Following is the corrected version of the doctoral dissertation with errata sheet added to the end of the document (created Oct 9, 2009 and last updated Jan 10, 2014):

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Corrections were made to remedy minor errors as well as substantive errors and citation errors and omissions. A list of corrections appears at the end of this document. The original, uncorrected version is catalogued at the University of Tennessee, Knoxville and by OCLC
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To the Graduate Council:
I am submitting herewith a dissertation written by Stephen Edward Bales entitled "Aristotle's Contribution to Scholarly Communication." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Communication & Information.

_____

J. Michael Pemberton, Major Professor

We have read this dissertation
and recommend its acceptance

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Suzie Allard

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Barbara J. Thayer-Bacon

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Dwight Teeter

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Carolyn R. Hodges
Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

ARISTOTLE'S CONTRIBUTION TO SCHOLARLY COMMUNICATION

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Stephen Edward Bales
December 2008

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Abstract

This historical study examines the Aristotelian foundations of the Library and Museum of Alexandria for the purpose of (1) understanding how the Library and Museum differed from preceding ancient Near Eastern information institutions (i.e., "protolibraries") and (2) how Aristotle's methodologies for producing scientific knowledge were carried out in Alexandria. While protolibraries served as safeguards for maintaining a static cultural/political "stream of tradition" and created, organized, and maintained "library" documents to this end, the Library of Alexandria was a tool for theoretical knowledge creation. The Library materialized Aristotelian pre-scientific theory, specifically *dialectic* and served the scholarly community of the Museum in its research. Following the Library, collections of materialized *endoxa*, or recorded esteemed opinions, became a necessary tool for use by scholarly communities. The Library established the post-Aristotelian paradigm under which academic libraries still operate. Although the Library of Alexandria represented a fundamental shift in the meaning and purpose of collections of recorded documents, a feminist critique of the post-Aristotelian library shows that the academic library, while used in knowledge creation, is rooted in a foundationalist philosophy that validates and maintains the *status quo*.

Table of Contents

Abbreviations

An. Post.	Posterior Analytics
An. Pr.	Prior Analytics
Cael.	On the Heavens
Cat.	Categories
De An.	On the Soul
Eth. Eud.	Eudemian Ethics
frag.	Fragments
Gen. An.	On the Generation of Animals
Gen. Corr.	On Generation and Corruption
Mag. Mor.	Magna Moralia
Metaph.	Metaphysics
Mete.	Meteorology
Part. An.	On the Parts of Animals
Ph.	Physics
Pol.	Politics
Rh.	Rhetoric
Soph. El.	Sophistical Refutations
Top.	Topics

Chapter 1: Introduction

As defined by the Association of College and Research Libraries, *scholarly communication* is "the system through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community, and preserved for future use."[1] After the late fourth century BCE, scholarship became increasingly reliant on the written word. The Greek philosopher Aristotle (lived ca. 384-322 BCE), whom Plato referred to as "the reader," was an early exponent of the dependence of academia on recorded information as a basic (and now largely taken for granted) element in scholarship.

Aristotle's scientific method hinged, first, on the examination of prior knowledge as a prerequisite for the creation of new knowledge:

> All teaching and all intellectual learning come about from already existing knowledge. This is evident if we consider it in every case; for the mathematical sciences are acquired in this fashion, and so is each of the other arts. And similarly too with arguments—both deductive and inductive arguments proceed in this way; for both produce their teaching through what we are already aware of... (*An. Post.* 1.1.71a1).[2]

Aristotle was the first thinker to posit that knowledge grows incrementally in society, that "by advancing from true but obscure judgements [the scholar] will arrive at clear ones, always exchanging the usual confused statement for more real knowledge" (*Eth. Eud.* 1.6.1216b30). But Aristotle went beyond theorizing about pre-existent

[1] Association of College and Research Libraries, "Principles and Strategies for the Reform of Scholarly Communication: Scholarly Communication Defined," American Library Association, http://www.ala.org/ala/acrl/acrlpubs/whitepapers/principlesstrategies.htm (accessed September 1, 2007).

[2] From Aristotle, *Complete Works of Aristotle: The Revised Oxford Translation*, 2 vols., ed. Jonathan Barnes (Princeton, NJ: Princeton University Press), 1984.

knowledge. His personal library was an essential tool in support of his research and teaching agendas. The philosopher used the works of previous thinkers extensively in his treatises on science, art, rhetoric, and practical philosophy.[3] Aristotle also used his books pedagogically as learning tools in his Peripatetic School (the Peripatos) located at Athens' shrine to the Lycian Apollo (the Lyceum).[4]

Aristotle's school reflected its founder's catholic research interests and soon attracted students and scholars in a wide range of disciplines, producing "orators, generals and statesmen, also mathematicians, poets, musicians, and physicians."[5] The Peripatos's heyday as a leading educational institution of the ancient world, however, was relatively short-lived—entering into what historian Ulrich Wilamowitz-Möellendorf called "the death-sleep of Aristotelian Philosophy" under the leadership of Straton of Lampsacus (ca. 286-268 BCE).[6] Straton's ascension corresponded, un-coincidentally, with the Peripatos's loss of Aristotle's library to the disgruntled Neleus of Scepsis (who had been denied the Lyceum headship—but received the books in a bequest from Theophrastus of Eresus, Aristotle's successor to the headship of the Lyceum), depriving

[3] For examples see *Ph.* 1.2.184b15and *Metaph.* 1.3.983a24.

[4] "Peripatetic" is derived from the *Peripatos*, or covered walkway at the Lyceum, where Aristotle would walk as he lectured.

[5] Cicero *De Finibus,* 5.3., as translated by Felix Grayeff in, *Aristotle and His School: An Inquiry into the History of the Peripatos With a Commentary on Metaphysics Z, H, Λ, and Θ* (New York: Barnes & Noble, 1974), 39.

[6] Ulrich von Wilmatowitz-Möellendorf, *Antigoonos von Karystos* 4 (Berlin 1881), 83, as translated in John Patrick Lynch, *Aristotle's School: A Study of A Greek Educational Institution* (Berkeley: University of California Press, 1972), 136.

it "of the primary materials on which [the students' and scholars'] work was largely based."[7] This hobbled the school, and bombast replaced philosophy.[8]

Aristotelianism, however, has continued to influence philosophy and logic to the present. Classicist Ingemar Düring wrote that although the Peripatos faltered, "It was outside the Peripatos that Aristotle's philosophic tenets, his scientific method, his achievements in various branches of science, in brief, his life's work gained most importance."[9] Aristotelian influence reached its apogee with the foundation and flowering of the Great Library and Museum of Alexandria (hereafter referred to as "the Library" and "the Museum").

Approximately twenty years after Aristotle's death (322 BCE), Ptolemy I (Soter), former satrap (provincial governor) of Alexander the Great and the first pharaoh of Hellenistic Egypt (reigned ca. 323-285 BCE), established the Library and Museum (ca. 297/6 BCE). These institutions, a community of scholars (the Museum) and its Library (or *libraries*, when considering a smaller collection at the nearby temple of Serapis), represented the pinnacle of cooperative scholarship in the ancient world, and they are still regarded as symbols of the human intellect's capacity for genius. And although recorded information had been in use for thousands of years prior to the foundation of the Library and Museum, *scholarship*—as clear candidate for primogenitor of the modern understanding of the term—appeared only with the paradigm shift in the *meaning* and *use*

[7] Gregory Crane, "Aristotle's Library: Memex as Vision and Hypertext as Reality," in *From Memex to Hypertext: Vannevar Bush and the Mind's Machine,* eds. James M. Nyce and Paul Kahn (Boston: Academic Press, 1991), 340.

[8] Strabo 13.1.54, in *Geography*, trans. Horace Leonard Jones, 8 vols (Cambridge, MA: Harvard University Press, 1950).

[9] Ingemar Düring, "Notes on the History of the Transmission of Aristotle's Writings," *Gotesborgs Hogskolas Arsskrift* 56, (1950): 39.

of recorded language found with the Library and Museum. Before Aristotle, "scholars" used collections as repositories of information necessary for maintaining a civilization's "stream of tradition."[10] Alexandria saw the creation of a research community—scholars working with each other and those who came before them (in the form of recorded knowledge)—with the goal of producing *new* knowledge as an end in itself. This Alexandrian knowledge production resulted in the generation of *explicit* knowledge: a "set of organized statements of facts or ideas, presenting a reasoned judgment or an experimental result," that was fixed and transmitted in a systematic form.[11] To do this necessarily required the evaluation, organization, use, and transformation of knowledge, and this change in the use of information revolutionized scholarly communication.

What accounts for the theoretical foundations of the Library and Museum, and how did these developments contribute to scholarly communication? Although a link between Aristotle and the Library and Museum has been widely assumed among scholars, the philosopher's connection with Alexandria is often dealt with in a frustratingly casual manner. Classical scholars have failed to explore satisfactorily how deeply Aristotle's thought influenced the *basic character* of the Library and Museum and, by extension, the practice of scholarship.

[10] A. Leo Oppenheim, "Assyriology—Why and How?" *Current Anthropology* 1, nos. 5-6 (1960): 410.

[11] Daniel Bell, *The Coming of Post-Industrial Society: A Venture in Social Forecasting* (New York: Basic Books, 1973), 175.

Research Questions

The fullest possible understanding of Aristotle's contributions to the development of scholarly communication will result only from a thorough investigation of the Library and Museum, *the pivotal manifestations of scholarly communication in the ancient world*, and their connection to Aristotle's theory of science and his methodologies for producing scientific knowledge. The research questions asked in this dissertation are the following: (1) In what manner did the Library and Museum differ from preceding ancient information institutions (i.e., from the earliest clay tablet collections to Alexandria) as a result of this actualization of Aristotle's methodologies for producing scientific knowledge? And (2) how were Aristotle's methodologies for producing scientific knowledge carried out in the Library and Museum?

The dissertation examines how *Peripatetic thought*, i.e., the system of inquiry founded by Aristotle and characterized by a "tentative and dialectical character," a clear delineation of a wide range of specific arts and sciences, and an orientation towards empiricism, [12] contributed to the *mode and purpose* of research engaged in at the Library and Museum. This dissertation, furthermore, examines how the Library and Museum varied from preceding information institutions—representing a fundamental shift in the nature of scholarly communication from systems aimed at cultural preservation (e.g. the Assyrian Library of Assurbanipal) to those aimed at scientific inquiry.

[12] *Encyclopedia of Philosophy*, 2nd ed., s.v. "Peripatetics."

Significance

The modern profession of librarianship suffers from myopia when it comes to exploring its own history.[13] Michael Buckland and Ziming Liu found the discipline of information science to be largely ahistorical: "The collective memory has been dominated by events after 1945, and much of the historical commentary has been anecdotal, superficial, or uncritical."[14] The history of libraries and librarianship is better represented in the literature, but, until the second half of the twentieth century, consisted largely of simple narrations of events.[15] This nearsightedness on the part of the library and information science disciplines is disconcerting, for

> From historical consciousness derives also adaptability to change, an acute realization that life has not always been as it is today, and that it will not forever remain as it is at present. Thus one arrives at a proper perspective upon contemporary events, an ability to relate each to its appropriate antecedents and to project, at least to some extent, its possible consequences. History properly comprehended enriches and deepens the understanding of contemporary society.[16]

The unreflective librarian knows not from whence she came, and this lack of historical awareness results in a dearth of professional identity and theoretical grounding.

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[13] While several excellent histories explore libraries and librarianship prior to the modern age, including Lionel Casson, *Libraries in the Ancient World* (New Haven: Yale University Press, 2001), Michael H. Harris, *History of Libraries in the Western World*, 4th ed. (Metuchen, N.J.: Scarecrow Press, 1995), James Westfall Thompson, *Ancient Libraries* (Berkeley: University of California Press, 1940), and Konstantinos Sp. Staikos, *The History of the Library in Western Civilization*, vols. 1-3 (New Castle, DE: Oak Knoll Press, 2004), the bulk of scholarly effort is left to the archaeologists, Assyrianologists, and classicists. These scholars, while providing insight into the development of the library and librarianship, lack the valuable perspective of the information professional.

[14] Michael Buckland and Ziming Liu, "History of Information Science," in *Historical Studies of Information Science*, ed. Trudi Bellardo Hahn and Michael Buckland (Medford, NJ: Information Today, 1998), 284.

[15] Jesse Hauk Shera, "The Literature of American Library History," *Library Quarterly* 15, no. 1 (January 1945): 23.

[16] Jesse Hauk Shera, *Historians, Books and Libraries; A Survey of Historical Scholarship in Relation to Library Resources, Organization and Services* (Cleveland: Press of Western Reserve University, 1953), 110-112.

Reflective librarians risk trading their professional identity for "focused pragmatism," a sin that library historian H. Curtis Wright pinned on the seventh century BCE Assyrian king Assurbanipal, whom he termed the first "ultrapragmatic librarian to exhibit 'a complete absence of any speculative or reasoning effort.' Not ability, mind you, but effort."[17] Understanding the historical development of the information profession is valuable to both librarians and information scientists, allowing for the development of historical perspective and fostering professional identity. It is the responsibility of the historian of libraries, therefore, to "ask simply and directly: What were the influences that brought the library into being?"[18]

Historians have paid inadequate attention to Aristotle's relationship to the development of the academic library as a research institution and a necessary tool for scholarly communication. Nowhere is the absence of Aristotle more glaring than in the literature of library and information science.[19] This dissertation, then, fills a gap in the library and information science (LIS) literature, providing valuable links between the modern institution of the academic research library, the modern profession of librarianship, and their ancient antecedents. Institution and profession would benefit greatly from a deepened historical awareness and better understanding of the ancient philosophical thought that has so long served as library and information science's theoretical substratum.

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[17] H. Curtis Wright, "Assurbanipal," *ALA World Encyclopedia of Library and Information Services*, 2nd ed. (Chicago, American Library Association, 1986), 83.

[18] Jesse Hauk Shera, "The Literature of American Library History," *Library Quarterly* 15, no. 1 (January 1945): 24.

[19] A keyword search on "Aristot*" in the *Library and Information Science Abstracts* online database yielded only 22 peer reviewed articles referring to the philosopher. None of these articles contained the keyword "Alexandria." (Search conducted 1 August 2007.)

The findings are also of value to other disciplines such as classical philosophy. The findings further the understanding of Aristotle's methodology and theory of science in terms of its practical application, which, as Owen McLeod observed,[20] is open to conflicting interpretations.

Scope

Apart from a survey of ancient pre-Alexandrian "protolibraries,"[21] beginning with the earliest Mesopotamian institutions (ca. 3000 BCE), the *terminus a quo* for this historical study is 585 BCE, date of Thales's flourishing (Thales is considered the first western philosopher). This starting point will allow for Aristotle's works to be located within the context of his philosophical predecessors. The *terminus ad quem* is the end of the ancient period (ca. 500 CE), although the primary period of analysis ends with the expulsion of the scholars from Alexandria (ca. 144 BCE) by Ptolemy VIII (Physcon) (reigned ca. 145-116 BCE), after which the Library and Museum appear to have gone into serious decline as research institutions.

Methodology

This dissertation employs an historical methodology. Jacques Barzun and Henry G. Graff defined history "at its simplest" as "the story of past facts."[22] It is the historian's role, through the careful documentation of past events, to bring "order and meaning to the

[20] Owen McLeod, "Aristotle's Method" *History of Philosophy Quarterly* 12 (1995): 1-18.
[21] The term "protolibrary" is used to identify all pre-Alexandrian information institutions.
[22] Jacques Barzun and Henry F. Graff, *The Modern Researcher*, 4th ed. (San Diego: Harcourt Brace Jovanivich, 1985), 46.

welter of facts,"[23] and successful written history "holds its place in our civilization because we know that it reports things that actually took place."[24]

In addition to identifying fact and defining chronological sequence, the research for this dissertation analyzes *meaning*, for to "know what people *did*, we must know what they *meant*; and meaning is necessarily situated in the contexts of time and place."[25] Without adequate interpretation of meaning, the historian becomes merely an antiquarian, and "antiquarianism is not history."[26] Such successful interpretation of the past is not an easy task—it requires that historians commit to objectivity through constantly testing their subjective impressions of the events of history.[27]

The basic methodological elements of this study are common to most forms of historical research, consisting of (a) the careful *collection* and (b) *interpretation* of evidence culminating in an intellectual synthesis and (c) *presentation* in the form of a *narrative*.[28]

Sources in translation from the period studied (ca. 585 BCE-ca. 144 CE) serve as the backbone of this study. While many modern translations of ancient works are recognized as authoritative, all have nonetheless been "collected, sanitized, and

[23] Ibid., 426.
[24] Ibid., 47.
[25] David Paul Nord, "The Practice of Historical Research," in *Mass Communication Research and Theory*, eds. Guido H. Stempel III, David H. Weaver, and G. Cleveland Wilhoit (Boston: AB Longman, 2003), 366.
[26] Gilbert J. Garraghan, *A Guide to Historical Method*, ed. Jean Delanglez (New York: Fordham Press, 1946), 330.
[27] Barzun and Graff, *Modern Researcher*, 184.
[28] James D. Startt and William David Sloan, *Historical Methods in Mass Communication*, rev. ed. (Northport, AL: Vision Press, 2003), 3.

homogenized for the use of the general scholarly public."[29] With this in mind, materials were carefully identified, collected, evaluated, and interpreted. Alternative translations were consulted when available. Data collection and analysis, an iterative process, ceased only when further effort resulted only in redundancy. Careful attention to *verification* minimizes uncertainty, allowing the historian to make "rationally convincing" decisions.[30] Modern secondary sources were used to gain an acquaintance with the basic modern literature of the field.

Evidence

Valuable sources contemporary to the time period being studied include the works of the pre-Aristotelians (e.g., Socrates and Plato), Aristotle, his students and contemporaries (e.g., Theophrastus), and those individuals connected with the Library and Museum (e.g., Callimachus and Eratosthenes). Other contemporary sources include commentaries and derivative historical works (e.g. Polybius's *Histories*—second century BCE). Derivative sources provide context for source material and lend support to the assertions made in this study. Archaeological sources are used where the historical record is incomplete.

The two-volume edition of the *The Complete Works of Aristotle: The Revised Oxford Translation,* edited by Jonathan Barnes,[31]collects the entirety of Aristotle's surviving works and is generally recognized as the standard English edition of Aristotle's

[29] Charles W. Hedrick, Jr., *Ancient History: Monuments and Documents* (Malden, MA: Blackwell Publishing, 2006), 67.

[30] Barzun and Graff, *Modern Researcher*, 112.

[31] Aristotle, *The Complete Works of Aristotle: The Revised Oxford Translation,* ed. Jonathan (Princeton: Princeton University Press, 1984).

corpus.[32] Quotations of Aristotle use the *Oxford Translation* unless otherwise noted. Particular attention is given Aristotle's logical treatises—collectively known as the *Organon* ("instrument"). The *Analytics* (*Prior* and *Posterior*) and *Topics* are especially important to this research.

In addition to the *Organon*, this dissertation uses other works of Aristotle that further define or employ the philosopher's scientific methodology, particularly the philosopher's use of *endoxa* (esteemed opinion). Explanation of Aristotle's pre-scientific methods, induction and dialectic, are scattered throughout his scientific and practical philosophic treatises. Well known examples include passages found in the *Topics* (1.1.100b20), *Nicomachean Ethics* (8.1.1145b1), *Eudemian Ethics* (1.5.1216b30; 7.1.1235b13), and *Metaphysics* (3.1.995a24).

It is impossible to specify Aristotle's exact scientific methodologies. The confusion over Aristotle's scientific procedures results largely from of his having not written the surviving treatises for general publication. These are not the highly polished works of Plato but works-in-progress (Aristotle is supposed to have written beautiful dialogues in a Platonic style that Cicero likened to a "golden stream of eloquence,"[33] but only a few fragments of these remain). The treatises are likely lecture notes, either Aristotle's own or those transcribed by his students, from multiple periods in the development of his philosophy. They contain many contradictions (sometimes within the

[32] Lindsay Judson writes in "Review: The Master of Those Who Know," *Classical Review*, New Ser., 36, 1 (1986): 67-68, that the *Revised Oxford Edition* is an improvement over the classic twelve volume "Oxford Translation" of 1893, including a more precise translation and "a greater degree of uniformity of translation of particular words and phrases within each work…the overall result of these changes is a much more reliable translation of Aristotle's words."

[33] Cicero *Academica Priora*, 38.

same treatise), strange interpolations, promises of explanations or examples that never follow, unfinished arguments, and unfinished sentences. Materials deemed common knowledge to Aristotle's contemporaries were afforded only superficial treatment or were excluded from discussion.

Arriving at an understanding of the philosopher's methods is, as a result, like digging for and assembling dinosaur bones. Aristotle's statements regarding method are spread out across his works, and remarks cogent to methodology are often buried in larger scientific discussions. Methodological statements tend to be ambiguous and open to varying interpretations, and alternate translations may affect how a particular procedure is reconstructed. The historian of science, therefore, must "be bold enough to make *likely* guesses and conjectures."[34] The scholar must discern some sort of identifiable pattern from the mélange with the understanding that Aristotle's scientific methodology will never be fully understood.

Ancient sources, temporally remote to the time period under analysis, are limited in number and often fragmentary—but nonetheless useful in that they address the Library and Museum, those involved in their formation or operation (either directly or indirectly), or classical scholarship in general. While many of these sources require careful consideration of their reliability, others (e.g., Arrian's *Anabasis of Alexander*) are considered to be historically sound works of scholarship.

Medieval/Byzantine sources (spanning ca. 476 C.E—1454 C.E.) include the work of historians and scholiasts (commentators on classical authors). Of importance are the

[34] Aant Elzinga, "Some Remarks," *Journal for General Philosophy of Knowledge* 5, no. 1 (March 1974): 9.

Byzantine scholiast John Tzetzes and his *Prolegomena to the Comedies of Aristophanes,* which contains the largest extant pre-modern history of the Library, and the *Chronography* of Byzantine chronologist George Synkellos,[35] which provides a historical timeline of Alexandria.

Multiple modern secondary sources are useful. P.M. Fraser, Edward Parsons, Rudolf Blum, and Werner Jaeger's writings are of particular value as historical treatises. Various secondary sources are used to analyze Aristotle's methodologies.[36]

This study uses footnotes to reference all modern, ancient sources, and medieval/byzantine sources, except for references to the works of Aristotle. References to Aristotle's works are given as parenthetical citations and use the short-form abbreviations employed by the *Oxford Classical Dictionary,* 2nd edition.[37] Parenthetical references are to title, book, chapter, and Bekker number, the last being the system of pagination developed by the nineteenth century classical philologist August Immanuel Bekker. References to ancient and medieval/Byzantine sources are by author, long-form *Oxford Classical Dictionary* abbreviation for the title of the work, book, chapter, and paragraph (when available). If no abbreviation currently exists for the particular work in the *OCD,* the title of the work as it appears on the particular edition is used instead. The references to Plato are to title and Stephanus number, the system of pagination based on the 1578 edition of Plato's works by Henricus Stephanus.

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[35] George Synkellos, *The Chronography of George Synkellos: A Byzantine Chronicle of Universal History from the Creation,* trans. William Adler and Paul Tuffin (Oxford: Oxford University Press, 2002).

[36] Useful resources include Wayne N. Thompson's *Aristotle's Deduction and Induction: Introductory Analysis and Synthesis* (Amsterdam: Rodopi N.V., 1975), and Patrick H. Byrne, *Analysis and Science in Aristotle* (New York: State University of New York Press, 1997).

[37] *Oxford Classical Dictionary,* 2nd ed., ed. N.G.L. Hammond and H.H. Scullard (Oxford: Clarendon Press, 1970), ix-xxii.

Limitations

Beyond the use of works in translation, there are further limitations to this study. The historian is temporally removed from the events studied and comes from a different cultural milieu. Certain fallacies potentially arise from this separation, including the use of anachronism, presentism, the interminable fallacy (the tendency to make a long story short), the telescopic fallacy (the tendency to make a short story long), and the logical extension of small samples.[38] The classical historian must remain particularly aware of this last pitfall in that their "problem is scarcity of sources, not abundance"[39] (the classical historian must assume a role similar to that of an archaeologist,[40] a profession that demands constant rigor). Finally, this paper deals with the development of scholarly communication and the academic library in the western world. While the history of far eastern information institutions is also important to gaining an understanding the development of scholarly communication, it falls outside of the scope of this research. The histories of far eastern information institutions do, however, offer opportunities for future fruitful comparison.

Chapters in this Dissertation

Chapter 1: Introduction

[38] David Hackett Fischer discusses all of these fallacies in *Historians' Fallacies: Toward a Logic of Historical Thought* (New York: Harper & Row, 1970).

[39]Martha Howell and Walter Prevenier, *From Reliable Sources: An Introduction to Historical Methods* (Ithaca: Cornell University Press, 2001), 82.

[40] Rudolf Blum, *Kallimachos: The Alexandrian Library and the Origins of Bibliography*, trans. Hans H. Wellisch (Madison, WI: The University of Wisconsin Press, 1991), 143.

This section introduces the research topic and questions, key assumptions, limitations, method of analysis, and contributions.

Chapter 2: Protolibraries

This section analyzes the available source material on pre-Alexandrian protolibraries, including those of Mesopotamia, Egypt, and Bronze Age Mycenaean, Archaic, and classical Greece. This analysis allows for fruitful comparison of protolibraries with the Library and Museum.

Chapter 3: The Birth of Alexandria and its Scholarly Community

This section describes the origins and basic characteristics of Alexandria and the Museum, Alexandria's scholarly community. It starts to develop a chronology connecting Aristotle to the Library and Museum.

Chapter 4: The Library of the Museum

This section identifies *how* the Library was organized and administrated. Through further analysis of the historical record, it argues that Aristotle, his philosophy, and members of his school served as the intellectual inspiration of the Library and Museum.

