejecting the reductive materialism of his predecessors (namely, Democritus), Aristotle is clear that in the case of animals, it is the soul that constitutes the essence of the being, so that the natural philosopher must define in terms of the soul of the animal and its acts.[84] The goal of the natural philosopher is to set down the specific differences of the animal being studied, which are given through sense-perceptive induction and division, and then to explain them in terms of formal and final cause.[85]

As Michael W. Tkacz has shown, St. Albert the Great brilliantly expresses that Aristotle applied the two stage research program we have seen set out in *APo*, moving from division to demonstration, to the study of animals.[86] First, there is the analytic, descriptive—*narratio*—process, wherein essential morphological attributes are connected to their subjects and divided to obtain generic and specific knowledge. The second stage of the research program then consists in the demonstrative expression of the causes of the connection of *per se* attributes to their subject—the stage of *assignatum causarum* (*Questiones de Animalibus*). At *PA*, IV.12, for example, Aristotle explains various (priorly collected and assigned) differentia in birds, which are apprehendable through the birds' activities in connection with their morphological features, as ordered

[84] *De Partibus Animalium*, I.1 (641a14-27): Εἰ δὴ τοῦτό ἐστι ψυχὴ ἢ ψυχῆς μέρος ἢ μὴ ἄνευ ψυχῆς […] εἰ δὴ ταῦτα οὕτως, τοῦ φυσικοῦ περὶ ψυχῆς ἂν εἴη λέγειν καὶ εἰδέναι, καὶ εἰ μὴ πάσης, κατ' αὐτὸ τοῦτο καθ' ὃ τοιοῦτο τὸ ζῷον, καὶ τί ἐστιν ἡ ψυχή, ἢ αὐτὸ τοῦτο τὸ μόριον, καὶ περὶ τῶν συμβεβηκότων κατὰ τὴν τοιαύτην αὐτῆς οὐσίαν, ἄλλως τε καὶ τῆς φύσεως διχῶς λεγομένης καὶ οὔσης τῆς μὲν ὡς ὕλης τῆς δ' ὡς οὐσίας. Καὶ ἔστιν αὕτη καὶ ὡς ἡ κινοῦσα καὶ ὡς τὸ τέλος. Τοιοῦτον δὲ τοῦ ζῴου ἤτοι πᾶσα ἡ ψυχὴ ἢ μέρος τι αὐτῆς. Or, If this is the soul [i.e., what is being studied], or a part of the soul, or what cannot exist with out the soul […] then, if this is so, it would belong to the natural philosopher to speak and know what concerns the soul—if not the whole, then concerning that itself by which the animal is such a kind, and [he will speak of and know] the definition of the soul (τί ἐστιν ἡ ψυχή), or [what] the part itself is, and concerning those attributes belonging to it by which it is such a kind of being (κατὰ τὴν τοιαύτην οὐσίαν), especially [since] nature is spoken of as being in two ways, i.e., as matter and as being [in the sense of essence]. And this latter is both as what is moving and as the end. And, with respect to the case of the animal, certainly, this is either all the soul or some part of it."

[85] Aristotle makes this same point at *History of Animals*, I.6 (491a7-11). Cf., Lennox's commentary on *PA*, I.5, p 175. On essence being the principle of demonstration in biology, see also, Allen Gotthelf, "First Principles in Aristotle's Parts of Animals," in *Philosophical Issues in Aristotle's Biology*, 167-198.

[86] See Michael W.Tkacz, "Albert the Great and the Revival of Aristotle's Zoological Research Program," *Vivarium* 45 (Brill, 2007). As Tkacz also explains, the reason St. Albert is the first to appreciate the Aristotelian conception of natural scientific research is that he is the first to fully grasp Aristotle's rejection of the Platonic notion of the forms as separated. Rather, the forms are immanent in the subject being studied. Since they are only grasped confusedly in relation to us, however, scientific methodology must consist in disclosing them as better-known to nature in themselves. This is accomplished through the two fold research process here described and clearly seen in *PA*. On this latter point, see Tkacz's "Albertus Magnus and the Recovery of Aristotelian Form," *The Review of Metaphysics,* Volume 64, Issue 4, June 2011.

to their distinct ends. After dividing birds which are web-footed from those that have talons (using division by simple *reductio*), Aristotle gives the causal explanation of the former:[87]

> Thus, these things occur from necessity on account of these causes, as it is on account of what is better that they possess these kind of feet for the sake of the life they live, because they are living in the water, and wings being of little use [there], they may possess feet useful for swimming.[88]

Aristotle then divides long-legged birds, and gives the causal explanation of this morphological feature, noting that the organs of animals are for the sake of their end-directed functional-acts, and not vice versa:

> Some of the birds are long-legged. The cause of this is that their mode of life is marsh-dwelling. For nature produces the organs for the sake of the functional-act (τὸ ἔργον), but the functional-act is not for the sake of the organs. Thus, because they are not swimmers, they are not web-footed, and it is on account of their mode of living, in residing [in the marsh], that they are long-legged and long-toed, and many of them possess many joints in their toes.[89]

Here, we can see Aristotle explaining why the morphological feature arises in the animal on the *hypothesis* of the end, which is the ἔργον/*ergon*—that is, the deed, act, or as I will say here, the functional-act.[90] It is necessary that nature operate as an internal teleological principle and cause of animal develop-

[87] Aristotle makes this point, here in *PA* I.1, using respiration as an example. See, *De Partibus Animalium*, I.1 (642a31-32): Δεικτέον δ' οὕτως, οἷον ὅτι ἔστι μὲν ἡ ἀναπνοὴ τουδὶ χάριν, τοῦτο δὲ γίγνεται διὰ τάδε ἐξ ἀνάγκης. "One must demonstrate the cause in this manner, for example, showing that breathing exists for the sake of this, and that this comes to be on account of these things from necessity."

