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Richard Whately's Revitalization of Syllogistic Logic

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Abstract

This is an expanded version of the first chapter *Richard Whately's Revitalization of Syllogistic Logic* in **Aristotle's Syllogism and the Creation of Modern Logic** edited by Lukas M. Verburgt and Matteo Cosci (Bloomsbury, 2023). Drawing upon the author's 1982 Ph. D. dissertation (https://digitalcollections.dordt.edu/faculty_work/230/) and more current scholarship, this essay traces the critical historical background to Whately's work in more detail than could be done in the published version.

Keywords

Richard Whately, logic, syllogism, development, Aristotle

Disciplines

Logic and Foundations

Richard Whately's Revitalization of Syllogistic Logic

Since the time of Aristotle [logic] has not had to go a single step backwards, … What is further remarkable about logic is that until now it has also been unable to take a single step forward, and therefore seems to all appearance to be finished and complete.[1]

Kant's "Preface" to the *Critique of Pure Reason* (B-edition, 1787)

Immanuel Kant's epigram on Aristotle's logic has an authoritative ring to it, but strictly speaking, it is false—in both directions. Over the two millennia since Aristotle first introduced the classic notions of logical deduction and scientific demonstration in his *Prior* and *Posterior Analytics*, logic had progressed forward and backward in various ways, both as a science and as an art. Kant's late eighteenth-century contemporaries, however, would likely have agreed that Aristotle's core logic comprised a completed system of valid syllogistic forms of reasoning, qualified perhaps by some reservations about the fourth figure.

Half a century later, developments in British logic put the lie to Kant's appraisal. William Hamilton (1837ff) extended formal logic by introducing new propositional forms to accommodate quantifying the predicate; John Stuart Mill (1843) reinterpreted and expanded logic by incorporating inductive reasoning; Augustus De Morgan (1847ff) generalized syllogistic logic to include relations as well as properties; and George Boole (1847, 1854) used algebraic notation and techniques to express propositions and deduce consequences from premises, opening up propositional logic in the process. Each of these trends—particularly those originating in De Morgan's and Boole's investigations—broke through the traditional bounds of Aristotelian logic.

The baseline for this transformation was Richard Whately's spirited defense of the syllogism mounted around 1825. By mid-century, British logicians uniformly acclaimed Whately as having restored Aristotelian logic, though they also recognized that this played no active role in further developments.[2] Documenting Whately's work as the catalyst in revitalizing syllogistic logic will be the focus of this chapter.

For background to these developments, we will first explain why Aristotelian logic needed a champion, surveying the chief criticisms of logic as well as the main alternatives on offer during the seventeenth and eighteenth centuries. Next, we will briefly consider some responses to logic's critics prior to Whately. Our analysis of Whately's role in reviving logic will then outline the contours of his system and present his defense of logic. Finally, we will draw some conclusions about the part Whately's logic played in the development of nineteenth-century British logic and assess its place in the history of logic more broadly.

Seventeenth-Century Challenges to Aristotelian Logic: Syllogism's Competitors and Critics

Seventeenth- and eighteenth-century mathematics and natural philosophy made little use of traditional forms of reasoning. Systematic emphasis by Kepler, Galileo, Newton, Boyle, Euler, Laplace and others on careful observation, experimentation, inductive generalization, mechanical explanations, and quantitative relationships between measurements—applied first in astronomy, optics, mechanics, and chemistry, and then also in acoustics, magnetism, and electricity—left scientific practitioners less reflectively focused on the forms of deductive argumentation. And, as mathematics moved away from an axiomatic geometric basis, where an explicit use of syllogistic forms had never taken root, toward the

analytic approach of algebra, calculus, and differential equations, deductive reasoning found even less of a home there than earlier. Syllogistic reasoning was largely confined to the study of university logic, with applications primarily in the humanities and theology.

Syllogistic reasoning was also *attacked* by advocates for these fields, and toward the end of the seventeenth century traditional logic was *challenged* by an empiricist epistemology.

Though there had been attempts to reform Aristotelian logic during the Renaissance, the first serious attack on the syllogism from the perspective of natural philosophy came from Francis Bacon (1561-1626) in his *Novum Organum* (1620), the second part of his *Great Instauration*. Bacon proposed advancing knowledge for the eventual control of nature by means of an inductive organon of discovery that would compete with Aristotle's logic.[3] Bacon's "logic," his scientific method, promotes collaborative observation, experimentation, and painstaking induction. This would allow one to gradually ascend to first principles in natural philosophy by methodically comparing phenomena to discern their points of agreement and disagreement. Syllogistic reasoning is of little value for acquiring knowledge of nature because it remains trapped in the realm of words and propositions. Being unable to investigate the truth about things, syllogistic argumentation is prone to accept unverified principles from past authorities. Scholastic logic is fit only for disputation about received opinions or for drawing particular conclusions from general statements, possibly induced from earlier considerations.

While Bacon's empiricist methodology was generally embraced by later British thinkers,[4] in France, René Descartes' views predominated. Descartes (1596-1650) also challenged traditional logic,[5] but from the vantage point of mathematics. Like Bacon, Descartes thinks human understanding needs guidance in its search for truth and to avoid error, but Descartes finds inspiration in the emergent analytic method of mathematics, not induction. In his *Rules for the Direction of the Mind* (written c. 1628) and his *Discourse on Method* (1637), Descartes promotes the analytic method, both for arriving at clear and distinct ideas and for discovering connections between them. Syllogistic reasoning, he claims, is unfit for such epistemic tasks, being useful only for organizing and conveying to others what we already know.[6] Furthermore, syllogistic forms and rules interject a mechanical contrivance into argumentation and so obscure the natural links between ideas that our native reason perceives as it draws deductive conclusions.

Descartes set forth no system of logic, but his followers Arnauld and Nicole combined Cartesian views on knowledge and method with a version of syllogistic logic in their *Port Royal Logic*, *La Logique ou l'art de penser* (1662).[7] Written to make accessible "all that was of any use in logic,"[8] its third part contains a version of traditional syllogistic logic, though it notes apropos of its exposition of syllogistic rules and forms that, while necessary to explain logical theory, they are actually of little use and introduce subtle difficulties. Arnauld presents his arguments in concrete form, and the reader is told that the formal apparatus of syllogistic logic, while available, may be bypassed, instead examining an argument "by the light of nature than by mere forms; … considering the good sense of it."[9] Or, if a rule is wanted, one can apply the grand principle distilled from their analysis of valid arguments: *one of the premises must contain the conclusion, and the other one must show that it does*.[10]

As the title *The Art of Thinking* makes clear, more than argumentation is of concern in the *Port Royal Logic*. The opening sentence reveals its Cartesian scope and aim: "Logic is the art of directing reason aright, in obtaining the knowledge of things."[11] Logic dealt with all aspects of arriving at truth, not merely logical consequences and formal inference. The first two parts of the book thus discuss how to properly form clear ideas and true propositions to avoid confusion and error, and the fourth final part gives a substantive exposition of Descartes' ideas on method. This expansive epistemic outlook on and

organization of logic would exercise a durable influence on later thinkers, such as John Locke, Isaac Watts, and William Duncan.[12]

Toward the end of the seventeenth century, two influential Aristotelian logic texts were published at Oxford, rejuvenating traditional logic within their university setting—John Wallis's *Institutio Logicae* (1687), and Henry Aldrich's compact *Artis Logicae Compendium* (1691) along with its somewhat abbreviated *Artis Logicae Rudimenta*.[13] Notwithstanding their widespread use, these logics failed to halt the surge put in motion by Bacon, Descartes, Arnauld, and others toward devaluing syllogistic logic.

The most influential British critic of logic at the time was John Locke (1632-1704). Locke published his monumental *Essay Concerning Human Understanding* in 1690, articulating an empiricist epistemology based on sensations and reflection. His outlook on the source of our ideas lines up more with Bacon than Descartes, though Locke makes no attempt to develop the notion of induction. Like Bacon, he finds logic too closely tied up with words, which keeps things at arm's length. His thinking about reasoning, on the other hand, notwithstanding his opposition to innate ideas and principles, is strongly indebted to Descartes and the *Port Royal Logic*. Like them, Locke proposes relying on our native reasoning process rather than constraining it by an artificial syllogistic formalism. Locke especially castigates as worse than useless the university study of traditional logic with its attendant practice of disputation, something he had endured first-hand at Oxford.

Locke's attack on Aristotelian logic, notwithstanding some begrudging appreciation of syllogism's use in certain contexts and for limited purposes, grew more hostile as the last decade of the century proceeded. In the well-known pithy sarcasm of his *Essay*'s fourth edition (1700), Locke insists that "God has not been so sparing to Men to make them barely two-legged Creatures, and left it to Aristotle to make them Rational."[14] While the understanding needs guidance in pursuing truth, deduction works best when the mind is left to its normal strategy of simply juxtaposing and comparing sensation-based ideas with one another.[15] Syllogistic forms cannot help us find intermediate ideas to connect our ideas, and hence it is of no use for finding arguments or advancing our knowledge.[16]

Eighteenth-Century Challenges to Aristotelian Logic: Logic Textbooks

Locke's comprehensive focus on epistemic matters and his stigmatizing formal reasoning became central emphases in later treatments of logic, setting the tone for the next century.[17] Strange as it seems to us today, eighteenth-century thinkers came to regard his *Essay* and the posthumously published *Of the Conduct of the Understanding* (1706) as a new logic. These works, along with the *Port Royal Logic,*[18] exerted a strong influence on Isaac Watts (1674-1748), whose didactic *Logick* (1724) has the lengthy subtitle *The Right Use of Reason in the Enquiry after Truth, with a Variety of Rules to Guard against Error, in the Affairs of Religion and Human Life, as well as in the Sciences*.[19]

Watts' text was widely used both at Oxford and Cambridge, but it was considered by some as "old woman's logic,"[20] no doubt on account of its rather tiresome and pretentious prescriptions on how one should strive for clear ideas and true judgments and work to avoid deception and error. While Watts opposes "that noisy Thing that deals all in Dispute and Wrangling," he still maintains that true logic is "the Art of using Reason well in our Enquiries after Truth, and the Communication of it to others."[21] His text includes a section on syllogistic argumentation for the sake of completeness, but it is less than half the size of each of the first two sections on ideas and judgments. Watts remains convinced that "the Light of Nature, a good Judgment, and due Consideration of Things tend more to true Reasoning than all the Trappings of Moods and Figure."[22] Watts is not as vocal a critic of traditional logic as Locke, though he

also focuses on mental operations, broadly conceived, and downplays the value of formal syllogistic reasoning.

Another popular logic along Lockean lines[23] was written by William Duncan (1711-1760). His very readable *Elements of Logick*, first published anonymously in Dodsley's *The Preceptor* (1748), appeared later that year as a text under his name. It was republished, in both forms, more than 20 times before Whately's logic text appeared. Additionally, a slightly edited version drawn from its final three parts comprised the bulk of the lengthy *Encyclopaedia Britannica* entry on "Logic" (1771). This material remained in later editions into the middle of the nineteenth century.

The goal of logic, for Duncan, is to examine the "Powers and Faculties" of the Understanding "from our first and simple Perceptions, through all their different Combinations, and all those numerous Deductions that result, from variously comparing them one with another." This will enable us to "learn in what manner we ought to conduct our Thoughts, in order to arrive at Truth, and avoid Error."[24] Logic thus has for Duncan, as it did for Watts, a practical epistemic purpose.[25] Duncan does not actively denigrate Aristotelian logic, but standard technical details about syllogistic forms are benignly neglected; the interested reader is directed instead to the *Port Royal Logic*.[26] One becomes expert at deducing consequences through practice, not by learning rules and forms.

Scientific knowledge for Duncan, still conceived in Aristotelian terms as a system of truths deductively based upon first principles, is procured in Cartesian fashion. One begins with a foundation of clearly defined ideas and compares them either directly by intuition, yielding self-evident truths, or through a deductive process of linking them together with intermediate ideas to arrive at derived truths. Mathematics is the obvious model here. Natural philosophy can be considered a science to the extent that it proceeds similarly—although its principles are based ultimately in experience, not on the mind's own abstract ideas. In both cases, knowledge is advanced through deduction; syllogisms generate truths not known before. The inutility of syllogistic reasoning, however, a theme present in both Bacon and Descartes and soon to become prominent again, is nowhere to be seen in Duncan's thinking.

Eighteenth-Century Challenges to Aristotelian Logic: Logic's Critics

At mid-century in Britain, Bacon's proposal for a logic of induction remained dormant, both in England (Locke, Watts) and Scotland (Duncan). This was soon to change. Already in 1733, the French philosopher Voltaire had hailed Bacon as "the father of experimental philosophy," elevating his reputation internationally. Bacon's empiricist outlook was embraced in Scotland by Common-Sense Enlightenment philosophers such as Thomas Reid (1710-1796). Reid sought to combat the skepticism and idealism of Hume and Berkeley, which he traced back to the Cartesian and Lockean view that human knowledge arises from our mind's ideas rather than from direct access to the things themselves. In this respect, Reid chose one horn of the epistemic dilemma presented by Hume, whereas Kant took the other. Reid also held a Baconian position in his opposition to Aristotle with respect to syllogistic logic.

Reid was the leading exponent of the emerging Scottish philosophy of mind, publishing treatises in this area in 1764 and 1785. Just prior to this, as professor of philosophy at King's College, Aberdeen, Reid had taught a variety of philosophical topics, including logic and natural philosophy. In 1764 he was appointed professor of moral philosophy at Glasgow, a position he retained for the rest of his life, though his teaching career ended in 1781.

In 1774, Reid's friend Henry Home, Lord Kames (1696-1782), recruited him to write "A Brief Account of Aristotle's Logic," which was published as a scathing 74-page appendix to Kames' *Sketches*

of the History of Man. The book itself characterizes Aristotle's logic as being as solid as a soap bubble—colorful on the outside, but hollow on the inside.[27] Syllogistic reasoning is accused of being an artificial form of argumentation, good only for disputation, and for superficially deducing conclusions that are better known than their premises, since such arguments' conclusions are more *contained in* their premises than *inferred from* them.[28] Reid's own ground-breaking essay goes on to attack Aristotle and syllogistic logic more systematically, often in a slanderous *ad hominem* manner,[29] recommending Bacon's inductive organon as an alternative.

True logic, according to Reid has both positive and negative functions. Negatively, it helps one avoid "obscure and indistinct conceptions, false judgment, inconclusive reasoning, and all improprieties in distinctions, definitions, division, or method."[30] Positively, its goal is "to teach men to think, to judge, and to reason, with precision and accuracy."[31] This expansive view of the nature and scope of logic agrees with the tenor of the times, but it is at odds with traditional Aristotelian logic, which focuses most heavily on the logical relations among categorical propositions (conversion, the square of opposition) and on syllogistic reasoning.

Reid's wide-ranging criticisms of Aristotle's logic were both about the utility of logic and its technical organization. We'll take up the latter sort first; the first type was to become more pronounced as time went on.