Chapter 5: Alexandria and Aristotelian Science

This chapter begins a two-part examination of the thesis adopted in chapter four, that the intellectual basis for the Library and Museum was rooted in Aristotle's philosophy and science. Accepting that Aristotle's ideas served as the intellectual basis of the Library and Museum, this section begins an in depth analysis of what those theoretical contributions were. A brief intellectual history of pre-Aristotelian philosophers gives needed context for a following examination of Aristotle's life and

epistemological approach. It is argued that the Library and (more specifically) the Museum institutionalized the scientific component of Aristotle's complete scientific method.

Chapters 6: The Alexandrian Library and Aristotelian Pre-Science

Having argued that the Alexandrian scholarly community represented a materialization of Aristotelian science, this section analyzes the philosophical basis of the use and organization of the Library collection to support the post-Aristotelian scholarly community. It argues that the Library collection reflected the "pre-scientific" components—induction (*epagoge*), dialectic, or both—of Aristotle's complete scientific method. The chapter identifies the Library of Alexandria as the prototypical "post-Aristotelian" academic library.

Chapter 7: Re-Assessing the Post-Aristotelian Library

This section applies a feminist perspective to the dominant post-Aristotelian paradigm of academic library outlined in the previous chapters. It reconsiders the post-Aristotelian library as a tool for entrenching elite male political/cultural domination.

Chapter 8: Conclusion

This section summarizes the research, discusses its implications, and outlines opportunities for further research. The evidence shows a strong link between Peripatetic philosophy, particularly Aristotelian pre-scientific methods, and scholarly communication as it existed in the Library and Museum. Understanding this historical realization of Aristotle's philosophy allows for clear distinctions to be drawn between Alexandria and the preceding ancient information institutions. This model of post-

Aristotelian academic library uses collections of materials *systematically* for the creation of theoretical knowledge. The findings have important implications for LIS education and the development of professional identity among LIS practitioners.

Appendix: The Debate over Dialectic

As a supplement to chapter six, this appendix surveys four modern views concerning Aristotle's dialectical method and argues that—at the dawn of Alexandria—dialectic represented a living method used for philosophy and science.

Chapter 2: Near-Eastern Protolibraries

Humans possess an indefatigable drive to collect artifacts documenting their knowledge, actions, and very existence. The reasons vary: achieving and maintaining power, manifesting and encouraging religious devotion, satisfying curiosity, and a host of other possible motives. Humans also, with a fervor approaching the religious, are predisposed toward imposing order on their cultural handiwork.

Organized collections of information resources have existed since before the historic age. The assignment of *value* (be it sacred, cultural, intellectual, or economic) to recorded language has insured the established place of "information institutions" in various forms to the present day. The value of a document is a shifting concept. It is derived from a context of use (e.g., an archive, a school) as well as the morphological elements of the information resource itself, i.e., the written symbols and the media used for recording them. Value determines to what end information is recorded, collected, organized, how long it is preserved, and who is made responsible for performing these functions.

The Alexandrian Library has achieved an exalted status in Western consciousness as *the* exemplar of the western research library. The Library was a "quantum leap forward in the history of mankind's collection and dissemination of information. The Library's memory has symbolic value as an icon of universal knowledge and scholarly discovery for western culture in the modern era."[1] Great institutions, however, (as is the

[1] Steven Blake Shubert, "The Oriental Origins of the Alexandrian Library," *Libri* 43 (1993): 142.

case with all great ideas) rarely appear full-blown but embody a convergence of individual inspiration, cultural context, and historical influence. The ancient Greeks themselves recognized the third of these forces. And although the Library was an extraordinary product of the Hellenistic age and many historians (modern and ancient) claimed it unique in its ascendancy, the Library was preceded by thousands of years of Near Eastern "protolibraries."

This chapter investigates several questions concerning the pre-Alexandrian information institutions. What organizational patterns (in terms of physical and administrative structures) were used? What bibliographic methodologies existed in the protolibraries? What library philosophies existed before the foundation of the Great Library of Alexandria? This review of protolibraries provides the necessary context for three outcomes: (1) A deepened understanding of the Library and Museum through placing them in the context of their predecessors, (2) The identification of parallels and exposition of differences between the Library and Museum and preceding Near Eastern protolibraries, and (3) a better understanding of the Library as an entity *sui generis* occupying a unique place in history.

There are limitations to this survey. The period under analysis covers an approximately 3500 year time period and multiple civilizations: from the earliest clay tablet collections of the ancient Mesopotamians through the late classical period. This analysis, as a result, is necessarily a summation. An exhaustive analysis, however, would be needlessly tedious. With the exception of a few remarkable exceptions (e.g., the protolibrary of Assurbanipal, the tyrant libraries of Hellenic Greece), the evidence shows

little variation among pre-Alexandrian information institutions across three and a half millennia. Finally, the evidence is limited due to the ravages of time and nature, including humanity's capricious nature (and tendency to periodically destroy its own handiwork), and the clumsy practices of early nineteenth century archaeologists.

"Information institutions" were features of most ancient civilizations that boasted a written language. This survey focuses on the protolibraries of four civilizations:

(1) Mesopotamia (from the dawn of Sumer, ca. 3350 BCE, the first increasingly urban civilization, through the fall of Nineveh and the Assyrian empire, ca. 612 BCE).

(2) Pre-Alexandrian Egypt (beginning with the first dynasty, ca. 3100 BCE, through the foundation of Alexandria, 331 BCE).

(3) The Greek and Cretan Mycenaean civilization (ca. 1600 BCE-ca 1100 BCE). (It was decided not to discuss Bronze Age Minoan protolibraries because their script has not been deciphered.)

(4) Ancient Greece of the Archaic (800-500 BCE) and classical ages (ca. 500-323 BCE).

The protolibraries of these civilizations inaugurated the beginning of recorded history and, by the dawn of the Hellenistic age (typically considered to have begun with the death of Alexander the Great, ca. 323 BCE), they were already ancient civilizations. The Mesopotamians dominate this survey due to the extent of their surviving material culture in the form of hard-baked clay tablets. In contrast, the physical evidence of pre-Alexandrian Egyptian and Mycenaean Greek protolibraries is slender, and remnants of

the protolibraries of classical Greece are practically non-existent. But the influence of these civilizations' information institutions, particularly those of the pre-Alexandrian Egyptians, on the Library and Museum should be estimated. Egyptian protolibraries, while obscure to modern scholars, were visible and accessible to the early Ptolemaic pharaohs.

Definition of Terms

Although the terms "library" and "archive" are helpful, allowing the reader to better conceptualize an information institution in regards to its functions, the fallacy of *presentism*, or "anticipating the past," is a potential pitfall.[2] Even if information institutions in history point toward or prefigure modern information institutions, the web of context, time, and ideology renders a sense of coequality between past and present an exercise in speculative scholarship. To avoid *nunc pro tunc* conflations the term "protolibrary" is used as a general term to designate pre-Alexandrian information institutions and does not suggest that the Library represents an *early modern academic library* (but this does not rule out that the Library might serve as a precursor for later institutions).

The terms "library" and "archive" are unavoidable yet difficult to define adequately. Archaeologist Olof Pedersen offered simple (perhaps overly so) summations of these terms: "With rather broad definitions of the terms 'document' and 'literary text,' it may be simplest to say that archives are collections of documents and libraries are

[2] Fischer, *Historians' Fallacies*, 135.

collections of literary texts."[3] Pedersen's use of "document," however, is *too* broad. Both archives and libraries contain "documents," if one considers a document to be something that captures information in a physical format. For this analysis, "archival documents" are defined as "records" of transactions (e.g. economic or governmental) or other documentation of everyday life (legal documents, etc.), and "library documents" are defined as recorded expressions of intellectual activity: "knowledge-based resources." Adopting these definitions facilitates comparison through analogy to characteristics found in modern information institutions. Further, use of those definitions points out the limitations of today's terms when dealing with the ancient world.

Mesopotamia: Cradle of Literacy and Organization

The Sumerians (ca. 3350-ca. 1900 BCE) are credited as the earliest known inscribers of clay tablets, as well as the earliest organizers of this medium, one that would serve the effective organization of information for three millennia. The Sumerians' genius lay in a "remarkable talent for organization and a sense of orderliness that approached a national characteristic."[4] They were also enthusiastic businessmen and developed written language to support public economy and administration.[5] The archaeological record supports this preoccupation with business. Evidence points to the development of Sumerian text as the adaptation of a Neolithic (the earliest available evidence dates to ca. 8000 BCE) accounting system that used clay tokens incised with

[3] Olof Pedersen, *Archives and Libraries of the Ancient Near East: 1500-300 B.C.* (Bethesda, Maryland: CDL Press, 1998), 3.

[4] Ernst Posner, *Archives of the Ancient World* (Cambridge, Massachusetts: Cambridge University Press, 1972), 23-24.

[5] I.J. Gelb, *A Study of Writing*, rev. ed. (Chicago: University of Chicago Press, 1974), 62.

pictographic and ideographic signs to represent individual commodities of trade.[6] That the beginning of written language was as a tool for commerce is telling. Writing began as a tool for practical expediency and would remain so for thousands of years.

The urban revolution of late fourth millennium BCE Mesopotamia increased the complexity of the token system, resulting in a large array of pictographic and ideographic tokens, with 15 major classes and 200 subclasses of tokens having been identified by the late twentieth century.[7] The increasing complexity led to the invention of hollow clay envelopes or "egg tablets" (discovered at the sites of ancient Nuzi, Mesopotamia), what Assyriologist A. Leo Oppenheim identified as an "operational device for bureaucratic purposes."[8] This system for sealing parcels of tokens in opaque clay *bullae* required that the contents be symbolically reproduced on the tablet's outer surface, first through impressing the tokens on the tablet, and then through representing token types with incised markings by means of a wooden stylus (*cuneus*). When the egg tablets' surfaces began providing a full accounting of their contents, the tokens inside became redundant and excluded. The tablets flattened out (but not completely, Mesopotamian archaeologist Denise Schmandt-Besserat suggested that the later Sumerian tablets' concave backs might represent a holdover from the previously ovoid shape).[9]

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[6] Denise Schmandt-Besserat, *How Writing Came About* (Austin, TX: University of Texas Press, 1996), 29-31.

[7] Denise Schmandt-Besserat, "The Earliest Precursor of Writing," *Scientific American* 238, no. 6 (June, 1978): 54.

[8] A. Leo. Oppenheim, "On an Operational Device in Mesopotamian Bureaucracy," *Journal of Near Eastern Studies* 18 (1959): 123.

[9] Schmandt-Besserat, "Earliest Precursor of Writing," 59.

Now that the basic format of the clay tablet had been established and information was presented in a way that promoted logical analysis and abstract thinking, cuneiform, the Sumerian's syllabic writing system, developed from these pictograms and ideograms at a rapid pace. This fixing of an approximation of spoken language on a sturdy medium helped insure the transmission of culture throughout the ancient Mesopotamian region over the next three thousand years. The Sumerians' cultural hegemony became entrenched and represented "classical" civilization to subsequent Mesopotamian civilizations.

The Sumerians' legacy was so embedded that, although the organizational techniques used in Mesopotamia and the Fertile Crescent (an area stretching from the mountains of southern Armenia to northern Arabian Desert) varied somewhat between successive dominant cultures, there was remarkable consistency in the basic organization and administration of these civilizations' protolibraries. And considering the Mesopotamians' zeal for trade and conquest, it is reasonable to conclude that the Sumerians, through direct contact, as well as through their impact on the traders and conquerors of later Mesopotamian civilizations, had some influence on patterns found in pre-Alexandrian Egyptian protolibraries. For example, more than 382 clay tablets and fragments written in Babylonian cuneiform, the *lingua franca* of the early to mid-second millennia BCE Near East for business and diplomacy, have been recovered from the mid-fourteenth century BCE Egyptian protolibrary in El-Amarna (Lower Egypt). [10]

[10] Victor H. Matthews, "El-Amarna Texts," in *Near Eastern Archaeology: A Reader*, ed. Suzanne Richard (Winona Lake, IN: Eisenbrauns, 2003), 357.

The Sumerians' mercantile orientation is evidenced by the great quantities of clay tablets unearthed to date, and, with Sir Henry Rawlinson's and Edward Hincks's cracking of old Persian script in mid-nineteenth century. Unfortunate is the Assyriologist who spends years learning to read cuneiform in the hopes of deciphering a great and hoary body of literature, only to be faced with an endless supply of business receipts, lists, and bureaucratic memoranda. But this Near Eastern drive to *document* reflected and served as a bulwark of bureaucratic societies geared towards *maintaining the integrity* of civilization.

Of the 200,000 plus Mesopotamian tablets unearthed by the late twentieth century, more than 90% relate directly to economic issues.[11] The economic character of the majority of unearthed clay tablets does not mean that the Sumerians, or subsequent Mesopotamian cultures, were devoid of spiritual, literary, or scientific impulses, but it underscores that writing developed as a practical form of documentation of transactions. Archaeologist and historian of the Middle East D.T. Potts described the Sumerians' fixing of cuneiform script in baked clay tablets as "devised, purely and simply, as a solution to an account-technical problem, not the perpetuation of myths, epics, hymns, historical records, or royal propaganda."[12] This pragmatism is reflected in the documents' use for practical outcomes, be they archival records or library documents. What few library documents that have been discovered ultimately served culturally and politically

[11] Rod Barker, "Ancient Libraries: the Early Evolution of Cataloguing and Finding Tools," *Cataloguing Australia* 24, no. 1/2 (1998): 3.

[12] D.T. Potts, "Before Alexandria: Libraries in the Ancient East," in *The Library of Alexandria: Centre of Learning in the Ancient World,* ed. Roy Macleod (London: I.B. Tauris Publishers, 2000), 20.

conservative ends and resulted in the need for highly serviceable protolibraries charged with these documents' administration and preservation.

This orientation towards conservation and expediency spanned three millennia. This intense practicality, looming so large in the ancient Mesopotamian psyche, resulted in the development of Mesopotamian protolibraries as resources for motivated interests with targeted needs (political, economic, religious, etc)—all of which aimed ultimately at preserving the *status quo*. Oppenheim referred to the purpose of the training of Mesopotamian scribes as perpetuating a civilization's "stream of tradition."[13] This "stream of tradition," a "normative culture" extending across hundreds or even thousands of years was embodied at any given moment in ancient Near Eastern history in the civilizations' protolibraries. The Mesopotamian protolibraries insured the continuity of the Mesopotamian societies across time, through economic and administrative activity, as well as through documenting and entrenching cultural norms by means of both archival documents and library documents. This was quite effective. The late Assyrian civilization (early to mid first millennium BCE) worshipped essentially the same pantheon of deities as the Sumerian civilization, as well as maintained a similar social and political texture (e.g., a king who served as the gods' representative, a scribal-priest class, and essentially the same cuneiform script).

[13] A. Leo Oppenheim, "Assyriology—Why and How?" *Current Anthropology* 1, no. 5/6 (1960): 410.

The Scribes: Jealous Guardians of Tradition

The intelligentsias—the scribes—were the guardians of the *status quo*. Professional scribes served as temple and palace administrators and provided for the day-to-day operation of Mesopotamian protolibraries. These scribes were a minority of well-paid elites who were responsible for the transmission of Mesopotamian culture. They were clerics initiated into the mysteries of the written word, an esoteric craft literacy given to them by their deities, most notably the scribe god Nabu, the "lord of w[isdom], who [gathers to himself] all learning, The lore of heaven and netherworld is forever [in Nabu's hand]."[14] This *sacred mystery* of writing was passed down from one generation of scribe to the next through the rote copying of age old Sumerian texts. As a result, scribes were not only the "fountainhead of all our information about Mesopotamia, but they are also the medium through which it reaches us."[15]

But the scribe was ultimately and always *in the service of the temple and king* (the gods' chief representative on earth). The primary service performed by a scribe, as a result, was to record data and interpret information for the purpose of maintaining the temple and the king. Therefore, the Mesopotamian scribe possessed a great deal of wealth, as well as spiritual and temporal power. Naturally these men were not keen to compromise their station and jealously guarded their primary claim to societal power, literacy.

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[14] Benjamin R. Foster, ed., *Before the Muses: An Anthology of Akkadian Literature*. 3rd ed., trans. Seux (Bethesda, MA: CDL Press, 2005), 704-705.

[15] A. Leo Oppenheim, "The Position of the Intellectual in Mesopotamian Society," *Daedalus* 104, no. 2 (Spring 1975): 38.

The syllabic scripts, from the unwieldy cuneiform to the more economical Semitic "proto-alphabets," did much to both create and maintain the Mesopotamian scribes' status as elites. The symbols of Mesopotamian scripts represent phonetic units that combine a vowel sound with one or more consonants. Syllabic writing systems ranged from those containing in excess of one thousand signs (e.g. early Sumerian script) to those paired down sets of 22 to 40 characters (the Semitic "proto-alphabets," which resembled the Greek alphabet, but, having no vowel signs, were syllabic). And, while the syllabic scripts allowed for spoken language to be expressed in writing (and thus saved for later use), they did so in an approximate fashion, causing a break between writing and speech—the script was able only to provide a crude approximation of spoken words. Even as the number of signs became less cumbersome over time, they remained open to multiple interpretations and were easily misread. Signs could have multiple phonetic values (the syllables GA and QA might be represented by the same sign), and certain syllables might not be represented at all, requiring the substitution of signs representing approximate phonetic matches (GA might have to substitute for KA).[16]

The conservative nature of Mesopotamian civilization may, in fact, be attributable in part to the nature of the scripts. The limited capability of the syllabic scripts to record human thought, made recorded language an "inorganic memory" that lacked facility and precision. This inflexibility set limits on written expression, and the syllabic scripts did

[16] Gelb, *Study of Writing*, 72.

little to encourage innovation in human thought and encouraged the development of highly conservative civilizations.[17]

The lack of precision helped insure the continued monopoly of the scribal class. Literacy required an intensive regimen of training that went far past childhood. Writing became a narrow and elite "craft literacy."[18] The ambiguity of written texts demanded that the reader understand both a cultural and scribal "context of situation" to achieve correct interpretation. The same texts were taught to generation after generation of new scribes, and a novel piece of writing not based on conventional models would have made for exceptionally difficult reading. The Near Eastern syllabic scripts, therefore, left little room for deviation from what was already known and aided in the maintenance of traditional power structures. This resulted in the development of set canons of literature.[19] The "stream of tradition," became fixed out of necessity—the inflexibility of the script demanded it—and consisted of "classic" literatures maintained and supported because of their familiarity. According to classicist and linguist Eric A. Havelock, this left less chance for misinterpretation and little room for new expression.[20]

The Mesopotamian literature lacked diversity due to the script's inability to express "fine distinctions and light shades of meaning."[21] The limitations of the script encouraged the use of recognizable archetypes and discouraged novelty: "The heroes

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[17] H. Curtis Wright, *The Oral Antecedents of Greek Librarianship* (Provo, UT: Brigham Young University Press, 1977): 34.

[18] Eric A. Havelock, *Origins of Western Literacy*, (Toronto: Ontario Institute for Studies in Education), 1976.

[19] See C. K. Ogden and I. A. Richard's *The Meaning of Meaning: A Study of the Influence of Language Upon Thought and of the Science of Symbolism* (New York: Harcourt Brace & World, 1923) 296-336.

[20] Havelock, *Origins of Western Literacy*, 34.

[21] Harold A. Innis, *Empire and Communications* (Lanham, MD: Rowman & Littlefield, 2007), 81.

tend to be broad types, more or less undifferentiated, rather than highly personalized individuals. Moreover, the incidents and plot motifs are related in a rather static and conventionalized style…" (Compare the myths of the Hebrew Bible—written in a syllabic script—to those the Mesopotamians. Many of the same archetypes and motifs appear across the two literatures).[22]

Communication theorist Robert Logan argued that the limitations of the scripts prevented the creation of theoretical science by not allowing an adequate medium for developing the necessary abstract concepts, nor providing the precision necessary for expressing them (or disputing them).[23] Mesopotamian "scholarship," therefore, did not support the development of ideas through any sort of dialectic. There was, as a result, a complete lack of polemic in written cuneiform.[24] The Mesopotamian "science" that evolved was practical: geometry served to delimit land, and astronomy allowed for creation of calendars and the accurate prediction of events.

The following late period Babylonian (ca. first millennium BCE) poem, "In Praise of the Scribal Art" (generally considered to be a school text for copying),[25] sums up the position of the scribe, the esoteric nature of the script, and the use of writing for pragmatic purposes as well as control [emphasis added]:

> The scribal art is the mother of the eloquent,
> father of the erudite,
> The scribal art is enjoyable,

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[22] Samuel Noah Kramer. *The Sumerians: Their History, Culture, and Character* (Chicago: University of Chicago Press, 1963), 184.

[23] Robert K. Logan, *The Alphabet Effect: A Media Ecology Understanding of the Making of Western Civilization* (Creskill: New Jersey, 2004), 4-5.

[24] Oppenheim, *Position of the Intellectual*, 38.

[25] Victor Avidgor Hurowitz, "Literary Observations on 'In Praise of the Scribal Arts'," *The Journal of the Ancient Near Eastern Society of Columbia University* 27 (2000): 49.

one can never have enough of its charms.
The *scribal art is not easy to learn*, but he who masters it
will no longer be intimidated by it.
Strive after the scribal art and *it will surely enrich you*,
Work hard at the scribal art and *it will bring you wealth*.
Do not be careless in the scribal art, do not neglect it,
The scribal art is *the abode of beauty*,
of *the secret lore* of Amanki,
Work ceaselessly at it and *it will reveal its secret lore to you*,
Do not neglect it, lest you be ill spoken of.
The scribal art is *a good lot, one of wealth and plenty*.
When you are a youngster, you suffer,
when you are mature, you [prosper]
The scribal art is *the nexus of all [wisdom(?)]*,
Pour yourself into it (?) [then draw from (?)] its excellence.
To learn Sumerian is the highest learning,
The standard (?) (form), the dialect form,
To write a stela, *to measure a field, to balance accounts*, …,
[ ] the palace […..],
The scribe shall be its servitor,
he shall call others for forced labor![26]

The Nature of the Mesopotamian Collections

Parties sponsoring protolibraries were private (family enterprises or well-to-do individuals) or official (royal or temple). Both private and official protolibraries were largely dedicated to housing the "phenomena of material life."[27] In this sense the protolibraries accurately reflected the Sumerian word naming them, *e dub ba* ("tablet house" or "store room").[28]

Private or family owned business archives were ubiquitous in Mesopotamia and regions touched by Mesopotamian imperialism or commerce. They were usually found

[26] Foster, *Before the Muses*, 1023-1024; trans. Römer.
[27] Mogens Weitemeyer, "Archive and Library Technique in Ancient Mesopotamia," *Libri* 6, no. 3 (1956): 214.
[28] Ibid., 220.

among the wealthy and mainly housed transactional records. For example, of the 105 houses excavated in Kanis (an Old Assyrian business community in central Anatolia dating from the early to mid-second millennium BCE), 70 had adjoining archive rooms or corners of rooms dedicated to storing small collections.[29]

Private collections of library documents were owned by learned professionals.[30] Assyriologist Klaas R. Veenhof noted that "such texts are more likely to be found where the professional activities of a scribe [who worked at temple or palace] were not primarily of an administrative nature, but required the use of literary or scientific texts, which he might then keep in his room."[31] Private collections were typically small and attached to the owner's home. These collections' trivial size required little organization.[32] Larger private collections of archival or library material might incorporate organizational patterns similar to those found in more "official" protolibraries.

"Official" Mesopotamian protolibraries were *princely*, established by the ruler to serve the interests of the state, or *priestly*, and created to serve the needs of a particular religious cult (and considering that the king was the ultimate mortal representative of the gods, these protolibraries ultimately served needs of the state as well).[33] The official nature of these protolibraries is indicated by (1) their location, being attached to or in the vicinity of the institution they served, (2) their contents (materials of service to the goals

[29] Posner, *Archives*, 46-47.
[30] Pedersen, *Archives and Libraries*, 269.
[31] Klaas R. Veenhof, "Cuneiform Archives: An Introduction," in *Cuneiform Archives and Libraries: Papers Read at the 30th Rencontre Assyriologique Internationale, Leiden, 4-8 July 1983*, ed. Klaas R. Veenhof (Leiden: Nederlands Historisch-Archaeologisch Instituut Te Istanbul, 1986), 5.
[32] Ibid., 11.
[33] Ibid., 9.

of the sponsoring institution), and (3) the seals of state or temple administrators.[34] These protolibraries contained both archival and library documents (again employing a very liberal definition of what constitutes the latter sort of document).

Mesopotamian protolibraries containing library materials are of understandable interest to library historians. Patterns within these protolibraries' physical organization and institutional administration suggest underlying *motivations* resulting in the incorporation of non-archival materials. Library historian Michael H. Harris attributed the origins of protolibraries bearing library documents to the gradual addition of legal, historical, and genealogical records into government archives.[35] By the mid-twentieth century CE, remains of protolibraries boasting library materials had been excavated in the Mesopotamian cities of Kish, Pantabiblia, Sippara, Ashur, Shuruppak, Akkad, Uruk, and Nippur.[36]

The latter half of the twentieth century saw more discoveries of protolibraries incorporating types of library documents, notably the 1974 discovery of a clay tablet collection attached to the royal palace of Ebla (modern day Tell Mardikh, Syria), which contained over 15,000 clay tablets.[37] Giovanni Pettinato, the first cuneiformist to work on the Ebla tablets' translation, noted that as many as 4,000 (37.5%) of these tablets may represent "literary texts," but one should bear in mind that Pettinato's definition of "literary text" includes spells and divination texts, and that only twenty myth texts have

[34] Ibid.
[35] Harris, *History of Libraries*, 9.
[36] Thompson, *Ancient Libraries*, 12.
[37] Paolo Matthiae, *Ebla: An Empire Rediscovered* (London: Hodder and Stoughton, 1980), 164.

been identified thus far, and that many of these exist in multiple copies in the reserve room.[38]

Library documents appear to have been housed with, but organized separately from, collections of economic records, legal documents, or political communiqués. The library materials might be located in designated containers, dedicated subject rooms, or place of most likely use, such as scriptoria or scribal schools attached to the protolibrary. Assyriologist Mogens Weitemeyer explained that library documents, much like the transactional records, were "gathered with a view to immediate or later use by the group of persons served by the [proto-]library,"[39] most notably the scribes, king, and community. Collections of library materials served, therefore, in (1) *maintaining* the *administrative structure* of the institution through the education of new scribes and/or (2) in the *maintaining* the *welfare of the civilization*, be it at the level of the immediate community or the state in the personage of the king (again, through facilitating the education of scribes in the king's service or the state's continued welfare through religious or pseudo-scientific activities such as divination or astrology). Library documents, like the more typical transactional "archival" records, were effectively administrative documents, and their organization and conservation served to ensure the structure and continuity of Mesopotamian society.