[88] *De Partibus Animalium*, I.1 (694b5-9): Ἐξ ἀνάγκης μὲν οὖν ταῦτα συμβαίνει διὰ ταύτας τὰς αἰτίας· ὡς δὲ διὰ τὸ βέλτιον ἔχουσι τοιούτους τοὺς πόδας τοῦ βίου χάριν, ἵνα ζῶντες ἐν ὑγρῷ καὶ τῶν πτερῶν ἀχρείων ὄντων τοὺς πόδας χρησίμους ἔχωσι πρὸς τὴν νεῦσιν. Cf., G.E.R. Lloyd's "Empirical Research in Aristotle's Biology," in *Philosophical Issues and Aristotle's Biology*, ed. by Allan Gotthelf and James G. Lennox (New York: Cambridge University Press, 1987).

[89] *De Partibus Animalium*, IV.12 (649b11-17): Ἔνιοι δὲ μακροσκελεῖς τῶν ὀρνίθων εἰσίν. Αἴτιον δ' ὅτι ὁ βίος τῶν τοιούτων ἕλειος· τὰ γὰρ ὄργανα πρὸς τὸ ἔργον ἡ φύσις ποιεῖ, ἀλλ' οὐ τὸ ἔργον πρὸς τὰ ὄργανα. Διὰ μὲν οὖν τὸ μὴ πλωτὰ εἶναι οὐ στεγανόποδά ἐστι, διὰ δὲ τὸ ἐν ὑπείκοντι εἶναι τὸν βίον μακροσκελῆ καὶ μακροδάκτυλα, καὶ τὰς καμπὰς ἔχουσι πλείους ἐν τοῖς δακτύλοις οἱ πολλοὶ αὐτῶν.

[90] See also, *De Partibus Animalium*, I.5 (645a23-26): Τὸ γὰρ μὴ τυχόντως ἀλλ' ἕνεκά τινος ἐν τοῖς τῆς φύσεως ἔργοις ἐστὶ καὶ μάλιστα· οὗ δ' ἕνεκα συνέστηκεν ἢ γέγονε τέλους, τὴν τοῦ καλοῦ χώραν εἴληφεν. Or, "For not what is by chance, but *that for the sake of which* (ἕνεκά) exists most of all in the functional-acts (ἐν τοῖς ἔργοις) of nature; and where [animals] have been constituted or come to be for the sake of the end, it has taken the place of the fitting-good (τοῦ καλοῦ) or what is best."

ment in this manner because of the regular or normative observed fact of the ontogenesis of animal species.[91] Accordingly, and beginning with our experience of such animals (birds, here), we know normative functional-activities or life practices of the animals (we would say "behaviors" now), for example, that they are marsh-dwelling or aquatic swimmers, and the distinguishing morphological features by observation, for example, long-legged and claw-toed or short-legged with webbed feet. In the study of animals, then, we begin by collecting this information (i.e., life activities and morphology), and then we conclude by demonstration of what organic matter and form are necessary on the hypothesis of these same activities. The first stage requires the first *reductio* style induction as division, establishing necessary knowledge of the fact of distinguishing morphological features, which cannot be denied as they are normatively perceived features of the particular members of the species. The second stage then moves to provide causal explanation of these distinguishing morphological features by demonstration *on the hypothesis of the end*. The better-known to us conception of activities and morphology is constituted primarily by these features normative presence in the subject of study. The better-known to nature conception of these animals and their activities is constituted through causal demonstration showing that the dividing morphological features are necessary on the supposition of the life activities of subject. Thus, we can see that explanation of animals proceeds from the necessity of constraint, proper to inductive division, to hypothetical/conditional/suppositional causal explanation. In our coming to know of natural animal beings our grasp of the animal's functional-act or ἔργον (*ergon*) becomes more rich and refined as we go from the better-known to us experience, through division and causal explanation to better-known to nature understanding. Initially, the animal ἔργον (*ergon*) is given to us simply as the normative life actions of the subject of study. After division and explanation on the hypothesis of the end, these life actions are apprehended as the functional perfection of the organism, given the capacities it possesses through its morphology.

The two stage method of division in the study of animals that Aristotle has set out, here, can well be called the *power-object model of division*. As Aristotle explains, what is to be defined with respect to its kind or genus (τῷ γένει) is defined in terms of its receptive power, capacity, or potentiality (δύνᾰμις/*dunamis*), and the actual object to which it is ordered. He further tells us that, "What *is* is acted upon in [its] potential by what is actual, so that both the former one and the latter one are the same with respect to genus."[92] Power and its object,

[91] Cf., *Physics* II.8.