Reid is scornful of Aristotle using literal symbols in his formal treatment of syllogistic reasoning, for by them logic is "purposely darkened." If meaningful terms had been used instead, he says, it would have been apparent to all how naked Aristotle's theory was.[32] A charge of obfuscation is also levelled at how Aristotle determined invalid moods. Aristotle demonstrated these in a manner "very painful to follow"[33] by cryptically providing three terms for readers to use in constructing their own counterarguments. Reid does appreciate Aristotle's overall treatment of valid moods, though. He finds his approach of summarizing the general thrust of each figure's moods after first identifying them to be preferable to the quasi-axiomatic approach of Aldrich and Arnauld, where invalid moods are ruled out and the remaining moods accepted because they agree with certain foundational principles. Reid likewise criticizes the tedious task of reducing syllogistic moods to first figure forms, claiming of all this that it is improper "to demonstrate that a syllogism is conclusive," because the conclusion of a syllogism already necessarily follows from its premises.[34]

In the end, Reid grants that syllogistic reasoning is conclusive but deems it rather trivial. Aristotle's *Dictum de Omni et Nullo*—"*what is affirmed or denied of the whole genus may be affirmed or denied of every species and individual belonging to it*"—may be the ultimate foundation of syllogistic logic, but this is "a principle … of no great depth."[35] Reid derides what Whately later accepted as characteristic of all valid arguments: "In reasoning by syllogism from general principles, we descend to a conclusion virtually contained in them."[36]

Reid also criticized Aristotelian logic's utility. For one thing, syllogistic forms are rarely used, even in the most deductively organized fields, such as mathematics. In fact, Reid notes, mathematics often deals with relational statements and arguments, which don't fit well into a categorical and syllogistic mold.[37]

The syllogism also has little to offer natural philosophy. Though scholastic thinkers, he says, had taken logic to be the engine of science, Bacon was correct in opposing his inductive method to Aristotle's logic. Reasoning on its own will make little progress but "only carry a man round like a horse in a mill."[38] Science advances by determining a solid foundation of first principles, and these are established by induction. Here Reid parts company with earlier thinkers like Watts and Duncan who had favored a more

Cartesian view of epistemology and had ignored the contribution induction could make. In contrast with them, Reid has nothing to say about the method of analysis but instead talks about observation, experiment, and induction. Nevertheless, while induction fits centrally within the scope and aim of logic, Reid does not explicitly call for or develop an inductive logic. This had to wait for others, notably Tatham (1790), Stewart (1814), and Mill (1843).

Reid's analysis of Aristotle's logic went through over a dozen printings in the next half-century, both as part of Lord Kames' treatise and as an independent work. Parts of it were also appended to the *Encylopaedia Britannica*'s article on "Logic" as a two-page section titled "Reflections on the Utility of Logic,"[39] beginning in the third edition (1797). New material on Baconian induction in the article's section on "Reasoning" also appeared first in this edition. This was extracted from *The Chart and Scale of Truth* (1790), written by the outspoken Oxford disciple of Reid and Bacon, Edward Tatham (1749-1834).

Tatham considered syllogistic reasoning to be only one type of reasoning, applicable mainly to mathematics. Inductive reasoning is what is needed for investigating nature; syllogistic logic is designed primarily for subtle disputation about words. Consequently, Tatham campaigned to modernize Oxford by removing traditional logic from the curriculum and having students study Bacon's scientific induction, arguing this both in his book and in a series of later pamphlets (1807-1811).

Two years after Reid's essay on Aristotelian logic appeared, George Campbell (1719-1796) published his *Philosophy of Rhetoric* (1776). While little concerned with logic, Chapter VI of Book I delivered a broadside against syllogistic reasoning. Quite possibly composed after the attacks of Kames and Reid,[40] Campbell especially credits Locke for his overall outlook. Like Reid, Campbell finds syllogistic reasoning applicable to mathematics, but as such artificial forms are judged "unnatural and prolix,"[41] they are generally avoided by mathematicians. And with respect to natural philosophy, syllogistic reasoning proceeds in exactly the wrong direction, from general propositions to particular instances, from things less known to ones better known.[42] Such arguments are therefore of little use for scientific investigation, being only of value for disputatious wrangling.[43] As the study of nature progressed in the modern era, Campbell notes, Aristotelian logic had "faded … and is now almost forgotten. There is no reason to wish its revival."[44]

Campbell thus characterized syllogistic arguments largely as epistemically sterile. This viewpoint was incipiently present in the critiques of Bacon and Descartes, not to mention those of Kames and Reid. Campbell, however, goes a bit further than his predecessors by explicitly characterizing syllogistic reasoning as inherently circular. If it is the nature of syllogistic reasoning to proceed from the general to the particular, from a premise to a conclusion that it contains, as the *Port Royal Logic* (and Reid) admitted in explicating what makes a syllogism valid, then the conclusion must always be better and earlier known than the premise—making syllogisms essentially useless for generating new knowledge. The syllogism is thus a prime example of *petitio principii*, the fallacy of begging the question. In order to establish the truth of the general premise by induction from particular cases—the hallmark requirement of an empiricist epistemology—one would first need to demonstrate the truth of the conclusion, one such case, and so the syllogistic argument for this result would complete a vicious circle. Campbell hammered home this structural critique by saying that "there is always some radical defect in a syllogism which is not chargeable with this."[45]

By the end of the eighteenth century Scottish common-sense philosophy was known for its focus on the operations and powers of the mind, but also for having revived interest in induction, in this respect moving away both from Cartesian and Lockean philosophical viewpoints and from Aristotelian forms of reasoning. Neither Reid nor anyone else at this time, however, had developed a new logic based upon

inductive reasoning;[46] that would finally materialize in *A System of Logic, Ratiocinative and Inductive* (1843) by John Stuart Mill (1806-1873). A thinker who advocated such a logic in the meantime, though, and whose ideas on the nature of axioms influenced Mill's view of deduction, was Dugald Stewart (1753-1828), the philosophical heir of Reid.

Stewart was born and educated in Edinburgh but studied moral philosophy with Reid at Glasgow in 1771-1772, returning home at age 19 to teach university mathematics for his ailing father. He was eventually appointed professor of moral philosophy at Edinburgh in 1785, a position he held until 1820, though his ex-student Thomas Brown replaced him as lecturer from 1810 on.

Stewart's first volume of the *Elements of the Philosophy of the Human Mind* (1792) is dedicated to Reid and generally continues his overall inductive approach to the philosophy of mind. In it he explores the fundamental laws of mental phenomena, the groundwork for developing a philosophical system of logic. At this point Stewart says some quite positive things about the value of formal reasoning,[47] especially when compared to Reid, Kames, Campbell, and Tatham. He readily acknowledges the formal nature of valid arguments, even affirming the value of literal symbolism: conclusions, he says, are "most likely to be logically just, when the attention is confined solely to signs" and not led astray by "casual associations."[48] Reasoning "may be carried on by words alone; … every process of reasoning is perfectly analogous to an algebraical operation"[49]—once the meaning of our terms is fixed to avoid ambiguity. He makes these remarks shortly after giving a syllogistic example, reformulating it with letters, and then noting that "to perceive the justness of the inference, it is not even necessary … [to] understand its meaning."[50] However, he does think that an authentic logic, based on principles of mental philosophy and a philosophical language, should go beyond what is traditionally considered logic.[51] A *rational logic* would include a variety of rules to enhance people's ability to reason rightly and avoid error in whatever field they are engaged in. While some may reason well due to natural ability, this shouldn't preclude a more systematic approach.

Stewart's second volume, focused completely on reasoning, came out in 1814, after a 22-year hiatus. In the interim he had backed away from some of his ideas on the relation of logic to language as its instrument, not wanting to be associated with the view that reasoning is grounded in a well-ordered, unambiguous language modeled on algebra,[52] because reasoning involves the "*silent habits of interpretation*" more than the formal application of rules.[53] In addition, some works defending the value of syllogistic logic had recently appeared (e.g., Gillies 1797, 1804, and 1813; Walker 1805; and Copleston 1810: see below), which Stewart feels obliged to answer. Moreover, the topic of induction, which Reid had only begun to explore,[54] required more deliberate consideration. After 1810, when Stewart was relieved of lecturing, he had more time to devote to thinking and writing about all these things.

Stewart begins by discussing various types of "deductive evidence"—intuitive, demonstrative (mathematical), and probable. Then in Chapter III he turns to consider "a few leading questions" pertaining to the nature and utility of Aristotelian logic. The final chapter of the book explores "the Method of Inquiry Pointed Out in the Experimental or Inductive Logic."

Stewart's assessment of traditional logic in 1814 is highly critical. In relitigating earlier criticisms, Stewart reinforces a few of them that are worth noting. First, Stewart criticizes the deductive structure of logic, strengthening what Reid had said about Aristotle's logic. *Aristotle's Dictum*, he claims, should not be taken as a basis for validating syllogistic forms but should rather be seen as an inductive generalization of the many forms of conclusive reasoning. Syllogistic arguments are actually the basis of the *Dictum*, not the reverse. Given this, the *Dictum*'s triviality indicates just how shallow syllogistic logic really is.

Furthermore, like Reid, he believes the whole project of demonstrating demonstrations is ill-conceived. For one thing, offering a demonstration doesn't increase the conclusive character of a valid argument: the conclusion follows from the premises without any further assistance.[55] But also, grounding the validity of syllogistic forms in a demonstration is circular, for the conclusive character of such demonstrations must be tested by putting them into syllogistic form, the very thing whose validity is at issue.[56]

Stewart also profiles Campbell's *petitio principii* charge, which may not have been well known up to this time.[57] Stewart notes, as did Campbell, that the truth of a syllogistic conclusion is already presupposed in the major premise; he thus declares that the trenchant criticism that syllogisms beg the question is "unanswerable."[58]

Stewart likewise reaffirms the criticisms of Bacon, Locke, Reid, and Kames regarding the inutility of syllogistic reasoning. As syllogistic reasoning deduces particular conclusions from general premises, it can be legitimately applied in situations where one must accept maxims as indisputable, as in the case of a legal proceeding. But this sort of reasoning proceeds in the opposite direction of what is called for in the pursuit of knowledge, particularly in investigating nature, where observation, experiment, and induction are required. A complete logic must thus include the study of induction as well as the syllogism.

Stewart discusses the nature of inductive reasoning in the last chapter of his book. In 1792 Stewart had noted that the study of nature starts with inductive reasoning and abstraction, providing general terms and principles as a deductive basis for further progress.[59] In 1814, the last half of this joint scientific method is downplayed and the first half gets emphasized. Stewart credits Bacon with inaugurating this branch of logic, this instrument of scientific discovery so masterfully employed by Newton and other scientists. In opposition to Aristotle's recent defenders,[60] Stewart claims that identifying Aristotle's unproductive view of induction (exhaustive enumeration) with the more complex experience-based notion of Bacon is completely misguided.

While Stewart doesn't systematically develop an inductive logic, he gives the most significant British analysis of induction since the time of Bacon, rounding out what had been said by Reid and Kames. He entertains the hope that, time permitting, he might one day return to erect "a rational and practical system of logic."[61] Stewart died before he could fulfill this wish, one year after the third volume of his *Philosophy of Mind* was published. The topic was to be taken further instead by Herschel (1830) and Whewell (1837, 1840), whose ideas provided the foil for Mill to develop his more elaborate system of logic (1843), taking deduction as well as induction into account and intricately linking the two together.

Stewart recapitulated the critique of logic up to that point, but he was not the last Scottish philosopher to discuss logic prior to Whately's work. His successor, Thomas Brown (1788-1820), sharply criticized Aristotelian logic and promoted inductive logic in the posthumous publication of his *Lectures on the Philosophy of the Human Mind* (1820), a work that was quite popular in the nineteenth century (running through 20 editions in 40 years) but is less well known today. We will not delve into his associationist philosophy of mind, but we'll look briefly at his view of syllogistic reasoning, which shares some features with earlier criticisms of its inutility but offers a slight twist.

Traditional logic, in Brown's mind, is a "*trifling art*" whose argument-forms invariably assume as their major premise "the very *conclusion itself* under another form."[62] Brown uses this verdict to suggest that the proper form of an argument is an enthymeme, the conclusion being drawn from the minor premise alone simply by understanding the meaning of the terms involved. To conclude that "Socrates is mortal," one only needs to know that "Socrates is a man" because it is of the nature of men to be mortal. The conclusion thus follows immediately from the particular premise, making the major premise superfluous: the full syllogistic format simply makes the argument more cumbrous and confused.

Moreover, the tacit major premise "All men are mortal" is less known and more in need of demonstration than the conclusion "Socrates is mortal," so it is not a proper epistemic basis for inferring that conclusion.[63] We spontaneously reason by one idea suggesting a second, that one suggesting a third, and so on. This is best represented by a sequence of propositions, each being the conclusion of the one before it, without interposing a major premise. Syllogistic forms fail to capture this smooth flow of enthymematic reasoning.

Brown's assessment of logic, like those of his Scottish predecessors mentioned above (Stewart 1792 being an exception), is made under the assumption that syllogistic reasoning should be judged as a mode of advancing meaningful knowledge, as a material argument, not merely as a way of deducing formal consequences from premises. His criticisms of logic's inutility are very similar to ones made by Reid, Campbell, and Stewart, but he never explicitly accuses the syllogism of circularity or committing the fallacy of *petitio principii*. Syllogistic forms are derided as being useful only for the disreputable practice of disputation, where arguments are made without any regard for truth.[64]

Late Eighteenth- and Early Nineteenth-Century Scottish Defense of Aristotelian Logic

Although Scottish philosophy nursed an ongoing antipathy toward logic during the fifty years preceding the publication of Whately's logic, Scotland was also where a defense of logic commenced. James Burnett, Lord Monboddo (1714-1799) wrote a rambling six-volume work toward the end of the century in support of Greek metaphysics. The fifth volume included a long aside claiming that the utility of syllogistic logic was "so great, that, without the knowledge of it, we cannot tell what science, what certainty, or truth, is."[65] Monboddo's unquestioning preference for Aristotelian logic was tendered without countering the growing criticism of syllogistic reasoning, however, and his ideas had little traction.

The work of his fellow countryman John Gillies (1747-1836) was more noteworthy. In 1797 Gillies published a two-volume translation, with commentary, of *Aristotle's Ethics and Politics*. This included a chapter titled "New Analysis of Aristotle's Speculative Works," a portion of which was devoted to Aristotle's logic. Gillies attempted to defuse some of the modern criticisms of logic by alleging that they were based on a misunderstanding of the nature and purpose of logic. *Aristotle's Dictum* is true, he says, because it is based on the fundamental principle underlying the construction of language, that "things with a common nature, receive a common name."[66] He then affirms what Stewart had said earlier, that logic is the art of using language correctly and that knowledge is attained by "the proper application of language as an instrument of thought."[67] Validity is warranted not by the meaning of an argument's terms but by its form,[68] which Aristotle had indicated by using letters. This practice, far from darkening the subject, as Reid had contended, clearly shows that conclusions follow from the relations among the signs alone.[69] Bacon's critique that syllogistic reasoning traffics in words is thus no reproach—that's how all reasoning takes place.[70]

In 1823, when Gillies' *New Translation of Aristotle's Rhetoric* came out, he took the opportunity to include in his 150-page introduction some further comments on Aristotelian logic in response to its critics. Expressing satisfaction with the success of his earlier defense of Aristotelian logic against Kames, Reid, and Campbell,[71] he noted that in the interim Stewart had found it necessary to reinforce their criticisms and add some of his own. Gillies proceeded to address these,[72] sometimes opposing Stewart and other times claiming that Stewart was really in agreement with Aristotle. With respect to Stewart's 1814 accusation that it was improper for logicians to fortify the conclusiveness of demonstrative reasoning with demonstrations, Gillies countered that "they do no such thing. They show, on the contrary,

wherein demonstrative truth consists, and the mental process by which it is obtained."[73] Continuing, Gillies noted that Campbell's *petitio principii* charge is a mere "quibble," for a syllogistic conclusion needs both premises in order for the conclusion to be a valid consequence.[74] An enthymeme as it stands is an incomplete argument. While Gillies doesn't refer to Brown here or elsewhere, this also addresses his critique of the syllogism.

Gillies also elaborated on his 1797 assertion that Aristotle never considered logic the great engine of science. Aristotle, according to Gillies, had advocated an experiential basis for science in which "induction is the corner stone."[75] Generalizations and definitions must be grounded in close observation of individual things and cautious inductive generalizations. Once these get formulated as principles, however, syllogistic reasoning is used to deduce further consequences and so expand our knowledge.

Gillies' views on Aristotelian logic were well received by some at the time, including Edward Copleston, who by 1810 was launching his own defense of logic from Oxford University. Before discussing his contribution, we'll briefly touch on a couple of contemporaneous developments in Ireland.

Early Nineteenth-Century Irish Defense of Aristotelian Logic

Over the final decades of the eighteenth century, Scottish universities modernized their course of logic instruction as part of their first philosophy course, contextualizing their skeletal treatment of the syllogism by exploring mental philosophy and other topics, such as rhetoric and *belles lettres*.[76] Cambridge University had also gravitated away from Aristotelian logic, having largely substituted a study of Euclidean geometry as the way to learn the basics of deductive reasoning. The University of Dublin and Oxford University, however, retained a stronger commitment to the study of traditional logic, even if supplemented by reading portions of Locke.