Considering the elite nature of Mesopotamian literacy and its importance in maintaining tradition, it is not surprising that Mesopotamian protolibrary collections, and

[38] Giovanni Pettinato, *The Archives of Ebla: An Empire Inscribed in Clay* (Garden City, NY: Doubleday, 1981), 47.

[39] Weitemeyer, "Archive and Library Technique," 218.

library documents in particular, served an important didactic function. Scribal schools were frequently attached to, or in the vicinity of, Mesopotamian protolibraries. Early twentieth century Assyriologist and librarian Morris Jastrow stressed the didactic function of the library materials in mid-second century Babylonian protolibraries. In his examination of archaeological finds made at Telloh, Sippar, and Nippur (all three cities in Sumeria), Jastrow came to the following conclusions: (1) temples contained chiefly business archives, (2) attached to these temples were large schools dedicated to the training of priests and scribes, (3) sections of the temples were set aside to house collections of "textbooks" (i.e., library materials, in this case "hymns, incantations, omens, and the like") for the training of priests and scribes, and (4) religious texts were prepared to train priests in the various functions of the cult.[40]

Oppenheim echoed Jastrow's conclusion that the collections of library materials served as textbook repositories for training scribes through the duplication of texts. Collections of library materials did not stem from, nor were they intended for, the production of theoretical knowledge. These documents represented the fruits of a "purely operational and highly effective device: it was considered an essential part of the training of each scribe for him to copy faithfully the texts that had made up the [Mesopotamian] stream of tradition."[41] The library materials, therefore, served as tools for ensuring the continued running of the protolibraries, which in turn ensured the continued security of the state. This resulted in the accumulation of "literary" (e.g., ancient epics such as tale of

[40] Morris Jastrow, Jr. "Did the Babylonian Temples Have Libraries?" *Journal of the Oriental Society* 27 (1906): 165.

[41] Oppenheim, "Assyriology—Why and How?" 410.

Sumerian hero "Gilgamesh," proverbs or "wisdom literature") and "scholarly" texts (e.g., mathematical problems, lexical lists) in protolibrary collections that served a *primary function* as storehouses for transactional records.[42]

While literary works served largely as educational tools for the scribes who maintained the "stream of tradition" and administrative structure of Mesopotamian society, the largest body of "scholarly" material in Mesopotamian protolibraries consisted of pseudo-scientific divination texts composed and collected to maintain the *status quo* through interpretation of the cultural record. In these texts "a phenomenon is described (an event, the behavior or feature of an animal, the position of the stars, etc.), and opposite that description is the statement of what should happen to the country, the king, or some other individual as a result."[43] The following is an example from mid-second millennium Babylon:

> When Mars is visible in Tammuz, the bed of warriors will be wide. When Mercury stands in the north, there will be corpses, there will be an invasion of the king of Akkad against a foreign land. When Mars approaches Gemini, a king will die and there will be hostility.[44]

Mesopotamian "science" (or what Assyriologists, cuneiformists, and historians have designated as science), like both the pseudo-science and literature, served practical purposes. The scientific texts found at Ebla (and attached to the schoolroom), contain lists of what was "then knowable:" "encyclopedias" of animals, stones, plants, and

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[42] A. Leo Oppenheim, *Ancient Mesopotamia: Portrait of a Dead Civilization* (Chicago: University of Chicago Press, 1977), 243.

[43] Laura Arksey, "The Library of Assurbanipal, King of the World," *Wilson Library Bulletin* (June 1977): 837.

[44] R. Campbell Thompson, ed. and trans., *The Reports of the Magicians and Astrologers of Nineveh and Babylon in the British Museum* (London: Luzac and Co.), lxxiii.

metals.[45] While these scientific works are enumerative and descriptive, there is no evidence of attempts to build theory.

In summation, no Mesopotamian documents were created or collected to support research that engaged in dialectic to create new knowledge, but what Oppenheim described as emblematic of Mesopotamian scholarship as a whole: records (i.e., data or information) of past transactions or formulations of traditionally determined relationships.[46] The collection of materials for "scholarship," as a result, was intended for the interpretation of tradition with the goal of maintenance of the prevailing cultural milieu.

The Great Library of Assurbanipal: A "Modern" Library?

Despite this blurring of the lines between archive and library (with heavy stress on *archive*), the great protolibrary of Assurbanipal (king of Assyria ca. 669-631 BCE), often is designated as the West's first true "library" in the modern sense. The protolibrary of Assurbanipal does, in fact, appear at first blush to be an anomaly among Mesopotamian protolibraries.

This large protolibrary (with an estimated total of 20,000 tablets)[47] was created by royal fiat and appears to be the first information institution organized with the intent of being *systematically collected* and *universal* in its scope. Oppenheim held that Assurbanipal's protolibrary was indeed systematically collected and (intentionally)

[45] Pettinato, *Archives of Ebla*, 235-236.
[46] Oppenheim, "The Position of the Intellectual," 38.
[47] Pedersen, *Libraries and Archives*, 164.

represented the sum total of Mesopotamian tradition.[48] Potts concurred, considering most of the other Mesopotamian protolibraries were "collections of economic texts with an admixture of lexical and school texts deemed necessary by the scribes who wrote the administrative tablets."[49]

Oppenheim's simple description of the library at Nineveh certainly gives the impression of a "modern" library. However, the protolibrary of Assurbanipal served the primary purpose of maintaining the Mesopotamian "stream of tradition" in a manner similar to its less extensive contemporaries and 2500 years of Near Eastern predecessors.

Assurbanipal claimed to be a "scholar" and sent out agents to protolibraries throughout his empire, and even to lands outside of his domain, to collect records for his use. This claim is supported by a letter sent by the king to an envoy, in which Assurbanipal ordered the scribe to orchestrate the collection of tablets from protolibraries across the Mesopotamian world concerning a variety of subjects as well as to consider "any tablets and ritual text about which I have not written you, and they are suitable for my palace, select (them) and send (them) to me."[50]

But, for all of its novelties, such as this assiduous collection of all sorts of cuneiform texts,[51] as well as the inflated aspirations of its creator, Assurbanipal's protolibrary appears little different in its essential purpose than other Mesopotamian protolibraries. The protolibrary's basic organization represented the ultimate display of the Assyrian, indeed the Mesopotamian, drive to organize, and no novel approach to

[48] Oppenheim, "Assyriology—Why and How?" 412.
[49] Potts, "Before Alexandria," 23.
[50] Weitemeyer, "Archive and Library Technique," 229, trans. E. Ebling.
[51] To collect "everything" suggests that Assurbanipal had no taste or differential view of selection.

thought or knowledge creation.[52] And while many library scholars, such as Briscoe et al., think that the idea of the library was functionally defined with the creation of Assurbanipal's protolibrary in that the royal library *collected, catalogued, classified, conserved*, provided *reference*, and a sort of *circulation*,[53] they forget modern libraries' role in *creating* knowledge springing from information resources.

Assurbanipal's protolibrary was no different from other Mesopotamian protolibraries in terms of its basic purpose of maintaining the *status quo*. Assurbanipal's scribes, therefore, were charged with creating and maintaining a collection suited for documenting the past while providing access to materials useful in present or future crises. Beyond its size, the composition of the collection itself does not appear terribly different than its predecessors, with only about 5000 (25 percent) of the tablets dedicated to "literature."[54] And, while all types of Mesopotamian literature were found at the library, the main categories covered were "omens, incantations, medical texts, [and] lexical lists."[55] A temple of Nabu the scribe god was located within a few meters of the building holding the bulk of Assurbanipal's collection, where the scribe no doubt made use of the collection in the traditional manner: pedagogy.[56] Assurbanipal's "information institution," despite its owner's ambitions, sat squarely in the tradition of its predecessors.

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[52] H. Curtis Wright. *Assurbanipal* (Chicago: ALA World Encyclopedia of Library and Information Services, Second Edition, 1986), 82.

[53] Peter Briscoe and others "Ashurbanipal's Enduring Archetype: Thoughts on the Library's Role in the Future," *College & Research Libraries* 47, no. 2 (March 1986): 121.

[54] Pedersen, *Archives and Libraries*, 164.

[55] Ibid.

[56] Ibid., 161.

The Organization of the Mesopotamian Collections

The business environments within which westerners operate today, while gilded with technological achievements, are but a refinement of ancient Mesopotamian techniques. Library historian Rod Barker noted that "In these ancient libraries we see the initial evolution of the concept of metadata and literary classification that led eventually to the many classification schemes seen today, the MARC [Machine Readable Cataloging, a metadata standard] and now the Dublin Core [a metadata standard for electronic documents]. The medium changes, but not the underlying concepts."[57] There is archaeological evidence to support such a claim. Thanks to the many violent clashes between Mesopotamian civilizations and their fondness for razing conquered cities, large numbers of clay tablets were left *in situ* and found baked hard. Context provides researchers invaluable information regarding the organization of collections and the actualization of Mesopotamian bibliographic thinking.

The Mesopotamians' genius for organization shone brightly in their bibliographic methodologies. These methodologies were robust, the earliest evidence of systematization of clay tablets being found in the "tablet house" of ancient Shurruppak (Sumeria), and the royal archive at Ebla (both ca. 2600-2400 BCE).[58] The basic tenets of Mesopotamian bibliographic systematization were implemented for nearly two millennia afterwards and, as Rod Barker argued, possibly were the roots of the early twenty-first

[57] Rod Barker, "Ancient Libraries: The Early Evolution of Cataloguing and Finding Tools," *Cataloguing Australia* 24, no. 1/2 (1998): 10.

[58] Potts, "Before Alexandria," 21.

century classification and metadata schemes.[59] While individual methodologies for organizing and providing access to documents inevitably varied as a result of collection size, document type (considering both purpose and media), and context, there is evidence that documents were, as a matter of course, identified, classified, cataloged, and arranged. And it appears that the Mesopotamian bibliographic methodologies, while largely static for millennia and seemingly simplistic to the modern observer, were effective for locating needed information over the course of thousands of years.

The motive behind organization of archival records in Mesopotamian protolibraries is best described as systematizing to provide for an easily workable collection. Protolibrary collections could be comparatively large, with the collections at Nineveh and Ebla reaching into the thousands, and the need for information, considering its usage for practical purposes, might often be pressing.

With archival documents**,** controlling and finding information was an apparently simple procedure. Records were often massed broadly by topic (economic, legal, etc.). This method, depending upon the size of the collection, might require further classification—with large collections often organizing subjects by room (the protolibrary at Ebla contained several rooms dedicated to specific types of records including economic, governmental, taxation, and historical documents).[60] Within a protolibrary room, records were often stored using one of three techniques:[61] (1) pigeonhole niches in

[59] Barker, "Ancient Libraries," 10.
[60] Matthiae, *Ebla: An Empire Rediscovered*, 157-158.
[61] Posner, *Archives*, 56.

the walls; (2) open wooden or clay shelves (often lining the walls); and (3) the container system, using wooden or brick boxes, woven reed baskets, or leather containers. Tablet receptacles were labeled as to the nature of their content. Weitemeyer described clay basket labels dating from the III Dynasty of Ur (21st -20th century BCE) as providing insight into the general archival arrangement technique (i.e., their basic means of sequencing records) of the ancient Mesopotamians:

> The labels first stated that the receptacle was a table basket; then followed information about the contents of the tablets, e. g. legal verdicts, accounts, receipts and expenses. At the end was an indication of the period covered; in most cases the period was one year, in some cases the beginning year (or month) were indicated. Sometimes the years, months and intercalary months, if any, were summed up.[62]

Archivist and Assyriologist Ernst Posner provided an example of a basket label to demonstrate this system: "I) *pisan dub-ba*… document container, court decisions[s] [President was] Ur-kal, Prefect of the City, year S 44."[63] In open-shelving systems, labels inscribed on small clay tablets (6-7 centimeters by 4-5 centimeters) might be placed in front of a series of tablets that they were intended to identify.[64]

Frequently used archival tablets were often identified *individually* for quick retrieval. The long edges of the shelved documents were wide, allowing for a summary of the contents of the document. Tablets in containers, such as wooden boxes, were often stored upright in a fashion similar to modern file cards, with their top edges providing enough room for an inscription of the date of the transaction, the tablets' position in a

[62] Weitemeyer, "Archive and Library Technique," 222.
[63] Posner, *Archives*, 60.
[64] Ibid., trans. Nikolaus Schnieder.

larger series of tablets, as well as a summary of the tablet contents, and the name of the recording scribe.[65]

The appearance of library materials in protolibrary collections resulted in the need for additional, more sophisticated bibliographic techniques. Archival records were collocated more or less "naturally" (by the date on which they were inscribed). Library material, however, often required grouping by abstract commonality (requiring determination of, and division by, subject). Harris noted that in the library of Assurbanipal documents relating to one another according to subject were grouped together in their own rooms.[66] He offered the following subject groupings:

- History and governmental affairs
- Intelligence on foreign nations
- Geography
- Taxation records
- Laws and Legal decisions
- Legends and Mythology
- Astronomy and Astrology
- Biology
- Mathematics
- Medicine
- Natural History

There was, despite such apparent groupings, no known "Mesopotamian theory of classification" nor set canon of categorization besides whatever pragmatic for the specific situation.

Beyond subject grouping by room, similar library material might be further classified through the creation of an artificial series (as opposed to a singular work being

[65] Potts, "Before Alexandria," 22.
[66] Harris, *History of Libraries*, 20.

spread over multiple tablets). In this way, related texts in a particular (and sometimes very specific) subject area, such as Sumerian mythology, might be collocated to form a larger "text"—in some cases reaching more than 100 tablets in length.[67] Tablets within a series received special markings on an edge or in the colophon identifying them as such. The final line of a tablet was often used as the incipit (identifying lead in text) for the next tablet in the work or series, allowing for maintenance of correct sequential order.[68]

The colophon came later in the development of Mesopotamian protolibraries and served as metadata for both text identification and selection purposes. [69] Library historian Lionel Casson compared the colophon to the title page of a modern book.[70] It often contained the title and description of the work and at the beginning of the first millennium BCE contained up to 10 other elements: (1) the incipit, (2) the series name and number, (3) the number of lines, (4) the copy source, (5) the name of tablet owner, (6) the name of recording scribe, (7) the reason for making the copy, (8) a curse on those who would remove or destroy the tablet, (9) the date, and (10) the disposition or provenance of the copy.[71] These ancient, localized attempts at the creation of "document languages" are fascinating in that they represent early attempts at the creation of an artificial bibliographic language.

Finally, it is of no small importance that the Mesopotamians made primitive catalogs for their protolibrary collections (these were not "true" catalogs in the post-

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[67] Weitemeyer, "Archive and LibraryTechnique," 227.
[68] Thompson, *Ancient Libraries*, 9-10.
[69] Weitemeyer, "Archive and Library Technique," 226.
[70] Casson, *Libraries in the Ancient World*, 5.
[71] Erle Leichty, "The Colophon," in *Studies presented to A. Leo Oppenheim, Juen 7 1964* (Chicago: University of Chicago Press, 1964), 147.

Alexandrian sense in that they did not list works, but instead listed individual items or served as broad subject category labels). Library material was more difficult to control than archival records, and these rudimentary catalogs served double duty as shelf lists and helped provide both access and accurate control of inventory (although, due to the nature of the syllabic script, these lists were not alphabetically ordered). Protolibrary catalogs survive from as early as the third millennium BCE. They might consist of "content labels" on protolibrary room walls or clay tablet "checklists."

So, while the Mesopotamian protolibraries were not particularly diverse, these information institutions were well-organized for effective retrieval. They were easily workable repositories that served to keep Mesopotamian culture intact in spite of the frequent conflagrations and regime changes.

The Pre-Alexandrian Egyptian Protolibraries

Like the Mesopotamians, the ancient Egyptians were meticulous documenters of their culture and history, a history that spanned three millennia and 31 dynasties (ca. 3100-331 BCE). Unfortunately, due to the relatively short lifespan of papyrus and leather,[72] their primary media, few documents remain for Egyptologists to consider, and those documents recovered have been most often found out of their original context of

[72] In moderate climates papyrus lasts only decades. The dry climate of Upper Egypt, however, has resulted in the discovery of large caches of papyrus. C. Basile and A. Di Natali reported, in *Il Museo del Papiro di Siracusa* (Syracuse: Istituto Internazionale del Papiro, 1994), 159, that the oldest known piece of Egyptian papyrus with writing on it dates to 2500 BCE. Posner wrote in *Ancient Archives*, 72 that "practically no papyrus has survived in the Nile Delta, although thousands have been found elsewhere, especially on the fringes of the desert south of Cairo."

use in the protolibraries themselves. [73] What we know about the Egyptian information institutions, according to Ernst Posner, comes from "individual documents, narrative sources, inscriptions, and tomb reliefs."[74] Only vague references remain to pre-Alexandrian Egyptian protolibraries existing between the pre-dynastic and 28th dynasties (ca. 3100 BCE- ca. 1500 BCE).[75] While there are a larger number of surviving papyrus rolls following the 28th dynasty,[76] evidence concerning protolibraries from the following centuries is only slightly better.

The sack of Thebes (Upper Egypt) by the Assyrians (mid-seventh century BCE) saw the beginning of centuries of turmoil, two oppressive occupations by the Persian empire (525-404 BCE; 343-332 BCE), and the final subjugation of the Egyptians to the Greco-Roman cultural hegemony (332 BCE-395 CE). The physical and recorded evidence is so sparse that Casson concluded that ancient Egypt had "nothing to add to the history of libraries. They existed there, to be sure, but we know them only vaguely and indirectly."[77] This summary conclusion is shortsighted.

What we do know for certain is that the early Egyptian dynasties passed on much of their corpus of literature from generation to generation, and that protolibraries served as the agency for effecting this preservation and transmission.[78] One surviving reference, recorded on a stela at Abydos (upper Egypt) and attributed to Neferhotep I (ca. 1705-ca.

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[73] Posner, *Ancient Archives*, 74.

[74] Ibid.

[75] John A. Sperry, Jr. "Egyptian Libraries: A Survey of the Evidence," *Libri* 7, nos. 2-3 (1997): 146.

[76] Frederic G. Kenyon, *Books and Readers in Ancient Greece and Rome* (Oxford: Clarendon Press, 1932), 45.

[77] Casson, *Libraries in the Ancient World*, 16.

[78] Sperry, "Egyptian Libraries," 146.

1694 BCE), relates the pharaoh's efforts to see the "ancient writings of Atum" (the Egyptian creator god) and confirms that caches of papyrus scrolls were stored in buildings or designated areas of buildings, i.e., protolibraries, dedicated to these texts' preservation and continued access. The pharaoh said: "My heart hath desired to see the ancient writings of Atum; open ye for me an investigation." Neferhotep's courtiers replied:

> "That which thy ka hath [commanded] is that which happens. Let thy majesty proceed to the libraries and let thy majesty see every hieroglyph. His majesty proceeded to the library [literally "house of rolls"]. His majesty opened the rolls together with these companions. Lo, his majesty found the rolls of Osiris."[79]

But though protolibraries existed, and several of the architectural edifices survived, these buildings' contents remain shrouded in mystery. Only scraps of a few papyrus rolls have ever been discovered in association with the buildings (and those texts that have survived are often painted or carved into the walls of the protolibraries). Scholars' estimation of what the Egyptian protolibraries contained must rely on the nature of surviving Egyptian literature, Greek writings from the classical and Hellenistic ages, later observers of these protolibraries, and the remains of the protolibrary edifices themselves.

Similar to their Mesopotamian counterparts, Egyptian protolibraries might be private or official, and in the latter case royal or temple. A distinction between "library" and "archive" appears to have been recognized by the ancient Egyptians, with "archives" mentioned as places where managerial and transactional documents are lodged and

[79] James Breasted, ed. and trans., *Ancient Records of Egypt; Historical Documents from the Earliest Times to the Persian Conquest,* vol 1 (New York: Russell & Russell, 1962), 333-334.

"libraries" as places where a wide variety of library "book-rolls" were written and kept.[80] The protolibrary was typically attached to the institution that it served and in a room specifically designated for the task.

The Egyptian "Library:" the "House of Life"

The Egyptian protolibrary dedicated to library documents, known as the "House of Books" or "House of Life," was generally attached to a temple. Besides pedagogical motives for collecting library materials (protolibraries often served as scribal schools), the "Houses of Life" served as cultural repositories, collecting the Egyptian sacred writings, their literature, their "scientific" writings.[81] As with Mesopotamian "science," Egyptian "science" was used in the practical, non-theoretical sense and focused primarily on medicine, mathematics, and astronomy,[82] as well as divination texts and magic. The following example of pre-Alexandrian Egyptian astronomy came from a stone engraving from the Cenotaph temple of Seti I (begun ca. early 13th century BCE) and is typical of both the practical and descriptive nature of Egyptian science and the limited versatility of their syllabic script:

> These stars sail out at night to the limits of the sky outside of her (Nut); they shine and [accordingly] are seen. In the daytime they sail inside her, do not shine, and [hence] are not seen. They enter after (or, with) this god (Re) and they go forth after (or, with) him.[83]

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[80] J.A. Black and W.J. Tait, "Archives and Libraries in the Ancient Near East," in *Civilizations of the Ancient Near East*, eds, Jack M. Sasson, John Baines, Gary Beckman, and Karen S. Rubinson (New York: Charles Scribner's Sons, 1995), 2198.

[81] Shubert, "Oriental Origins," 151.

[82] Marshall Clagett, *Ancient Egyptian Science: A Source Book*, v. 184 (Philadelphia: American Philosophical Association, 1989), 30.

[83] Marshall Clagett, *Ancient Egyptian Science: A Source Book*, v. 214, trans. A. de Buck (Philadelphia: American Philosophical Association, 1995), 393.

The Egyptian protolibraries, like those of the Mesopotamians, served as cultural safeguards. Keeping administrative records was important in pharaonic Egypt. But, in contrast to the Mesopotamian's obsession with transactional record keeping, the Egyptians were concerned with maintaining the integrity of their religious traditions, which permeated many aspects of their culture. Magical texts, for example, were especially valued for their age and were rigorously copied.[84] The scribes were not as diligent, however, as the Mesopotamians in their preservation of transactional records —papyrus was sometimes scrubbed clean of old records for reuse.[85] And while Assurbanipal promoted Assyrian (and his own) supremacy through the accumulation of texts into a "universal" collection, the Egyptians, as was often their habit, promoted their supremacy through the monolithic stature of their architecture.

A case in point is the library of Ramses II (the "Great"), also known as Ozymandius (reigned ca. 1279-1213 ca. BCE). This royal library was attached to the Ramasseum (the mortuary temple of Ramses II, built ca. mid-thirteenth century BCE), contained over 20,000 papyrus rolls, and was "planned and executed on a royal scale."[86] The first-century BCE Greek historian Diodorus Siculus wrote that the fifth century BCE philosopher Hecataeus of Abdera had visited "the sacred library which bears the inscription 'Healing-place of the Soul,'" and reported that "contiguous to this building

[84] John Baines, "Literacy and Egyptian Society," *Man* 18, no. 3 (September 1983): 588.

[85] Edward F. Wente, "The Scribes of Ancient Egypt." In *Civilizations of the Ancient Near East*, ed. Jack M. Sasson, John Baines, Gary Beckman, and Karen S. Rubinson,vol. 4. (New York: Charles Scribner's Sons, 1995), 2212.

[86] Charles L. Nichols, *The Library of Rameses the Great* (Berkeley: Peacock Press, 1964), 28.

are statues of all the gods of Egypt… ."[87] The Ramasseum, however, was atypical in the size of its collection, and while the libraries were often housed in impressive temple complexes, the actual collection of documents tended to be rather small, as suggested by the cramped nature of the rooms in which the scrolls were housed.[88]

The Egyptian Scribes

Professional scribes, as in Mesopotamia, served as Egyptian protolibrary administrators. They were also members of the priesthood and were highly regarded in Egyptian civilization as learned professionals (the literacy rate in ancient Egypt being estimated at one percent overall).[89] Similar to their Mesopotamian counterparts, the Egyptian scribes were privy to the sacred and esoteric skill of writing (hieroglyphs, hieratic, and demotic were all syllabic scripts). And, like the scribes of Mesopotamia, an Egyptian scribe was a member of an elite and lucrative profession—the scribes were powerful men. Egyptologist Ernest Cushing Richardson noted that the Anastasi Papyrus, a Ramses II era text, identified a scribe who owned a horse and was therefore "well enough thought of (thousands of years ago) to pay more than enough for the bare necessities of life."[90]

But, as was the case with the Egyptian scribes' Mesopotamian counterparts, the scholarly activity within the temple protolibraries was ultimately geared towards *maintaining* the integrity of Egyptian society through custodianship of the "stream of

[87] Diodorus Siculus 1.49.3.

[88] Felix Reichmann, *The Sources of Western Literacy: The Middle Eastern Civilizations* (Westport, CT: Greenwood Press, 1980), 99; see also Sperry, "Egyptian Libraries," 145-155.

[89] Baines, "Literacy and Egyptian Society," 584.

[90] Ernest Cushing Richardson, *Some Old Egyptian Librarians* (Berkeley, CA: Peacock Press, 1964), 3.

tradition." And although the extent of scholarly activity in these information institutions will never be fully known, archaeologist Steven Blake Shubert concluded that no evidence that "real [i.e., theoretical] scientific research was pursued. Likewise, purely literary activity seems to be lacking."[91] And while it is likely that the "House of Life" served as a production unit for new religious texts,[92] it was never wholly divorced from the temple and was mainly used as a workshop for facilitating the purposes of the temple, i.e., maintaining Egyptian cultural/political continuity.[93]

The Organization of Egyptian Collections

Scholars benefit from the Mesopotamians' adoption of clay for their documents. The Egyptians certainly developed bibliographic methods suited to their needs, but little evidence remains. Little is known concerning the actual arrangement of scrolls within the protolibraries. The physical remains of Egyptian protolibrary buildings, however, offer some clues to the organization of materials within. Wall niches were used to hold rolls but papyrus scrolls were typically stored in wooden chests or in clay jars.[94] This, of course, makes sense—scrolls tend to roll off open shelves, so niches and jars would keep them stationary.