[92] *De Partibus Animalium*, II.1 (647a8-9): Πάσχει δὲ τὸ δυνάμει ὂν ὑπὸ τοῦ ἐνεργείᾳ ὄντος, ὥστε ἐστὶ τὸ αὐτὸ τῷ γένει καὶ ἐκεῖνο ἓν καὶ τοῦτο ἕν. While Aristotle rejects the dichotomous for of division displayed by Plato in the *Sophist*, he is actually developing the functional-account of definition that first arises in Plato. See, *Phaedrus*, 270b: "Ἐν ἀμφοτέραις δεῖ διελέσθαι φύσιν, σώματος μὲν ἐν τῇ ἑτέρᾳ, ψυχῆς δὲ ἐν τῇ ἑτέρᾳs." Or, "In both cases [i.e., medicine and dialec-

then, are coupled together and we must disclose both to understand the being being defined. Accordingly, animals are defined through the identification of their functional-acts, which is a matter of analyzing a power in relation to its proper object/act.[93] These are first grasped through their expression in the animal's observable activities. The activities follow on what the animals are in their parts and through the whole. The form of the animal expressed by its essential attributes is apprehended as a capacity receptive of a distinct object—whether this consists in the webbed-feet of a duck for the sake of swimming, long legs and claw-toes for the sake of marsh-dwelling, or the form of the eye for the sake of awareness of color and shape.

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tic], one must define nature (φύσιν), the body in the case of the one and the soul in the case of the other." And then, *Phaedrus*, 270c9-d7. Τὸ τοίνυν περὶ φύσεως σκόπει τί ποτε λέγει Ἱπποκράτης τε καὶ ὁ ἀληθὴς λόγος. ἆρ' οὐχ ὧδε δεῖ διανοεῖσθαι περὶ ὁτουοῦν φύσεως· πρῶτον μέν, ἁπλοῦν ἢ πολυειδές ἐστιν οὗ πέρι βουλησόμεθα εἶναι αὐτοὶ τεχνικοὶ καὶ ἄλλον δυνατοὶ ποιεῖν, ἔπειτα δέ, ἂν μὲν ἁπλοῦν ᾖ, σκοπεῖν τὴν δύναμιν αὐτοῦ, τίνα πρὸς τί πέφυκεν εἰς τὸ δρᾶν ἔχον ἢ τίνα εἰς τὸ παθεῖν ὑπὸ τοῦ, ἐὰν δὲ πλείω εἴδη ἔχῃ, ταῦτα ἀριθμησάμενον, ὅπερ ἐφ' ἑνός, τοῦτ' ἰδεῖν ἐφ' ἑκάστου, τῷ τί ποιεῖν αὐτὸ πέφυκεν ἢ τῷ τί παθεῖν ὑπὸ τοῦ; Or, "That is well then, and consider at length what both Hippocrates and true reason (ὁ ἀληθὴς λόγος) say concering nature (περὶ φύσεως). For, concerning the nature of anything whatsoever, must we not reason (διανοεῖσθαι) in this manner: first, concerning that which we ourselves wish to be technically knowledgable of and to be able to make another as such, [we must answer as to] whether it is simple or multiform (ἁπλοῦν ἢ πολυειδές), and then, if it is simple, examine its capacity (δύναμιν), what it is naturally productive of in relation to the act it holds, or what it is in relation to the affecting thing that acts upon it, and if it has many forms, these being numbered, as we said regarding one, to see these and say of each of them, what is the act (τί ποιεῖν) for which it has naturally come to be, or what is the affection (τί παθεῖν) for which it is naturally, and what acts upon it." For a more expansive account of Plato's seminal contribution to the power-object model of division, see *The Aristotelian Foundations of the Human Good*, chapter 1.

[93] In case one is not convinced of this point through this treatment of *PA* I.1-II.1, here are several other texts, to make the point emphatically. At *Politics* I.2 (1253a23), he notes: …πάντα δὲ τῷ ἔργῳ ὥρισται καὶ τῇ δυνάμει… Or, "And everything is defined by its functional-act (τῷ ἔργῳ) and capacity (τῇ δυνάμει)." Also, at *De Caelo*, II.3 (286a8-9), Aristotle notes that Ἕκαστόν ἐστιν, ὧν ἐστιν ἔργον, ἕνεκα τοῦ ἔργου. Or, "Each thing that exists, of which there is a function, is for the sake of the function." And, the author of the *Meteorology*, at IV.12 (390a10-13), notes: ἅπαντα δ' ἐστὶν ὡρισμένα τῷ ἔργῳ· τὰ μὲν γὰρ δυνάμενα ποιεῖν τὸ αὐτῶν ἔργον ἀληθῶς ἐστιν ἕκαστον, οἷον ὀφθαλμὸς εἰ ὁρᾷ, τὸ δὲ μὴ δυνάμενον ὁμωνύμως, οἷον ὁ τεθνεὼς ἢ ὁ λίθινος· Or, "Everything is defined by its functional act (τῷ ἔργῳ); for the objects (δυνάμενα) of the capacities produce their functional-acts which is what each thing truly is; for example, if it were the eye, it would be the act of seeing, and when there is no capacity the thing is only called what it is equivocally, as when the body dies or in the case of the stone body." Reeve has helpfully collected these texts. See, C.D.C. Reeve, *Action, Contemplation, and Happiness: An Essay on Aristotle* (Cambridge, MA, Harvard University Press, 2012), 239.