The dominant logic at Trinity College Dublin during the last half of the eighteenth century was the 1759 *Compendium* authored at the university's request by one of its fellows, later its provost, Richard Murray (1726?-1799).

A popular commentary on Murray's logic was published in 1805 by John Walker (1768-1833), someone Stewart deemed among the "ablest advocates for the *Organon* of Aristotle."[77] Editions of Walker's commentary were widely used at Trinity College for the next three-quarters of a century,[78] even though he was only reinstated as a fellow of the college in 1833 after having been expelled in 1804.[79] In 1847 his commentary was "still *the work* upon the subject," but now it included other notes and references as well, taken especially from the "pre-eminent" logic of Dublin's Archbishop Whately.[80]

Murray gave a concise treatment of the standard topics of Aristotelian logic but offered only an insipid rationale for studying the subject: "logical terms occur frequently in the writings of eminent authors."[81] His definition that "Logic is the art of using reason aright, … [whose] end is to investigate truth, and to communicate it, when discovered, to others"[82] fit the broader perspective on logic advocated earlier by Watts and Duncan. Though accepting this definition, Walker had no compunction about clarifying, improving, or even contradicting Murray as he saw fit.[83]

Walker held, for instance, that a patient in-depth study of Aristotle's logic was intrinsically useful, giving students the tools to make good classifications and definitions. And studying syllogistic forms of argument would make them better reasoners,[84] able to determine the validity of an argument. Walker explains and illustrates Murray's approach, which is based on the quasi-mathematical canons concerning the agreement or disagreement of terms, though he expresses dissatisfaction with the vagueness of this approach. His preference is to use *Aristotle's Dictum* for verifying valid syllogistic moods, but also for arguing that a form not covered by this principle must be invalid.[85]

In his appendix, Walker devoted nine pages to repudiating several of Locke's criticisms of the syllogism.[86] While Locke and others held that a chain of reasoning is more naturally presented by a sequence of connected ideas or an ordered progression of propositions (sorites), Walker maintained that a chain of syllogisms was necessary to fully exhibit an argument's conclusive force.[87] Walker thought his reflections here might help inoculate students against Locke's criticisms when studying his *Essay* later in their college program.[88]

Another Irish thinker around this time who proffered a limited defense of syllogistic logic was the eccentric Richard Kirwan (1733-1812), who had earlier established his scientific reputation as a chemist and geologist. His protracted and list-ridden two-volume *Logick*[89] (1807) was written because he considered the standard logics of the time deficient,[90] also in answering the criticisms of traditional logic levelled by Locke and Campbell (Reid and Tatham are not mentioned).

Though Kirwan opens the body of his text by classifying logic as both a science and an art,[91] the former gets short shrift. His exposition of the fundamentals of syllogistic reasoning, for example, is just that—a catalog of vaguely formulated principles and rules, followed by a list of examples.[92] He fails to use these to determine which syllogistic moods are valid or invalid;[93] in fact, Kirwan never exhibits syllogisms in a formal symbolic way at all. Like Locke, he evidently deemed the classification of syllogisms according to figure and mood a useless subtlety.[94] He does note, however, that the conclusion of a valid syllogistic form "is contained implicitly in the premises," from which he deduces that "a *false* conclusion cannot be drawn from *true* premises" and that a true conclusion cannot be drawn from false premises—"for a true conclusion cannot be contained in such premises; truth and falsehood being incompatible with each other."[95]

The reader who perseveres as far as page 509 will come upon Kirwan's section "A Vindication of the Syllogistic Mode of Reasoning" in which he defends syllogism's "utility against the objections of so great a master of reasoning as Mr. Locke."[96] Already at the outset of the book he had claimed that a knowledge of logic is useful for sorting out controversies, for determining which arguments are valid and which fallacious.[97] Syllogistic forms put arguments in stark relief so that their validity can be easily tested.[98] In the section giving his reply to Locke's censures he reemphasizes these points. Syllogistic reasoning is useful for clarifying an argument, even though one may ordinarily reason in a more abbreviated manner. Moreover, syllogisms encapsulate the process of our minds as we reason,[99] whatever the format of our argument. Locke, he says, may have been justified in opposing syllogistic forms of reasoning in his day due to their association with wrangling and intricate technicalities,[100] but this should not be blamed on the syllogism itself.

Besides Locke's objections, Kirwan briefly addresses Campbell's *petitio* criticism, though not by refuting it. Formulating one of Campbell's arguments as an irregular sort of syllogism, he slyly demands to be shown the *petitio* that such a syllogism must contain.[101] He also points out that syllogisms are fruitfully used both in mathematics and legal arguments, thus proving their utility.

In both Walker and Kirwan, then, we see a partial defense of syllogistic logic and a response to the aspersions of Locke, though not to the inductivists' criticisms of the inutility of the syllogism for advancing knowledge. Neither has the substance and breadth of Gillies' defense, but they highlight the fact that thinkers in various parts of Britain were beginning to push back against the critics of Aristotelian logic. A stronger and more cogent defense of logic was soon to arise, however, from the place where one would naturally expect to see it, from one of Oxford's staunchest defenders, Edward Copleston (1776-1849).

Early Nineteenth-Century English Defense of Aristotelian Logic

Copleston entered the arcane world of Aristotelian logic around 1797 when he discovered as an Oriel College tutor that he was expected to teach the subject to his students. This became even more pressing after 1800 when Oxford began making examinations more rigorous.[102] Not having studied the subject himself, Copleston threw himself into the task, gleaning ideas from various texts, especially Aldrich. Whately later observed about his mentor Copleston that "from this chaos of loose materials, mingled with rubbish, he formed … a coherent, and intelligible, and valuable system,"[103] one that Whately happily drew upon when he himself became a tutor. Copleston soon gained a reputation as the best Oxford tutor of his day, being appointed an Oxford examiner for 1802-1803.

In 1802, Oxford tutor Henry Kett (1761-1825) published his *Elements of General Knowledge*, essentially the substance of years of tutorial lectures, which included a chapter on "Logic, or the Right Use of Reason."[104] As the title indicates, this was based largely on the logics of Watts and Duncan. Kett also lauds Bacon for promoting "a new and superior kind of logic" in opposition to Aristotle's syllogistic.[105] His work's success and the anticipation of a ready market of undergraduates preparing for their examination in logic encouraged Kett to publish his *Logic Made Easy* (1809), a loose synthesis of scholastic and modern logics.[106]

Kett's chapter on logic had already been panned in 1804 as part of a scathing review[107] by Oriel fellow John Davison (1777-1834), but when Kett's inept potboiler on logic came out in 1809, Copleston felt obliged to take it apart limb by limb in *The Examiner Examined, or Logic Vindicated*[108] for debasing logic at Oxford. This was a warm-up salvo for three pamphlets written shortly thereafter,[109] in which Copleston ably defended Oxford's classical education against repeated Scottish "calumnies" fired anonymously by John Playfair (1748-1819) in the *Edinburgh Review*[110] and in response to a friendlier polemic by Henry Home Drummond (1783-1867), Lord Kames' grandson. These four writings plus published extracts from some entries in Copleston's common-place-book[111] give insight into his ideas on logic.

Playfair's indictment of English university education, made in an 1808 review of Laplace's astronomy and elaborated in an 1810 response to Copleston's rejoinder, was that it failed to train students adequately in modern analytic mathematics and natural philosophy. In particular, Oxford was guilty of abjectly adhering to "the dictates of Aristotle … as infallible decrees,"[112] studying scholastic logic and Aristotelian metaphysics instead of upgrading to the ideas of Bacon and Locke. Oxford's tradition, Playfair claims, has had dire consequences. "The logic of Aristotle is particularly hostile to inductive science. By turning the mind to the syllogistic method, it becomes a very powerful obstruction to that knowledge which is derived, by induction, from experience and observation."[113]

Copleston took up the cudgel to reply to Playfair's criticisms, upholding Oxford's approach to education in general and its approach to logic in particular. Developing the character and virtues needed by gentlemen to assume their place in public life required the study of classical literature, in their original languages, not "the hasty acquisition of miscellaneous knowledge"[114] in some specialized field of research. Logic is an essential part of Oxford's liberal arts curriculum, Copleston says, because it helps one develop a disciplined mind and because it provides tools to test an argument's validity and so "*cut short* wrangling."[115]

Logic, Copleston asserts, does not teach a method of inquiry, nor is it an engine of science. Consequently, the syllogism has not been superseded by Baconian induction, nor are they in competition with one another.[116] Aristotle as well as Bacon understood that the basic principles of science are attained through induction, though he did accept some too hastily. Opposing syllogistic reasoning to induction,

however, as Kames, Reid, Campbell, and now Playfair have done, thus signals a serious misunderstanding of the aims of syllogism.[117] While criticizing syllogistic reasoning may have been appropriate at the time when Bacon wrote, the abusive deployment and pretensions of logic that he combatted have long since been abandoned. Syllogism is not meant to be used as a method of discovery of facts and principles. "Complaints … of the barrenness of logic" are akin to demanding of a "reading-glass" that it produce words for one who is unable to read.[118] Logic, therefore, and Oxford's study of it, no longer deserve the hostility directed at it. Replacing Aristotle's syllogism with Bacon's induction would be like discarding "the windmill, because the steam-engine has been invented, or … the mariner's compass, since the introduction of gunpowder";[119] these things serve entirely different purposes and are not in conflict.

Copleston's viewpoint on logic is less grandiose than that of Watts and earlier writers. Logic is not the art of rightly using Reason in the search after truth but is "an art of *language*,"[120] regulating how we use words and propositions to unpack what we know and to convey our reasoning to others. Copleston criticizes some of Kett's syllogisms for violating the epistemic principle that our arguments should proceed from better-known facts to lesser-known ones.[121] However, Copleston wards off Campbell's *petitio* criticism by asserting that syllogisms capture how the mind invariably draws particular conclusions from general principles.[122] Though he doesn't elaborate, Copleston claims that syllogistic reasoning can prove new truths from inductively acquired premises.[123]

As for criticisms regarding logic's "tedious explanations and subtleties," these don't apply to modern logic compendia like that of Aldrich, which have "judiciously compressed and *re-cast*"[124] logic in a more appealing form than earlier. Copleston concedes that syllogistic forms are too pedantic for ordinary discourse;[125] for that reason, logic should also study conditional and disjunctive forms of argument, which have their own rules.[126] Nevertheless, the "chief boast of Aristotelian logic" is that it provides categorical forms into which any argument whatsoever may ultimately be resolved.[127] Rules governing the syllogism can then be used to test an argument's validity. If an argument is fallacious, applying "one drop of sound logic" will make the falsehood precipitate out.[128] In summarizing the soundness of Aristotle's syllogistic system, Copleston notes that complex moods not in first figure form may be reduced to one of those "perfect forms," making their conclusive character more evident. They, in turn, are justified by Aristotle's "*Dictum de Omni et Nullo*; which *Dictum*, therefore, is the *Nucleus* of the whole system."[129] Copleston's ideas regarding the structure and utility of Aristotelian logic, along with his stress on the importance of language for logic, was soon adopted as the core of Whately's own understanding of Aristotle's logic.

In the final seven pages of his thrashing of Kett, Copleston presents a few of his own notions about logic, holding out the hope that he might one day produce a more systematic treatment of logic. However, this was not to be. Perhaps Copleston became too busy first with his work as Provost of Oriel and then with the demands of his ecclesiastical appointment as Bishop of Llandaff and his responsibilities as a member of the House of Lords. But in addition, Copleston evidently believed that the time was not ripe for such a work.[130] His student and later colleague Richard Whately would instead take up the baton and finish the task.

Copleston presented the most incisive English defense of Aristotelian logic prior to Whately, but in January 1815 William Rowe Lyall (1788-1857), a Cambridge grad, wrote a polite but critical review of Stewart's 1814 volume. Lyall defends Aristotle against Stewart's censure of logic for demonstrating the conclusive nature of syllogistic argumentation, and he rejects his criticism that syllogistic reasoning goes in a direction opposite to how knowledge gets produced—because this would deny the legitimacy of all demonstrative reasoning.[131] On the other hand, Lyall takes Stewart's ongoing failure to develop a

persuasive inductive mental philosophy as suggesting the barrenness of his project of rational logic. In defense of traditional logic, Lyall rejects the critics' demand that it must justify its existence by its utility, by materially improving our natural reasoning capabilities. One doesn't denigrate Newtonian science by saying that bodies will fall and planets will orbit as they do whether or not we know the laws that govern their movements.[132] Similarly, logic ought to be accepted as the science, not the art, of reasoning, whose object it is to identify the general laws by which our minds draw valid conclusions, regardless of any practical applications.[133] And, like all sciences, its goal should be to reduce those laws to one over-arching principle, if possible.

Just how familiar Whately was with Lyall and his ideas about logic as a science is not clear, but Lyall wrote at a time when Whately was thinking about logic, and he did it in a journal that Whately and some of his Oriel colleagues contributed to. Regardless, Whately was to espouse many of the same ideas that he had promoted. As we'll see, Whately may also have had direct contact with Lyall about the time he was writing his logic article.

The Genesis of Whately's Logic: Copleston, Newman, and Whately

Richard Whately (1787-1863) matriculated at Oriel College in 1805, where he was tutored and befriended by Copleston. Whately became a fellow of Oriel in 1811, receiving his M.A. the next year. He tutored students privately over the next decade, residing at Oriel, where Copleston was provost from 1814 to 1827. At the time Oriel was the intellectual powerhouse of Oxford University, producing some of the brightest English thinkers of the time.[134] As a member of this community, Whately honed his ideas on various topics through robust conversations with friends on rambling walks through the countryside rather than by bookish scholarship.[135] Whately's strength lay in clearly explicating the fundamentals of a subject,[136] being little interested in pursuing them in depth.

Whately's first publication, *Historic Doubts Relative to Napoleon Buonaparte* (1819), was reprinted about three dozen times in the nineteenth century. This was an adroit satirical adaptation of Hume's skepticism toward Biblical accounts of miracles applied to testimony regarding the exploits and character of (the still living) Napoleon, arguing that this would lead one to doubt his very existence. Actively employing arguments in defense of Christian beliefs was something Whately did repeatedly over his lifetime, believing it to be a key reason why students should be well-versed in logic.[137]

Given his growing reputation, Whately was an obvious choice to contribute the article on "Logic" to the inaugural edition of the *Encyclopaedia Metropolitana*,[138] the ambitious brainchild of Samuel Taylor Coleridge (1772-1834). This was an English competitor to the Scottish *Encyclopaedia Britannica*, already in its sixth edition, making Whately's article a rival of theirs, which, as we noted above, was essentially Duncan's logic supplemented by Reid's critique of logic and Tatham's advocacy for induction. Begun in 1817, the encyclopaedia soon ran into financial difficulties, but in 1820 it was put on a firm footing under the editorial leadership of Lyall.

Whately's article on logic was published in two parts in the middle of 1823.[139] While it drew upon materials Whately had used over years for tutoring students in logic, these were substantially derived from Copleston's ideas and notes.[140] Whately's article also benefited from some editorial sculpting by his student John Henry Newman (1801-1890). In April 1822 Newman had been elected fellow of Oriel College, and Whately was assigned as his mentor. As a way of becoming familiar with logic, Newman was asked by Whately to copy out a manuscript that he had written earlier on the topic as a set of five "Analytical Dialogues" between a student and his instructor. He then suggested that Newman convert this material into a discursive form for his *Encyclopedia Metropolitana* article. Newman worked on this in the

summer of 1822, adding a few pages of his own surveying the history of logic, and returned it to Whately by late September.[141] Whately polished and fleshed out Newman's script, incorporated the more technical parts based on Aldrich's logic, and added his own chapter on fallacies before submitting it to the *Encyclopaedia Metropolitana*.