The scrolls themselves were identified through small papyrus or clay labels summarizing their content.[94] Some containers, such as wooden chests, provided a list of

[91] Shubert, "Oriental Origins," 159.
[92] Alan H. Gardiner, "The House of Life," *Journal of Egyptian Archaeology* 24 (1938): 176.
[93] Ibid., 177.
[94] Posner, *Archives*, 86.
[95] Jaroslav V. Černy, *Paper and Books in Ancient Egypt* (London: H.K. Lewis, 1952), 29.

the scrolls' contents on the outside surface.[96] The library at the temple at Edfu (Upper Egypt) contains a rudimentary catalog inscribed directly into the building's wall (again, not a "true" catalog of works but an inventory or "shelf list"). The Edfu library, unfortunately, dates to the late Ptolemaic period—it is not certain if the Edfu catalog represents a post-Alexandrian innovation or the continuation of ancient Egyptian bibliographic methods. The fact, however, that an industrious scribe thought it necessary to have the contents of the Edfu collection recorded in such a permanent form implies that the Egyptians put great stock in cataloging their collections. While the *engraving* at Edfu appears to be an anomaly, the usage of catalogs by the Egyptians is likely not.

The Mycenaean Protolibraries

The Mycenaean protolibraries (ca. 1450-1100 BCE) are intriguing in that they show no similarity to the later Hellenic and Hellenistic information institutions that followed them. The Bronze Age Greeks appear to have borrowed many of their bibliographic methods from other Near Eastern civilizations with whom they traded. Library historians tend to ignore the governance of Mycenaean protolibraries, claiming that the only thing that may be said with any authority about these information institutions is that they were attached to palaces (i.e., the palace at Knossos in Crete), or citadels (as is the case with Mycenaean protolibraries found in mainland Greece, e.g., at Pylos, Thebes, and Mycenae), and that scribes were employed to produce and organize administrative records. But archaeologists have made discoveries that point to a

[96] Harris, *History of Libraries*, 33.

distinctive organizational milieu; one that shows collections of recorded documents being used for completely conservative functions. These collections appear to have been dedicated *entirely* to the political/economic upkeep of Mycenaean society.

All unearthed and deciphered Mycenaean clay tablets (no papyrus has yet been recovered) are of an economic or administrative character.[97] There is a complete lack of any library documents, literary or scientific (there is some suggestion, however, that the earlier, still unreadable Minoan script contains religious content).[98] Known Mycenaean tablet deposits, furthermore, are limited solely to administrative seats of power,[99] and there appear to have been *no* literate Greeks outside of the palace at Knossos and citadels of Greece.[100] The protolibraries seem to have existed solely for serving the administrative needs of the Mycenaean kings (the "*wanakes*") and did not produce or collect anything concerned with "an extra-palatial sphere of interest or control."[101]

Archaeologist and linguist J.P. Olivier determined that the Cretan "basic economic document," whether Minoan or Mycenaean, or written in hieroglyphic (Minoan script, used ca. 1900-ca. 1400 BCE), Linear A (Minoan script, used ca. 1850-ca. 1400 BCE), or Linear B (Mycenaean script, used ca. 1600 BCE-ca. 1100 BCE), followed the model: "Personal name, geographical name, OVIS 100, e.g. 'Hector, at Phaistos, (has a

[97] Only the Late Bronze Age Mycenaean "Linear B" Mycenaean tablets have been translated. The earlier Minoan "Linear A" and hieroglyphic scripts remain un-deciphered.

[98] Arne Furumark, "Linear A and Minoan Religion," *Opuscula Atheniensia* 17 (1988): 51-90.

[99] John Bennet, "Knossos in Context: Comparative Perspectives on the Linear B Administration of LM II-III Crete," *American Journal of Archaeology* 94, no. 2 (1990): 231.

[100] Thomas G. Palaima, "Comments on Mycenaean Literacy," in *Studies in Mycenaean and Classical Greek Presented to John Chadwick, Minos* 20–22, eds. J.T. Killen, J.L. Melena, and J.P. Olivier (Salamanca: Ediciones Universidad de Salamanca, 1987), 499.

[101] Ibid.

flock of) 100 sheep.'"[102] The character of the 640 tablets and fragments at the "Room of the Chariot Tablets" at the palace of Knossos, the palace's largest Late Bronze Age Mycenaean protolibrary (it had several), illustrates this protolibrary's specification for the purpose of keeping the palatial bureaucracy running. The tablets are related entirely to palace administration: chariot production, personnel lists, and account statements concerning land, saffron, textiles, foodstuff, and livestock.[103]

Many Bronze age Greece archaeologists conclude that, either the Mycenaean civilization was only "functionally literate" and transmitted their literature entirely through oral tradition (by means of bards) or that the library material was recorded entirely on more perishable media like papyrus or leather. But, in lieu of the discovery of caches of Mycenaean documents containing literature or writings that suggest scientific activity, the Mycenaean information institutions may only be characterized as "administrative hubs" for serving the needs of the *wanakes*.

There is little evidence for a clearly delineated "scribal class" in Late Mycenaean Greece. Olivier, in a study of the Mycenaean scribes of Knossos, concluded that the Mycenaean protolibraries did not have scribes in the Mesopotamian or Egyptian sense, that Mycenaean officials were literate in that they learned only what was required adequately to perform their specific administrative duties.[104] Being a Mycenaean "scribe" was second to being an "official," and this meant that the Mycenaean "scribes are not

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[102] J.P. Olivier, "Cretan Writing in the Second Millenium B.C.," *World Archaeology* 17, no. 3 (February 1986): 379.

[103] Jan Driessen, *The Scribes of the Room of the Chariot Tablets at Knossos: Interdisciplinary Approach to the Study of a Linear B Deposit* (Salamanca: Ediciones Universidad de Salamanca, 2000) 22-24.

[104] J.P. Olivier, *Les Scribes de Cnossos: Essai de Classement Des Archives D'un Palais Mycénien*, *Incuanubala Graeca*, vol. 17 (Rome: Edizioni Dell'Ateneao, 1967), 135

professional writers, as in the Near East, but are literate officials who can write a tablet as and when required."[105]

The Organization of the Mycenaean Collections

While the Mycenaean "scribes" appear to have been quite different from their Mesopotamian and Egyptian priest-scribe contemporaries, with their use of written language (more "tool" and less "totem"), the physical remains of Mycenaean protolibraries share remarkable similarities with their Near Eastern counterparts. The Mycenaean "Linear B" script was scratched by stylus into clay tablets of varying sizes. The tablets, however, were never intentionally baked,[106] suggesting that they were meant as temporary records only, and that permanent records were kept on easily perishable material such as papyrus, possibly in imitation of the Egyptians (again, not a scrap of Bronze Age papyrus has been discovered). Except for the palace at Knossos, which contained several protolibrary "bureaus," Mycenaean protolibraries consisted of one or two small rooms located centrally in the citadel.[107]

Mycenaean protolibraries display clear similarities in inter-site physical organization techniques. Both the archaeologists Carl Blegen, excavating the archive complex at Pylos, and Arthur Evans, excavating Knossos, uncovered evidence for shelving (through noting the dispersion area of fragmented tablets), storage containers (with bronze hinges and wood ash being found at both palaces, and evidence for woven

[105] John Chadwick, *Mycenaean World* (London: Cambridge University Press, 1976), 24.

[106] This accounts for the paucity of evidence available to scholars of Bronze Age Greece. Those few tablets that survived did so only because they were baked hard in a palace destruction.

[107] Thomas G. Palaima and James C. Wright, "Ins and Outs of the Archives Rooms at Pylos: Form and Function in a Mycenaean Palace," *American Journal of Archaeology* 89, no. 2 (April 1985): 262.

baskets being found at Pylos in the protolibrary),[108] and "Near Eastern style" benches for stacking tablets. These organizational techniques mimicked those found in Mesopotamian information institutions.

The tablets themselves might be ordered in series (through being stacked one on top of the other),[109] with a "tabulation tablet" added to summarize the series' contents.[110] Although no higher level metadata in the form of catalogs have been recovered to date, the existence of pictographic box and basket labels shows that tablets were organized by subject category. Bronze age Aegean archaeologist John Chadwick noted that over twenty basket labels were discovered at the central archive at Pylos and include labels representing women, agricultural products (such as barley), chariot wheels, and place names.[111]

The contents of tablets were summarized by these baked clay seals attached to the boxes or baskets,[112] or markings inscribed on the tablets' long edges (it seems reasonable that papyrus tags were also used, but very little evidence survives).[113] Loose clay seals or nodules were discovered at many sites, including the major Linear B deposits at Pylos and Knossos. Bronze Age Aegean archaeologist Vassilis Aravantinos, examining clay

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[108] Carl Blegen and M. Rawson, *The Palace of Nestor at Pylos in Western Messenia*, vol.1, *The Buildings and Their Contexts* (Princeton, NJ: 1966), 98-99; Arthur Evans, *The Palace of Minos: A Comparative Account of the Successive Stages of the Early Cretan Civilization As Illustrated by the Discoveries At Knossos*, vol. 4 pt. 2 (New York: Biblo and Tannen, 1964), 669.

[109] See Evans, *Palace of Minos,* vol. 4 pt. 2, 670, for a photograph of a preserved series of tablets referring to "Adzes."

[110] Chadwick, *Mycenaean World*, 22-23.

[111] John Chadwick, "The Mycenaean Filing System," *Institute of Classical Studies Bulletin* 5 (1958): 1-5.

[112] Ibid., 1.

[113] Evans, *Palace of Minos*, vol.4 pt 2, 696.

sealing nodules at Thebes and Pylos, suggested that such sealings acted as metadata *bullae*, describing the contents of individual papyrus documents.[114]

An Abrupt and Final End

The Mycenaean citadels were destroyed sometime around 1100 BCE. What emerged from the Late Bronze Age Greek civilization was very different from all of its Near Eastern predecessors. Gone was the conflation of written language, religion, and cultural continuity. It was replaced by a transformational alphabet that made the scribal class obsolete, as well as enabling a new-found critical approach to understanding reality. The pre-Alexandrian first millennium BCE Greek protolibraries looked very different from their Mycenaean and Near Eastern protolibraries.

The Greek world from the time of the poet Homer (fl. between ca. 1075 and 875 BCE) onward knew approximately as much (or even less considering that early twentieth-century historians have the benefit of 150 years of archaeological science) about their Mycenaean predecessors as today's historians do. A rapid and brutal decline of Mycenaean culture began in the twelfth century BCE. This cultural destruction was initiated by indeterminate factors, although several explanations have been proposed,

[114] Vassilis Aravantinos, "The Mycenaean Inscribed Sealings From Thebes: Problems of Content and Function," in *Aegaeum 5: Aegean Seals, Sealings and Administration: Proceedings of the NEH-Dickson Conference of the Program in Aegean Scripts and Prehistory of Classics*, ed. T. Palaima (Liege 1990), 164.

including invasions of Dorians from areas north of Macedonia,[115] or the aggressive Sea Peoples of the Mediterranean.[116]

Archaeologist William Taylour eloquently assessed the situation: "The elaborate administration that had maintained its power disintegrated, its trade, which was its life-blood, was disrupted and the fabric of its society decayed to an inglorious end. We are on the threshold of the Dark Ages."[117] The Mycenaean survivors retreated to the mountains of Greece for safety and suffered a massive "collective amnesia" that is unparalleled in western history.[118] The Greek collections that emerged from this Dark Age looked radically different; they contained expressive literature and philosophy of some of the finest quality that the world has ever known.

The Archaic and Hellenic Protolibraries

Two factors proved exceptionally important in the development of the character of the classical Greek protolibrary: the works of Homer (dates of his flourishing vary from ca. 1075 to ca. 875 BCE) and the introduction of the Greeks to the Phoenician "proto-alphabet" (likely around the ninth century BCE).[119,120] The Homeric epics became a touchstone in the development of the Hellenic identity. And, upon the derivation of the

[115] For an overview of this traditionally held, but now reconsidered, view of the destruction of the Mycenaean's, see Robert Drews, *The End of the Bronze Age: Changes in Warfare an the Catastrophe Ca. 1200 B.C.* (Princeton, NJ: Princeton University Press, 1993), 62-65.

[116] E.D. Oren, ed., *The Sea Peoples and their World: A Reassessment* (Philadelphia: University of Pennsylvania Museum of Archaeology and Anthropology, 2000); Alessandra Nibbi, *The Sea Peoples and Egypt* (London: Noyes Press, 1975).

[117] William Taylour, *The Mycenaeans* (New York: Frederick A. Praeger, 1964), 178.

[118] Wright, *Oral Antecedents*, 86-87.

[119] Kenyon, *Books and Readers*, 11.

[120] Herodotus 5.58.

Greek alphabet from the Phoenician, Homer served as the foundation of Greek written literature (the Homeric rhapsodists would take advantage of the innovation to aid in recitation).

Unlike cuneiform, the Greek alphabet, with its inclusion of vowel signs, enabled writing that recorded human thought with near perfect precision and made reading and writing comparatively simple procedures to learn. Reading and writing was no longer solely the province of the ruling elites. Papyrologist E.G. Turner concluded that the typical Athenian citizen was literate, citing as evidence the great quantities of text-bearing *ostraca* (clay potsherds used as "scratch paper" for writing) recovered from Athenian waste dumps.[121]

The expansion of literacy in ancient Greece resulted in an increase of interest in reading. This in turn nurtured the literary tradition begun by Homer and the Homeridae, the clan that recited Homer, and resulted in the increased production of books to meet demand. By the end of the fifth century BCE a Greek book trade flourished,[122] and collections of scrolls began to appear. The high volume of written material that emerged had to be managed.

There are few physical remains of Greek protolibraries remaining from the beginnings of the Greek Dark Age to the founding of Alexandria. This lack of physical evidence results from the Greek's adoption of papyrus as medium of choice (the letters of the alphabet are difficult to scratch into clay). The oldest known surviving Greek papyrus

[121] E. G. Turner, *Athenian Books in the Fifth and Fourth Centuries B.C.* (London: H.K. Lewis & Co., 1954), 8.

[122] Kenyon, *Books and Readers*, 24.

text, in fact, is a late fourth century BCE Ptolemaic era copy of the Greek poet Timotheus' (lived ca. 450-ca. 360 BCE) *Persae* found at Abusîr (in lower Egypt near modern Cairo).[123] Therefore, no pre-Alexandrian Archaic or Hellenic protolibraries (in Greece or anywhere else) have been found that contain the physical remains of documents. The information that modern scholars have concerning these collections comes from references in classical literature. References to specific protolibraries in this literature, however, are extremely limited.

The Nature of the Post-Mycenaean Greek Collections

As was the case with the Mesopotamian and Egyptian protolibraries the post-Mycenaean Greeks had protolibraries at temples that also served as records depositories.[124] These were civic archives within which political documents were archived and where citizens were required to register business and legal transactions. There is very little evidence regarding the bibliographic methods employed by the pre-Alexandrian Greeks in these civic archives, but they probably consisted of papyrus rolls and wooden record tablets stored in jars or wall niches and grouped as "annual accumulations."[125]

The Archaic and Hellenic Greek world also saw the beginning of collections of primarily library materials. Library historian Edward Parsons compiled a list of the "libraries of old Greece" through consulting a list of scroll collectors in the

[123] Timotheos, *Die Perser*, *Aus Einem Papyrus von Abusîr Herausgegeben*, ed. Ulrich von Wilamowitz-Möllendorff (Leipzig: J.C. Hinrichs, 1903) (contains facsimile); see Edward Maunde Thompson, *An Introduction to Greek and Latin Palaeography*, Oxford: Clarendon Press, 1912), 105-107 for a physical description of *Persae* and partial facsimile.

[124] Diogenes Laertius 9.5.6.

[125] Posner, *Archives in the Ancient World*, 112-113.

Deipnosophists by Greek/Egyptian historian Athenaeus of Naucratis (fl. ca. 200 CE).[126] To this list Parsons added other ancient Greeks which the Hellenistic and Roman era literature suggests likely collected scrolls. Most of these collections, however, were from the Ptolemaic era or later, and all of the ancient references to Archaic and Hellenic collections, besides those to Aristotle, provide little beyond the bald fact that the person collected scrolls.

The character of the Archaic and Hellenic Greek men described in this list, beginning with Pisastratus (tyrant of Athens from 561 to ca. 527 BCE), and ending with Aristotle (died 322 BCE), is telling. Nearly all of these men are described as cultured intellectuals (or poseurs as such). All were men of means. With the exception of the philosopher Plato (lived ca. 429-347 BCE) and the poet Euripides (lived ca 485-ca. 406 BCE), all of those men on the list who lived prior to the fourth century BCE were aristocrats or tyrants. And again, with the exception of Plato and Euripides, all of these pre-fourth century BCE *bibliophiles* possessed or acted as patrons for collections of *library* material gathered without any apparent pragmatic purpose beyond that of

[126] Edward Alexander Parsons, *The Alexandrian Library, Glory of the Hellenic World: Its Rise, Antiquities, and Destructions* (Amsterdam: Elsevier Press, 1952), 8-18. Parson's complete list is as follows: (1) Pisistratus (tyrant of Athens from 561-527 BCE), (2) Polycrates (tyrant of Samos, ca. 540-522 BCE), (3) Nicocrates of Cyprus (dates unknown, but probably from the Archaic period), (4) Euripides (the poet, ca. 485-406 BCE), (5) Eucleides (Athenian archon, ca. 403/2 BCE), (6) Plato (lived ca. 429-347 BCE), (7) Clearchus (tyrant of Heraclea, lived ca. 450-401 BCE), (8) Demosthenes of Athens (the orator, lived 384-322 BCE), (9) Aristotle (384-322 BCE), (10) Theophrastus of Eresus (Peripatetic philosopher 370-288/5 BCE), (11) Strato of Lampsacus (Peripatetic philosopher, died ca. 269 BCE), (12) Perseus, king of Macedon (reigned 179-168 BCE), (13) Mithridates VI, king of Pontus (lived 120-63 BCE), and (14) Heiron II, tyrant of Syracuse (lived ca. 306-215 BCE).

individual study or as a display of wealth. [127] None of the tyrants listed by Athenaeus or Parsons are known to have produced any scholarship or literature.

Most of the personally owned protolibraries were very small ("book collections," as P.M. Fraser loosely calls them),[128] and they had no need for careful organization. Modern scholars know that the Greeks stored their scrolls in upright containers that might hold several at a time (*capsae*) or on shelves (*scrinia*)[129] The poet Ovid (lived 43 BCE-14 CE) described his own personal library at Rome:

> But when at last you've reached my private study
> And found the rounded book-boxes, your home,
> You'll see your brothers [of the book he is addressing] there arranged in order,
> All works of the same midnight oil at Rome.
> The others will display their titles clearly,
> Each name uncovered on the front above.
> Three [scrolls], you'll see, hide far-off in a dark corner
> Even so they teach how to love.[130]

While Ovid's *Tristia* was written in the early first century CE by a Roman, it is tempting to picture the personal protolibraries of the Archaic and classical Greeks set up in a similar fashion, with scrolls stuffed in *capsae* in the owner's study, possibly grouped by genre or common subject matter, and labeled with papyrus tags (*syllaboi*) stating their titles on the exposed end.[131]

A more systematic form or arrangement was necessary for the larger collections. The evidence for specifying these methods, however, is lacking. But the Greeks are

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[127] De VleeSchauwer, in *History of the Western Library: Volume I: History of the Library in Antiquity* (Pretoria, South Africa: University of South Africa, 1963), 44, speculated that a tyrant's collection would typically consist of Homer's works, poetry, and historical works.

[128] P.M. Fraser, *Ptolemaic Alexandria,* vol 1 (Oxford: Clarendon Press, 1972), 320.

[129] Kenyon, *Books and Readers,* 59-60.

[130] Ovid *Tristia,* 1.105-110.

[131] Kenyon, *Books and Readers,* 60.

remembered for the lucidity of their thought, and the arrangement of books would provide one more interesting problem for scholars to attack. The first large personal collection was likely that of Aristotle himself, who may have been the first Greek to use alphabetical order to organize his scrolls.[132]

Beginning in the fourth century BCE, collections were found attached to philosophical schools such as Aristotle's Lyceum. The Lyceum saw written documents becoming important as "educational and research aids in the modern sense… as a result of Aristotle's personality, the scientific character of his thought, his practice of questioning anything that could not be proved, the method of teaching at the Lyceum and the encyclopedic learning he instilled into his students."[133] In this manner, the purpose of the pre-Alexandrian Archaic and Hellenic protolibraries had developed in sharp contrast to their Near Eastern counterparts.

With the philosopher Aristotle, the organization of information left the realm of pragmatism and use for perpetual cultural maintenance and began its association with science. Aristotle's collection, large by the standards of his contemporaries (probably about 1000 rolls), but miniscule by today's, was an academic *library*. But the Library of Alexandria would be something else, an extraordinary syncretism between oriental organizational technique and western philosophy: a monumental "official" Alexandrian Library founded upon dizzyingly sophisticated Greek philosophical principles that supported creative scholarship.

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[132] Lloyd W. Daly, "Contributions to a History of Alphabetization in Antiquity and the Middle Ages," *Collection Latomus* 90 (1967): 16-17.

[133] Konstantinos Sp. Staikos, *The History of the Library in Western Civilization*, vol. 1, *From Minos to Cleopatra*, trans. Timothy Cullen (New Castle, DE: Oak Knoll Press, 2004, 112.

Library Philosophy before Alexandria

The *purpose driven* and *goal focused* orientations of Mesopotamian protolibraries (be they economic, bureaucratic, divinatory, or a combination) resulted in the creation, organization, and maintenance of "library" documents for the purpose of practical functionality. As a result of this *focused pragmatism*, what library historian H. Curtis Wright described as "housekeeping routines" serving basic management functions, [134] it is not surprising that Mesopotamian protolibraries displayed an appropriateness of purpose in location, individual organization, and internal administration, and that their documents served solely practical applications. Although the distinction between "library" and "archive" in ancient Mesopotamia is far from clear, in the end, all materials served essentially the same purpose. They *maintained* dominant cultural values: love of the State (as well as love of the State through love of the gods), love of life, and love of material prosperity.[135]

The pre-Alexandrian Egyptians were no less driven to maintain the integrity of their culture (and it might be argued that the Egyptians were more successful than their Eastern neighbors at doing this, considering the round-robin of dominant Mesopotamian civilizations). But, while the Egyptians engaged heavily in mercantile activities, religion was the cornerstone of society,[136] and the custodianship of library material in "Houses of Life" became a means for maintaining cultural cohesion. The Mycenaean protolibraries

[134] Wright, *Oral Antecedents*, 82.
[135] Kramer, *The Sumerians*, 249-268.
[136] Rosalie David, *The Ancient Egyptians: Beliefs and Practices* (Brighton, United Kingdom: Sussex Academic Press, 1998), 3.

appear to have obviated all scholarship whatsoever, functioning solely as administrative support for the day-to-day activities of the Aegean kings.

Therefore, in all three of these pre-Alexandrian civilizations—Mesopotamian, Egyptian, and Mycenaean—documents were collected and organized with regard to practical use potential. "Literary" and "scholarly" pursuits did not result in the production of theoretical knowledge but served only in the maintenance of the *status quo* through the stewardship of tradition. And, while the protolibraries of these three civilizations served the function of *educating* their intelligentsia, this same didactic function served this underlying (but never formally articulated) philosophy which centered on *maintaining* the society. The tacit library philosophy was goal oriented towards preserving the "stream of tradition." "Archival" and "library" documents, therefore, served essentially the same purpose. Ostensible departures in terms of philosophy, such as Assurbanipal's goal of creating a library of a truly universal character, were only novel devices for achieving the same ends: societal continuity.

The post-Mycenaean Greeks no doubt used collected documents for *maintaining* their culture, as well as *educating* their youths. Aristotle, for example, wrote in *Pol.* 8.1338a37-40 that children should be taught to read and write. But while the Greek temples continued the Near Eastern tradition of serving as repositories for records, personal libraries started to appear, those that contained sophisticated works of library material, presumably for personal study or enjoyment but not geared towards a cultural/political end.

There is no evidence (at least until Aristotle's personal library), however, that these collections were used as part of any systematic process for the creation of new works of scholarship. The following chapters explore the thesis that Aristotle introduced and codified the idea of forming collections of written material to aid in *systematically creating* new knowledge *for its own sake* (*Mag. Mor.* 2.10.1208a31), and the Library of Alexandria embodied this philosophy. While there is reason to believe that the Library of Alexandria was used to further state initiatives, it will be shown in the following chapters that this was not the Library's philosophical basis. The Near Eastern protolibraries served an essentially passive role. The Library, in stark contrast, served an active role. It did not just preserve information, it closely assisted in the *creation* of knowledge.

Chapter 3: The Birth of Alexandria and Its Scholarly Community

Of the monuments of the ancient world, none matched the Library of Alexandria in terms of its importance to humanity. The Library was the crowning achievement of the Hellenistic world and the capstone of three centuries of inspired Greek thought (and the impetus for centuries of profound scholarly accomplishments). The Library first represented humankind's desire to *know* in a way that simultaneously defined the limits of and subverted established traditions. It defined Greco/Macedonian culture and furthered the Hellenization of the former Persian Empire, while incorporating the literature of Near-Eastern civilizations into a plural, and for the first time approaching *universal*, "memory of mankind." The Library carried on the progressive and cosmopolitan ideas of Alexander the Great and served as a tool for *creating* entirely new theoretical knowledge.