Reasoning on the Hypothesis of the End as Effect-Cause Reasoning

In the *De Anima* Aristotle expresses this form of reasoning on the hypothesis of the end is also a matter reasoning from attributes (functional-actions) taken as effects back to essential capacities as the cause of the attributes or effects.[94] Again, this makes sense in terms of the movement from what is better-known to us to what is better-known to nature. On the power-object model of division, we begin with factual knowledge pertaining to the animals functional-acts and morphology, and then we reason hypothetically to obtain proper causal understanding disclosing the essence of the being.[95]

Having defined the soul (ψυχή/*psuche*) generically at *De Anima* II.1 as "the primary actual-fulfillment of a natural body in potential (δυνάμει) to possessing life,"[96] by way of the eliminative form of division, Aristotle then proceeds to divide the species by way of the power-object model of division:

> 'Living' being said in many ways, we say something is living even if it possesses only some one of these things: intellect (νοῦς), sense-perception (αἴσθησις), motion and rest in accord with place, and also motion in accord with nourishment, and both perishing and growth.[97]

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[94] *De Anima*, I.1 (402b16-25): ἔοικε δ' οὐ μόνον τὸ τί ἐστι γνῶναι χρήσιμον εἶναι πρὸς τὸ θεωρῆσαι τὰς αἰτίας τῶν συμβεβηκότων ταῖς οὐσίαις (ὥσπερ ἐν τοῖς μαθήμασι τί τὸ εὐθὺ καὶ τὸ καμπύλον, ἢ τί γραμμὴ καὶ ἐπίπεδον, πρὸς τὸ κατιδεῖν πόσαις ὀρθαῖς αἱ τοῦ τριγώνου γωνίαι ἴσαι), ἀλλὰ καὶ ἀνάπαλιν τὰ συμβεβηκότα συμβάλλεται μέγα μέρος πρὸς τὸ εἰδέναι τὸ τί ἐστιν· ἐπειδὰν γὰρ ἔχωμεν ἀποδιδόναι κατὰ τὴν φαντασίαν περὶ τῶν συμβεβηκότων, ἢ πάντων ἢ τῶν πλείστων, τότε καὶ περὶ τῆς οὐσίας ἕξομεν λέγειν κάλλιστα· Or, "It seems that not only is the knowledge of the definition useful for the inquiry into the causes of the attributes properly belonging to beings (ταῖς οὐσίαις) (as in mathematics [knowing] what the straight and the curved, and the line and the plane are, is for discerning that the angles of the triangle are equal to such a number of right angles), but also, conversely, the proper attributes (τὰ συμβεβηκότα) contribute in great part to the knowledge of the definition (τὸ τί ἐστιν); For whenever we are able to render an account in accord with what appears concerning proper attributes (περὶ τῶν συμβεβηκότων), either all or as many as possible, then also we are able to speak well concerning the being [in the sense of essence] (περὶ τῆς οὐσίας);"

[95] See, *De Anima*, I.1 (402b14-16): εἰ δὲ τὰ ἔργα πρότερον, πάλιν ἄν τις ἀπορήσειεν εἰ τὰ ἀντικείμενα πρότερον τούτων ζητητέον, οἷον τὸ αἰσθητὸν τοῦ αἰσθητικοῦ, καὶ τὸ νοητὸν τοῦ νοῦ. Or, "If the functional-acts (τὰ ἔργα) are first, it might be considered again whether one must first inquire into the corresponding objects, such as what is sensed in the act of sense-perception, and what is known in the act of knowing." And, again, see *De Anima*, I.1 (403b11-12): …ἀλλ' ὁ φυσικὸς περὶ ἅπανθ' ὅσα τοῦ τοιουδὶ σώματος καὶ τῆς τοιαύτης ὕλης ἔργα καὶ πάθη… Or, "… but the scientist of nature is he who is concerned with the whole precisely in the functional-acts and affective objects of a body such as this and of matter of such a disposition…"

[96] *De Anima*, II.1 (412a22-28):

[97] *De Anima*, II.2 (413a22-25): πλεοναχῶς δὲ τοῦ ζῆν λεγομένου, κἂν ἕν τι τούτων ἐνυπάρχῃ μόνον, ζῆν αὐτό φαμεν, οἷον νοῦς, αἴσθησις, κίνησις καὶ στάσις ἡ κατὰ τόπον, ἔτι κίνησις ἡ κατὰ τροφὴν καὶ φθίσις τε καὶ αὔξησις.