Whately's "Logic" drew immediate acclaim. A *British Critic* reviewer deemed it "at once profound and popular," answering "the vituperative charges . . . [of] the wise men of the North" and presenting the subject in a manner "both pleasing and familiar."[142] In concluding, he held out the hope that Whately's logic "will soon be called for in a separate and more accessible shape."[143] In response to this and to encouragement from others, *Elements of Logic* was published as a book early in November 1826. Gaining a ready audience, a second edition quickly followed in 1827, with seven more appearing before 1850, along with numerous reprintings.[144] In the end, *Elements of Logic* became the most widely used nineteenth-century logic textbook in Great Britain and the United States, greatly exceeding Whately's expectations.[145]

Whately slightly revised his original article for the first edition of the book, adding a two-page dedicatory letter of appreciation to Copleston plus a 23-page "Preface" defending the utility of logic and assessing the state of logic at Oxford. This was followed by the material taken from his article: an "Introduction" discussing the nature of logic and various attitudes toward logic through history; an "Analytical Outline of the Science," which gave students a helpful synopsis of logic and a rationale for studying it; a "Synthetical Compendium," which systematically presented the standard technical topics of terms, propositions, and arguments; a substantial chapter on "Fallacies," which later thinkers judged masterful; and a concluding "Dissertation on the Province of Reasoning," which explored induction and the epistemic import of logic. Besides a final index, there were two appendices, one discussing the meanings of common ambiguous terms, and the other giving 99 arguments that students could (be asked to) use as exercises—transcribing them into syllogistic forms, evaluating their validity by syllogistic rules, and reducing valid ones to first figure forms.[146] To discuss all of this, we will first focus on Whately's view of the nature and scope of logic; then we will outline the contours of Whately's technical treatment of logic; and finally we will examine Whately's responses to the criticisms of Aristotelian logic.[147]

Whately's View of the Nature and Scope of Logic

Whately opens his 1823 article by straightforwardly announcing that "Logic … may be considered as the Science and also as the Art of Reasoning."[148] This statement sets out two significant theses. First, Whately insists that logic—traditional Aristotelian logic—is a *science*, and not merely an *art*.[149] Neglecting the scientific character of logic has had deleterious consequences, such as focusing too heavily on the utility of logic. This led earlier thinkers like Watts and Scottish Common-Sense philosophers to expand logic's domain beyond its natural boundary, making demands of it that could not be met. No one system can rightly direct the mind in all its mental operations on all subjects. Logic's true aim is more modest, focusing on the reasoning process and its necessary prerequisites.

That's Whately's second main point. Logic's concern is with *reasoning*: "It investigates the principles on which argumentation is conducted, and furnishes rules to secure the mind from error in its deductions."[150] Logic doesn't prescribe how we *ought* to reason; it determines rules that *do* govern the mind's procedure as it makes sound arguments.[151] Logic is the theory (science) and practice (art) of reasoning.[152]

Advocating a leaner logic with reasoning as its chief focus is relatively new with Whately. Earlier logicians, particularly those following Descartes and Locke, but also Aldrich to some extent, treated the first two parts on ideas/terms and judgments/propositions as important in their own right, not just as ancillary to the third part on reasoning/arguments. Logic was thus unreasonably expected by them, according to Whately, to teach one how to arrive at clear and distinct ideas, classify and define things appropriately, assess evidence for judgments and determine their truth, as well as evaluate arguments and avoid fallacious reasoning.[153]

The fourth part of logic, dealing with method, was especially emphasized by thinkers in the Baconian and Cartesian traditions. Here one would explain how to investigate and communicate truth using the methods of induction, analysis, and synthesis. Whately still includes this and the other parts of logic in his text, but now the main focus of logic is pulled back to argumentation and its principles and rules. Other matters are considered only insofar as needed to understand the operation and use of sound reasoning.[154] Of course, besides syllogistic technicalities, Whately highlights his defense of logic and his viewpoint on the proper nature and scope of logic; these are, in fact, what distinguishes Whately's text from all others.

Whately adds an important qualifier to his original classification of logic as he begins his systematic exposition. All parts of logic, he says, require the medium of language—for expressing ideas, judgments, and reasoning as terms, propositions, and arguments.[155] In 1826 he formulates this in even stronger terms: "logic is entirely conversant about language."[156] He supplements this in 1834 by claiming that if any mental reasoning *can* occur without the use of language, this lies outside the province of logic.[157] This agnostic viewpoint comports well with his nominalist attitude toward "common terms," which he says have no referent in reality but are incomplete notions of individuals.[158]

Whately's ideas here are closely allied with Copleston's,[159] who made the following entry in his Common-Place-Book: "Logic … has nothing to do with reasoning except as expressed in words."[160] We saw a similar emphasis on language in Stewart 1792 and Gillies 1797. On first hearing, this also seems not that different from what Aldrich says, though Whately begs to differ.[161] For Aldrich, words are the necessary and convenient signs logic must use in place of the things and concepts they signify,[162] but this only makes language an instrument of logic, not its essential foundation.

Whately elaborates his viewpoint on language as the basis for logic by asserting that "the conclusiveness of [an argument] is manifest from *the mere form of the expression*, *i.e.* without considering the *meaning of the Terms*."[163] This is most clearly exhibited by using letters to stand for the terms. Here, too, Whately goes further than Aldrich, who, while acknowledging that formal consequences of premises are the proper domain of logic, still allows there to be two kinds of inferential consequences—material consequences, which depend on the meaning of the terms involved; and formal consequences, which depend instead on the argument's logical form.[164] Aldrich continues, however, by illustrating the latter sort, exactly as Whately does, with an overly simple argument formulated symbolically using letters: "B is A, C is B, therefore C is A."[165]

Whately supports using letters in syllogistic logic to exhibit the forms of propositions and syllogisms in contradistinction to critics like Reid, who had accused Aristotle of adopting this practice to intentionally darken his treatment and make his logical discoveries seem more profound than they actually were.[166] In Aristotle's defense, Whately notes that this practice is analogous to using number symbols in arithmetic and letters in algebra [167] to abstract the notion of quantity from the full concrete contexts and specificity in which they occur. Symbolic representation of propositions forces one to concentrate on the logical connection between the premises and the conclusion "without any risk of being

misled by the truth or falsity of the conclusion."[168] Without the generality that symbolic representation enables, Whately says, no science can be developed, either for logic or mathematics.

That an argument's validity is strictly due to its logical form, independent of the meaning of the terms and propositions involved, was widely acknowledged, if not by all of syllogism's critics, at least by traditional logicians and its defenders, but also by Stewart, who, as we saw above, endorsed this feature of conclusive arguments in 1792. So while the formal character of logic is a central tenet of Whately's approach to logic, it certainly was not new.[169] What can be argued for Whately in this regard is that he effectively reclaims and underscores this time-honored feature of reasoning. Emphasizing the value of language may have facilitated this: "the *form of expression* … alone is regarded in Logic"[170] is something Whately stresses in several contexts. Whately thus simplifies and purifies traditional logic by excising material (semantic) considerations and dropping certain philosophical topics, reaffirming logic's formal core as its proper focus. However, his logic is far from formalistic in any modern sense;[171] concrete everyday arguments on sundry subjects remain the grist for his logic mill, even though their meaning and their premises' truth values are deemed materially irrelevant for determining their validity.

Symbolically formulating an argument helps to filter out noise that would complicate assessing its validity. But it also reveals the logical *form* of an argument. Whately doesn't explicitly tell the reader what this "form" consists of, though he uses the word repeatedly. It seems that for him the form of an argument includes its premise-conclusion arrangement (its figured mood) and also the propositions' quality and quantity. In the final analysis, logical form is determined by the sort of connection holding between the propositions' terms (their "agreement" or "disagreement") and whether these terms are to be taken universally or partially (their distributed status).

Whately's systematic presentation of logic, therefore, begins with *terms* and their extent, then considers *propositions* and their logical relations, and finally looks at *arguments* and validity criteria. In discussing all this, we will assume a basic familiarity with Aristotelian logic. Our attention will be focused primarily, as Whately would have it, on the syllogism.

Whately's Organization and Technical Development of Syllogistic Logic

Aristotle had defined *syllogism* broadly, as *discourse in which, some things being supposed, something else necessarily follows*.[172] Over time, *syllogism* had become more narrowly understood as an argument with two premises and a conclusion—categorical statements with two terms, linked by a common middle term. Whately calls Aristotle's more general notion an "argument" and reserves the term "syllogism" for the latter.[173]

Nevertheless, Whately insists that a syllogism is "not a peculiar *kind of argument*, but only a peculiar *form* of expression"[174] into which *all arguments* may be resolved when "stated *at full length* and in … *regular form*."[175] Cast into such a form, an argument's validity can be definitively tested.[176] Syllogistic forms also capture the deductive process taking place in our minds when we reason correctly, regardless of what subject the propositions treat.[177] Whately makes this outlook on syllogisms a basic part of his defense of logic.

After examining several valid arguments, Whately claims that they can all be reduced to "the universal principle of Reasoning," Aristotle's *Dictum de Omni et Nullo*:[178] "whatever is predicated (*i.e.* affirmed or denied) universally, of any class of things, may be predicated in like manner … of any thing comprehended in that class."[179] Furthermore, arguments that don't match this *Dictum* are invalid.[180] This summarizes Whately's view of conclusive reasoning as presented in his "Analytical Outline." Fleshing this out systematically is naturally more involved.

A science, conceived in Aristotelian terms, must be based on intuited first principles arising from collective human experience of a circumscribed subject matter, with further truths being deduced from them. Both Whately and Aldrich follow this prescription in their organization and treatment of syllogistic reasoning,[181] though neither one adheres to a strictly axiomatic approach. To facilitate testing, Whately gives two "axioms or canons by which [a syllogism's] validity is to be proved" in addition to Aristotle's *Dictum*.[182] One deals with the agreement of terms (for testing affirmative syllogisms), and the other treats disagreement of terms (for negative syllogisms).[183] Whately claims that these sufficient conditions for validity are also necessary:[184] if a form violates these canons, it is invalid.[185] From these basic canons six rules for syllogisms are (loosely) argued[186] and treated as if they, too, are (individually) necessary and (collectively) sufficient for validity. Two rules identify the overall structure of a syllogism (three terms, three propositions); two tell how terms should be distributed in the argument; and two govern negative premises and conclusions.[187] Two additional rules governing particular premises and conclusions are treated as corollaries of the other rules.

Whately next identifies 64 total moods, listing 12 that can't be ruled out as invalid.[188] He then introduces the four syllogistic figures and points out which figured moods must be rejected for violating rules about the distribution of terms. In the end, 24 syllogistic forms remain, six in each figure, though five are judged "useless" because their conclusions are weaker than what is warranted. While he seems to believe that all these forms are valid because they violate none of the rules, he nevertheless grounds their validity in the *Dictum de Omni et Nullo* as well.[189] First figure forms are valid because they satisfy *Aristotle's Dictum* directly, while the validity of all other forms is confirmed by reducing them to first figure forms, either by converting the premises or conclusion or by constructing a first figure *reductio* argument. In the end, Whately believes the validity of all syllogistic forms has been established by *Aristotle's Dictum*, on which "all Reasoning *ultimately* depends."[190]

Having argued that all regular syllogisms are justified by *Aristotle's Dictum*, Whately next turns to consider other forms of deductive reasoning. While categorical propositional reasoning was the overwhelming focus of traditional logic, texts (such as Aldrich) often took up "hypothetical" forms as well,[191] discussing certain conditional and disjunctive arguments. Whately spends five pages on these. The forms he treats are ones in which the component propositions are categorical propositions.[192] For these propositional forms Whately discusses inference rules like *Modus Ponens* and *Modus Tollens* (but not *Hypothetical Syllogism*) along with *Disjunctive Syllogism* and *Constructive* and *Destructive Dilemma*. Whately recognizes these rules as establishing the validity of hypothetical arguments directly, but he also explains how conditional and disjunctive propositions may be reduced to categorical propositions, so he can still maintain that *Aristotle's Dictum* is the foundation of all conclusive reasoning.[193]

Whately's technical presentation of logic is clearly built on top of Aldrich's logic.[194] While he prefaced his presentation with his own overview of the field, streamlined Aldrich's canons and rules, and added striking examples and illustrations, in the end his system of syllogisms is still largely constructed from and confined to the logic that had been Oxford's favorite for over a century. His canons still involve the indistinct idea of terms agreeing or disagreeing with one another,[195] and his rules use the vaguely formulated notion of distribution of terms. *Aristotle's Dictum* holds a more central role, but Whately is not completely clear what sort of logical foundation it or the canons and rules provide for syllogistic reasoning. Are both sets of principles necessary and sufficient for validity, or do they serve distinct purposes? If, as Whately holds, *Aristotle's Dictum* is the ultimate basis of all reasoning, how does this principle logically relate to the canons and rules adopted, and are both really needed for treating syllogisms?

The well-deserved reputation of Whately's text is thus not due to any bold technical novelties or a firmer foundation for syllogistic forms. It is also not because Whately included a number of educational exercises—this was added only in the first edition of the book (1826), and by then other texts based on Aldrich had done a similar thing.[196] Its standing was partly due to Whately's strong reputation as a controversialist, which comes through in the non-trivial examples he uses and also in his chapter on "Fallacies."[197] His classification of fallacious reasoning into logical and non-logical fallacies was greatly admired at the time[198] and is still recognized as a seminal development in the history of this (amorphous) topic.[199] But in the moment, as well as in the long run, this was also not the main reason for the popularity of Whately's logic. Its success, as we will argue next, was due instead to his vigorous and able defense of logic against the criticisms that had been gradually accruing in number and intensity over the preceding two centuries.

Whately's Defense of Aristotelian Logic Against Its Detractors

Whately takes up two main types of criticisms of logic—criticisms of some key technical matters (logic as a science), and criticisms of logic's inutility (logic as an art). These are somewhat connected, but we'll look at them separately.

One structural criticism addressed by Whately is Reid's and Stewart's accusation that demonstrating demonstrations is absurd and unnecessary: syllogisms are conclusive all on their own. Whately replies that this is not the way to think about *Aristotle's Dictum*. It doesn't add to the certainty of a syllogism's conclusion, it merely encapsulates the core process of all syllogistic reasoning. This is what all sciences do: they seek out a grand principle that generalizes and accounts for known results.[200] Now, while this may be true, Whately does use *Aristotle's Dictum* as a deductive basis for proving the validity of syllogistic forms, and the canons and rules are also used for this purpose. So Whately's arguments *do* purport to demonstrate the conclusive character of syllogisms; his response doesn't adequately repel Stewart's attack. Furthermore, Stewart's more insightful criticism that some sort of circularity is involved in this deductive procedure—since all sound reasoning is, according to Whately, essentially syllogistic— goes unanswered.[201]

A second criticism along this line is Campbell's caustic charge that all syllogisms embody the fallacy of *petitio principii*—that one must already know the truth of a conclusion in order to know the truth of the universal premise. Whately also has some difficulty answering this criticism decisively, which is understandable since he believes syllogisms exemplify *Aristotle's Dictum*, where the conclusion is a special case of the universal premise. Whately's initial comeback to this criticism, however, is to leverage his opponent's position to his own advantage by taking the issue up on the other end. Given that all valid reasoning is captured by *Aristotle's Dictum*, Whately says, Campbell's critique, if correct, would be an indictment against *all* deductive reasoning; and that certainly can't be right. "[Campbell's] objections … lie against the process of reasoning itself universally, and will, of course, apply to those very arguments which he is himself adducing."[202] In the sixth edition of his text (1836) Whately adds the charming analogy that this is like "the woodsman, who had mounted a tree, and was so earnestly employed in lopping the boughs, that he unconsciously cut off the bough on which he was standing."[203]

Whately thus alleges *that* this circularity criticism must be wrong, but he doesn't explain *why* it is wrong. In fact, Whately accepts Campbell's criticism, in a sense—it recognizes that valid conclusions are virtually contained in their premises, which is the nature of all deductive reasoning.[204] Whately does have the resources to defuse the *petitio* criticism more fully, but he fails to employ them when dealing directly with Campbell. In his chapter on fallacies, Whately classifies *petitio principii* as a non-logical fallacy. Its

problem is not with logic; no rules are violated. Rather, the problem is epistemic in nature: knowledge is not advanced by such arguments. In classic Aristotelian terms: a *petitio* argument is a valid *deduction* but doesn't *demonstrate* the conclusion.[205] Of course, with respect to the syllogism, if the universal premise can be established other than by an inductive survey of the included particulars, then its conclusion wouldn't necessarily be known prior to the premise. Whately never objects to Campbell's criticism precisely along these lines, but he does come close when defending the epistemic utility of logic.