Accounts vary as to how long the Library operated, ranging anywhere from three hundred (ca. 297/6-48 BCE) to one thousand years (ca. 297/6 BCE-646 CE). What may be said with a reasonable degree of probability, however, is that for a period of roughly one hundred and fifty years (ca. 297/6-ca. 144 BCE),[1] scholarship at the Library and Museum reached heights that would not be repeated anywhere in antiquity. One would, in fact, be hard pressed to find any comparable time span in history prior to the European

[1] A time span demarcated by the reigns of Ptolemy I (Soter) (reigned 323-283 BCE) and Ptolemy VIII Eurgetes II (Physcon) (king of Egypt 170-163, 145-130, 127-116 BCE).

Renaissance that produced an equally impressive string of scholars (e.g., Euclid, Eratosthenes, Callimachus) or intellectual and artistic products or artifacts (e.g., the rescension of Homer, the *Argonautica*, the *Pinakes*). Even in the period following Ptolemy VIII's expulsion of the intellectuals and the subsequent decline of scholarship in Alexandria, the Library served as the intellectual hub of the Greco-Roman world. And, despite its eventual destruction(s), the Library achieved immortality as an *idea*, a symbol of the *archetypal academic library*, influencing the development of the modern academic library. For, as the eighteenth century classicist John Toland wrote, the "fame of the Alexandrian School, and of the Alexandrian Library, reached much farther than the name of Alexander himself."[2]

This chapter addresses the origins of the Library and Museum of Alexandria. It provides a chronology of Alexandria and identifies the major personalities involved in the creation of the city's intellectual community. The character of the Museum is discussed here, setting the stage for chapter four's analysis of the Library's basic organization, administration, and intellectual substratum.

The Origins of the Library and Museum of Alexandria

Alexander the Great

Alexandria was a new city in an ancient land and represented the physical/geographical realization of Alexander III's ("the Great") (lived 356-323 BCE)

[2] John Toland, *Hypatia: Or, the History of a Most Beautiful, Most Vertuous, Most Learned, and Every Way Accomplish'd Lady; Who Was Torn to Pieces by the Clergy of Alexandria* (London: printed for M. Cooper; W. Reeve; and CA. Sympson, 1753), 4.

keen cosmopolitan vision. After his rout of the ill-fated and incompetent Persian emperor, Darius III (reigned 336-330 BCE), at Issus (333 BCE), Alexander ended Persian control of the Eastern Mediterranean at the battle of Granicus (332 BCE). He then seized Egypt from the Persians quite easily with an army of 40,000 men.[3] Alexander was welcomed by the country's inhabitants with open arms and a sense of relief—Egypt had suffered under the heel of Persia.[4]

Egypt, the "gift of the Nile," [5] was an appealing prize: it was steeped in wisdom and mysticism, the Red Sea buffered it against threat of invasion by way of the Near East,[6] and the fertile Nile teamed with life and was well suited for supporting agriculture (Egypt would later serve as the bread basket of Rome). Alexander realized that Egypt was an ideal location for founding an administrative center for his new empire, and "after his [Alexander's] conquest of Egypt he wished to found a large and populous Greek city, which should bear his name, and by the advice of his architects was on the point of measuring off and enclosing a certain site for it."[7] The legend is, however, that Alexander was visited in a dream by the poet Homer, who recited this verse: "'Now there is an island in the much-dashing sea, in front of Egypt; Pharos is what men call it.'"[8]

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[3] Edwyn Bevan, *A History of Egypt Under the Ptolemaic Dynasty*, vol. 2, *A History of Egypt* (London: Methuen, 1927), I.

[4] Pseudo-Callisthenes wrote that "when he [Alexander] had come to Egypt, all the Egyptians, with the priests and prophets of their gods came to him, and glorified him with a loud voice..." *History of Alexander the Great*, 34.

[5] Herodotus *Histories*, 2.5.

[6] This natural barrier would, according to Pausanias 1.6.6., later allowed Ptolemy I to save his crown when under attack by the *Diadochi* Antigonus and his son Demetrius, but although "Ptolemy was in extreme danger… [Ptolemy I] managed to save his throne by placing his army at Pelousion [Eastern fort blocking the only viable road into Egypt]." Alexander, as were the later Seleucid kings, was surely aware of just how difficult the vast expanses of Asia minor and Syria were to defend as a seat of power.

[7] Plutarch *Vitae Parallelae. Alexander*, 26. 2.

[8] Ibid., 26.3-4.

Immediately Alexander "rose up at once and went to Pharos, which at that time was still an island, a little above the Canobic mouth of the Nile [i.e., the western outlet of the river into the Mediterranean], but now it has been joined to the mainland by a causeway"[9] (this breakwater, the *Heptastadium* which connected the Pharos lighthouse to the mainland, was erected in the first half of the third century BCE and "formed not only a bridge to the island but also an aqueduct").[10]

The site that Alexander dreamt of was located on the western end of the Nile Delta, a strip of land tucked between Pharos to the north and Lake Mareotis to the south. The location was then occupied by the small Egyptian port town of Rhakotis, which would become Alexandria's ethnically Egyptian district.[11] Alexandria, however, would not be an Egyptian capital in the style of Memphis or Thebes—it would be a *Mediterranean* capital for a *Mediterranean* empire.

The Greek geographer Strabo (fl. late first century BCE) listed the site's advantages as having (1) ports: a Mediterranean port (the only viable one, in fact, in Egypt) and inland port (on Lake Mareotis, to the South), (2) multiple canals linking the city to the lake, and (3) a pleasant climate (as opposed to the rest of Egypt).[12] Alexander was so eager to build his new capital that he began immediately. Arrian, Alexander's second century CE biographer, wrote that the king designed the basic ground plans of the

[9] Ibid., 26. 3-4.
[10] Strabo 17.1.6.
[11] Pausanius 5.21.9
[12] Strabo 17.1.7

city himself, marking where the boundary wall, market place, and temples would be constructed.[13]

Alexander soon left Egypt to continue his conquest of the East. After the king's departure, Alexandria was rapidly developed under its provisional governor Cleomenes (governed 331-323 BCE). The city was constructed in a grid, the style favored by the Greeks and seen in other new cities founded by the Alexander and the *Diadochi* (Alexander's successors). Strabo remarked that Alexandria resembled a *chlamys*, or the short and broad Macedonian military cloak.[14] The city was further developed and greatly embellished under the reigns of the first three Ptolemaic Kings (323-221 BCE) and would become, by the first century BCE, the largest city in the western world with over 300,000 free residents.[15] Alexandria was a thriving commercial, cultural, and intellectual center—the light of the western world.

Ptolemy I

Ptolemy I (Soter) (lived ca. 367/6-ca. 283/2 BCE), son of Lagus, was not of a distinguished lineage but rose through the ranks of the Macedonian court, [16] first under Alexander's ambitious father, Philip II (reigned 359-336 BCE), and later under Alexander (reigned 336-323 BCE). Ptolemy grew up with Alexander in the court, and

[13] Arrian *Anabasis of Alexander*, 3.1.5

[14] Strabo 17.1.8.

[15] Diodorus Siculus 17.52.5-7. There is no certainty over who Diodorus qualified as being a "free resident." P.M. Fraser, in *Ptolemaic Alexandria*, vol. 2, *Text* (Oxford: Clarendon Press, 1972), 171, wrote that if Alexandria was indeed the largest city of the time it would have likely had in excess of one million residents.

[16] Pausanias 1.6.2 reported that the Macedonians thought Soter was actually the son of Philip II of Macedon and therefore half brother to Alexander. Quintus Curtius Rufus *History of Alexander*, 9.8.22 repeats this claim: "[Ptolemy] was a blood-relation [to Alexander], and some believed him to be a son of Philip; at any rate he was an offspring of one of the king's concubines."

though Ptolemy was ten years Alexander's senior, the two were close friends until Alexander's death. Their friendship is first attested to by Ptolemy's recall to the Macedonian court and elevation to the "highest honors" by the new king Alexander in 336 BCE (Ptolemy had been exiled in 338 BCE by Philip II for notifying Alexander of the king's maneuvering to raise his eldest son, Philip Arrhidaeus, to the throne).[17]

Ptolemy I would remain in the young king's confidence throughout the Persian campaigns. He became a member of Alexander's elite *somataphylax,* or seven-member royal bodyguard,[18] and even served as the king's "foretaster."[19] Ptolemy performed brilliantly as one of Alexander's generals, receiving increasingly important commands that were on equal footing with other trusted companions of the king such as Leonnatus and Perdiccas.[20] At one point he commanded "three regiments of the Companions' [of Alexander] cavalry and all the mounted javelin-men."[21]

Ptolemy helped to uncover the "conspiracy of the pages" against Alexander's life,[22] and the king is said to have returned the favor by saving Ptolemy's life during the Indian campaign after he was wounded by a poisoned arrow. His plight caused the king "special anxiety,"[23] and Alexander "was not so much concerned [for the other dying

[17] Plutarch *Vit. Alex.*, 10.3. Arrian *Anabasis*, 3.6.5-6 repeats this story, noting that Alexander appointed Ptolemy as a bodyguard upon his return from exile.

[18] Arrian *Anabasis*, 6.28.4.

[19] The foretaster was responsible for sampling Alexander's food to prevent the king from being poisoned. Athenaeus 4.171b.

[20] Arrian *Anabasis*, 4.21.4; see also Diodorus Siculus 17.104.4-5.

[21] Arrian 3.29.7.

[22] Ibid., 4.13.7.

[23] Quintus Curtius Rufus *History of Alexander*, 9.8.22.

soldiers], but he was deeply distressed for Ptolemy, the future king, who was much beloved by him."[24]

This devotion between friends transcended mere comradeship or affection. Ptolemy likely was privy to Alexander's thoughts, counsel, and strategy. The two shared a deep intellectual simpatico, and, upon Alexander's death, Ptolemy endeavored to realize Alexander's *cultural project* until his retirement from the throne of Egypt (ca. 285 BCE) (Ptolemy I's son and grandson would carry on his ambitions during their reigns).

According to Pseudo-Callisthenes, even during Alexander's lifetime there was consternation amongst Alexander's men that he would select Ptolemy as his successor. Peridiccas, for example, worried that "Peradventure he [Alexander] will give all his possessions to Ptolemy alone, for he loved him very much during his life."[25] Ptolemy would not be the sole beneficiary of Alexander's immense fortune or domains—the empire was left with no clear inheritor.

But Ptolemy had little desire to rule a world empire. He actively counseled the *Diadochi* against this notion and advocated the division of the empire among the dead king's generals.[26] Though not as politically ambitious as Alexander, Ptolemy was intimately familiar with Alexander's *political, cultural,* and *intellectual* agendas. Ptolemy was a true believer, and, like Alexander, he was a man of action and keen wit.

Upon Alexander's death, Soter founded a dynasty that ruled Egypt for three centuries until the death of Cleopatra VII in 31 BCE (after which time Egypt became a

[24] Diodorus Siculus 17.103.7-8.
[25] Pseudo-Callisthenes 3.20
[26] Quintus Curtius Rufus *History of Alexander* 10.6.15.

Roman province). Alexandria would serve as his capital: a new city for a new *Hellenistic* Egypt. Like Alexander, Ptolemy recognized the location's natural advantages and potential as a base of operations for administering Egypt. He seized the country without delay in 323 BCE, becoming a satrap of Alexander's successor and half brother, the feeble-minded Philip Arrhidaeus (reigned 323-317 BCE). Ptolemy was presumably to "obey the king and [Arrhidaeus regent] Perdiccas."[27] He soon alienated Perdiccas, first by having Cleomenes executed, whom Soter thought "favored Perdiccas and could not be trusted,"[28] and then by hijacking Alexander's embalmed corpse, which was in route to Perdiccas in Macedonia. Ptolemy enshrined the body in Alexandria, further cementing his legitimacy as Alexander's rightful successor.[29]

The turbulence of the last few decades of the fourth century BCE left Ptolemy little time to focus on carrying out any of his grand designs for Alexandria. The *Diadochi* were intent on carving up Alexander's empire in the most violent and protracted manner possible. While he was a wise leader who preferred to let the other claimants to Alexander's empire fight it out over territory while he protected his possessions, even Ptolemy took a stab at expansionism (possibly motivated by a combination of greed and

[27] Diodorus Siculus 18.2.

[28] Pausanias 1.6.3.

[29] Strabo 17.1.8 wrote that Ptolemy I enshrined Alexander's corpse in Alexandria. This account concurs with that of Pseudo-Callisthenes 3.23, pg 142: "This body of Alexander must not be laid here [at Memphis]… So Ptolemy made a grave for the body of Alexander at Alexandria, as he had been ordered, and there did he lay the body of Alexander; and they call that place 'The tomb of Alexander' unto this day." Pausanius 1.6.3 gives a varying account, supported by Quintus Curtius Rufus *History of Alexander*, 10.10.20, that Soter buried Alexander at Memphis but that it was later moved to Alexandria by Ptolemy II's (Philadelphus) (reigned ca. 285-246 BCE) brother Argaius. Regardless of the corpse's exact provenance, it sat in Alexandria for centuries afterwards, heralding the city's pre-eminence as the center of the Hellenistic world. Cassius Dio 51.16.5 reports that Augustus viewed the body three centuries later "and actually touched it, whereupon, it is said, a piece of of the nose was broken off."

the desire to acquire buffer states). Pausanius, the second century CE travel writer and geographer, wrote that Ptolemy held Egypt "as if it were a prize of war," and that "[Ptolemy I, seeing] that Pheonicia and Coele Syria, as it was called [sic], were conveniently situated for an offensive against Egypt, he set about in earnest to become master of those regions."[30]

Arrian wrote that the "death of Perdiccas [murdered by his own troops during his failed invasion of Egypt in 320 BCE] immediately put Ptolemy in business: he took Syria, took Phoenicia, received the exiled Seleucus, son of Antiochus, whom Antigonus [the "one-eye," one of Alexander's generals and *Diadochi*, lived ca. 382-301 BCE] has thrown out, and got ready to fight Antigonus."[31] This expansionism was countered in 306 BCE, however, with Ptolemy's loss of territory to Demetrius (Poliorcetes) (lived 337-283 BCE), son of Antigonus.

But Egypt was nearly impregnable. The country, Egyptologist and historian of comparative religion Edwyn Bevan wrote, could draw in like a turtle and "in spite of all disasters, he [Ptolemy] could await the turn of fortune, drawn safely in from the outside storm."[32] This safety afforded by location would allow Ptolemy to focus on the development of his kingdom's infrastructure. Alexandria, a thriving Mediterranean port city removed from immediate threat of external attack, was given the breathing space necessary to effect a rapid development into a mercantile, cultural, and intellectual Mecca.

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[30] Diodorus Siculus 18.42-43.
[31] Pausanius 1.6.4
[32] Bevan, *History of Egypt*, 27.

So after nearly twenty years of hard-fought internecine warfare among Alexander's former satraps, a bloody interlude that revealed the notion of a unified Macedonian empire to be a farce, Ptolemy finally secured his control of Egypt to the degree that he felt comfortable crowning himself pharaoh (ca. 305 BCE) (he also took the crown to spite Antigonus, who had recently declared himself king of Macedonia). Finally, and after much bloodshed, Ptolemy's original suggestion to the Companions of Alexander, the distribution of the empire among them,[33] was realized: "all the satraps became kings."[34]

Then, in the relative peace achieved among the Hellenistic kingdoms following the battle of Ipsus (301 BCE) in which Ptolemy, Cassander, Lysimachus, and Seleucus leagued together to defeat Antigonus once and for all, Ptolemy was finally able to implement his cultural/political/intellectual agenda. Through careful observation of his peer *Diadochi* and the lessons learned from his own less-than-successful attempt at territorial expansionism, the first Greek pharaoh realized the folly of attempting Alexander's dream of a world empire. The extent of Ptolemaic territorial holdings would be modest and include Cyrene to the west and, at times, the coast of Syria and various Asiatic holdings. Ptolemy I did not, however, shed Alexander's progressive and cosmopolitan aspirations. And while the altruism behind Alexander's idea of the "brotherhood of man," in which he aspired to bring "together in one body all men

[33] Quintus Curtius Rufus *History of Alexander*, 10.6.15.
[34] Appian Συριακή, 9.54.

everywhere, uniting and mixing in one great loving-cup"[35] may be disputed, Alexander meant to make Greek culture world culture. Ptolemy I would continue this work.

From the beginning, Ptolemy I followed Alexander's lead in Egypt. He was even-handed with his Egyptian subjects, which greatly endeared him to them. Quintus Curtius Rufus, the first century CE Roman biographer of Alexander, wrote that "[Ptolemy I] was a most valiant warrior, and even greater and more distinguished in the arts of peace than in those of war; modest and affable in his manner of life [and] particularly generous and easy of access."[36] His reign was distinguished by an active policy of tolerant Hellenization through the skillful imposition of Greek cultural hegemony. The king employed Egyptian advisors, such as the renowned historian Manetho (fl. late third fourth to early third century BCE), and adopted the title and divine status of pharaoh, a step that the Persian emperors had never taken (and subsequently seen by the native Egyptian population as imperialistic slight by their Persian overlords).

Ptolemy was shrewd. He learned from Alexander that through *orientalizing*, i.e., incorporating elements of eastern culture familiar and comfortable to his Egyptian subjects, the pharaoh could consolidate his power. This calculated syncretism is most visible in his invention of the god Serapis,[37] a deity created through combining Osiris

[35] Plutarch *Moralia: De Fortuna Alexandri*, 329c.

[36] Quintus Curtius Rufus *History of Alexander*, 9.8.23.

[37] Serapis was apparently revealed to Soter in a dream, in which he was visited by "a young man of extraordinary beauty and of more than human stature, who warned him to send his most faithful friends to Pontus and bring his [Serapis'] statue [actually that of Jupiter-Dis] hither" (Tacitus *Histories*, 4.83). Psuedo-Callisthenes, in *History of Alexander*, 32 extended the god's history, connecting Alexander with Serapis, the god predicting to the Macedonian the future might of Alexandria: "when the city is built, [people] will call it 'the great city,' and the fame of its greatness shall be spoken of in the whole world…"

with the Memphian Apis Bull, Dionysius, and Jupiter-Dis.[38] Ptolemy III (Eurgetes) (reigned 246-221 BCE) would build a temple to Serapis in Alexandria's Egyptian quarter (Rhakotis) that would house the sister library to *the* Library (possibly as a "college" of the Museum's "university"). The Great Library itself would take on eastern characteristics.

Ptolemy I's two greatest endowments, and those that had the most lasting impact on western culture, were the Library and Museum. The Museum, or "shrine of the Muses," served as a temple and a center for literary, artistic, philosophic, and scientific activity. The Library served the scholars of the Museum.

Demetrius of Phalerum

Despite any scholarly pretensions he might have had, Ptolemy I realized his limitations. He employed experts to realize his intellectual agenda. He showed an affinity to the Peripatetic school above all others, [39] though there were many competing schools from which to select scholars to spearhead his intellectual plans (the Greek world was rife with competing philosophies, including Platonism, Epicureanism, and Stoicism). The king first attempted to recruit Theophrastus of Eresus (370-288/5 BCE), a scientist and scholar and Aristotle's esteemed successor to the Lyceum "deanship," to establish his academic community at Alexandria. Theophrastus politely declined the invitation and elected to remain at the Lyceum. The pharaoh then offered, possibly at the suggestion of Theophrastus, the Peripatetic Demetrius of Phalerum (lived ca. 350-280 BCE) the

[38] Fraser, *Ptolemaic Alexandria*, vol. 1, 256.

[39] Straton of Lampsacus, the famed Peripatetic physicist, for example, would serve as tutor to the king's children for a time before returning to Athens to head the Lyceum (ca. 287 BCE).

opportunity to realize Ptolemy's intellectual ambitions.[40] Demetrius accepted and soon entered the upper echelons of Ptolemy's court. In his *Various History*, the second century CE Greek historian Aelian wrote that Demetrius became a close advisor to the king, taking "charge of legislation in Egypt as an associate of Ptolemy."[41] Demetrius' lasting claim to immortality, however, rests on his role in realizing the Library and Museum.

Demetrius was the Hellenistic equivalent of the "Renaissance Man," and Edward Parsons described him as the first great figure of the Alexandrian age.[42] Over the course of a never-dull life, he elevated himself from humble origins as "a slave in the household of Timotheus and Conon" to the dictatorship of Athens (317-307 BCE) under Cassander, the king of Macedonia (reigned 319-297 BCE),[43] before eventually becoming the intellectual advisor to Ptolemy I.

Demetrius was a man of many talents and was "among the Greeks a serious scholar and polymath" who excelled at statesmanship, oratory, poetry, and philosophy.[44] He was a true Aristotelian who came "not from a soldier's tent, but from the shady retreat of the great philosopher Theophrastus,"[45] with whom he was likely a student somewhere between 335 to 225 BCE, after which time he entered public life. Although only one of Demetrius' works survives, *De Elecutione* (although Demetrius' authorship of this work is disputed),[46] Diogenes Laertius, the third century CE biographer of philosophers,

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[40] Phalerum was a satellite area eight kilometers to the southwest of Athens.
[41] Aelian *Varia Historia*, 3.17.
[42] Edward Parsons, *Alexandrian Library*, 132.
[43] Aelian *Varia Historia*, 3.17; Pausanius 1.25.5; Strabo 9.1.20.
[44] George Synkellos 328.
[45] Cicero *Brutus*, 9.37; see also Diogenes Laertius 5.75.
[46] W. Rhys Roberts "Introduction," *Demetrius on Style*: *The Greek Text Of Demetrius De Elecutione*, edited by W. Rhys Roberts (Hildesheim: Georg Olms Verlag, 1969), 64.

attributed multiple writings to Demetrius. Diogenes concluded that the Phalerian "surpassed almost all contemporary Peripatetics. For in learning and versatility he has no equal… some of [his] writings are historical and others political; there are some dealing with poets, others with rhetoric."[47]

Demetrius was the rare breed of philosopher that Plato and Aristotle had lionized—a person of thought *and* action—a "philosopher-king." The Roman statesman and philosopher Cicero (lived 106-43 BCE), who held Demetrius in high esteem as a scholar, wrote that the Phalerian was no ivory-tower academic but put his theoretical training to practical use. Demetrius first demonstrated this proactive application of his philosophical training in politics, a practical science which he certainly would have studied at the Lyceum. In Cicero's words,

> Theophrastus, a pupil of Aristotle's, spent a great deal of time, as you know, on that kind of subject [politics]…Later, following Theophrastus, Demetrius of Phalerum, whom I mentioned earlier, led political theory in a striking manner out of the quiet seclusion of the scholar's study, not just into the dust and heat of the day, but into the line of battle and the actual conflict. I could mention many great statesmen who were quite learned, and many excellent scholars who were not particularly experienced in politics; but apart from Demetrius, who can easily be found to have excelled in both spheres, being a major figure in scholarly research and also governing his country?[48]

It is generally accepted that Demetrius' tenure as dictator of Athens was successful. Cicero wrote that Demetrius revived an Athens that lay prostrate after the turmoil following Alexander's death.[49] George Synkellos, the ninth century CE Byzantine chronographer, repeated the compliment, naming Demetrius "the third law

[47] Diogenes Laertius 5.80.
[48] Cicero *De Legibus*, 3.14.
[49] Cicero *De Republica*, 2.2.

giver" of the Athenians.[50] He is said to have increased the state revenues and to have initiated many new construction projects. [51] The Athenians erected over three hundred statues of Demetrius during his dictatorship.

Demetrius was overthrown, however, upon Demetrius (Poliorcetes) 307 BCE "liberation" of Athens from Cassander. After Poliorcetes' restoration of the Athenian *demos*, the "typical jealousy of the Athenians ousted [Demetrius of Phalerum]."[52] The Greek historian Plutarch (lived ca. 50-120 CE) wrote that Demetrius was more afraid of his fellow-citizens than he was of his conqueror.[53] Demetrius of Phalerum's fear of Athenian democracy, a fear that he quite possibly had inherited from Aristotle, was well founded: The deposed dictator was condemned to death in absentia, and all but one of his 300 statues were reportedly melted down and made into chamber-pots.[54] Demetrius' eloquent reply to this final indignity: "but the merits which caused them [the statues] to be erected they cannot destroy."[55]

Demetrius' worth, however, was not lost on the new Hellenistic ruling class. Poliorcetes, out of high regard for the Phalerian's reputation, gave him safe conduct to his

[50] George Synkellos 329.

[51] Athenaeus 12.542; Diogenes Laertius 5.75-76.

[52] Aelian *Varia Historia*, 3.17. Aelian 9.8 does, however, paint an unfavorable depiction of Demetrius as "given to very luxurious habits, and acquired an income of 1,200 talents a year. Of this he spent a little on his army, and the rest on his own extravagance. He had the floor sprinkled with perfume, and at each point of the year the flowers that were in season were scattered before him so that he could walk on them. He was uncontrollable in his behaviour to women and indulged in affairs with young men. He took care of his appearance, arranging his hair and dying it blond. He applied rouge to his face and used other cosmetics, taking a great deal of pride in his effeminacy." Athenaeus, at 7.542d (although a notorious gossip) repeated this story and added that "the Demetrius who made statutes and ordained the conduct of lives for other people constructed his own life with utter freedom from law."

[53] Plutarch *Vitae Parallelae*: *Demetrius*, 9.1.

[54] Strabo 9.1.20; see also Diogenes Laertius 5.77.

[55] Diogenes Laertius 5.82.

exile in Thebes.[56] It is not known how long he remained in Thebes or what he engaged in while there. Edward Parsons suggested that he resided there for ten years, after which time he journeyed to Alexandria at the request of Soter.[57] Ptolemy I offered Demetrius sanctuary in Alexandria, where he was soon attached to the pharaoh's court and eventually charged with organizing the Museum and Library. Once again the Greek world would be the beneficiary of Demetrius' practical application of philosophical training.