To begin, we know these species of soul as distinct in terms of act:

> But that (ὅτι) these are distinct with respect to reasoned-account or definition (τῷ λόγῳ), is manifest; for there is a difference with respect to sense-perception (αἰσθητικῷ) and forming beliefs (δοξαστικῷ), if the act of sensation is really other than that of forming beliefs, and similarly concerning each of the others [i.e., capacities] having been stated. Further, all of these [capacities] belong to some of the animals, and some of them to some, and to others only one (and this produces the difference among animals);[98]

Finally, Aristotle explains how we move to complete better-known to nature apprehension of the definitions of the species of soul:

> It is necessary—to make an inquiry into what follows concerning these [species of soul]—to set down the particular definition (τί ἐστιν) of each, in this manner, at once, concerning the things belonging [to it] and concerning the things that are other [than it]. And, it is necessary, if one is to state what each of these is, such as what thinking, or sensation, or nourishment is, that one must first already state what the act of thinking (τὸ νοεῖν) is and what the act of sense-perception (τὸ αἰσθάνεσθαι) is, etc.; for the functional-operations (αἱ ἐνέργειαι) and the ordered-activities (αἱ πράξεις) are prior according to reasoned-account (κατὰ τὸν λόγον). And if this is so, it is in turn necessary to have examined first the corresponding-objects of these [functional-operations and activities], and it would be necessary to have divided concerning each of these things first the cause (αἰτίαν) on account of which it is, as for example concerning what nourishes (τροφῆς), and the sensible-object (αἰσθητοῦ), and the object of thought (νοητοῦ).[99]

Aristotle expresses the need, then, to fully define each species of the soul and the attributes belonging to them by identifying the act of the capacity in relation to the object or end that *causally* affects it. A summary showing Aristotle's accomplishments in the *De Anima* along these lines will be helpful our purposes.[100]

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[98] *De Anima*, II.2 (413b29-414a1): τῷ δὲ λόγῳ ὅτι ἕτερα, φανερόν· αἰσθητικῷ γὰρ εἶναι καὶ δοξαστικῷ ἕτερον, εἴπερ καὶ τὸ αἰσθάνεσθαι τοῦ δοξάζειν, ὁμοίως δὲ καὶ τῶν ἄλλων ἕκαστον τῶν εἰρημένων. ἔτι δ' ἐνίοις μὲν τῶν ζῴων ἅπανθ' ὑπάρχει ταῦτα, τισὶ δὲ τινὰ τούτων, ἑτέροις δὲ ἓν μόνον (τοῦτο δὲ ποιεῖ διαφορὰν τῶν ζῴων)·

[99] *De Anima*, II.4 (415a14-22): Ἀναγκαῖον δὲ τὸν μέλλοντα περὶ τούτων σκέψιν ποιεῖσθαι λαβεῖν ἕκαστον αὐτῶν τί ἐστιν, εἶθ' οὕτως περὶ τῶν ἐχομένων καὶ περὶ τῶν ἄλλων ἐπιζητεῖν. εἰ δὲ χρὴ λέγειν τί ἕκαστον αὐτῶν, οἷον τί τὸ νοητικὸν ἢ τὸ αἰσθητικὸν ἢ τὸ θρεπτικόν, πρότερον ἔτι λεκτέον τί τὸ νοεῖν καὶ τί τὸ αἰσθάνεσθαι· πρότεραι γάρ εἰσι τῶν δυνάμεων αἱ ἐνέργειαι καὶ αἱ πράξεις κατὰ τὸν λόγον. εἰ δ' οὕτως, τούτων δ' ἔτι πρότερα τὰ ἀντικείμενα δεῖ τεθεωρηκέναι, περὶ ἐκείνων πρῶτον ἂν δέοι διορίσαι διὰ τὴν αὐτὴν αἰτίαν, οἷον περὶ τροφῆς καὶ αἰσθητοῦ καὶ νοητοῦ.

[100] For a very helpful treatment of the capacities of the soul in Aristotle, see C.D.C. Reeve, *Action, Contemplation, and Happiness.*

The nutritive capacity is one that is the source of the preservation of the living being to the extent that it is such a kind of being, and food is its object or end, which is whatever is bodily *and* digestible for the organism, providing the material cause necessary for growth and preservation. 'Preservation' is extended beyond the individual to include the species, so that reproduction is an essential aspect of the nutritive capacity, its end being the production of a new individual member of the species.[101] Of the sensitive capacity, there are five types: (i) touch, (ii) sight, (iii) hearing, (iv) smell, and (v) taste. Each of these has a bodily organ with a corresponding object, which is its end and the cause of the act of sensation: (i) the animal body, in general, corresponds to tangible bodies; (ii) the eye to color; (iii) the ear to sound or what is hearable; (iv) the nose to what is smelled; and, (v) the tongue or mouth to what is tasted.[102] All of the senses also share in common that they are receptive, through impression, of the forms of any sensually perceived and or known being.[103] Over the five senses, with their organs and proper objects, Aristotle shows the necessity of another faculty, the common-sense, which constitutes a singular act of awareness of the acts of sense-perception of the particular through the organs, and in this way alone allows the animal to judge of what is sensed simultaneously.

[101] *De Anima*, II.4 (416b10-29). In contemporary biology, the study of the nutritive capacities of the animal soul have advanced to that of (i) metabolism, which seeks explanation in terms of the chemical processes and controls which provide energy to sustain the life of the organism, (ii) homeostasis, which explains the formal mechanisms by which an organism maintains its own biological stability while compensating for environmental conditions in a manner optimal for its survival and wellbeing, and (iii) biological reproduction, which explains how species are sustained from the simplest to the most complex forms from cell replication through mitosis up to sexual reproduction by the genetic model. See, Wallace, *The Modeling of Nature*, 81–92.