Whately's defense of the use of logic as the art of reasoning was broached already in his "Introduction" but is elaborated more methodically in his final "Essay on the Province of Reasoning." Here he takes on logic's vocal critics who oppose induction to syllogism and who assert that syllogistic reasoning cannot produce new truths.[206]

Whately's response to logic's inductivist critics has two parts, both based on disambiguating *induction as a process of investigation* from *induction as a type of argument*,[207] something emphasized earlier by his mentor Copleston.[208] First, he readily acknowledges the value of inductive investigation for experientially establishing principles to be used as a deductive basis for any science. In this sense, there can be no genuine conflict between Bacon and Aristotle, between induction and syllogism:[209] both are necessary, and both can flourish. Second, however, when induction is put into argument form, concluding a general principle on the basis of examining particular cases, this may be treated the way all reasoning is—as a syllogism. Whately, following Aldrich (and traditional logics generally), notes that an inductive argument can be considered an enthymeme whose missing premise is a generalizing warrant.[210] The strength of the evidence for this induction premise determines the conclusion's degree of certainty, but the inference itself proceeds the way all (syllogistic) arguments do. To reiterate, for Whately syllogism is not a *type* of reasoning, but the *form* into which *all* arguments can be put. Here too then, there is no discord between induction and deduction, only mutual support.

Aspects of Whately's answer to inductivist criticisms was to be challenged by later thinkers, especially by Bentham and Mill, but his claim that there was no intrinsic conflict between syllogism and induction, particularly induction as a scientific method of investigation, was generally accepted. As Whately pointedly noted: "A *plough* may be a much more ingenious and valuable instrument than a *flail*, but it can never be substituted for it."[211] Induction may prepare the ground for growing an epistemic crop, but syllogistic reasoning reaps the inferential harvest. As time went on, Whately fortified his defense of syllogistic logic over against detractors who would set up an opposing logic of one sort or another in its place.[212]

Whately still needs to confront the compelling criticism that syllogisms cannot advance our knowledge. This was a thorny issue for Whately. First, if a general premise is accepted on the basis of an inductive generalization, the argument's conclusion might well have been part of the evidence used in support of that premise. But regardless, proceeding from a general premise to a special case of that premise seems to be exactly what *Aristotle's Dictum* demands.[213] Acknowledging this, Whately maintains that deductive conclusions are always virtually contained in their premises. How then can syllogisms discover new truths, lesser known than their premises?

Whately addresses the issue of logic's utility on a surface level by avoiding the simplistic arguments typical of many traditional logics, where the obvious meaning of the terms used in the conclusion implies the truth of the conclusion, making an argument superfluous. Whately counters this criticism by resorting to less trivial arguments that deal with issues relevant to his time.[214] He also refocuses the inutility criticism by contending that logic cannot be asked to do something it was never designed for. Logic is not an engine of science or a remedy for achieving clear and distinct ideas or arriving at true judgments.[215] It

is instead the science of conclusive reasoning, whose rules can be used to test the validity of an argument once put into syllogistic form. This, then, is already a valuable use of logic. Even without any practical application, though, logic has great worth as the science of reasoning, for reasoning is "the most appropriate intellectual occupation of MAN."[216] That one can reason well without ever studying syllogisms is no more an argument against logic's merits than the ability to boil water is an argument against learning the theory of heat.[217]

But can syllogistic reasoning discover new truths? Whately again attempts to clarify the issue by drawing some distinctions:[218] what is meant by "discover" and "new truth"? Some discoveries, he admits, are of "real matters of fact" gained through observation or testimony, yielding information not known before, and these can't be found simply through reasoning. Other discoveries, however, are of things "implied in that which we already know."[219] This happens in geometry, for instance, where one learns the truth of new propositions only through demonstrations. The truth of a result like "circles are to one another as the squares on their diameters" is unknown before arguing it,[220] even though all the results used to demonstrate it were already known. Reasoning may also arrive at factual consequences if we have some facts to start with. These conclusions will be new to those who did not know they were contained in what was supposed, particularly if the subject matter is complex. This is like a person who owns a vein of buried metal on his property: it already belongs to the owner, but when it is dug up, its ownership is finally revealed.[221] A result may be virtually contained in a syllogism's premises, but until it is derived from them it may not be explicitly known to the reasoner. What is "new" and what is "known" is relative to each person, unlike what is logically contained or implied in the premises.

An even more convincing argument for the epistemic utility of reasoning is given in a later edition. This time, instead of sticking with an enthymematic formulation of *Aristotle's Dictum*, which supposes the tacit premise as already known, Whately focuses on a syllogism in fully expressed form. Suppose, he says, diggers unearth the remains of a horned animal. Not knowing that all horned animals are ruminants, they can't conclude that it is the skeleton of a ruminant. On the other hand, a naturalist off-site knows this property of horned animals but is unaware that the discovered remains are of a horned animal. Only when the knowledge of the diggers and the naturalist are combined can they conclude that the skeleton is that of a horned animal.[222] Both premises must be known jointly in order for the conclusion to be known.[223]

The issue of logic's utility arises in part because logical consequence has not been sufficiently distinguished from epistemic matters. Whately is moving toward a more formal understanding of logical inference, but what this means about argumentation is still not fully recognized. Notions of logical consequence (what logically follows from a set of premises), logically deduced conclusion (what can be deduced from a set of premises by accepted rules of inference), and epistemic outcome (what is learned from earlier knowledge) are still inextricably bound together. Moreover, by accepting categorical propositions as the canonical form of propositions (interpreting them extensionally as containment assertions)[224] and then adopting *Aristotle's Dictum* as the basal principle underlying all valid reasoning (what is true of an entire class is true of any subclass), it's understandable that one might be perplexed about the epistemic status of a conclusion logically contained in its premises. It's difficult then to see how deduction can arrive at anything truly new. How to think differently about all this would take some time, but Whately offered a helpful beginning analysis of how deductive reasoning might produce new knowledge.

Contemporaneous Reactions to Whately's Logic: Bentham, Mill, and Hamilton

Whately's logic attracted immediate attention from several quarters. It was reviewed as soon as it appeared in the *Encyclopaedia Metropolitana,* but it garnered even more notice as a book. Those who, like John Hill (1787-1855) and John Huyshe (1800-1880) and Thomas Jackson (1812-1886), published commentary editions of Aldrich, quickly took note of Whately's ideas.[225] In 1827, Whately's friend, colleague, and one-time student Samuel Hinds (1793-1872) published an authorized abridgement of Whately's logic, including "so much of that work as is necessary to qualify a candidate for examination in the Schools,[226] along with Whately's exercises and his own extended analysis of an argument, which Whately took over in 1829. Encouraged by the success of Whately's text, a spate of new works on logic in Britain was unleashed in the quarter-century between its first appearance and the formative publications of Mill, De Morgan, and Boole.[227] Whately's text also received three substantive reviews.

The first critical analysis of Whately's logic appeared early in 1827 in book form. Written by George Bentham (1800-1884), the privately educated nephew of the Utilitarian philosopher Jeremy Bentham (1748-1832), this review reads like a running commentary on matters in Whately's logic, large and small. Bentham was soon to become a well-known botanist, but when *Elements of Logic* came out, he was busy editing his uncle's manuscripts, including ones on logic. Bentham hoped to use Whately's work as a foil for developing his own alternative logic based on his uncle's ideas.[228]

Bentham took Whately's logic to be the best version of Aristotelian logic then available.[229] He appreciated Whately's emphasis on logic as a science as well as an art, noting that this opinion, while little held, agreed with his uncle's views that every art has its science.[230] He also concurred with Whately's defense of logic against its Scottish Common-Sense detractors[231] and with the gist of what he had said about the utility of deductive reasoning.[232] And, like Whately, he believed that taking logic as a guide to direct our Reason in all areas of thought was too expansive.

However, Bentham accuses Whately of swinging too far in the opposite direction by limiting logic to syllogistic reasoning. Analogical and inductive reasoning are different forms of reasoning and require their own branch of logic.[233] There is no real reason "why the deductive process should, in preference to the inductive, claim the sole right to the common denomination of Logic."[234] But while Bentham gives some general rules for inductive reasoning, he admits that a more systematic treatment remains to be developed.[235]

Bentham also thought Whately was too restrictive with regard to the technicalities of syllogistic logic. Besides reasoning, rational operations such as classification (for terms) and agreement of terms (for propositions) are important in their own right. Moreover, according to Bentham, these are poorly treated by Aristotelian logic. Propositions assert a relationship of agreement/disagreement between classes representing the subject and predicate, but this is ambiguous unless we know whether to take a term universally or partially. This is specified for the subject, he says, by a categorical form's quantity but not for the predicate. Bentham suggests, therefore, that propositions should explicitly quantify both terms by stipulating whether the classes are to be taken totally or partially.[236] Then all possible class relations can be clearly expressed using identity or difference in an equation or inequality. For instance, "All X are Y" bifurcates into two identities: "tX = tY" and "tX = pY", where "tA" symbolizes the totality of class A and "pA" means a part of class A.[237] This gives rise to eight standard propositions, four positive equations and four negative inequalities. Bentham claims that quantifying the predicate also clarifies and simplifies the standard treatment of syllogisms. He gives four "plain and simple axioms" for the relations between classes as a substitute for all the canons and rules undergirding the validity of syllogistic forms.[238]

Unfortunately, Bentham's work had little impact on further developments in logic, in part because of publication difficulties. Bentham first had trouble finding a publisher, but then after only 60 books were sold, the publisher went bankrupt, and creditors seized the remaining copies to sell for wastepaper.[239]

John Stuart Mill's anonymous January 1828 review was the first widely read assessment of Whately's logic text. Mill deemed the critique composed by his acquaintance George Bentham hasty and rash, demonstrating the author's lack of mastery on the topic in comparison with Whately.[240] Though Mill himself was only 21 at the time, half of Whately's age, he had already studied logic carefully on several occasions, beginning when he was 12, but more intensively with his friends in the years following 1825. By 1828 he had read Aristotle's *Organon* and several traditional texts, including Aldrich, and he was also familiar with the ideas of Reid, Stewart, and Brown.[241]

Mill gives a thoughtful response to Whately's logic, but those who know Mill only from his famous *System of Logic* written 15 years later won't recognize much of that work's viewpoint in the review.[242] His mature ideas on logic would take shape a few years later as he reflected further on aspects of Whately's defense of logic and on the nature of inductive reasoning.

In general, Mill appreciates Whately's logic, though that doesn't stop him from offering helpful criticism on "one or two imperfections … trifling in comparison with the general excellencies of the work."[243] He deems Whately's introductory overview "an extremely happy idea"[244] and its discussion of reasoning, which includes a felicitous treatment of hypothetical argumentation, as good as can be had anywhere.[245] The first two sections on terms and propositions, however, are in need of "a clearer explanation, and a fuller development."[246]

Mill has nothing in particular to say about Whately's emphasis on language or on formal/symbolic reasoning; this evidently didn't require comment. He completely agrees with Whately, however, that putting arguments into syllogistic form enables one to evaluate their conclusiveness with ease. Knowing the theory of the syllogism is useful for detecting and avoiding fallacies. Furthermore, he praises Whately's instructive chapter on fallacies as an "excellent dissertation" full of "apt examples and illustrations drawn from all the most interesting subjects in the range of human knowledge."[247]

Surprisingly, Mill largely consents to Whately's restricting ordinary logic to deductive reasoning, a position the mature Mill would later decisively abandon. An inductive logic would be a welcome supplement to Aristotelian logic, he says, but it will never supersede it.[248] Even if such a logic were to develop better rules for induction than presently available, "they would not contribute, in the slightest degree, to the correctness of our *reasoning*. The syllogistic logic affords the only rules which can possibly be of any service to that end."[249] Mill quotes with approval passages from Whately that assert syllogism's monopoly over reasoning, declaring his support for this by the astonishing claim that "*all* correct reasoning is syllogistic: and to *reason by induction* is … a misconception of the two words, as if the advice were, to *observe by syllogism*."[250]

What Mill most admires about Whately's logic is its defense of syllogistic reasoning "against the contemptuous sarcasms of some modern metaphysicians."[251] Mill has in mind here Reid and other Scottish philosophers "whose writings have been for the last fifty years the great stronghold of the enemies of Logic."[252] Given developments earlier in the century, though, Mill concludes that their influence was already waning and that syllogistic logic was bound to make a comeback with the appearance of a "worthy antagonist in the field of controversy."[253] Whately was that champion. His work "was still required, to direct, as well as stimulate, the study of that invaluable science."[254] Mill finds that Whately's "vindication of the utility of logic is conclusive: his explanation of its distinguishing character and peculiar objects, of the purposes to which it is and is not applicable, and the mode of its application,

leave scarcely any thing to be desired."[255] Inductivists' persistent opposition to the syllogism is simply misguided.[256]

Far from challenging Whately's promotion of deductive reasoning in the task of enlarging our knowledge, Mill would bolster it further. It's clear from mathematics, where syllogistic reasoning is ubiquitous, that deduction actually produces new truths. The same is true of physical sciences, where conclusions are deduced from inductively ascertained principles. Consequently, syllogism's use "in the investigation of [physical] truth is immense."[257] Moreover, syllogistic arguments occur often in the fields of morality, politics, and mental philosophy. The "correctness of our inferences" is guaranteed by the validity of deductive reasoning, which is essentially syllogistic.[258] Regardless of subject matter, all reasoning proceeds in exactly the same way, as Whately emphasizes. *Aristotle's Dictum* adequately captures this process: "Every valid argument is a case of this general principle."[259] That valid conclusions are virtually contained in their premises is no proof against the fact that reasoning brings them to light. Without argumentation "they might have remained for ever as completely unknown, as if they did not result from the knowledge we previously possessed. Of this fact, the whole science of mathematics is a perpetual proof."[260]

Mill believes that Whately has convincingly argued against logic's critics that deduction produces new truths. Nevertheless, this remains a "seeming paradox" and a "mystery" still to be philosophically resolved.[261] This aspect of Whately's defense of logic continued to vex Mill until he made a careful study of Stewart's ideas on the nature of deductive reasoning around 1830.[262] His final inductive resolution of the problem gets enshrined in his 1843 *Logic*.

All in all, Mill maintained that impediments to "the right appreciation of the importance of logic, Dr. Whately has for ever removed."[263] In contrast, five years later William Hamilton (1788-1856), while acknowledging Whately's importance, held that much more remained to be done on logic's behalf. We'll look at his 1833 review as our final contemporaneous evaluation of Whately's work.

Hamilton was almost an exact contemporary of Whately. Born into a professorial family associated with the University of Glasgow, he matriculated there in 1803, taking logic classes from George Jardine (1742-1827), who had revised the traditional curriculum by incorporating topics from the philosophy of mind (new logic), aesthetics, and rhetoric to contextualize what little remained of syllogistic logic.[264] In 1807 Hamilton won a scholarship to attend Balliol College, Oxford, remaining there until 1811. This was the time when Copleston was busy demolishing Kett's superficial treatment of Aristotelian logic and defending Oxford's study of logic against Playfair's scathing assault. Hamilton followed the Edinburgh-Oxford skirmish and distinctly sided with Copleston and Aristotle against his countrymen. However, Hamilton was never part of the intellectual circle of thinkers around Copleston and Whately.[265] Hamilton's wide-ranging knowledge came instead from studiously preparing for his public oral examination, gaining him a reputation as "the most learned Aristotelian in Oxford."[266]

Hamilton returned to Scotland and practiced law for a few years after becoming a member of the bar in 1813. His real passion was philosophy, however, and after studying Kant, he became his foremost British advocate. Given his scholarly interests, Hamilton contributed numerous articles to the *Edinburgh Review* (1829ff), and he also edited *The Works of Thomas Reid* (1846) and the *Collected Works* (1854) of Dugald Stewart. In 1836 he was appointed Professor of Logic and Metaphysics at the University of Edinburgh, a position he retained until his death. His ideas on logic were disseminated partly in articles, but more through his many followers' work and influence.[267] He never published a finished treatise on logic, though he contributed a two-page conclusion to the *Encyclopaedia Britannica*'s article on logic (seventh edition) in around 1837. His lectures on logic were finally printed (posthumously) in 1860, being

preceded a decade earlier by the publication of an 80-page prize exposition of his system by his student Thomas Spencer Baynes (1823-1887).