While the dates of Demetrius' association with the Library and Museum are uncertain, he was the Library's unofficial "director" for years (most likely from ca. 297/6-ca. 283 BCE).[58] Ptolemy I was a fitting patron for Demetrius: they were like-minded men. Soter's second son, Ptolemy II (Philadelphus) (reigned ca. 285-246 BCE), however, distrusted Demetrius. The Phalerian had unsuccessfully counseled Ptolemy I to leave his throne to his first born son, Ptolemy (Keraounes). Demetrius was exiled in disgrace soon after Philadelphus' ascension, and he was allegedly murdered "when an asp was laid on his body" (ca. 280 BCE).[59] His importance to western history, however, has not been lost.

[56] Plutarch *Vit. Dem.*, 8.5-9.2

[57] Parsons, *Alexandrian Library*, 130.

[58] While the ancient and Byzantine sources give Demetrius the credit for the first development of the Library and Museum, they tend to ascribe the initial patronage of these institutions to Ptolemy II (Philadelphus). It is unlikely that Philadelphus founded the Library and Museum. Scholars now generally accept Ptolemy I as responsible for instituting the Library and Museum, and for having assigned Demetrius the task of developing it (the Library would be developed as *part* of the Museum).

[59] Cicero *Pro Rabirio Postumo*, 9.23.

The University of Alexandria

The Library may only be fully understood in the context of the Museum of Alexandria, for it was an appendage to that scholarly institution. The Museum was Ptolemy I and Demetrius of Phalerum's lasting contribution to scholarly communication, and arguably it was the first "university" (if one considers a university to be a scholarly research/educational community composed of clearly defined philosophical and scientific "faculties"). Strabo (although writing in the late first century BCE Roman empire, when the Museum was approximately 275 years old) provided the only extant description of the Museum and its administration. Strabo's description allows for striking similarities to be drawn between the Museum and the modern university:

> The Museum is also a part of the royal palaces; it has a public walk, an Exedra with seats, and a large house, in which is the common mess-hall of the men of learning who share the Museum. This group of men not only hold property in common, but also have a priest in charge of the Museum, who formerly was appointed by the kings, but is now appointed by Caesar.[60]

As with Aristotle's Lyceum and Plato's Academy, the prototypical scholarly communities that preceded the Museum, the scholars engaged at the Museum lived and worked in a communal, collegiate environment under the leadership of a high priest who served also as dean (the Library would have its own director—the Head Librarian). The scholars were exempt from taxation, supported by public funds, and given the leisure time to conduct research. There is evidence that academic lectures were given in the Museum. Thirteen lecture halls were discovered in Alexandria by a Polish-Egyptian archaeological team in 2004. It is estimated that all thirteen combined could have held

[60] Strabo 17.1.8.

over 5000 students. [61] Classicist A.W. Argyle concluded that Strabo's usage of the words *museum, peripatos* (covered walk), and *exedra* (a lecture or discussion hall) in his description of the Museum suggests that the geographer "expected his readers to understand that the institution at Alexandria was similar to that [the Lyceum] at Athens" (which served both as research *and* instructional institutions).[62]

And, as with modern institutions of higher learning, scholars were expected to engage in *praxis*, for the scholars "received considerable support from kings who were eager for fame and well-disposed to the arts and crafts."[63] The Museum's engineers invented siege machinery for the Egyptian army (e.g., they perfected the torsion catapult),[64] and the Museum physicians contributed to improving the sanitation of Egypt and providing medical care for the Ptolemies' military.

Thus, the Hellenistic age inaugurated an era of sober scholarship and science with Alexandria as its center. The city became so awash in intellectuals of all stripes that Timon of Phlius (ca. third century BCE), the famously cantankerous skeptic philosopher, commented that "Many there be that batten in populous Egypt, well propped pedants who quarrel without end in the Muses' bird-cage."[65] The parade of Alexandrian scholars that were presumably members of the Museum during the third and second centuries CE was

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[61] David Whitehouse, "Library of Alexandria Discovered," *BBC News*, May 12, 2004, http://news.bbc.co.uk/2/hi/science/nature/3707641.stm/.

[62] A.W. Argyle. "The Ancient University of Alexandria," *Classical Journal* 69, no. 2 (1974): 348-349. But despite the historical and archaeological evidence that some sort of public lecturing was being conducted at the Museum, there is ongoing debate as to whether any formal instruction was being offered.

[63] Philo of Byzantium *On Artillery Construction*, 3.50.20ff, as translated in G.E.R. Lloyd, *Greek Science After Aristotle* (New York: W.W. Norton & Company, 1973), 99.

[64] Thomas W. Africa, *Science and the State in Greece and Rome* (New York: John Wiley, 1968), 51-52.

[65] Athenaeus 1.22.

astounding (see table 1 below for a partial list of these scholars). These men were responsible for many of the foundational scholarly texts of western civilization.

Considering the quality of work being conducted in all areas of scholarship in Alexandria, as well as incentives in the forms of both financial gain and the highest level

Table 1 Notable scholars of Alexandria from the late fourth to the mid-second century BCE.

Scholar	**Flourished**	**Expertise**	**Achievement**
Agatharchides of Cnidos	Ca. mid second century	Geography, history	Histories of Asia and Europe
Alexander of Aetolia	Ca. 285-283	Poetry	Sorted tragedies collect by the Library under Philadelphus
Apollonius the Eidograph	Ca. first half of the second century	Poetry,	Classified lyric poems
Apollonius of Perga	Ca. second half of the third century	Mathematics	Developed Conics
Apollonius of Rhodes	Mid third century	Poetry	Argonautica, *Librarian of Alexandria*
Archimedes	mid to late third century	Mathematics, physics, engineering	Archimedes screw
Aristarchus of Samothrace	First half of the second century	Philology	Rescension of Homer Librarian of Alexandria
Aristophanes of Byzantium	Ca. late third century to early second century	Philology, lexicography	Systematized punctuation, Edited Homer, Revised the *Pinakes*, Librarian of Alexandria
Callimachus of Cyrene	Ca. mid third century	Poetry, biography, cataloging	Pastoral poetry, *Pinakes*, bibliography
Conon of Samos	Ca. 245	Astronomy, Mathematics	Discovered "Archimedes Spiral" and Coma Berenices
Ctesibus of Alexandria	Early second century	Mechanics	Invented hydraulic clock and hydraulic organ
Demetrius of Phalerum	Ca. 297/6-283	Philosophy, rhetoric, politics	Organized Museum/Library
Theocritus	Early to mid third century	Poetry	Composer of Bucolic poetry
Dionysius Thrax	Ca. mid to late second century	Philology, grammar	Authored earliest Greek grammar
Erasistratus	Ca. 258/257	Physiology	Founded physiology, comparative and pathological anatomy as separate subjects
Eratosthenes of Cyrene	Second half of the third century	Philology, poetry, philosophy mathematics, geography, astronomy	Estimated circumference of the Earth, first systematic geographer
Euclid	Ca. 323-285	Mathematics, physics	*Thirteen Books of Elements*

Table 1, continued

Scholar	Flourished	Expertise	Achievement
Herophilus	Ca. first half of third century	Anatomy	Founded anatomy as scientific discipline
Hipparchus of Nicaea	Ca. 162-126	Astronomy, Mathematics, geography	Constructed first celestial globe
Hypsicles	Early second century	Mathematics, Astronomy	Divided ecliptic into 360 degrees
Lycophron of Chalcis	Ca. Early third century	Poetry	Sorted comedies collected by the Library under Philadelphus
Manetho	Ca. late fourth to mid third century	History	Annals of Egypt
Sostratus of Cnidos	Ca. first half third century	Architecture	Architect of the lighthouse of Alexandria
Straton of Lampsacus	Early third century	Philosophy, physics	Theory of the void, tutor of Philadelphus
Timocharis	Ca. early third century	Astronomy	Created first star catalog
Zenodotus of Ephesus	Early to mid third century	Philology, lexicography	Edited Homer, Librarian of Alexandria

of intellectual association, it is not surprising that all manner of scientists, scholars, and artists flocked to Alexandria from across the Hellenistic world.

And if certain prized intellectuals might not be willing to come to Egypt on their own accord, or be lured by the bribes offered by the Ptolemies, other, more forceful, methods might be used. The philosopher Stilpo (lived ca. 380-ca. 300 BCE), not wanting to leave his native Megara (a city near Corinth that had fallen under the influence of Egypt), had to go into hiding for fear that Ptolemy I would force him to leave Greece for Alexandria.[66]

Leaving Alexandria could be equally difficult. Aristophanes of Byzantium, the great philologist (literary scholar) and (Head) Librarian of Alexandria, was thrown into prison by Ptolemy V (Epiphanes) (reigned 205-180 BCE), where he subsequently died. Epiphanes had heard rumors that Aristophanes had been persuaded by the Attalid king Eumenes II (Soter) (reigned 197-159 BCE) to "defect" to the great library of Pergamum.

Even after Physcon's expulsion of the Alexandrian intellectuals, notable scholars, including the grammarian (i.e., a textual critic) Didymus (fl. ca. mid first century BCE), the geographer Strabo, the physician Galen of Pergamum (fl. second half of the second century CE), and Athenaeus of Naucratis (fl. ca. 200 CE), author of the *Deipnosophists*, would make the pilgrimage to Alexandria. All of these imminent scholars, from the Museum's beginnings to its final liquidation, surely made good use of its libraries during the course of their work. The mathematician and inventor Archimedes of Syracuse (lived ca. 287-212 BCE), for example, referenced *specific books* of other ancient philosophers

[66] Diogenes Laertius 2.115.

in his own treatises,[67] and Strabo and Athenaeus drew from multiple sources for their respective *Geography* and *Deipnosophists*. The latter work alone "cites some 1,250 authors, gives the titles of more than 1,000 plays, and quotes more than 10,000 lines of verse."[68]

To this day the western university has maintained the basic structure set forth by the Museum. An integral part of the structure defined by the Museum (and co-opted by the modern university), was the inclusion of an academic library for the purpose of facilitating scholarship. And, as in modern academic libraries, the librarians of Alexandria *identified, selected,* and *acquired* materials, and then *organized* it (via cataloguing and classification) in the hopes of later *retrieving* it. All of this was done primarily in the service of theoretical knowledge creation. This innovative use of a collection was decidedly not Near Eastern in character and warrants further examination.

[67] Archimedes *The Sand Reckoner*, 221, trans. T.L. Heath.
[68] *Oxford Classical Dictionary*, 2nd edition., s.v. "Athenaeus."

Chapter 4: The Library of the Museum

By identifying *how* the Library was organized and administrated, coupled with an analysis of modern era literature to better understand the Library's basic character and function, it is possible to develop a better understanding of how the Library differed from preceding information institutions, and how this difference is traceable to Aristotle. The following analysis aids this understanding by further cementing historical links between Aristotle and Alexandria. Furthermore, by examining the intellectual substratum of the Library, this chapter sets the stage for chapters five and six's discussion of how Aristotle contributed to scholarly communication through his philosophical and scientific method's actualization.

The Basic Character of the Library

It is not known when Demetrius began organizing the Library, but it is safe to assume the collection's founding as occurring soon after the first "bricks" of the Museum were set (ca. 297/6 BCE). For, by the end of Demetrius' tenure as its unofficial director, the Library's holdings were already massive. Demetrius is credited with having collected over 200,000 scrolls for the Library.[1] According to the second century BCE *Letter of Aristeas to Philocrates,* one of two surviving accounts of the creation of the Library (the other being the twelfth century CE *Prolegomena to Aristophanes*, by John Tzetzes), Demetrius' goal was to "round out the number [of scrolls] of half a million."[2]

[1] Pseudo-Aristeas 9-10.
[2] Ibid., 10.

Unfortunately, little historical evidence concerning the physical description of the Library has survived to the present. And, besides some recent finds (i.e., the thirteen lecture halls found in the Brucheum, or Greek, district),[3] no archaeological evidence has been recovered. Historians must piece together snatches of information from the ancient sources and look to other information institutions of the ancient world in order to develop a tentative physical description of the idea of the Library.

It is likely that the Library was incorporated physically into the Museum. Both the ancient Greeks and Egyptians had the habit of attaching their proto-libraries to temples or palaces. Diogenes Laertius, for example, wrote that the Ephesian philosopher Heraclitus (fl. ca. 500 BCE) deposited his work on natural science in the library collection of the temple of Diana.[4] In Bronze Age Egypt, the Ramasseum, the temple of Ramses the Great (reigned ca. 1279-1212 BCE), housed a massive temple library that, according to early twentieth century archaeologist Charles L. Nichols's estimate, contained twenty thousand scrolls.[5] Assurbanipal's proto-library was attached to his palace and within yards of the temple of Nabu, the Mesopotamian god of writing. The temple of Nabu also housed a proto-library collection.[6] The Library, therefore, was most likely incorporated into the Museum.[7]

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[3] See page 83 above.

[4] Diogenes Laertius 9.5.6.

[5] Nichols, *Library of Rameses the Great*, 30.

[6] Pedersen, *Archives and Libraries*, 160-163.

[7] Diana Delia, in "From Romance to Rhetoric: The Alexandrian Library in Classical and Islamic Traditions," *American Historical Review* 97, no. 5 (1992): 1451, noted that "the notion that a library ought to comprise a building in its own right is a modern assumption." America's first free-standing library, at the University of South Carolina, was not built until 1830.

Classicist Anne Holmes noted that the Library is nowhere mentioned in the ancient texts as being housed in a separate building. Strabo, though providing a detailed description of the Museum, does not mention a separate Library. Strabo did, however, describe the royal palace of the Ptolemies as "to quote the words of the poet [Homer] 'there is building upon building.'[8] All, however, are connected with one another and the harbour… the Museum is also part of the royal palaces."[9] Athenaeus wrote of "the collection *in* the Hall of the Muses" [emphasis added].[10] Again, this attachment of the Library to the Museum would have been seen as *de rigeur* by the ancients: "what evidence survives from early libraries shows [libraries] as a bookstore attached to a cult centre, which, after all, is what the Mouseion was."[11] Not only was the Museum dedicated to the worship of the Muses, but also nineteenth century maps of ancient Alexandria typically place the tomb of Alexander, the presiding genius of Alexandria whose body served as the emblem of his cult, as directly adjacent to or attached to the Library and Museum.[12] The trend of a library being attached to a temple would continue for centuries following the foundation of the Library. The Library's sister library at the Serapeum, which may have served as a "branch" library to house overflow from the main library, was likewise housed in the temple proper itself.

The royal library of the Attalid kings of Pergamum, founded in the first decades of the third century BCE, provides important clues as to the possible architectural design of the Library. The library of Pergamum was created by Eumenes II (Soter) in the first

[8] Homer *Odyssey*, 17.226, as quoted in Strabo 17.1.8.
[9] Strabo 17.1.8.
[10] Athenaeus 5.203.
[11] Anne Holmes, "The Alexandrian Library," *Libri* 30, no. 4 (1980): 287.
[12] Parsons, *Alexandrian Library*, 73-79.

half of the third century CE as an imitation of and rival to the Library. It is reasonable to conclude, therefore, that the Pergamene architects took cues from the Library and Museum, though implementing them on a smaller scale. Luckily, the ruins of the library of Pergamum have been discovered and excavated (most recently by Dr. Wolfgang Radt of the German Archaeological Institute of Istanbul).[13]

The Pergamene library comprised four adjacent rooms directly attached to the Temple of Athena, a tutelary divinity of libraries, located on the city's acropolis (the library was also within yards of the royal palaces). Again, typical to the ancient world, the library of Pergamum did not comprise a separate architectural entity but "must have opened directly onto the second storey of the gallery [of the Temple of Athena] because there was neither a street nor a square in the vicinity."[14]

So, as with Pergamum, but on a vastly larger scale, the Library and Museum would most likely have been a single unit. With a little imagination one might see the modern academic library as looking something like the ancient Library *and* Museum: a building with faculty studies, lecture halls, administrative offices, scholars beavering away at their scholarly pursuits, and thousands upon thousands of books lining the shelves.

The Library's Organization

The Library represented a bibliographic control task of colossal proportions. Demetrius laid the groundwork for an institution that both collected a monumental body

[13] Radt published his findings most recently in *Pergamon: Geschichte un Bauten einer antiken Metropole* (Darmstadt, GE: Primus Verlag, 1999).

[14] Vehbi Bayraktar, *Pergamon*, 6th ed. (Istanbul: NET Turistik Yayinlar A.S., 1992), 42.

of knowledge and arranged it for successful use. John Tzetzes, a twelfth century CE Byzantine scholiast (a literary critic and commentator on classical texts), estimated that, at the time of the famed cataloger Callimachus of Cyrene (ca. 260-240 BCE), the Library and Serapeum together contained more than 532,800 rolls: "the public library [at the Serapeum] had 42,800 books; the private library of the court and palace had 400,000 unsorted books, and 90,000 single, sorted books."[15] By the mid-first century BCE the Library is said to have contained over 700,000 rolls.[16]

The Library's "collection development policy," therefore, was necessarily expansive, aggressive, and comprehensive. The *Letter of Aristeas* relates that "When Demetrius of Phalerum was put in charge of the king's library, he was assigned large sums of money with a view to collecting, if possible, all the books in the world" (the Library was meant to be a *universal collection*).[17] Ptolemy III (Eurgetes) used subterfuge to acquire the works of the three Great Tragedians (Aeschylus, Sophocles, and Euripedes), providing 15 talents of silver to Athens (one talent of silver weighing about 60 English pounds) as collateral for the original documents until copies might be made. Alexandria kept the originals and returned the copies to Athens.[18] Non-Greek works were also sought out: Tzetzes wrote that "the books of other peoples submitted were translated."[19] Manetho, Soter's Egyptian advisor, composed the *Aegyptiaca*, a history of Egypt written in Greek. Athenaeus cited a work by Mochus, a Phoenician historian (dates

[15] Tzetzes *Prolegomena to Aristophanes.* In Parsons, *Alexandrian Library*, 112. Parsons concluded that the unsorted books contained multiple works per roll, while the single books contained only one work or part of a work per scroll. Ibid., 205.

[16] Aulus Gellius *Noctes Atticae.* 7.17. 3.

[17] Pseudo-Aristeas 9.

[18] Galen *Commentarius in Hippocratis Epidemias*, 3.

[19] Tzetzes *Prolegomena,* in Parsons, *Alexandrian Library*, 112.

unknown), in his *Deipnosophists*.[20] And Pseudo-Aristeas, a Hellenized Jew writing in the mid-second century BCE who assumed the persona of Aristeas, legendary poet and servant of the god Apollo, reported that Ptolemy II (Philadelphus) had the books of the Hebrew Bible translated into Greek and added to the Library.[21]

The scope of the acquisition efforts suggests that Demetrius and the later librarians of Alexandria possessed phenomenal organizational acumen. Scrolls had to be identified and procured, and they poured into the Library. Ptolemy II (Philadelphus) is reported to have acquired works of Aristotle and Theophrastus from the latter's nephew, Neleus of Scepsis, [22] for the Library (whether Athenaeus meant that Philadelphus acquired Aristotle and Theophrastus' complete libraries or their personal works is not entirely clear).[23] Galen, the second century CE Greek physician, wrote that Ptolemy III (Eurgetes) confiscated all books coming into the port of Alexandria so that they might be copied and added to the Library.[24]

It was left up to the Alexandrian librarians to sift through the piles of incoming scrolls to decide what was worthy of inclusion in the Library, and choice of inclusion was no haphazard affair. Although we have no surviving official "collection development

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[20] Athenaeus 3.126.

[21] Pseudo-Aristeas 10-12; see also Tzetzes, *Prolegomena*, in Parsons, *Alexandrian Library*, 112-113.

[22] Athenaeus 1.3a-b.

[23] Strabo 13.1.54, provides a conflicting story that "Theophrastus bequeathed it [his library] to Neleus; and Neleus took it to Scepsis and bequeathed it to his heirs… their descendents sold [the books] to Appellicon of Teos… Sulla, who had captured Athens, carried off Apellicon's library to Rome, where Tyrannion the grammarian, who was fond of Aristotle, got it into his hands." Parsons, in *Alexandrian Library*, 14, attempted to reconcile the two differing accounts: "The most reasonable view is that both stories are partly correct. We believe that Neleus sold to Ptolemy for a large sum the libraries of Aristotle and Theophrastus, but that he retained some, perhaps many of the original manuscripts of the writings of the philosophers." Parson's version, however, is based on little evidence.

[24] Galen *Commentarius in Hippocratis Epidemias,* 3.17.1.

policy" for the Library, the fact that we possess a "canon" of ancient Greek literature, including authoritative versions of Homer and early Greek poets and dramatists, is evidence that the Alexandrian librarians were rigorous in the control of their texts. The Alexandrian scholars' initial project was the recension of Greek literature, so corrupt texts were brought up to acceptable standards before being accepted into the collection, or they were systematically expunged from the Library.

The sheer volume of material collected in the Library and Serapeum demanded considerable rigor of classification and cataloging for the collection to be workable. And it was workable: both Strabo's 17 book *Geography* and Athenaeus' 15 book *Deipnosophists* reference hundreds of Greek works that the authors likely tracked down in the Library's "stacks." So what do we know about this monumental task of bibliographic control?

John Tzetzes' *Prolegomena* relates that "Under the royal patronage of Ptolemy Philadelphus [actually under Soter], Alexander of Aetolia [fl. ca. 285-283 BCE] edited the books of tragedy, Lycophron of Chalcis [fl. ca. 285-283 BCE] those of comedy, and Zenodotus of Ephesus those of Homer and the other poets."[25] Library historian Robert Barnes noted that this feat would only have been possible if the books were first ordered by subject matter and then, likely, as is the case with previous Greek "lists," ordered alphabetically.[26]

[25] Tzetzes *Prolegomena*, in Parsons, *Alexandrian Library*, 112-113.

[26] Robert Barnes, "Cloistered Bookworms in the Chicken-Coop of the Muses," in *The Library of Alexandria: Centre of Learning in the Ancient World,* ed. Roy Macleod (London: I.B. Taurus, 2000), 68-69.

Callimachus' *Pinakes, or Tables of Men Distinguished in Every Branch of Learning, and their Works*, a masterwork in 120 books that cataloged the Greek literature (and possibly works that were *translated* into Greek, like the Hebrew Pentateuch) of the Library, is evidence that profound classification and cataloguing work at the Library evolved from these earlier efforts at organization. The *Pinakes* were likely compiled from a larger catalog of the Library collection—the first true catalog in history—also created by Callimachus. [27]

Surviving fragments of the *Pinakes* are few, unfortunately, and these reveal only three definite subject divisions: oratory, laws, and miscellanea.[28] Citing other evidence related by Athenaeus and Diogenes Laertius, Edward Parsons expanded the list to include: [29] (1) Epic and other non-Dramatic Poetry, (2) Drama, (3) Laws,[30] (4) Philosophy,[31] (5) History,[32] (6) Oratory,[33] (7) Medicine, (8) Mathematical Science, (9) Natural Science, and (10) Miscellanea.[34] Parsons admitted that there is little evidence for three (Medicine, Mathematical Science, and Natural Science).[35] But, considering that later bibliographies that appear to be based on the *Pinakes* contained additional subject divisions that were likely gleaned from the *Pinakes'* major or subdivided organizational headings, and the many types of scholars and natural scientists who were working at the Library and Museum and would have been aided by such subject divisions, Parson's

[27] Blum, *Kallimachos*, 152-153.
[28] Callimachus frag. 430, 433, 434, 435, Blum. In Blum, *Kallimachos*, 152-153.
[29] Parsons, *Alexandrian Library*, 209.
[30] Athenaeus 13.585b.
[31] Diogenes Laertius 13.86; Athenaeus 6.252c.
[32] Athenaeus 2.70b.
[33] Ibid., 15.669e.
[34] Ibid., 6.244a.
[35] Parsons, *Alexandrian Library*, 211.

additions appear warranted. Historian Rudolf Pfeiffer gave an alternate subject division of the *Pinakes* as follows: (1) Oratory, (2) Laws, (3) Miscellanea, (4) Epic Poetry, (5) Lyric Poetry, (6) Tragic Poetry, (7) Comic Poetry, (8) Philosophy, (9) History, and (10) Medicine.[36] Regardless of the exact number or types of major subject categories, more than three would have been necessary in order to make retrieving information from the massive collection manageable.

Callimachus scholar Rudolf Blum deduced from the *Pinakes* fragments, and later bibliographic lists that likely drew upon the *Pinakes,* that Callimachus organized authors into author-subject classes and subclasses. Callimachus then arranged the authors alphabetically (though in "coarse" arrangement, by first letter only), added biographical data for each author, listed the titles written under each author, cited the opening words of each work, and listed the number of lines for each work. [37]

What resulted was a simple but brilliant system that should appear familiar to a modern-day cataloger. The *Pinakes* was no mere shelf inventory, as was the case with the Mesopotamian "catalogs." It was a true catalog that listed works (as opposed to individual physical items). It later served as the model for many later library catalogs, such as the one used in the Pergamene library, and bibliographic lists, including Diogenes Laertius' *Lives and Opinions of the Eminent Philosophers.* Importantly, the *Pinakes* was a living catalog, meeting the demands of a growing collection: the Head Librarian and eminent grammarian Aristophanes of Byzantium performed a revision of the work.[38]

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[36] Rudolf Pfeiffer, *History of Classical Scholarship: From the Beginnings to the End of the Hellenistic Age* (Oxford: Clarendon Press, 1968), 128-129.

[37] Blum, *Kallimachos,* 152-153.

[38] Athenaeus 9.408f.

But, besides having an extraordinary catalog, there is little evidence that the morphological elements of the Alexandrians' bibliographic methodology improved on that of the Mesopotamians. Library historian Polly Archuletta summed up the general ideas of the Library's organization based on what we know of other information institutions that collected primarily papyrus documents:

> Within the Alexandrian Library, the papyrus rolls were kept in pigeon-hole boxes fastened to the wall. The rolls of one book were placed together in a box. Purple tags hung from the ends of the rolls and served to identify the roll by title and first line. The rolls were 6 to 12 inches tall and 20-25 feet long. Valuable rolls were sometimes carried with an extra blank sheet of papyrus wrapped around them.[39]

Considering the lack of evidence, the above description remains conjecture. There is, in fact, no available evidence as to how the material within the Library was actually physically organized, beyond what we know from other ancient information institutions.