[102] See, *De Anima*, II.5-11. For a helpful summary of Aristotle's conception of sensation and sense-perception, see Jonathan Lear, *Aristotle: The Desire to Understand*, 101–116. For an excellent analysis of the sense-perceptive faculties in the Phenomenological tradition, see Robert Sokolowski, *Introduction to Phenomenology*, 66–76. See also, Hans Jonas sixth essay, in *The Phenomenon of Life*, "The Nobility of Sight: A Study in the Phenomenology of the Senses," 135–156.

[103] See, *De Anima*, II.12 (424a17-24): Καθόλου δὲ περὶ πάσης αἰσθήσεως δεῖ λαβεῖν ὅτι ἡ μὲν αἴσθησίς ἐστι τὸ δεκτικὸν τῶν αἰσθητῶν εἰδῶν ἄνευ τῆς ὕλης, οἷον ὁ κηρὸς τοῦ δακτυλίου ἄνευ τοῦ σιδήρου καὶ τοῦ χρυσοῦ δέχεται τὸ σημεῖον, λαμβάνει δὲ τὸ χρυσοῦν ἢ τὸ χαλκοῦν σημεῖον, ἀλλ' οὐχ ᾗ χρυσὸς ἢ χαλκός· ὁμοίως δὲ καὶ ἡ αἴσθησις ἑκάστου ὑπὸ τοῦ ἔχοντος χρῶμα ἢ χυμὸν ἢ ψόφον πάσχει, ἀλλ' οὐχ ᾗ ἕκαστον ἐκείνων λέγεται, ἀλλ' ᾗ τοιονδί, καὶ κατὰ τὸν λόγον. Or, "It is universally necessary to hold, concerning every sensitive capacity, that the sense-perceptive capacity (αἴσθησίς) is what is receptive of the forms (εἰδῶν) of the sensed objects without the matter, as the wax is able to receive the sign of the signet-ring without the iron or the gold, holding the gold or the bronze sign, but not *qua* gold or bronze; and similarly, the sensation of each is affected by that possessing color, or taste, or sound, but this is not said to the extent that each is of the [whole] thing, but to the extent that it is such as this [i.e., formally], and according to definition (κατὰ τὸν λόγον)." The necessity of the claim follows from the fact that it is impossible for individuated matter to pass into the organ and cognition.

Since we are capable of judging the difference between, for example, 'sweet' and 'white' in the same object, and since the acts of sensation through the tongue and the eyes are not capable of this discriminatory act in themselves, it is necessary that the common-sense exist over and above them, unifying their acts in awareness and allowing for such discrimination in the sensitive animal.[104] With sensation, as has already been mentioned, come also the related capacities of desire and imagination.[105] Finally, the intellective capacity (νοῦς) has as its object the essence (τί ἦν εἶναι)[106] which makes the particular thing known to be what it is, and this is also the species or definition (εἶδος)[107] of the known thing, which the intellect being actually exercised is capable of apprehending separately from matter (in the particular being known and the phantasm of sensation).[108] The soul of the human being, of course, presents a special case, since analysis of its acts shows it to possess with necessity a differentiating capability and act that does not occur through a bodily organ, namely, in the intellect. The main point of interest, for the current study, is simply to see that the method Aristotle sets out will work by reasoning from given life activities to what is necessary on the supposition that they are to be as they are. On the supposition of the intellectual acts of the soul of apprehending the universal taken as end/effect, it is necessary to set down the differentiating and essential capacity of intellect. In fact, Aristotle uses this model at *APo* II.19 in giving his genetic account of human knowledge, as we presented it above. The diagram below expresses this use of the power-object model of division,

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[104] See, *De Anima*, III. 2 (426b20-23).

[105] Aristotle also distinguishes a power of discrimination or estimative faculty in animals, which allows them to perform imperfect or non-intellective voluntary acts, as when they act for desired objects of sense-perceptive awareness. Further, he distinguishes the faculty of memory and treats it in a separate book (*De Memoria et Reminiscentia*), without which, as we have seen in the treatment of *APo*, II.19, experience and knowledge are impossible.