Hamilton's reputation in logic was first established by his April 1833 *Edinburgh Review* article, "Recent Publications on Logical Science." This piece is as much a display of Hamilton's erudition[268] on logic and its history as it was a critical survey of ten works published in the wake of Whately's text. After assessing the dismal state to which logic had fallen in Scotland, Ireland, and England, Hamilton turned to examine the works under review, which included Hill's fourth (1828) edition and Huyshe's second (1833) edition of Aldrich, Whately's third (1829) edition of *Elements of Logic*, Hinds' 1827 abridgement of Whately, and Bentham's 1827 book-length critique of Whately. Hamilton observes that when "logic seemed in Oxford on the eve of … an academic grave, a new life was suddenly communicated to the expiring study, and hope at least allowed for its ultimate convalescence under a reformed system."[269] This is an oblique reference to the examination reforms that had been under way at Oxford since 1800, but Hamilton continues by noting that "This was mainly effected by the publication of the Elements of Dr Whately, … [which] prompted imitation and determined controversy."[270]

Claiming that the books he's reviewing are "all so many manifestations of the awakened spirit of logical pursuit"[271] at Oxford, Hamilton goes on to evaluate their level of competence, focusing primarily on Whately's logic since that was the motive force behind the renewal. Hamilton finds that Whately's text is "respectably executed" and is even "the effort of an intellect of great natural power,"[272] but this is faint praise because he also says that it, like the other productions, is "rarely, indeed, wise above Aldrich,"[273] which "as a full course of instruction … is utterly contemptible."[274]

After slamming a work he has just recognized as resuscitating logic at Oxford, Hamilton feels compelled to substantiate his assessment. But since documenting all of the work's *deficiencies*— "[ignorance] of Aristotle; … no preliminary determination of the laws of thought … but only principle buried in detail; inadequate views of the science;"[275]—would require him to first elaborate on what a system of logic ought to be, for which there was no space, Hamilton confines himself instead "to an indication of some of Dr Whately's positive *errors*."[276]

Hamilton first contests Whately's claim of originality for conceiving of logic as a science: "The reverse is true. The great majority of logicians have regarded logic as a science, and expressly denied it to be an art."[277] He notes, however, that even if this claim were true, it would be unimportant, for the terms "art" and "science" have become almost indistinguishable, making them philosophically useless.[278] Now, Hamilton's observations may be strictly true, considering logic's long history, but Whately's claim is correct in that this was not the prevailing view in modern Britain. Furthermore, it was on account of logic's being considered in broad practical terms (logic as *art*) that it had been deemed largely useless.

Moving next to the subject matter of logic, Hamilton finds Whately's views contradictory since he says that logic's focus is on "the process of reasoning" but also that "logic is *entirely conversant about language.*"[279] Hamilton takes issue with both characterizations because (unlike what Kant recognized) they don't adequately treat logic as a formal science, as the study of the "laws … or canons of thought." Logic, he says, studies "things in general" insofar as they stand "under the general forms of thought imposed on them by the intellect."[280] Since thinking involves much more than reasoning, Whately's concept of logic is too confining.[281] And, while language can be used as a vehicle to express thoughts, it's the laws governing the forms of thought and their relations that are the object of logic.[282]

Hamilton next pans Whately's "meagre and incorrect … sketch of the history of logic,"[283] continuing by further explicating Kant's outlook on "the nature and province" of logic: "Logic is a formal science; it takes no consideration of real existence, or of its relations, but is occupied solely about … the conditions

of thought itself."[284] Hamilton notes that Whately is also inconsistent in this regard. While he professes that logic is concerned only with formal inference, where an argument's "conclusiveness is evident from the mere form of the expression," something that can be clearly exhibited by using letters in place of terms,[285] Whately too often allows material and metaphysical considerations to intrude, thus contaminating his treatment of logic.

The "most original and valuable portion" of Whately's logic, according to Hamilton, lies in its "insufficient correction of mistakes touching the nature of logic … lingering among the disciples of Locke."[286] Beyond this double-edged remark, Hamilton has little to say about Whately's defense of logic. His concern is almost completely with characterizing logic as a science. Even what he has to say about induction is approached as a structural issue, as how one should formulate it as an argument. He fails to address Whately's defense against logic's inductivist critics, nor does he analyze whether the syllogism is inherently circular or whether deductive reasoning can produce new truths. The pointed criticisms of syllogistic logic by his compatriots Kames, Reid, Campbell, Stewart, and Brown are ignored in Hamilton's review,[287] as are Whately's lively responses to them.

In the end, then, Hamilton is so fixated on the perceived imperfections of Whately's notion of logic vis-à-vis his own Kantian standpoint that he cannot bring himself to adequately recognize the merits of Whately's logic. Judged by his own ideas of what logic should be, "[Whately's] work, indeed, never transcends, and generally does not rise to the actual level of science; nor with all its ability, can it justly pretend to more than a relative and local importance."[288] Hamilton's analysis is so blinkered that there seems to be no topic taken up by Whately that Hamilton can't find something to criticize. A grudging appreciation for Whately's text having restored logic at Oxford is about all he can muster. In this respect as in many others, Hamilton is at odds with Mill, whose earlier balanced review goes completely unremarked. Ironically, Hamilton's future prospect as a professor of logic, being able to *do* logic rather than defend a rationale for its existence, was enhanced by the very thing he ignores or downplays in Whately—a lively defense of logic's utility and a belief that logic is the science as well as the art of reasoning.

Historical Assessment of Whately's Logic

Mill claims that when Whately wrote his text the revival of syllogistic logic was inevitable and imminent. Hamilton, on the other hand, taking a longer view, says logic was about to perish when Whately's text resuscitated it. So, which is it?

From the above narrative it should be clear that developments were far more nuanced than what either presented. The attacks upon logic were still active in the first decades of the nineteenth century: there were criticisms from Tatham (1807-11), Playfair (1808, 1811), Drummond (1810), Stewart (1814), and Brown (1820), among others, and reprints of Kames, Reid, and Campbell continued to appear. But logic, while weakened, was far from extinct: defenses of syllogistic logic had been made by the Scotsman Gillies (1797, 1804, 1813; 1823); by Walker (1805) and Kirwan (1807) in Ireland; and by Copleston (1809, 1810-11) and Lyall (1815) in England. Moreover, recent Oxford examination reforms (1800, 1803, 1808) required a deeper knowledge of traditional logic from students than earlier, calling forth new editions of Aldrich by Hill and others.

But logic was not yet restored to full health by the early 1820s. Ideas put forward by Copleston and others still required consolidating in a focused way, and a fresh systematic presentation of Aristotelian logic given in the context of an energetic defense of syllogistic reasoning was wanted. Whately's logic was unmistakably just such work, breathing new life back into the study of logic.

The seminal significance of Whately's text was promptly recognized by British logicians, as already noted. The flood of new works on logic unleashed in Britain during the following decades cite Whately's work as the authoritative source to be consulted on various matters. Those reflecting on the changed climate toward logic invariably credit Whately with having turned the tide from apathy to acceptance.[289] Mill in 1843 again acclaims Whately as the person who did more than anyone else to restore logic to its previous position.[290] In 1854 Boole says the current revival of logic is "in a great measure due" to Whately's *Elements of Logic*,[291] calling Whately "the clearest of modern expositors of the science."[292] De Morgan in his 1860 article "Logic" for the *English Cyclopaedia* says of Whately that "to him is due the title of the restorer of logical study in England."[293]

The unanimity of later logicians in crediting Whately's text with rehabilitating logic does not extend to their assessment of the work's value, much less to an agreement of what the revival made possible. By 1850 traditional logic is again being challenged on several fronts, though this time not by thinkers who consider logic a worthless enterprise. The field is now dominated by Hamilton and Mill, neither of whom were completely sympathetic to Whately's advocacy of syllogistic reasoning. Hamilton promoted his version of *formal logic* as a rival to Whately's logic, which he thought still contained too many informal elements. He had also come to adopt a new theory of propositions based on his quantification of the predicate. Mill, on the other hand, had reconceptualized logic by making *inductive reasoning* central, expanding the field to encompass topics from the philosophy of science, emphases at marked odds with Whately's view of logic.

A more mathematical form of logic was also emerging, though it would be some time before it became mainstream. De Morgan wanted to expand syllogistic logic so that it would include new propositional forms and so that it could handle additional relations. And Boole's approach was a complete outlier, using algebraic notation and laws, as it did, to treat forms of proposition and argumentation.[294] It also initiated a more systematic development of propositional logic. Clearly, Whately's logic was not the direct source for any of these later developments in the field.

What, then, did Whately's logic contribute to logic's development, and how did it effect a revival of logic? If Whately's logic was just a new and improved version of syllogistic logic, how did this facilitate such disparate further developments?

Let's consider the main features of Whately's logic with these questions in mind. In the first place, we should acknowledge that Whately's spirited style of writing, his pedagogical overview of the field, his use of striking analogies, his concrete illustration of how logic could be used to evaluate everyday arguments—not to mention his use of English in place of Latin—made his logic accessible and attractive to a very wide audience, not just Oxford students.[295] Its value as a logic textbook accounts for a good deal of its popularity.

His logic was also an improvement in developing the systematic elements of logic. By refocusing attention on argumentation and (mostly) dealing with terms and propositions as they enter into this process instead of as a topic for expounding mental philosophy, Whately clarified the task and goal of logic in distinction to what it had been in the logics of Watts and Duncan but also from what was in Aldrich. Even where Whately is heavily dependent on Aldrich, he streamlines its organization and clearly explains its concepts and techniques, giving more emphasis to basic principles such as *Aristotle's Dictum*. Emphasizing that all reasoning has an underlying formal syllogistic structure that one can use to evaluate its validity makes logic's main goal stand out in relief. One might want to challenge how Whately goes about this, but his presentation is a clear and focused improvement over previous texts.

In simplifying and accentuating certain features of syllogistic logic, Whately made its formal features more pronounced than before. This is certainly true in comparison with eighteenth-century facultative logics, but it is even true in contrast with Aldrich. Narrowing the scope of inference to premises' formal consequences may have encouraged later logicians to give this feature even more prominence. Nevertheless, as we noted before, this is not a wholly new feature, nor is it executed the way it was in later formal logics. Whately rarely made use of symbolic expressions using letters, notwithstanding his belief that this would make the form of an argument more transparent. A heavier emphasis on abstractly symbolizing propositions and arguments[296] would undoubtedly have made Whately's logic inaccessible to the very audience he was attempting to reach.[297] Contrariwise, the great appeal of his logic was its relevance to concrete arguments that one might encounter in everyday controversies.

In the final analysis, Whately's logic became the leading traditional text of its time due to its vigorous defense of syllogistic reasoning. Arguing for logic's utility, disarming critics who would replace syllogistic logic with inductive logic, explaining how deductive reasoning could generate new truths and extend our knowledge in mathematics and elsewhere—all done with flair, confidence, and clarity in the context of a systematic presentation of logic's fundamentals—these are the things that made Whately's logic the key impetus behind logic's revival.[298] This, along with his emphasis that logic should be considered a science studying the underlying logical structure of all conclusive reasoning, made Whately's work stand out. Whately's unapologetic defense of logic gave it renewed scholarly respectability. Logic was now reckoned a proper field for study and investigation. So even though the system of logic Whately developed was (only) an updated version of traditional syllogistic logic, it opened up the possibility for bright people to explore logic further.[299] While *Elements of Logic* didn't itself plough any new ground, it cleared the field of the accumulated debris that had kept people from attempting to produce anything there, and it provided an opening for novel possibilities to be fruitfully cultivated. Whately's logic is thus the pivotal work that revitalized British logic and allowed it in due course to fan out along multiple new paths.

ENDNOTES

[1] Immanuel Kant, *Critique of Pure Reason*. Translated and edited by Paul Guyer & Allen W. Wood (Cambridge University Press, 1998), 106.

[2] See Blakey 1851, Neil 1853, Jennings 1854, De Morgan 1860, Fraser 1860, Neil 1862, Fraser 1864, Lindsay 1871, and Anon 1872.

[3] On the contrast between the two organons, see e.g. Bacon 1960, *The Great Instauration*: *Plan of the Work*, 23-26.

[4] See Sgarbi 2013 for a wide-ranging discussion of the rise of British empiricism in the seventeenth century and its relation to Aristotelian logic and philosophy.

[5] See Gaukroger 1989 and 2018 for a detailed exploration of Descartes' view of logic and syllogistic reasoning.

[6] For some trenchant observations on this and on the value of syllogistic logic in general, see Rules II, IV, X, and XIV in Descartes 1628 and Part II in Descartes 1637. While some interpret Descartes to say that syllogistic forms are circular or commit the fallacy of *petitio principii*, this is a judgment made in hindsight.

[7] As Wahl 2018 notes, the *Port Royal Logic* was one of the most popular logic textbooks in Europe during the 200 years following its composition. Written in French, it went through around 70 editions, including versions in Latin (1666) and English (1685). Baynes retranslated it in 1850 because he thought a faithful English version would be useful "now that a revival of logical studies has commenced." (v)

[8] Arnauld, "Author's Advertisement to the First Edition," in Baynes 1850, xli.

[9] Baynes 1850 III.IX, 202.

[10] Baynes 1850 III.X, 208 and 211. This vague containment formulation is made somewhat more definite by the text's introduction of the distinction between the comprehension and extension of a term.

[11] Baynes 1850 "Introduction," 25.

[12] Kneale and Kneale blame the *Port Royal Logic* for being "the source of a bad fashion of confusing logic with epistemology." (1962, 316)

[13] Aldrich's logic went through many editions in the eighteenth and nineteenth centuries, including ones in an English translation by John Wesley (1750ff), which was republished with notes and exercises by Thomas Jackson in 1836. By Whately's time more than a decade earlier, Aldrich was already experiencing a resurgence, both in Latin and English versions, several published anonymously, making their disentanglement tedious. The definitive Latin version mid-century was that of the Oxford logician Henry Longueville Mansel (fourth edition, 1862), who prefaced the work with a seventy-page general history and critical introduction.

[14] Locke 1700 [1975] IV.XVII.4, 671.

[15] Locke's discussion about comparing ideas is conveniently vaguer than what is presented in logic textbooks of the time, where the "quantity" of a proposition is also brought into consideration and not just its "quality." Winkler 2003 and Poggi 2013 analyze Locke's theory of reasoning in some detail.

[16] Locke 1700 [1975] IV.XVII.6, 679.

[17] Feingold 1997 analyzes the state of logic at Oxford in the late seventeenth century, while Yolton 1986 looks at its role in the eighteenth century. Buickerood's classic 1985 article delineates Locke's immense influence on eighteenth-century British logics, which he terms "facultative" because of their grounding in philosophical reflection on the operations of our mental faculties in acquiring knowledge. Ashworth 2015 also explores the nature of university logic in this time period.

[18] For technical details, Watts draws upon the *Port Royal Logic*, especially in discussing syllogistic rules and moods. De Morgan in 1864 described Watts' *Logick* appreciatively as "the English Port-Royal logic." (De Morgan 1966, 93n)

[19] *Logick*'s significance is indicated by its being published almost fifty times by the mid-nineteenth century. A supplement to his *Logick*, published in 1741 and many times thereafter, is titled (in brief) *The Improvement of the Mind*. This is Watts' counterpart to Locke's *Conduct of the Understanding*.

[20] This is Jeremy Bentham's assessment, who studied from it at Oxford around 1760. See Howell 1971, 342.

[21] Watts 1740 "Dedication," 3, 1.

[22] Watts 1740 III.II.III, 289.

[23] Buickerood 1985, 185 notes that "Duncan's logic is straightforwardly Lockean in letter as well as in spirit, including as it does some of Locke's own sentences."

[24] Duncan 1748 "Introduction," 3-4.

[25] Duncan doesn't explicitly define logic as an art, but he often describes various aspects of it (defining, judging, reasoning) as such. He refers to logic as a science early on, but only twice, without developing this idea in the text. See Duncan 1748 "Introduction," 12, 13.