Scrolls were indeed identified by projecting papyrus or parchment labels—*syllaboi*—that "hung outwards as the rolls lay on the shelves of bookcases (*scrinia*) or stood in the buckets (*capsae*) in which, as appears both from pictures and from literary references, they were often stored."[40] What information these Alexandrian *syllaboi* contained is unknown, although it is logical that they should include elements of Callimachus' organizational scheme for the *Pinakes* (the author, title, first word, number of lines, etc). Galen suggested that there is also evidence that the provenance of the scrolls were recorded, with scrolls seized from incoming ships being labeled as such.[41]

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[39] Polly Archuletta, "The Establishment of the Alexandrian Library," *Current Studies in Librarianship* 13, no. 1/2 (1989): 37.

[40] Kenyon, *Books and Readers*, 60.

[41] Galen *Commentarius in Hippocratis Epidimias, 3.*

Works often required several scrolls (*biblia*) and used an *incipit* continuing the last line of the previous scroll in the series. If a scroll had an exact shelf location, it might have been provided a unique identifier—as the call number today is printed onto selin labels and attached to books. It was unlikely, however, that ordering was this precise. The cylindrical shape of the scrolls meant that they had to be heaped on shelves or in alcoves, and when a scroll was removed, the heap would shift, making maintenance of order difficult (this being one possible reason why strict alphabetical order was not followed after the initial letter).[42]

The situation was daunting: library historian Frederic G. Kenyon concluded that the "lack of assistances to readers, or of aids to facilitate reference, in ancient [Greek] books is very remarkable."[43] That the librarians of Alexandria were able to organize and provide access to a significant portion of the western world's literature for hundreds of years is astounding.

The Library's Administration: The Librarians

As remarkable as the Library and the scholars that made use of it were the librarians that worked there (and, as will be shown, there was little difference between "librarian" and "scholar" in Alexandria). Demetrius of Phalerum was followed by a succession of Head Librarians (*bibliophylakes*) justly famed for their scholarship.[44] Edward Parsons analyzed two variant lists of Head Librarians, John Tzetzes'

[42] Blum, *Kallimachos*, 187.
[43] Kenyon, *Books and Readers*, 65-66.
[44] Demetrius is generally considered to have been in charge of organizing the Museum and Library but not to have officially been its Head Librarian. Parsons, in *Alexandrian Library,* 138, suggested that Demetrius was the "King's Librarian," as opposed to the first "Public Librarian" appointed by the King.

Prolegomena to Aristophanes (a *scholium*, or explanatory comment to a work of literature) and the anonymous *Oxyrhynchus fragment 1241* (possibly a student composition dating from the second century CE), to propose a chronological list of Head Librarians [see Table 2, below]:[45]

By any measure this is an extraordinary list of scholars. Zenodotus, Callimachus, Apollonius of Rhodes, Eratosthenes, Aristophanes, and Aristarchus were all renowned grammarians. Callimachus was also a famed poet and compiled the *Pinakes*. Apollonius of Rhodes composed the epic *Argonautica*. And Eratosthenes, quite possibly the best of the lot, represented the *quality* of scholar that the Library attracted. He was a polymath: a grammarian, geographer, mathematician, and astronomer and is justly famed for providing a remarkably accurate estimate of the Earth's circumference. Assuming that Eratosthenes used the Egyptian *stade* of 157.5 meters, which is accepted by many scholars, his estimate fell within *two percent* of the actual value.[46]

Even if Parsons's list of Head Librarians is not completely accurate (Demetrius is now considered to have not been Head Librarian *per se*, but unofficial director, and Callimachus is now generally considered *not* to have been Head Librarian),[47] it is obvious that there was little distinction between librarian and scholar among the Alexandrians. It is of considerable value to note that librarianship and scholarship were synonymous.

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[45] Ibid., 160.

[46] Jacques Dutka, "Eratosthenes' Measurement of the Earth Reconsidered," *Archive for History of Exact Sciences* 46, no 1 (1993): 56.

[47] There is an ongoing debate of limited value as to the exact succession of Head Librarians. The two main sources, Tzetzes' *Prolegomena to Aristophanes* and *Oxyrynchus 1241*, share only three names: Zenodotus, Aristophanes, and Aristarchus. Parsons, as with most historians, is hesitant in accepting Callimachus' headship (although he puts him on the list anyway). Fraser's order: Zenodotus, Apollonius of Rhodes, Eratosthenes, Aristophanes, Apollonius the Eidograph, and Aristarchus (*Ptolemaic Alexandria* vol 1, 333). Mostafa El-Abbadi, in *Life and Fate of the Ancient Library of Alexandria* (Paris: Unesco, 1990), 93, concurred with Fraser's list.

Table 2 Parson's chronological list of the Head Librarians of Alexandria.

Head Librarian	**From**	**To**
Demetrius of Phalerum (as unofficial director)		282 BCE
Zenodotus of Ephesus	282	ca. 260
Callimachus of Cyrene	ca. 260	ca. 240
Apollonius of Rhodes	ca. 240	ca. 230
Eratosthenes of Cyrene	ca. 230	195
Aristophanes of Byzantium	195	ca. 180
Apollonius the Eidograph	180	ca. 160
Aristarchus of Samothrace	ca. 160	131[48]

[48] Parsons, in *Alexandrian Library*, 151-152, concluded that Aristarchus of Samothrace "accompanied his old pupil (Euergetes II) [Physcon] when he [Physcon] was driven out of Alexandria (131-130 B.C.)." Fraser, in *Ptolemaic Alexandria* vol 1, 332-333, wrote that (and this appears to be the more popular conclusion) Aristarchus fled to Cyrene ca. 145/144 BCE upon Physcon's return to Egypt.

Little is known concerning the structure of the Library's day-to-day administration, but library historian Lionel Casson wrote that dozens of "sorters, checkers, clerks, pages, copyists, repairers, and so on," the first academic library "paraprofessionals," were required to keep the Library operating.[49] Callimachus was certainly aided in the enormous task of compiling the Library catalog by a variety of "assistant" and "associate" librarians serving as "subject specialists." The subordinate librarians, such as Lycophron of Chalcis and Alexander of Aetolia, who both aided Zenodotus, have equal claim to being true scholars as the Head Librarians. Both Lycophron (the "subject specialist" for comedies) and Alexander (the "subject specialist" for tragedies) were grammarians and members of the Alexandrian *Pleiad* of poets and tragedians.[50] The organization of the Greek literature was an enormous task and considered no mean feat. It took *philosophers and scientists* competent in both logical and hierarchical thinking. It was the first bookish age, and the scholars of the Museum were bookmen, not *bibliophiles* (i.e., lovers of books as objects rather intellectuals who used their collection as a means of facilitating their emergent trade, scholarship).

Librarianship became a union of (1) the theoretical inquiry peculiar to the Greeks (as opposed to the practical science of the Mesopotamians) and (2) bibliographic control, as borrowed or adapted from the Library's Near Eastern predecessors and influenced by Aristotelian methodology—particularly that found in his *Organon,* or logical works. The first major task of the Alexandrian scholars, the recension of Homer and the major Greek

[49] Casson, *Libraries in the Ancient World*, 37-38.
[50] *Suda*, Adler lambda 827; *Suda*, Adler alpha 1127.

authors,[51] illustrates this coupling. Not only were the librarians responsible for *organizing* the collection for retrieval, they actively took part in *creating* the information through *editing* the texts and thereby fixing the canon of Greek literature (this Greek theoretical substrate is detailed in chapters five and six).

The Decline of Scholarship in Alexandria and Eventual Destruction of the Library

Infighting and political maneuvering among royal siblings, a common occurrence among post-third century BCE Ptolemaic dynasts, had seen Ptolemy VIII (Physcon), the "pot-belly," forced to give up his throne and be relegated to the kingship of Cyrene (where he reigned 163-145 BCE). After marrying his sister, Cleopatra II (reigned ca. 175/4-170 BCE, and again from 130-127BCE) and murdering the popular Ptolemy VI (Philometer) (reigned ca. 180-145 BCE), his older brother and temperamental opposite,[52] Ptolemy VIII reclaimed Egypt in 145 BCE. Physcon, a hedonistic butcher who was "utterly corrupted with fat" and hated by the Alexandrians "because of his cruelty and thirst for blood,"[53,54] then embarked on a reign of terror, ca. 144 BCE, that left Alexandria's population diminished by the murder of many Alexandrians.[55]

Athenaeus reported that the king ordered these murders in reprisal for his earlier loss of power and "filled the islands and towns with men who had grown up with [and

[51] Tzetzes *Prolegomena,* in Parsons, *Alexandrian Library*, 112-113.
[52] Diodorus Siculus 33.12.1.
[53] Athenaeus 12.549d-e.
[54] Diodorus Siculus 33.22.1. See also Athenaeus 4.184c, which repeats this story and notes that the Egyptians modified Physcon's name from Eurgetes ("Benefactor") to Kakergetes ("Malefactor").
[55] Athenaeus 4.184c.

presumably had supported politically] his brother [Philometer]—philologians, philosophers, mathematicians, and many other men of skill in their profession."[56] The Mediterranean world benefited from this diaspora of intellectuals who subsequently "instructed many distinguished men."[57] Pergamum must have been particularly satisfied with this outcome, considering that Physcon, owing to his rivalry with king Eumenes II (Soter), had previously banned the export of papyrus (hence the Pergamenes' invention of the city's namesake, parchment).[58] The Library and Museum went into swift decline. The *model* of the academic library, however, had been firmly secured.

Little is known of the Head Librarians who followed the brilliant Aristarchus of Samothrace, who was, ironically, Physcon's tutor. *Oxyrynchus 1241* lists Aristarchus as followed by "Cydas, of the spearmen,"[59] a stooge appointed to carry out the persecution of the intellectuals.[60] The only other individual given the title of librarian was Onasander the Cypriot (active ca. 88 BCE) who was appointed by Ptolemy IX (Soter II) (Lathyrus) (reigned 116–110 BCE, 109–107 BCE, and 88–81 BCE). Onasander made no lasting contribution to scholarship.[61]

The final known member of the Museum was Theon of Alexandria (fl. ca. 364 CE). Hypatia (died 415 CE), Theon's daughter, herself a renowned Neoplatonist philosopher, mathematician, and astronomer, is sometimes referred to as the "last librarian of Alexandria." While Hypatia's proposed Headship of the Library is a romantic

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[56] Ibid.
[57] Ibid.
[58] Pliny (the Elder) *Naturalis Historia,* 13.21.70-71.
[59] B.P. Grenfell and Arthur S. Hunt, *The Oxrynchus Papyri,* vol. 10 (London: Egypt Exploration Fund, 1914), 108.
[60] El-Abbadi, *Life and Fate,* 94.
[61] Fraser, *Ptolemaic Alexandria,* vol. 2, 493.

prospect—her intellect being comparable to the early (Head) Librarians of Alexandria—there is scant evidence to support the claim.

There is no scholarly consensus as to when the Library met its final destruction, largely due to the failure of ancient sources to provide a decisive account. Plutarch wrote that Caesar unintentionally burned the Library at the height of the Alexandrian war (48 BCE).[62] Aulus Gellius, the second century CE grammarian, agreed with Plutarch, writing that the Library's 700,000 rolls were "all burned during the sack of the city in [the Roman's] first war with Alexandria."[63]

Library historian Mustafa El-Abbadi considered the Roman soldier and politician Julius Caesar's (lived 100-44 BCE) fire to be the final destruction of the Library.[64] Caesar himself, however, never mentioned the burning of the Library in his *Civil Wars*, but wrote that he burnt "all of those ships and the rest that were in the docks."[65] This statement, coupled with second century CE Roman historian Cassius Dio's remark that Caesar destroyed, along with storehouses of grain, collections of books,[66] has led some scholars to conclude that only the warehouses housing books, and not the Library collection itself, were destroyed. These warehoused books might have been waiting on

[62] Plutarch *Vitae Parallae: Caesar*, 49.3-4.

[63] Aulus Gellius *Noctes Atticae*, 7.17.3.

[64] El-Abbadi, *Life and Fate*, 154. P.M. Fraser refused to give a date for the Library's final destruction, but felt that the Caesar's fire left it "severely depleted" (*Ptolemaic Alexandria*, vol. 1, 335).

[65] Caesar *Bellum Civile*, 3.111.

[66] Dio Cassius 47.2. Dio's passage, however, is vague and may be alternately translated to support both viewpoints. El-Abbadi in *Life and Fate*, 152, provided a literal translation of the passage as "many places were set on fire, so that among others were also burned to ashes, the arsenal [*neorion*], the storehouses [*apothecae*] of the grain, and of the books, which are said to be of great number of excellence." Earnest Cary, in his 1952 Loeb Classical edition translation of Dio Cassius, on the other hand, translated the passage as saying that "many places were set on fire, with the result that the docks and the storehouses of grain among other buildings were burned, and also the library." It should be noted that the Greek word for library, *biblioteca*, is not used by Dio.

"processing" or represented an library overflow site. The palace buildings, at any rate, were built primarily of stone and would have been difficult to burn.[67]

Whether or not the Library was actually destroyed in 48 BCE, it is likely that a large number of books did burn in the Alexandrian War. But it is equally possible that the Library survived into the following centuries, whether largely intact or reconstituted. The Roman triumvir Marcus Antony, for example, is said to have given Cleopatra VII (ca. 35 BCE) 200,000 rolls from library of Pergamum (possibly the *entire* Pergamene collection) as a gift to replenish the Library following Caesar's destructions.[68]

As a result of the paucity of available evidence, other dates are given for the Library's final destruction. Jasper Griffin held that the Roman emperor Aurelian's 273 CE siege of Alexandria, in which "her walls were destroyed and she lost the greater part of the district called Bruchium"[69] marked the final end of the Library.[70] Historian Diana Delia supported this view, for if the Library was part of the Museum, "the continued existence of the *Museum* into the third century A.D. signifies the perpetuation of the library housed within and sustaining it."[71] The Serapeum, regardless of whether the Library had faced a third century destruction, would last at least another century until Theodosius I's ("the Great") (reigned 379-395 CE) 391 CE order to dismantle all pagan temples. Finally, a destruction is attributed the Caliph Omar's 641 CE order to burn the

[67] Arguments *for* the 48 BCE destruction often fail to consider that the librarians of Alexandria would likely have been actively attempting to save as many scrolls as possible, say, *by removing them* from the path of the approaching conflagration.

[68] Plutarch *Vitae Parallelae: Antonius,* 58.5.

[69] Marcellinus 22.6.15.

[70] Jasper Griffin, "The Library of Our Dreams," *American Scholar* 65 (Winter 1996): 69.

[71] Diana Delia, "Romance to Rhetoric," 1451.

Library's book rolls—the Koran having rendered them dispensable—to heat Alexandria's public baths. While this is a picturesque story, it is most likely folklore.[72]

What we can say with certainty is that the buildings that housed the Library and Museum were destroyed, along with a priceless cache of knowledge—a catastrophic destruction of classical literature. The decline of Hellenism, if not the inception of the dark ages, coincided with this event.

The history of humankind is filled with burning libraries and the resulting gaps in knowledge:[73] Nineveh, Alexandria, the libraries of Quin (third century BCE China), and the twenty first century national library of Iraq are but a few examples. Perhaps these destructions are what library historian Matthew Battles described as the "not so minor corollary" of declining political systems.[74] The Library and Museum, however, survived their physical destructions in the form of *ideas* deeply ingrained in the human psyche. They molded how the West thinks of the university as a community for producing original intellectual achievements, implementing a tool, the academic library, to effect progress.

The destruction of the Library serves as a warning of the potential catastrophes that might result without the careful stewardship of knowledge, such as the threat of a

[72] Edward Gibbon considered the story of Caliph Omar's destruction of the library to be false. In in his *Decline and Fall of the Roman Empire*, vol. 3 (New York: Random House, 1932), 177, Gibbon wrote that "the solitary report of [the thirteenth century CE Egyptian Christian scholar Abu l Faraj] who wrote at the end of six hundred years [after the conquest of Alexandria by Omar] on the confines of Media is overbalanced by the silence of two annalists of a more early date, both Christians, both natives of Egypt, and the most ancient of whom, the patriarch of Eutychius, has amply described the conquest of Alexandria." See also J.H. Butler, *The Arab Conquest of Egypt and the Last Thirty Years of Roman Dominion*, ed. P.M. Fraser, 2nd ed. (Oxford: Clarendon Press, 1978), 401-426.

[73] Matthew Battles, *Library: An Unquiet History* (London: W.W. Norton Company, 2003), 55.

[74] Ibid., 54-55.

looming "digital dark age."[75] And, while all the factual truths behind the Library and Museum may never be verified,

> Whatever our view of the fate of the Alexandrian library, we must be conscious that all these views [concerning the concept of "library"] are rooted in a tradition that relates to libraries and that originates in Alexandria. It is within this tradition that we are undeniably and firmly placed.[76]

The Foundations of the Library of Alexandria:

Politics or Intellect?

To determine the *intellectual foundations* from which the Library and Museum sprang will provide insight into the basic character of the institutions themselves and place in context the information institutions that preceded and followed the Library. The ultimate *vision* behind the Library and Museum is generally attributed to either of two traditions: (1) Demetrius of Phalerum (the "Greek" or "Aristotelian" thesis) or (2) Ptolemy I (the "Ptolemaic" thesis). The Greek thesis, as first articulated by classicist Fritz Milkau,[77] and championed by Edward Parsons,[78]

> amounts to saying (1) that the actual creator of the Museum was Demetrius of Phalerum, who, in response to an appeal by Ptolemy, created at Alexandria an Aristotelian Lyceum of gigantic proportions which became the Museum proper, a kind of university dedicated to educational excellence in the fields of literature and science; and (2) that Demetrius, relying on the quasi-boundless munificence

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[75] Jeff Rothenberg, in "Ensuring the Longevity of Digital Documents," *Scientific American* 272 (January 1995): 44, estimated the average physical lifetime of magnetic tape at one year, videotape at one to two years, magnetic disks at five to ten years, and optical disks at thirty years. Baked clay tablets may last 5000 plus years.

[76] Uwe Jochum, "The Alexandrian Library and its Aftermath," *Library History* 15 (1999): 5-12.

[77] Fritz Milkau, *Handbuch der Bibliothekswissenschaft*, vol 3 (Wiesbaden: O. Harrassowitz, 1952), 17.

[78] Parsons, *Alexandrian Library*, 104-105.

> of his king, endowed this institution with a massive library of equally universal character.[79]

Classicists have long held this view of the Library. The Greek thesis was challenged, however, by the mid-twentieth century library historian H. J. de Vleeschauwer's Ptolemaic thesis—a theory that grounds the origins of the Library in politics and Alexander's socio-cultural experiments.

De Vleeschauwer, while acknowledging the influence of Demetrius and Greek philosophy in the creation of the Museum, regarded "Ptolemy [Soter] and his recollections of oriental [eastern] library institutions" in his travels with Alexander as the primary source of inspiration for the Library:[80] "If the Greek thesis tends to make Demetrius the mastermind behind both the Museum and its library, I [de Vleeschauwer] for my part, tend to view them as the work of both Ptolemy and Demetrius in their respective roles as initiator and executor."[81] While the following analysis aligns itself with the Greek thesis, it is recognized that, through understanding both arguments, it is possible to orient the Library and Museum along a cultural/intellectual continuum, a succession that began with the earliest clay-tablet proto-libraries and continues to today's modern academic library.

The Library as Political/Cultural Tool

The Ptolemaic thesis grounds the Library in Ptolemy's calculated incorporation of elements from (1) Assyrian/Babylonian and (2) Egyptian proto-libraries as part of his

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[79] H.J. De Vleeschauwer, "Afterword: Origins of the Mouseion of Alexandria," in *The Oral Antecedents of Greek Librarianship*, by H. Curtis Wright (Provo, UT: Brigham Young University Press, 1977), 178.

[80] Ibid., 177.

[81] Ibid.

iteration of Alexander's (3) cultural/political/intellectual agenda. The Library became a means of maintaining political power, much like its proto-library *forebears*. De Vleeschauwer held that Ptolemy's influence in the creation of the Library and Museum (and the Library in particular) has been grossly underestimated and was influenced little by anything Greek. Ptolemy, instead of transplanting Greek institutions *per se*, was a champion of Alexander's political agenda: a novel cultural/political paradigm that "realized the usefulness of scholarship [in] the execution of their [the Macedonian rulers'] policies and the discharge of their military duties."[82] The Library was a manifestation of this agenda—an eastern administrative instrument adapted to serve Hellenization—it represented Alexander's peculiarly "Alexandrian" ideals (e.g., the universal nature of the collection reflected the "brotherhood of man" as opposed to the universal nature of Aristotelian scientific inquiry).

The idea of using libraries for political advantage was nothing new to the *Diadochi*. As described in chapter two, the ancient Greek aristocracy (and the Macedonians did consider themselves to be Greek) had long maintained private collections of books. For example, Aulus Gellius wrote that Pisistratus, tyrant of Athens from 561-527 BCE, "is said to have been the first to establish at Athens a public library of books relating to the liberal arts" (the "public" status of the collection, however, is doubtful).[83] Athenaeus repeated this story and mentioned other wealthy and powerful Greeks who owned private book collections: Polycrates (tyrant of Samos, ca. 540-522 BCE), Eucleides (Athenian archon, ca. 403/2 BCE), Nicocrates of Cyprus (dates

[82] Ibid., 181.
[83] Aulus Gellius *Noctes Atticae*, 7.17.1; see also Athenaeus 1.3a.

unknown, but probably from the Archaic period), Euripides (the poet, ca. 485-406 BCE), and the philosophers Aristotle and Theophrastus.[84]

With the exception of Aristotle and Theophrastus, who used books as intellectual fodder for their philosophic, scientific, and pedagogic activities, and Euripides, whose collection may have served as a reference resource during the creation of his art, the private collections in Athenaeus' list were arguably *prestige objects* collected by *bibliophiles*, not scholars. The original motivation for collection was as much for social reasons as for intellectual ones. Well-stocked collections of books added weight to the owner's standing in his community.

P.M. Fraser wrote that Ptolemaic patronage was "seemingly an invariable accompaniment of royal splendor… but the determination of the sovereign to support learning was of greater significance [than repayment in some form]."[85] This altruism on the part of the Ptolemy I, or any of the succeeding Ptolemaic pharaohs, is suspect. At the least, Greek patronage offered "immortality" to the patron through their association with works of lasting value.[86] In the hands of a skilled ruler like Ptolemy I, however, patronage became a powerful political tool.

Carnes Lord, the historian and Aristotle scholar, characterized the Library and Museum as successors to the Peripatos that, as a result of a resurgence of anti-Macedonian feelings, was successfully exported to Egypt. [87] Lord's thesis is supported by

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[84] Athenaeus 1.3a.

[85] Fraser, *Ptolemaic Alexandria,* vol 1, 305.

[86] Barbara K. Gold, *Literary Patronage in Greece and Rome* (Chapel Hill: The University of North Carolina Press, 1987), 176.

[87] Carnes Lord, "On the Early History of the Aristotelian Corpus," *The American Journal of Philology* 107 (1986): 142.

the pharaoh's recruitment of Demetrius of Phalerum, who had been directly linked to Theophrastus and thus to Aristotle, to spearhead the establishment of his research community. It is not difficult to see Ptolemy I's identifying Alexandria with the Peripatetic school as an opportunistic measure undertaken to build his regime's prestige and knowledge base.

Historian Andrew Erskine explored the Library and Museum's role in supporting the hegemony of the Ptolemaic pharaohs. Erskine saw Ptolemy I's attempts to associate Alexandria with Athens (first through Theophrastus and then Demetrius) as a move to consolidate political power: the Ptolemies' desire to be cultural leaders betrayed their political designs.[88] The Library and Museum became a bid by the Hellenistic rulers of Egypt to claim cultural authority over their subjects and to assert the Egyptian dynasts' "Greekness," both within Egypt and internationally, through directly linking Alexandria with Athens, Aristotle, and Alexander.

The philosophical institutions of Greece were small-scale enterprises and their libraries reflected this—Aristotle's library, for example, probably had fewer than 1000 rolls. These philosophical schools were conservative and politically insular. The Library and Museum, however, were massive, state sponsored, syncretistic, and highly organized. These were not particularly "Greek" characteristics, but clearly Hellenistic, reflecting a combination of Macedonian *hubris* and eastern gigantism. Alexander's funeral car bore witness to the early expression of the Hellenistic kings' tendency towards overstatement and adoption of Persian/Egyptian magnificence, with its "vault of gold, eight cubits wide

[88] Andrew Erskine, "Culture and Power in Ptolemaic Egypt: The Museum and Library of Alexandria," *Greece & Rome*, 2nd Ser., (1995): 45.

and twelve long, covered with overlapping scales set with precious stones."[89] The Macedonians had previously buried their dead with honor but never with such grandeur. Likewise, consider the Alexandrian Pharos, history's largest lighthouse, a marvel of Greek engineering and Egyptian exaggeration. It would be ridiculous, therefore, to ignore the influence of eastern information institutions on the Library and Museum.

The remnants of the ancient Mesopotamian cultures surely awed and inspired the Macedonian generals. The massive protolibraries, with thousands upon thousands of tablets, would have appealed to the invaders' grand ambitions. The protolibraries' ability to support the information needs of large bureaucracies, with their careful organization, would have appealed to the Macedonian administrative style: a style that revolved around kingship and *national* politics. Truly "Greek" (i.e., sub-Macedonian Greece: Epirus, Thessaly, the Peloponnese, and the islands) politics, it must be remembered, were much more restricted in scope, typically centering on the *polis* or city-state. The Hellenistic kingdoms were massive—the Seleucid Empire, for example, stretched from Palestine to Afghanistan—and required a new breed of assiduously organized information institution.

Egyptian culture must have also made a deep impact on Ptolemy I and helped mold his policies (the invention of the syncretistic god Serapis provides evidence of this appropriation and transformation of culture). The scope and grandeur of Egypt's landmarks must have greatly impressed Ptolemy—the *Diadochi* shared with the Egyptians a love for massive displays of chauvinism. Ptolemy I (or his son Philadelphus) likely visited the huge Ramesseum, and it probably served as once source of inspiration

[89] Diodorus Siculus, 18.26.5.

for the Museum and Library. The Library reflected, on Ptolemy's part, a calculated appropriation of *propagandist* and an *organizational* technique for the purpose of actualizing a political policy.