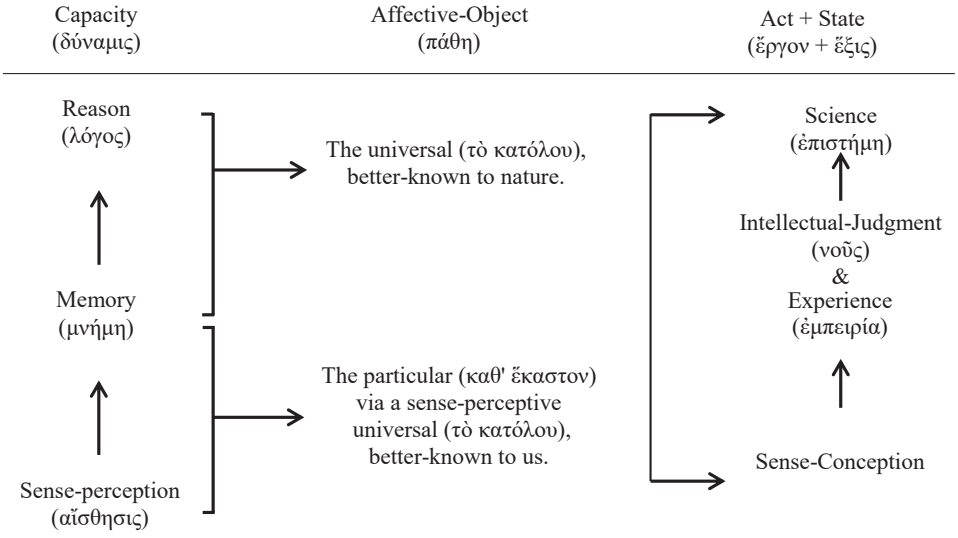
[106] *De Anima*, III.4 (429b10-19). Here, Aristotle distinguishes the intellective capacity from that of sensation by appealing, precisely, to essence as its object. Since there is a difference between a magnitude and the essence of magnitude, that is, what it is, and so with water and all other knowable things, and since the sensitive faculties have as their objects the particular things sensed, there must be another faculty in the case of humans capable of receiving and actively knowing essence.

[107] See *De Anima* III.8. At 432a1-3, Aristotle uses a brilliant analogy to express that the intellect in act, which is a form itself, is also the actual form of the thing known: ὥστε ἡ ψυχὴ ὥσπερ ἡ χείρ ἐστιν· καὶ γὰρ ἡ χεὶρ ὄργανόν ἐστιν ὀργάνων, καὶ ὁ νοῦς εἶδος εἰδῶν καὶ ἡ αἴσθησις εἶδος αἰσθητῶν. Or, "The soul is as the hand; for as the hand is the instrument of instruments, so also intellect is the form of forms and sensation the form of the sensed-object."

[108] For an excellent treatment of Aristotle's conception of sensation and sense and intellectual knowledge, synthesizing it with the achievements of modern biology and cognitive science, see Wallace, *The Modeling of Nature*, 114–156. For a helpful treatment of Aristotle's conception of the capacity of intellect (νοῦς), see again, Jonathan Lear, *Aristotle: The Desire to Understand*, 116–151.

providing clarity and distinct knowledge of human knowing itself, dividing capacities in relation to their objects and the corresponding habits produced by their acts:[109]

Figure 2. The Power-Object Model of Division in Posterior Analytics II.19



Division as Providing Principle of Philosophical Anthropology in Aristotle's *Ethics*

A final point relevant to the study of Wojtyła's Aristotelian method is that Aristotle himself appeals to the method of division, as we have seen him set it down in *APo*, *Physics*, *De Partibus Animalium*, and *De Anima*, in his own account

[109] Because intellectual-judgement and science are also acts of reason (what follows *reductio* and the proper syllogism), and because of the close connection between experience and intellectual-judgment, properly capturing the relationship between the states of concept formation, experience, intellectual-judgement and science is difficult, if not impossible, in such a diagram. In line with the *Metaphysics* I.1 text, we know that experience entails knowledge of the fact, which means, in turn, that it involves an act of intellectual-judgement. First principles, for which we cannot use middle-termed syllogisms, are established as necessary facts in division by *reductio*, as has been shown above. In a real sense, then, experience as knowledge of the fact already requires or is intellectual-judgment after such reasoning. Further, even concept formation involves the faculty reason for human beings, which is shown by the fact that the human concept, as soon as it is formed, can be applied in an act of judgment to the particular. The diagram is imperfect, but helpful in its way, nonetheless, for displaying the power-object model of division.

of the human good, in *Nicomachean Ethics*. As this is clearly one of Wojtyła's *inspiring* and *barrowed* sources, let us set down the key text for consideration. Having stated his intention to obtain a precise definition of the human good, Aristotle indicates the method he will use, which is the power object model:

> And this could be accomplished presently, if we could apprehend the functional-act (τὸ ἔργον) of the human being (τοῦ ἀνθρώπου). For, as in the case of the flute player and the sculptor and every art-practitioner, and generally where there is some functional-act (ἔργον) and activity (πρᾶξις), the good (τἀγαθὸν) is thought to be in the functional-act (ἐν τῷ ἔργῳ) and the well-doing (τὸ εὖ), in this manner it should be expected also for the human being (ἀνθρώπῳ), if indeed there is some functional-act that belongs to him.[110]

He continues:

> Is there some set of functional-acts (ἔργα) and activities (πράξεις) of the carpenter and the shoe-maker, while no such thing belongs to the human being, being brought into being by nature (πέφυκεν) as functionless (ἀργὸν)? Or, just as in the case of the eye, and the hand, and the foot, and generally, of each of the parts, some functional-act (ἔργον) presents itself, in this manner also would one not set down some functional-act of the human being apart from all these? What, therefore, could this possibly be?[111]

In what follows, of course, Aristotle proceeds to set out the definition of the human soul in relation to the organic body that he had already set out with the rigor of division as we have presented it here *De Anima* and to utilize this definition to disclose the human good. This, of course, is the topic of another essay, in general. However, it is worth this small look, as it were, since one reading *The Acting Person* will see that the approach of the Stagyrite is manifestly the inspiration for Wojtyła's philosophical anthropology as a foundation for ethics proper.[112]

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[110] *EN*, I.7 (1097b24-28): τάχα δὴ γένοιτ' ἂν τοῦτ', εἰ ληφθείη τὸ ἔργον τοῦ ἀνθρώπου. ὥσπερ γὰρ αὐλητῇ καὶ ἀγαλματοποιῷ καὶ παντὶ τεχνίτῃ, καὶ ὅλως ὧν ἔστιν ἔργον τι καὶ πρᾶξις, ἐν τῷ ἔργῳ δοκεῖ τἀγαθὸν εἶναι καὶ τὸ εὖ, οὕτω δόξειεν ἂν καὶ ἀνθρώπῳ, εἴπερ ἔστι τι ἔργον αὐτοῦ.