[26] Duncan 1748 III.IV, 230.

[27] Kames 1774 III.I "Appendix," 167.

[28] Kames 1774 III.I "Appendix," 166.

[29] Reid's "Account" is reproduced in Hamilton's annotated edition of Reid's *Works*, first published in 1846. While Hamilton exhibits a great deal of respect for Reid, his notes provide a running and sometimes clipped rebuttal on the points where he believes Reid is wrong or unfair.

[30] Reid 1774 [1863] VI.II, 711.

[31] Reid 1774 [1863] VI.I, 709.

[32] Reid 1774 [1863] III.III, 695 and IV.III. 698. Hamilton's retort (695n) is that "the purely *formal* character of logic requires an abstraction from all determinate *matter*; which is best shewn through … unmeaning symbols."

[33] Reid 1774 [1863] IV.IV, 700.

[34] Reid 1774 [1863] IV.IV, 700. Stewart repeats this criticism later and even Hamilton's rejoinder is inadequate (see Stewart 1814 [1854 III] III.1, 184-6 and Reid 1774 [1863] 701n). A clear understanding of the distinction between logical implication (validity) and deductive inference (deducibility) was lacking at this time, though it can be teased out already from what Aristotle says about perfecting syllogisms.

[35] Reid 1774 [1863] IV.V, 702. Hamilton shoots back at Reid in his note on this that "The end of all science is the reduction of the many to one."

[36] Reid 1774 [1863] VI.II, 712.

[37] Reid 1774 [1863] IV.V, 702. Reid makes this criticism in noting that some mathematical propositions, such as "A is less than B," contain more than two terms, the terms being compared and the relation itself. This idea on logic's mismatch with mathematical practice seems not to have been followed up by him or others.

[38] Reid 1774 [1863] IV.V, 701.

[39] Reid studiously ignored Duncan's logic in his writings, which makes it somewhat ironic that his critique of the utility of logic gets grafted onto Duncan's *Encylopaedia Britannica* logic article.

[40] See Campbell 1776 "Preface" and also Howell 1971, 406-8.

[41] Campbell 1776 I.VI, 164.

[42] Campbell 1776 I.VI, 168-9.

[43] Campbell 1776 I.VI, 181-2. See also Campbell 1776 II.VII, 123-4.

[44] Campbell 1775 I.VI, 183.

[45] Campbell 1776 I.VI, 174. This criticism of the syllogism was formulated in ancient times already by Sextus Empiricus, but Campbell seems to have arrived at it on his own.

[46] Though Tatham's 1790 work was considered by some of his contemporaries as a new system of logic, it's more of a philosophical commentary on the use and value of induction as over against syllogistic reasoning.

[47] Can this be attributed to his earlier familiarity with and teaching of mathematics?

[48] Stewart 1792 [1854 II] IV.2, 174.

[49] Stewart 1792 [1854 II] IV.2, 178ff. A few pages later (183, 186) and also earlier (82) Stewart acknowledges Leibniz as having entertained similar ideas. The full scope of Leibniz's ideas on logic, however, remained unknown until the early twentieth century.

[50] Stewart 1792 [1854 II] IV.2, 176.

[51] Stewart 1792 [1854 II] IV.5, 205.

[52] Stewart 1814 [1854 III] II.2, 103-4n and III.I, 192. Stewart stresses this in opposition to Gillies, who in 1804 had also claimed this for Aristotle. "Note L" stresses that Aristotle's use of letters in reasoning is very different from their use in algebra (Stewart 1814 [1854 III], 385).

[53] Stewart 1814 [1854 III] II.2, 107. In Volume 3 Stewart doubts whether developing a philosophical language analogous to algebra for formal reasoning is attainable. (1827 [1854 IV] I.III, 58-9)

[54] Stewart 1803 [1858 X] II, 266-7.

[55] Stewart 1814 [1854 III] III.I, 184-6.

[56] Stewart 1814 [1854 III] III.I, 191n.

[57] Campbell's *Rhetoric* wasn't republished until early in the nineteenth century, so his criticism may have gone largely unnoticed until Kirwan summarily dismissed it in his 1807 *Logick*. It isn't mentioned in the *Encyclopaedia Britannica* article on "Logic," nor does Gillies deal with it in his 1797 defense of Aristotelian logic. Stewart seems to be the first to bring it back into view.

[58] Stewart 1814 [1854 III] II.1, 74.

[59] Stewart 1792 [1854 II] IV.6-8, 206ff.

[60] Stewart primarily has in mind Gillies and Balfour 1805, but he also mentions the view presented in traditional logic texts such as Walker 1805.

[61] Stewart 1814 [1854 III] "Preliminary Observations," 6. Compare also Stewart 1827 [1854 IV] "Preface," 2.

[62] Brown 1820 XLIX, 578.

[63] Brown 1820 L, 589.

[64] Brown 1820 L, 590.

[65] Monboddo 1797 V.III.IX, 152.

[66] Gillies 1797 I.II, 71.

[67] Gillies 1797 I.II, 81. As noted above, by 1814 Stewart had distanced himself from this earlier viewpoint, evidently displeased that Gillies had associated him with a position that Aristotle (supposedly) held.

[68] Gillies 1797 I.II, 77.

[69] Gillies 1797 I.II, 77.

[70] Gillies 1797 I.II, 81.

[71] Gillies 1823 "Introduction" I, 26-7.

[72] Hamilton in Stewart 1854 III, 183n says that this gives "articulate answers" to Stewart's 1814 "strictures" on Aristotelian logic.

[73] Gillies 1823 "Introduction" I, 53.

[74] Gillies 1823 "Introduction" I, 53-4.

[75] Gillies "Introduction" I, 39.

[76] Jardine 1818 documents the changing nature of logic instruction at Glasgow during his forty years of teaching. See Jongsma 1982 2-I.3, 224- 39 for details.

[77] Stewart 1814 [1854 III] III.II, 203n.

[78] Murray's logic was finally dislodged at Trinity College by Thomas Kingsmill Abbott's critical 1881 pamphlet and 1883 textbook.

[79] Walker 1805 "Preface" and the DNB entry on John Walker.

[80] Walker 1847 "Publisher's Address," vi. Such additions were made after the 1832 edition.

[81] Murray 1832 "Introduction," 32. Quotes and references to *Murray's text* are to the English translation provided by Walker in this sixth edition. Walker notes his dissatisfaction with Murray's rationale already in 1805, saying that it caters to the popular view regarding the inutility of logic.

[82] Murray 1832 I.I, 10.

[83] G. B. Wheeler, the editor of the 1862 edition based on Walker, characterized Walker's commentary as "the essence of irascibility." (Walker 1862, iii. See also Furlong 1942, 47)

[84] Walker 1805 "Preface," 2-4.

[85] Walker 1805 III.V, 82 and "Appendix," 99-101.

[86] Walker 1805 "Appendix," 101ff.

[87] Walker 1805 "Appendix," 106.

[88] Walker 1805 "Appendix," 110.

[89] Neil 1862, 5 describes it as "the dry, meagre, acumenless abstract of Dr. Richard Kirwan."

[90] Kirwan 1807 I "Preface," ii. Watts and Duncan are the main logics Kirwan has in mind. Kirwan makes no reference to Murray or to Walker's 1805 commentary.

[91] Kirwan 1807 I.I.I, 1.

[92] Kirwan 1807 II.II.XI.I, 467-78.

[93] Perhaps with good reason: his rules don't show that AEO-1, for example, is invalid.

[94] Kirwan 1807 II.III.XI.IX, 526. See also Kirwan 1807 I "Preface," xi.

[95] Kirwan 1807 II.XI.III, 482-3. This last assertion, though manifestly false, was also held by others at the time. Walker, however, knew better (see Walker 1805 II.V, 40-1).

[96] Kirwan II.III.XI.IX, 509.

[97] Kirwan 1807 I "Preface," ix.

[98] Kirwan 1807 II.III.XI.I, 468. And yet Kirwan doesn't develop the theory of syllogism that would enable one to do this.

[99] Kirwan 1807 II.III.XI.IX, 513.

[100] Kirwan 1807 II.III.XI.IX, 526.

[101] Kirwan 1807 II.III.XI.IX, 527.

[102] See Jongsma 1982 2-III.1, 259-67 for a description of the state of logic at Oxford in the early nineteenth century.

[103] Whately 1854 "Introduction," 95.

[104] Kett 1802 [1803] II.IV.I. See Jongsma 1982 2-III.2, 268-75 for more details on Kett's treatment of logic.

[105] Kett 1802 [1803] II.IV.III, 95.

[106] Kett 1809 "Advertisement," iv.

[107] Davison 1803-4. His critique of Kett's "Logic" is in 1804, 156-8.

[108] The title alludes to Kett's having been Oxford's logic examiner for 1803-04.

[109] Copleston 1810-11. Copleston was awarded a D.D. by diploma for these efforts on behalf of Oxford. Davison also entered the fray on Oxford's side in August 1810.

[110] Playfair January 1808, April 1810, and November 1810; Drummond 1810.

[111] See Whately 1854.

[112] Playfair January 1808, 327.

[113] Playfair April 1810, 161.

[114] Copleston 1810 "Reply," 176.

[115] Copleston 1810 "Reply," 22.

[116] Copleston 1809, 39.

[117] Copleston 1810 "Second Reply," 16, 20-5. Copleston notes that Gillies has already defended Aristotle against ignoring induction and depending solely on the syllogism. Copleston alludes to the fact that he began thinking about the relation of induction to the syllogism about 1800, not long after both Tatham and Gillies had discussed the topic. See Copleston 1811 "Appendix," 9.

[118] Copleston 1811, 10n. Whately repeats this analogy in Whately 1823 [1872] "Introduction," 6.

[119] Copleston 1810 "Second Reply," 34.

[120] Whately 1854 "Logic," 119. See also Copleston 1811 "Appendix," 8-9.

[121] Copleston 1809, 21-2 and 25. Copleston calls syllogisms in which "the connection between the Middle term and one of the Extremes is less evident than the connection between the extremes themselves" *cracker syllogisms*.

[122] Whately 1854 "Syllogism," 121.

[123] Whately 1854 "Syllogism," 122.

[124] Copleston 1810 "Reply," 22.

[125] Copleston 1809, 54.

[126] Whately 1854 "Analysis," 102.

[127] Copleston 1809, 39-40. This includes inductive arguments, which draw a syllogistic conclusion from a number of cases via a latent major premise asserting that all things of the given sort have the property shared by the cases explicitly considered. Copleston's analysis of inductive arguments differs from Aldrich's and was taken over by Whately, who was thereafter credited with the change by later logicians and historians.

[128] Copleston 1809, 57.

[129] Copleston 1809, 42-3.

[130] September 28, 1828 letter from Whately to Copleston, in E J Whately 1875 I, 49.

[131] Lyall 1815, 304-5.

[132] Lyall 1815, 303.

[133] Lyall 1815. 302-3.

[134] Pattison 1876, 83-4.

[135] E J Whately 1875, 8-10.

[136] In later years Whately wrote *Easy Lessons* on several topics, including *Easy Lessons on Reasoning*, which first appeared as a weekly serial in 1843.

[137] Whately 1826 "Preface," xxvii-xxviii. Theological arguments were occasionally used as illustrations in his logic text, supposedly causing it to be banned by the Roman Catholic establishment (E J Whately 1875, 269-70). Appendix III, from the fourth (1831) edition on, also contained an extended logical analysis of Paley's argument for the divine origin of the Christian religion.

[138] I do not know who asked Whately to write for the encyclopaedia. Could it have been Lyall, who became the *Encyclopaedia*'s editor in 1820? Or did Whately belong to the "powerful host of talent and learning" (Anon October 1818, 361) recruited already around the time the encyclopaedia began in 1817?

[139] *Encyclopaedia Metropolitana* articles appeared serially, and not in the order they were eventually assembled into volumes, making their later dating problematic. Whately's "Logic" was the second article in Volume 1, but it only came out in parts IX and X. The publication date of Whately's article managed to elude everyone almost since it was written (even the bibliophile De Morgan was ignorant of the exact date in 1860) until I was able to pin it down definitively in my dissertation research. See Jongsma 1982, 523-4, n39.

[140] Whately assiduously and effusively credits Copleston with being the equivalent of a co-author (Whately 1826 "Dedication," iii-iv; see also Whately 1840 "Preface," vii-viii, Whately 1844 "Preface," vii, and a July 7, 1845 letter from Whately to Copleston in E J Whately 1875, 236-7), though some at the time thought this overly generous. Copleston certainly provided the initial material and outlook, helped Whately sharpen his ideas, and gave him

critical feedback and suggestions, while Whately refined the ideas, put them into written form, and updated them as necessary.

[141] See McKerrow 1975 and McKerrow Winter 1976. Newman 1964, 176-9 and Newman 1971, 72n give Newman's account of preparing Whately's article for publication.

[142] Anon September 1823, 303.

[143] Anon September 1823, 306.

[144] The *National Union Catalogue* lists over 75 English and American printings, and this doesn't include reprints of the *Encyclopaedia Metropolitana* article or editions of Whately's *Easy Lessons on Reasoning*.

[145] Cf. Whately's comments on the rising popularity of logic in the prefaces of his first, fourth, and eighth editions. (Whately 1826, xxiv; Whately 1831, xxxi; and Whately 1844, xxxi)

[146] Whately uses the terms "valid/invalid" and "validity" much as we do today. I do not know whether he is responsible for this technical terminology or is following others.

[147] Our analysis will be based primarily on Whately's 1823 article, supplemented by remarks on noteworthy changes introduced in later book editions.

[148] Whately 1823 [1872] "Introductory Section," 1. This remains the opening declaration in all later editions.

[149] The only writers I know who at the time call logic a science are Kirwan (1807), Lyall (1815), and Carvill (1821), and none of them develop this idea in the way or to the extent that Whately did. Coleridge also conceives of logic as a science, probably derived from his study of Kant's ideas on logic. In his "General Introduction" for the *Encyclopaedia Metropolitana* (Coleridge January 1818, 23) he categorizes logic as a pure formal science whose subject is the fixed laws and forms governing the mind's reasoning process. Contrariwise, logic was taken as an art in the Cartesian and Lockean traditions as well as by the British critics of Aristotelian logic. Similarly, Aldrich labels it "an instrumental art," a point Hill repeats in his 1821 commentary, even saying "Logic is … not a *science*," (9) a claim Whately declared strange in 1826 (II.I.2, 56-7n). After Whately's remark, Hill says instead: "Logic is both an *art* and a *science*. … [for] every art must have a science." (Aldrich 1828, I.1.3, 10-11) Huyshe (1827) and Bentham (1827) likewise call logic a science.

[150] This is Whately's second sentence throughout all editions. (1823 [1872], 1) In 1844 he adds the qualifier "rules as may be derived from those principles."

[151] Whately 1823 [1872] "Introduction," 9.

[152] Whately 1823 [1872] I.2, 24n.

[153] Whately 1823 [1872] IV.8, 54-5. Whately here uses Copleston's metaphor about foolishly expecting reading-glasses to teach one how to read: no general rules can be devised for avoiding ambiguous terms or rejecting falsehoods.

[154] In theory, that is. Whately retains some matters that later thinkers considered superfluous, though as time went on, he moved a few topics to a supplementary section that readers could omit.

[155] Whately 1823 [1872] I.2, 23-4.

[156] Whately 1826 II.I.2, 56n.

[157] Whately 1834 II.I.2, 60n. Whately makes this proviso after Hamilton's 1833 review, which emphasized thought over symbolic expression.

[158] Whately 1823 [1872] "Introduction," 20 and I.5, 28. In an 1850 letter to a correspondent Whately describes himself as a "zealous Nominalist." (E J Whately 1866 II.VII, 163)

[159] As we have seen, a similar attitude toward language's importance for logic is also present in Stewart 1792 and Gillies 1797.

[160] Whately 1854 "Logic," 119.

[161] Whately 1826 II.I.2, 56n.

[162] Aldrich I.II, in Hill 1821, 5-6.