[111] *EN*, I.7 (1097b28-33): πότερον οὖν τέκτονος μὲν καὶ σκυτέως ἔστιν ἔργα τινὰ καὶ πράξεις, ἀνθρώπου δ' οὐδέν ἐστιν, ἀλλ' ἀργὸν πέφυκεν; ἢ καθάπερ ὀφθαλμοῦ καὶ χειρὸς καὶ ποδὸς καὶ ὅλως ἑκάστου τῶν μορίων φαίνεταί τι ἔργον, οὕτω καὶ ἀνθρώπου παρὰ πάντα ταῦτα θείη τις ἄν ἔργον τι; τί οὖν δὴ τοῦτ' ἂν εἴη ποτέ;

[112] Aristotle's use of the term ἔργον (*ergon*) is nuanced, and its varied meanings are important for understanding the relation of Wojtyła's method to that of the Stagyrite. The term means, basically "act" or "deed," and this is the sense in which its content provides the point of departure for the study of natural living beings. As we have seen, ἔργον (*ergon*) also indicates the functional-act of a living being, which is its perfection in the expression of its teleologically ordered form. Aristotle intends this second meaning of ἔργον (*ergon*) in his use of the term in these

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texts of the *Nicomachean Ethics*. However, he is using the definition of the human being that he has already established in the *De Anima* (it is a subalternating principle of a science), so that, on his approach, this meaning presupposes acts of division already accomplished.

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Daniel C. Wagner

Sul Metodo Aristotelico di Karol Wojtyła
Parte I
Induzione aristotelica (ἐπαγωγή) e divisione (διαίρεσις)

Sommario

Il presente articolo è la prima parte dell'analisi dedicata al metodo aristotelico di Karol Wojtyła. Si mostra che la metodologia di *induzione* e di *riduzione* di Wojtyła è identica al metodo aristotelico di passare da ciò che ci è più noto dall'*esperienza* (ἐμπειρία / *empeiria)* a ciò che è meglio conosciuto dalla natura attraverso l'induzione (ἐπαγωγή / *epagoge*) e l'analisi (ἀνάλῡσις / *analusis*) o la divisione (διαίρεσις / *diairesis*). La descrizione dettagliata del metodo aristotelico nella Parte I conduce ad una presentazione e ad un apprezzamento della forma logica e dell'impulso del metodo di Wojtyła. Wojtyła utilizza le forme logiche della *reductio ad impossibile* e dell'inferenza derivante dall'*ipotesi finale*, ovvero l'inferenza risultato-causale, caratteristica delle scienze naturali, e il modello della definizione del tipo potenza-oggetto. Grazie a questa metodologia, Wojtyła ottiene una conoscenza decisiva della persona umana, conoscenza necessaria e innegabile: essa rivela *εἶδος (eidos)* o *tipi* di persone nel senso aristotelico, tomista e fenomenologico del concetto.

Parole chiave: Karol Wojtyła, metodo, induzione, riduzione, Aristotele, definizione, divisione, persona, atto, antropologia filosofica.

Daniel C. Wagner

Sur la méthode Aristotélicienne de Karol Wojtyła
Partie I
Induction aristotélicienne (ἐπαγωγή) et division (διαίρεσις)

Résumé

Le présent article est la première partie de l'analyse consacrée à la méthode aristotélicienne de Karol Wojtyła. On y montre que la méthodologie inductive et réductive de Wojtyła est identique à la méthode aristotélicienne consistant à passer de ce qui nous est mieux connu de l'expérience (ἐμπειρία / *empeiria)* à ce qui est mieux connu de la nature à travers l'induction (ἐπαγωγή / *epagoge*) et l'analyse (ἀνάλῡσις / *analusis*) ou division (διαίρεσις / *diairesis).* La description détaillée de la méthode aristotélicienne dans la Partie I conduit à une présentation et à une appréciation de la forme logique et de l'élan de la méthode de Wojtyła. Il utilise les formes logiques de *reductio ad impossible* et d'inférence provenant de l'hypothèse finale, ou l'inférence résultat-cause, caractéristique des sciences naturelles, et le modèle de la définition du type puissance-objet. Grâce à cette méthodologie, Wojtyła obtient une connaissance décisive de l'être humain, connaissance nécessaire et indéniable : elle révèle les *εἶδος (eidos)* ou *types* de personnes au sens aristotélicien, thomiste et phénoménologique du concept.

Mots-clés : Karol Wojtyła, méthode, induction, réduction, Aristote, définition, division, personne, acte, anthropologie philosophique.