[163] Whately 1823 [1872] III.1, 37. Whately says "force" instead of "form" here and in all nine book editions (the Latin term for "force" appears in Aldrich III.1 and III.2 as well: see Hill 1821, 109 and 113), but earlier he had said the "conclusiveness [of a valid argument] is evident from the mere form of [its] expression," ("Introduction," 15), and he also changed "force" to "form" when characterizing a syllogism in *Easy Lessons on Reasoning* (Whately 1843 I.IV.1, 24). Thus, my substitution is fully in keeping with Whately's thinking.

[164] Cf. Aldrich III.I in Hill 1823, 109-10 with Whately 1823 [1872] III.1, 37. Hill notes, however, (prior to Whately) that all material arguments can be reduced to formal syllogisms, which represent the inferential process that necessarily takes place in the mind.

[165] This ambiguous formulation is used as a (poor) shorthand representation of a syllogism.

[166] Whately 1823 [1872] "Introduction," 15.

[167] Algebra was considered to be "universal arithmetic" at the time. A more abstract symbolic version was proposed in George Peacock's 1830 *Algebra*, but even then, algebra lacked the abstract formal character it acquired over the next century.

[168] Whately 1823 [1872] "Introduction," 15.

[169] Van Evra 1984 emphasizes this feature of Whately's logic but overstates it, making Whately a harbinger of modern logic. While Whately advocates formulating an argument symbolically to test its validity (Whately 1823 [1872] "Introduction," 14), he himself uses abstract symbolism only rarely and no more than Aldrich. In fact, Aldrich abstractly symbolizes all 24 valid syllogistic forms, while Whately presents only one from each figure for illustration purposes. Aldrich also uses symbolic forms to exhibit the reduction process, while Whately uses concrete arguments. Whately was too much a controversialist to engage in extensive formalism. Logic may be a formal science, but Whately still has its use very much in mind.

[170] Whately 1823 [1872] II.2, 34; see also IV.8, 54 and V.2, 59.

[171] No formal syntax, semantics, or deduction system can be found in Whately. Whately only identifies regular patterns of valid argumentation (syllogistic forms) and classifies some as more basic than others because of their connection to *Aristotle's Dictum* and their ability to "perfect" the rest.

[172] See Aristotle 1989, 2.

[173] Whately 1823 [1872] III.1, 37.

[174] Whately 1823 [1872] "Introduction," 10.

[175] Whately 1823 [1872] III.1, 37.

[176] Whately1823 [1872] "Introduction," 5.

[177] Whately1823 [1872] "Introduction," 8.

[178] As noted above, this was Copleston's position.

[179] Whately1823 [1872] "Introduction," 12,13. This is Whately's formulation of the *dictum* distilled in medieval times from what Aristotle says in several places about universal predication. A version of this dictum using "term" instead of "class" is given a few pages later.

[180] Whately1823 [1872] "Introduction," 15-6.

[181] This conflicts with what Van Evra says (1984, 10; repeated in 2008, 83), but Whately's practice fits Aristotle's classical notion of science quite well. Once again, Van Evra makes Whately more modern than he was.

[182] Whately1823 [1872] III.2, 38.

[183] These vague "agreement" canons are counterparts to mathematical axioms about equality: quantities equal to the same quantity are equal to each other; and (derivatively) if one quantity is equal to a second and a third is not, the first and third quantities are unequal. Aldrich posits six canons, treating terms as naming classes and considering various relations between them.

[184] Whately1823 [1872] III.2, 38. Whately's canons and rules function as a summary of known features about arguments, not as formal axioms that implicitly specify valid arguments in the way the axioms, say, of abstract group theory delimit its models (groups).

[185] Whately briefly entertains using a counterargument to show an argument to be invalid: find an argument in the same form that is patently invalid because the premises are true while the conclusion is false. However, while Whately uses this ploy often in arguing against the position of others, he judges that using rules to test for validity "is evidently a safer and more compendious, as well as a more philosophical mode of proceeding." (Whately 1823 [1872] "Introduction," 11) Corcoran notes that the method of counterargument is widely used by Aristotle and wonders whether in the final analysis it might be the only method for establishing invalidity. (Corcoran 1989, 31)

[186] Whately 1823 [1872] III.2, 38-9. The fuzzy notion of "agreement" makes the argumentation less than rigorous.

[187] Aldrich is again less concise than Whately, giving twelve rules for rejecting invalid forms.

[188] Whately 1823 [1872] III.3, 40. Unlike Aldrich, who uses his rules about negative and particular premises and conclusions to explain why all but 12 moods are invalid, Whately is content with ruling out only two specific moods as examples of the process. In 1827 (II.III.3, 95) Whately silently changes his count to 11 potentially valid moods, something Hill had corrected Aldrich on already in 1821 (III.5, 140) by considering when terms must be distributed in the conclusion.

[189] This follows Aldrich, who explicitly uses the *Aristotelian Dictum* as a second method for demonstrating validity. *Aristotle's Dictum* does not have the central prominence in Aldrich that it does in Whately, however; in Aldrich it is a theorem based on the canons, though he says it can also be considered a self-evident axiom. (Hill 1821 III.6, 148)

[190] Whately 1823 [1872] III.4, 43. Of course, this is true only if forms satisfying *Aristotle's Dictum* generate valid arguments (granted) and if all inferences involved in the reduction process are also justified by the *Dictum*, which is not true: *Aristotle's Dictum* does not cover either conversion or the *reductio* maneuver.

[191] Whately viewed hypothetical propositions in semantic terms. A conditional statement, for example, was the formulation of an *argument* in which the antecedent proposition implies the consequent. Disentangling the logical relation of implication from the logical operator in a conditional statement took decades. Even mathematicians today get confused by it.

[192] In principle, at least. He expresses component propositions symbolically by indefinite categorical sentences like "A is B."

[193] Whately 1823 [1872] IV.6, 51-2.

[194] This is generally recognized by logicians at the time. Cf. Hamilton 1833, 200 and Neil 1862, 85.

[195] Contrast this with Walker's critical attitude, mentioned above. Walker advocated basing the theory of syllogisms solely on *Aristotle's Dictum*, which is more consistent with what Whately professes than Whately's own practice.

[196] Hill's second edition (I have not seen the first) of Aldrich's *Artis Logicae Rudimenta with Illustrative Observations on Each Section* (1821), for example, includes 140 exercises ("Promiscuous Syllogisms") at the end of the book. Anon 1824 (Hill was probably not the author of this) was a 72-page booklet wholly devoted to *Questions Adapted to Aldrich's Logic*; it included 115 arguments to be tested by Aldrich's syllogistic rules. Whately's exercises are similar to these but have slightly different instructions.

[197] His 50-page appendix on "Ambiguous Terms" is also added when Whately's logic comes out in book form.

[198] Neil 1862, 87 lauds it as being "almost beyond praise."

[199] See e.g. Hamblin's classic 1970 treatise and the *Stanford Encyclopedia of Philosophy* on this topic. De Morgan, whose own treatment of fallacies was appreciated in his day, observes when beginning his discussion of this topic that "There *is* no such thing as a classification of the ways in which men may arrive at an error." (De Morgan 1847 XIII, 237)

[200] Whately 1823 [1872] "Introduction," 13-4.

[201] So far as I know, Stewart, who died in 1828, never responded in print to Whately's treatment of his criticisms.

[202] Whately 1823 [1872] "Introduction," 13. Whately repeats the same sentiment in his concluding "Essay on the Province of Reasoning." (Whately 1823 [1872], 89).

[203] Whately 1836 I.4, 36.

[204] Whately 1823 [1872] V.3, 61.

[205] Unlike Aristotle, Whately never adequately distinguishes a *deduction*, which produces logical consequences from premises, from *proof* or *demonstration*, which produces (lesser known) truths from (better known) truths. Defending logic's utility is naturally couched completely in epistemic terms.

[206] Whately addresses these matters in the first two sections (later, chapters) of his concluding "Essay/Dissertation on the Province of Reasoning." These criticisms, recall, were not only expressed in major philosophical writings of the time by Kames, Reid, Campbell, Tatham, Stewart, and Brown; they are also found in the competing *Encyclopaedia Britannica*'s article on "Logic."

[207] Whately 1823 [1872] "Essay," 85-6.

[208] Cf. Copleston 1809, 12 and 35-9. Whately's discussion of induction takes place in the part of the text that Whately says Copleston contributed to the most. (Whately 1826 "Dedication," iv)

[209] Whately (and Copleston before him) give Bacon a pass on this, though Bacon clearly did oppose induction to syllogism at times in his writings.

[210] Whately, following Copleston's analysis, considers this inductive warrant as the *major premise*. (Cf. Copleston 1809, 39)

[211] Whately 1823 [1872] "Essay.2," 97. Striking illustrations like this are found throughout Whately's writing.

[212] In 1844, a year after Mill published his *Logic*, Whately mocks those who advocate replacing syllogistic logic with a "rational" or "philosophical" system of logic as being akin to seeking a "Universal Medicine" while ignoring "the humble labors" of pharmacists. ("Introduction.3," 11) Ten years later he voices much the same criticism, noting that logic's opponents have had "a fair field … left open for them for a very long time, … so that they had full leisure for hatching the egg of their philosophical system, if there had been any vitality in it." (Whately 1854 "Introduction," 92)

[213] This is still the common perception many have of deductive reasoning, that it is essentially *Universal Instantiation*.

[214] Whately 1826 "Appendix I," 273 and Whately 1844 IV.II.1,242.

[215] On this point, see Whately 1844 I.2, 58.

[216] Whately 1826 "Preface," ix.

[217] Whately 1826 I.1, 19n. Whately has Locke's critique of Aristotle in mind with this rejoinder.

[218] Whately 1823 [1872] "Essay.2," 90.

[219] Whately 1823 [1872] "Essay.2," 90-1.

[220] Whately 1823 [1872] "Essay.2," 91.

[221] Whately 1823 [1872] "Essay.2," 92.

[222] Whately 1844 I.2, 26 and II.1, 241.

[223] As noted above, this was also stressed by Gillies earlier.

[224] Whately's view of a proposition becomes more explicitly extensional as time passes.

[225] Hill's fourth edition (1828), Huyshe's first edition (1827), and Jackson's edition (1836, based on Wesley's mid-eighteenth-century translation) all treat Whately's logic as authoritative. An anonymous English edition (1827) also refers to Whately.

[226] Hinds 1827 "Preface," vii. Hinds' concentrates on the more technical material that students would have to know for Oxford logic exams.

[227] About a dozen nineteenth-century works on logic (other than several Aldrich editions) were published prior to Whately. Between 1823 and 1850, besides many reprintings of Whately's book, roughly another dozen editions of Aldrich came out and almost four dozen other works on logic.

[228] This aspiration was never brought to fruition. The negligible reception Bentham's book received certainly didn't help.

[229] Bentham 1827 "Preface," vii.

[230] Bentham 1827 II, 12.

[231] Bentham 1827 I, 1.

[232] Bentham 1827 X, 206-10.

[233] Bentham 1827 II, 16-8, and X, 172-5

[234] Bentham 1827 X, 175.

[235] Bentham 1827 X, 177-8.

[236] Bentham's quantification of the predicate thus replaces the "confusing" and "perplexing" doctrine of distribution of terms. (Bentham III, 27-8) While Bentham seems to have been the first to propose quantifying the predicate, his idea seems not to have been recognized until much later, and it was Hamilton who later popularized this idea, especially in a protracted and acrimonious priority dispute with De Morgan. For a discussion of this topic and its history, see Parry March 1966.

[237] Bentham 1827 VIII, 133-5.

[238] Bentham 1827 IX, 155-6. We omit the details of their use since this doesn't affect Bentham's assessment of Whately's logic.

[239] Jackson 1976, 57.

[240] Mill expressed these sentiments in a March 1828 letter, saying why he had little interest in reviewing Bentham's work. (Mill 2006, 36-7)

[241] Kubitz 1932, 22.

[242] The older Mill evidently renounced his earlier views on logic. His 1828 review was omitted from a collection of his earlier writings, and it also goes unmentioned in his *Autobiography.* (Robson 1978, lxxx)

[243] Mill 1828, 150.

[244] Mill 1828, 151.

[245] Mill 1828, 153.

[246] Mill 1828, 138. Mill offers a number of concrete suggestions for improvement toward the end of his review, on pages 153-65.

[247] Mill 1828, 166.

[248] Mill 1828, 150.

[249] Mill 1828, 150.

[250] Mill 1828, 150.

[251] Mill 1828, 137.

[252] Mill 1828, 137-8.

[253] Mill 1828, 138.

[254] Mill 1828, 138.

[255] Mill 1828, 138.

[256] Mill 1828, 147 and 169-70.

[257] Mill 1828, 149.

[258] Mill 1828, 150.

[259] Mill 1828, 153.

[260] Mill 1828, 170.

[261] Mill 1828, 170.

[262] Loizides 2014 "Introduction," 4-5.

[263] Mill 1828, 151.

[264] A synopsis of Jardine's logic lectures appeared in 1797. In 1818 (second edition, 1825) Jardine published his reflections on how he had organized and taught logic at Glasgow during the preceding thirty years.

[265] Veitch 1869, 56.

[266] Veitch 1869, 45.

[267] Logicians influenced by Hamilton's lectures and ideas include Thomas Spencer Baynes, Thomas Fowler, Alexander Campbell Fraser, Clement Mansfield Ingleby, James McCosh, Henry Longueville Mansel, William Spalding, William Thomson, and John Veitch.

[268] Hamilton's analysis is densely argued with many references to works and historical developments that surely eluded most of its readers.

[269] Hamilton 1833, 199.

[270] Hamilton 1833, 199.

[271] Hamilton 1833, 200.

[272] Hamilton 1833, 200.

[273] Hamilton 1833, 200.

[274] Hamilton 1833, 198.

[275] Hamilton 1833, 200.

[276] Hamilton 1833, 201.

[277] Hamilton 1833, 203. Even while making this assertion, Hamilton attributes Whately's view not to a traditional text but to Kirwan's 1807 work, accusing him (with no proof) of having "his predecessor's definition … immediately in view. (204n)

[278] Hamilton 1833, 204-5.

[279] Hamilton 1833, 208.

[280] Hamilton 1833, 209; see also 226.

[281] Hamilton 1833, 207.

[282] Hamilton doesn't say much about logic's relation to language here, only that he can't believe Whately seriously wanted to restrict our mental operations to what language permits. He says more about language as an instrument of thought in later writings. (Cf. Hamilton 1837, 460-1) Those laws governing thought that Hamilton later settles on are the Law of Identity, the Law of Contradiction, and the Law of Excluded Middle. (Cf. Hamilton 1860 I.VI, 96)

[283] Hamilton 1833, 210. As noted above, this was Newman's contribution. Whately defensively comments in the next (1834) edition that he has no intention to be giving even a condensed history of logic, only a "light and rapid glance" at various thinkers' ideas. ("Introduction," 3, 5)

[284] Hamilton 1833, 215.

[285] Hamilton 1833, 217.

[286] Hamilton 1833, 201.

[287] In Reid's *Works* (1846) Hamilton himself takes exception to Reid's criticisms of Aristotelian logic, but he fails to mention Whately's responses.

[288] Hamilton 1833, 201.

[289] The most comprehensive and informative survey of works published in the half-century following Whately's 1823 article is that of Anon 1872, which seems not to be that well known.

[290] Mill 1843 I "Introduction," 2.

[291] Boole 1854 "Preface," iii.

[292] Boole 1854 XV, 239.

[293] De Morgan 1860, 341.

[294] There is rich irony in Boole using the least rigorous part of mathematics (algebra) as a basis for the field of thought (logic) that was supposed to be the instrument making science more rigorous.

[295] See De Morgan 1860, 341 and Neil 1862, 84 and 86. Whately's logic also dominated the American market at the time. Peirce, who was later influenced mainly by De Morgan and Boole, was first introduced to logic in 1851 by studying Whately at the age of 12. (Fisch 1982 I "Introduction," xvii)

[296] At times Whately's symbolic expression of proposition even failed to consider their quantity or quality.

[297] This was an impediment for most to Boole's logic later on.

[298] This is Mill's early assessment; it is matched by what later authors also conclude. Cf. Anon 1872, 312ff and McCosh 1874 292.

[299] See Fraser 1864, 34.

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