The Ptolemaic thesis, therefore, lessens the role of Greek philosophical thought in the formation of the Library. According to this argument, Aristotle was a man of reflection and Alexander a man of action. Alexander's iconoclastic vision, a vision devoid of Aristotle in any meaningful sense, became the *key* influence on Ptolemy I's thinking. The Library and Museum represented the flowering of Ptolemy's adaptation of Alexander's *political designs,* an agenda that that used skillful appeals to culture to impose Greco/Macedonian hegemony.

There appears to be truth behind De Vleeschauwer's thesis. Ptolemy was a shrewd ruler, and the output of the Library and Museum were equally as useful to him as political and propaganda tools—markers of his regime's enlightenment, sophistication, and beneficence—as they were a means to fulfill some intellectual desire on Ptolemy's part. It is reasonable to conclude that Ptolemy I was profoundly influenced by both Alexander's ideas and the pharaoh's own previous experiences in Mesopotamia.

It is too convenient, however, to assume that the basic character of the Library was derived primarily from the Mesopotamians and Egyptians and filtered through Alexander's political program. While elements of the bibliographic policies employed by the Alexandrian Greeks were appropriated from the Mesopotamians and Egyptians as a result of their proven usefulness, and the Library was *obviously* a political instrument, the

basic *nature* of the collection, its philosophical foundations, point squarely at Aristotle, the Library's "spiritual father."

Without the philosopher, there would not have been the Library as we have come to know it. It would have been just one more (albeit massive) protolibrary. And while Alexander was surely a motivating factor in the Library's creation, it is ridiculous to assume too that Aristotle made no mark on the king's intellect. The philosopher's influence, whether the Library was employed as a political tool or not, (and it most likely was in some capacity), is the *fundamental* factor in differentiating the basic character of the Library from its predecessors, and the reason that the *idea* of the Library did not die with the political fortunes of ancient Egypt.

The Library as Intellectual Tool

H.J. de Vleeschauwer doubtless is correct that "Political considerations are often excluded, for example, when the library activities of Ptolemy and the other *Diadochi* are treated separately [from the affairs of state],"[90] and that

> Egypt was Aristotle's spiritual grandchild, but the notion of a splendid library on a grand scale was born of Ptolemy's experiences in the Near and Middle East. It was this happy conjunction of influences which produced the *Zweistrombegriff* [a concept derived from the union of two other concepts] that became the Mouseion"[91]

De Vleeschauwer, however, contradicted this notion of *Zweistrombegriff* with his strident dismissal of Greek influence on the Library. He portrayed Alexander as a sort of outré political revolutionary and concluded that "the Mouseion was, *above all else,* a political

[90] De Vleeschauwer, "Origins of the Mouseion," 183.
[91] Ibid., 195.

work long since brought to maturity" [emphasis added].[92] The Museum's libraries were likewise politically motivated [emphasis added]:

> The Macedonian example of their commander and the models which they came across in practically every city of importance in the East, *were the factors* which could have influenced the future Diadochi. *It was not the Greeks who supplied the model* for the Serapeiana as a temple library—there was no Greek temple library—but rather the many institutions which they inevitably encountered in the course of their campaigns from the Hellespont to Susa.[93]

Although one may argue with multiple elements of this statement (e.g., there were in fact Greek temple protolibraries), de Vleeschauwer's most grievous error is his confusing *library* with *building*, ignoring the collection itself. It is the collection that, according to library historian Christian Jacob, "gives actual material presence to potential knowledge," and "this potentiality may be fully realized when the library is centered on a particular teaching or corpus of texts that are fundamental to a community."[94] And though the edifices of the Library and Museum were most certainly grand and served as fodder for Ptolemaic propaganda, the *essential* feature of the Library rested in its collection of knowledge and that collections' use.

Despite its implementation to further a Hellenistic agenda, the Library was a unique *intellectual* entity, new in terms of size and scope, but with identifiable intellectual roots. Both Ptolemy I and Demetrius of Phalerum are traceable to the source of these roots: Aristotle. This much is certain: Aristotle's life intersected with the primary personalities involved directly or tangentially with the foundation of the Library and

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[92] Ibid., 196.

[93] H.J. De Vleeschauwer, "The Hellenistic Library," *Mouseion* 1, no. 3 (1963) 51.

[94] Christian Jacob, "Gathering Memory: Thoughts on the History of Libraries," *Diogenes* 49/4, no. 196 (2002): 44.

Museum: Alexander the Great, Ptolemy I, Theophrastus of Eresus, and Demetrius of Phalerum.

Aristotle served as Alexander's tutor by the invitation of Philip II, and this contact between philosopher and future king has fascinated scholars since. There is some dispute over the degree of influence that Aristotle had over the young Alexander, and current scholars tend to downplay the philosopher's role. Lewis Cummings, a modern Alexander biographer, wrote that "Aristotle infused into the mind of his pupil a keen interest and inquiring attitude of mind regarding at least several of the sciences."[95] De Vleeschauwer, however, felt that this influence was negligible and that, after Alexander's pubescence, Aristotle had no influence whatsoever on the king.[96] Classicist and Aristotle scholar Felix Grayeff, in his examination of Aristotle's school, wrote that Aristotle was just one of many tutors "who lectured occasionally to the young Alexander."[97] The dismissive attitude of modern scholars concerning Aristotle's influence on the young Alexander is unconvincing.

True, Plutarch referred to the "many persons, as was natural," who were "appointed to be his [Alexander's] nurturers, tutors, and teachers." Pseudo-Callisthenes (fl. ca. 100 BCE) listed these men as "his tutor in his boyhood… Lekrânîkos the Pellaean; and his master in letters was Âpos the Lemnian; and his teacher in geometry… was Philip; and his master in the art of speaking with brevity was Ârespîmôn; and his teacher in philosophy was Aristotle the Milesian;[98] and his instructor in war was Ardippos the

[95] Lewis Cummings, *Alexander the Great* (New York: Grove Press, 1940), 68.
[96] Blum, *Kallimachos*, 179
[97] Grayeff, *Aristotle and His School*, 32-33.
[98] This appears to be a mistake on Pseudo-Callisthenes' part. Aristotle was from Stagira Greece.

Dmaskian."[99] Five of these men were of little importance, if they even existed. Of the two men named by Plutarch (a much more reliable source than Pseudo-Callisthenes) who, besides Aristotle, were responsible for Alexander's education, Leonidas is described briefly as Alexander's role model and "preceptor," and Lysimachus simply as the prince's "tutor."[100] And though Aristotle had not yet fully developed as a philosopher during his time in Macedonia, his piercing intellect had already made him a celebrity at the Academy,[101] where he spent 20 years and was a favorite of Plato himself (Although Aelian reported that Plato did not like the way Aristotle "lived or his physical appearance").[102] Plato named Aristotle the "Brain of the Academy."[103]

Aristotle certainly made an impression on Philip II. Aristotle had grown up in the Macedonian court and had gone on to become a teacher of kings, having educated Hermias, the prince of Assos (ca. 347-345 BCE). The Stagirite came to the court of Philip (ca. 342 BCE) a known commodity: a rising star. A purported letter from Philip to Aristotle reads,

> Philip to Aristotle, Greeting.
>
> Know that a son is born to me. For this indeed I thank the gods, not so much because he is born, as because it is his good fortune to be born during your lifetime. For I hope that as a result of your training and instruction he will prove worthy of us and to our kingdom.[104]

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[99] Pseudo-Callisthenes 13.
[100] Plutarch *Vit. Alex.*, 5. 4-6.2
[101] Diogenes Laertius wrote that Aristotle was "Plato's most genuine disciple." In *Life of Aristotle*, 5.1.
[102] Aelian 3.18.
[103]Philoponus *Against Proclus's "On the Eternity of the World 6-8*, 211.20-25.
[104] Aulus Gellius *Attic Nights*, 9.3.5.

Plutarch wrote that the philosopher was renowned enough to receive "a noble and appropriate tuition-fee. The town of Stagira, that is, of which Aristotle was a native, and which Philip himself destroyed (ca 348 BCE), he peopled again, and restored to it those of its citizens who were in exile or slavery."[105] Why would Aristotle, a man already of no small reputation, make no more of an impression on a thirteen-year old Alexander than a faceless Lysimachus, Ardippos, or Ârespîmôn? Alexander, at any rate, would have had these teachers before being assigned Aristotle—at which time (around the age of 13) he was sent to the Macedonian town Mieza for the purpose of studying *directly* under the philosopher, where

> It would appear that Alexander not only received from his master his ethical and political doctrines [i.e., the "exoteric," or public, teachings], but also participated in those secret and more profound teachings which philosophers designate by the special terms "acroamatic" and "epoptic," and do not impart to many… [i.e., the "esoteric" teachings]"[106]

And though Aristotle was a man of intellect and Alexander a man of action, the two no doubt shared what classicist and Aristotle biographer Werner Jaeger termed a "community of ideas."[107] Alexander, while iconoclastic in his Hellenistic goals, and influenced little by Aristotle's political philosophy, was *Greek in his intellectual training.* Dio Chrysostom (lived ca. 40-ca. 112 CE), the Greek philosopher and politician, quoted Alexander as saying that his education under Aristotle "is not inferior to that which Achilles derived from Amyntor's [legendary king of Hellas] son, Phoenix."[108]

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[105] Plutarch *Vit. Alex.*, 7.2.
[106] Ibid., 7.3-8.4.
[107] Jaeger, *Aristotle*, 122-123.
[108] Dio Chrysostom *Second Discourse on Kingship*, 15.

Aristotle educated Alexander in the hope of creating a "philosopher-king," and this ambition alone separates the philosopher from a Lekrânîkos or Ârespîmôn. Aristotle had no doubt learned and adapted the concept of philosopher-king during his 20 years studying under Plato at the Academy. Plato's major political work, the *Republic*, outlined a *polis* (city state) state ruled by an enlightened "guardian" class. Those who were determined suitable guardians were tasked with ruling the *polis*. The guardian class was to be trained in philosophy, for

> Until philosophers are kings in their cities, or the kings and princes of this world have the spirit and power of philosophy, and political greatness and wisdom meet in one, and those commoner natures are compelled to stand aside, cities will never have rest from their evils,--no nor the human race…[109]

For Plato, philosophers were best suited for ruling states because they were lovers of knowledge and desired to know "what was good and what was not,"[110] i.e., they sought out the truth, thought critically about reality, and used what they learned in the service of the state. Plato's higher education for philosopher-kings, therefore, was decidedly non-practical. It was theoretical, consisting of mathematics and philosophy.[111] Plato himself attempted to mold (ca. 366 BCE) a philosopher-king, Dionysius II of Syracuse (born ca. 397).[112] The experiment, however, was doomed to failure. Plato offended the king with a condemnation of tyrants and was expelled from Sicily.[113]

Aristotle, following in Plato's footsteps, tried to educate philosopher-kings, although, considering his *Politics*, the Stagirite's enlightened princes were somewhat

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[109] Plato *Respublica*, 473d.
[110] Ibid., 375c.
[111] Ibid., 535a-540b.
[112] Plato *Epistles*, 327d.
[113] Diogenes Laertius 3.18.

different than Plato's guardians.[114] Unlike Plato, Aristotle allowed for three forms of effective government: monarchy, aristocracy, and timocracy (rule by land owners) (*Pol.* 8.10.1231a31). For Aristotle, effective rulers, whether they are timocrats, aristocrats, or kings, realize their natural human capacities for virtue and reasoning: they know how to rule and be ruled (*Pol.* 3.4. 1277a27). There is, in fact, no real difference between a fully realized (i.e., good) human and a philosopher-king, for "the same habits will be found to make a good man and a man fit to be a statesman or king" (*Pol.* 3.18.1288b.1) Aristotle did recognize, however, that in certain contexts monarchy was the ideal form of government. The ideal king, as a result, must excel "his subjects in all good things" (*Pol.* 8.10.1160b2).

Aristotle adopted Plato's basic ideas that, to rule effectively, one must cultivate the intellect, and that the result of effective rule was a virtuous state. True higher education, therefore, did not consist of learning a "bag of tricks" in order to make it through life. The ideal "Aristotelian" ruler should be *taught to philosophize*, for "certainly the good man and the statesman and the good citizen ought not to learn the crafts of inferiors" (*Pol.* 3.4.1277b3). The Stagirite first tried making a philosopher-king out of Hermias at Assos.[115] His next attempt was with Alexander.

Aristotle was likely Alexander's tutor for just three years,[116] after which (339 BCE) Alexander became regent while his father campaigned. One source, Diogenes Laertius, related that Aristotle apparently felt that Aristotle himself "thought that he had

[114] Aristotle might not have, however, fully formed his own ideas on the subject during the period that he taught Alexander, although Jaeger, in *Aristotle*, 274-275, contended that *Politics* books one through three and seven were from Aristotle's "early period."

[115] Diogenes Laertius 5.3.

[116] Diogenes Laertius 5.5.

stayed long enough with Alexander," after which "[Aristotle] departed to Athens, having first presented to Alexander his kinsman Callisthenes of Olynthus." But the philosopher surely remained an advisor, both in person (possibly until the beginning of the Persian campaigns) and after, through written correspondence. The king's ideas concerning philosophy would have been completely different without his encounter with the incandescent mind of Aristotle. Plutarch wrote [emphasis added]:

> Aristotle he [Alexander] admired at the first, and loved him, as he himself used to say, more than he did his father, for that the one had given him life, but the other had *taught him a noble life* [i.e., taught him philosophy]; later, however, he held him in more or less of suspicion… However, that eager yearning for philosophy which was imbedded in his nature and whichever grew with his growth, did not subside from his soul.[117]

And Aulus Gellius recorded this letter from the king to the philosopher:

Alexander to Aristotle, Greeting.

> You have not done right in publishing your acroamatic [i.e., esoteric] lectures; for wherein, pray, shall I differ from other men, if these lectures, by which I was instructed, become the common property of all? As for me, I should wish to excel in acquaintance with what is noblest, rather than in power. Farewell.[118]

Alexander had very different political views than his old master,[119] and his megalomania and lack of restraint put him at odds with the post-Socratic ideal of *aretē* (the goodness or virtue of a person as expressed by balance or harmony).[120] Alexander was not the philosopher-king Aristotle had hoped for. But Alexander's inquisitive intellect was characterized by a ceaseless thirst for expanding knowledge (he brought an

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[117] Plutarch *Vit. Alex.*, 7.3-8.4.
[118] Gellius 20.5.11.
[119] Alexander lacked Aristotle's xenophobia and "did not treat the Greeks as if he were their leader, and other peoples as if he were their master." Plutarch *De Fortuna Alexandri*, 329.6; see also Strabo 1.4.9.
[120] *Oxford Dictionary of Philosophy*, s.v. "*aretē*."

entourage of scholars on his adventure, including Aristotle's nephew Callisthenes), a scientific bent (he sent fauna back to Aristotle during his Persian campaigns),[121] and a love for recorded language (he kept a copy of Homer beside the knife under his pillow and surely sent books that he looted from the Persian proto-libraries back to Aristotle).[122]

All of the above values the king inherited or sharpened through his association with Aristotle. So, although Aristotle was unsuccessful at making Alexander a philosopher-king in either the Aristotelian or Platonic sense—the prince's impulsiveness, temper, and cruel streak ultimately prohibited this—the seed had been planted. Alexander *thought of himself as a philosopher*; he adopted the notion that the ideal ruler is both politically powerful and *intellectually engaged*, and he infused his cultural/political program with philosophy (e.g., his idea of the "brotherhood of man").

While little is known of Ptolemy I's early life, as a close companion of the young Alexander he would have encountered Aristotle frequently over the philosopher's tenure as the prince's tutor. He would also have known the philosopher's brilliant protégé Theophrastus, who had been Aristotle's close companion since their meeting at Assos (ca. 348/7-ca. 345 BCE),[123] and Theophrastus would become Ptolemy's obvious first choice to actualize his cultural scheme.

If we hold the accounts of Ptolemy's lifelong friendship with Alexander to be reliable, he would have heard Aristotle lecture at the school in Mieza, for Alexander kept his companions/bodyguards close. Aristotle was used to instructing groups, and

[121] Pliny (the Elder) *Naturalis Historia*, 8.17.44-45.
[122] Plutarch *Vit. Alex.*, 8.2.
[123] Aelian *Varia Historia*, 4.17.

Alexander's friends also would have been the beneficiaries of the philosopher's teachings. This method of education was *familiar* to Aristotle in that it was *Platonic*—it was how the Academy operated. Aristotle had only recently (ca. 350 BCE), headed up a "school" of this sort at Assos with the Platonists Xenocrates, Erastus, Coriscus, Callisthenes, and Hermias.[124]

De Vleeschauwer argued that Ptolemy had already completed his formal education before encountering Aristotle.[125] One is left to conclude that Ptolemy was therefore *not interested in learning more*. This is absurd. Ptolemy was an intellectual, apparently a skilled historian.[126] Why would he not wish to witness Aristotle when given the opportunity? Choosing not to do so would, in fact, provide evidence *against* the claim that Ptolemy was a thinker of any substance, contradicting both modern and ancient authorities.

If Plutarch was correct concerning Aristotle's influence on Alexander, there is no reason that Ptolemy, who shared so many of the characteristics and convictions of Alexander, was not also influenced by the philosopher. And, if we accept that Alexander *was indeed greatly influenced* by Aristotle, at least in terms of molding the king's basic attitudes towards intellectual investigation, it is ultimately of little importance whether Ptolemy had contact with the Stagirite himself. The philosopher's ideas could well have been transmitted to Ptolemy through Alexander.

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[124] Jaeger, *Aristotle*, 115.
[125] De Vleeschauwer, "Origins of the Mouseion," 176.
[126] Arrian *Anabasis, Preface*.

Ptolemy maintained contact with Peripatetic scholars throughout his life. The most imminent among these Aristotelian connections were Theophrastus, Strato of Lampsacus (whom Soter would make tutor to Ptolemy Philadelphus), Menander the famed Athenian playwright and master of the "new comedy" (whom Soter imported to Alexandria) (ca. 342/1-293/89 BCE), and, most importantly, Demetrius of Phalerum. As a close confidant to Alexander, a friend who shared a "community of ideas" with the king, Ptolemy I likely also strived to be a philosopher-king. But though the pharaoh had some philosophical aspirations and scholarly acumen, his true forte was soldiering and ruling. Therefore, when Ptolemy sought to make his grand cultural statement in Alexandria, he decided upon an *intellectual* one because Plato and Aristotle *had tied legitimate kingship inextricably to philosophy*, but he *delegated* responsibility to the man who had possibly had more right to the title of philosopher-king. The pharaoh chose someone who had also studied under Aristotle, and "a man of probity among the Greeks:" the Phalerian.[127]

Demetrius' intellectual credentials as a Peripatetic cannot be denied. Considering that Demetrius met his close friends at the Lyceum, the orator Deinarchus of Corinth (ca. 361-ca. 292 BCE), who was likely with Theophrastus from 335 BCE onwards, and Menander, who probably began his studies under Theophrastus in the mid 320's BCE, Demetrius studied under Theophrastus for up to a decade. The three friends surely would have heard Aristotle lecture, and they may have taken part in the philosopher's last major project, the collection and organization of the Greek constitutions. This like-mindedness

[127] George Synkellos 329.

drew the three together, as it drew Ptolemy to Theophrastus, Ptolemy to Strato, Ptolemy to Menander, and Ptolemy to Demetrius of Phalerum. This chain of association, whether proceeding *directly* through Ptolemy's personal contact with Aristotle himself, or tangentially through Ptolemy's studied selection of Demetrius, resulted in the creation of the Library and Museum within forty years of Aristotle's first ambulatory lectures at Mieza.

Implications

Although being the expected accoutrement of a religious cult, or propaganda tool for a prince (and it was both of these), the Library was first and foremost a tool for enabling intellectual work. And despite the "orientalization" of the Great Library, which no doubt distinguished it from its predecessors, Greek or "barbarian," the foundation of the Library is traceable to Aristotle through both Ptolemy I and Demetrius of Phalerum.

But despite a smattering of literature dealing with the Library and Museum as Aristotelian legacy, transplant, or symbol, the "Aristotelian connection" is seldom explicitly drawn. Much current scholarship, in fact, ignores the theoretical underpinnings of the Alexandrian institutions altogether, showing a preoccupation with the Library and Museum's fates,[128] or speculation concerning their locations and physical structure. Classicist Roger S. Bagnall questioned the importance of such research, suggesting that

[128] For examples of literature concerning the Library's destruction see Matthew Battles, *Library: An Unquiet History* (New York: W.W. Norton & Company, 2003), Jon Thiem, "The Great Library of Alexandria Burnt: Towards the History of a Symbol," *Journal of the History of Ideas* 40, no. 4 (1979): 508-526; Diana Delia, "From Romance to Rhetoric: The Alexandrian Library in Classical and Islamic Traditions," *The American Historical Review* 97, no. 5 (1992): 1449-1467; and Daniel Heller-Roazan, "Traditions Destruction: On the Library of Alexandria," *October* 100 (2002): 133-153. Concerning archaeological evidence see A.J.B Wace, "Recent Ptolemaic Finds in Egypt: Alexandria," *The Journal of Hellenic Studies* 65 (1945): 106-109; and Delia (1992).

intellectually valid areas of research include (1) the philological enterprise supported by the Library, (2) the use of Library collections to systematize knowledge, and (3) the importance of the Library as an institution embracing all knowledge.[129]

Research that consciously examines the *explicit* connection between Aristotelian thought and Alexandrian scholarship focuses on individual scholars, as opposed to any system-wide Peripatetic influence. Scholarship tends to discount that the Library and Museum were philosophically sectarian (i.e., a Peripatetic sect) by focusing on the academic output of prominent Alexandrian scholars. Classicist K.O. Brink showed that much early Alexandrian scholarship was not Peripatetic.[130] Aristotle scholar John Patrick Lynch argued that

> Polemical opposition rather than descendance is what the use of the title *Peripatetikos* signified among the Alexandrians. Far from being an Alexandrian extension, indicating the vitality of the Athenian Peripatos in the third and second centuries BCE, the 'Peripatetic' works of Hermippos, Satyros, Sotion, Herakeides Lembos, and other Alexandrians represented an attempt to usurp the traditions inherited by the post-Aristotelian school in Athens.[131]

But the Museum was never sectarian, it was never a Peripatetic school, and this has no real bearing on its philosophical foundations. De Vleeschauwer, however, used this point as a further argument against the Greek thesis:

> It is a very difficult thing, even long after the establishment of the Mouseion, to descry Aristotle's influence at work in Egypt. It strikes one as odd indeed, if he really was the prime mover in the intellectual life of Alexandria, that his philosophy was so poorly represented at the Mouseion.[132]

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[129] Roger S. Bagnall, "Alexandria: Library of Dreams," *Proceedings of the American Philosophical Society* 146, 4 (2002): 348-362.

[130] K.O. Brink, "Callimachus and Aristotle: An Inquiry into Callimachus' *Pros Praxiphanen*," *Classical Quarterly* 40 (1946): 11-26.

[131] Lynch, *Aristotle's School,* 137.

[132] De Vleeschauwer, "Origins of the Mouseion," 189.

De Vleeschauwer's superficial analysis again ignores the library *in toto*, as an entity that is "both externalised and internalized, material and mental."[133]

The Library brought about a new conception of the *purpose* of the library collection. And while Ptolemaic pharaohs after Ptolemy I would embellish the Library, Museum and Serapeum in a manner that would be expected for oriental monuments, these institutions' true significances would be revealed only through their use over the following centuries. The product of the Library and Museum was an amazing body of theoretical and practical work. Despite the philosophical (or artistic) allegiances of the particular scholars, *the basic philosophical underpinnings* of their work may be traced back to the then-dead Aristotle, who, as Strabo advises us, "taught the kings of Egypt to organize a library."[134] The Great Library of Alexandria was the first *post-Aristotelian library*.

[133] Jacob, "Gathering Memory," 51.
[134] Strabo 13.1.54.

Chapter 5: Alexandria and Aristotelian Science

The ancient Greeks initiated western philosophy, the application of reason for understanding the nature of reality and its constituent parts. In approximately two hundred years, from ca. 800-ca. 600 BCE, the means of plausibly *knowing* the nature of reality made a distinct shift (at least until the Middle Ages) from poetic inspiration, i.e., received knowledge, toward use of the intellect, i.e., reasoned knowledge. While these two forms of knowing remain in tension with one another to this day, *creative scholarship*—the active creation of theoretical knowledge—would not be possible without philosophical inquiry as its fundament.

The nascent philosophy of the Greeks flowered with the work of Plato (lived ca. 429-347 BCE), the first great post-Socratic thinker. Alfred North Whitehead notoriously wrote that the European philosophical tradition "consists of a series of footnotes to Plato. I do not mean the systematic scheme of thought which scholars have doubtfully extracted from his writings. I allude to the wealth of general ideas scattered through them."[1] Plato asked tough questions framed in beautiful dialogues that went well beyond his predecessors' ruminations about the underlying nature of the physical world: What is true? What is beauty? What is love? What is virtue? These questions would be reassessed continually over the next two and a half millennia. Plato, furthermore, would move beyond Socrates' (lived 469-399 BCE) *maieutic* examinations of abstract concepts

[1] Alfred North Whitehead, *Process and Reality: An Essay in Cosmology* (New York: Harper and Row, 1960), 63.

through his attempts to systematize philosophy and science[2]—both in the manner in which they were conducted (through a methodology of discovery) and the way that they were transmitted to students (through founding the Academy, the first philosophical school in the West).

Both the questions that Plato asked and his methods for answering them served as intellectual fodder for the investigations of his most famous pupil, Aristotle of Stagira. But while Aristotle inherited the "big questions" from Plato, his contributions to western philosophy were not mere footnotes to his master's work. Aristotelian thought provided the basic template for the system of scholarly communication that triumphed in the post-classical Greek and Roman worlds and which would be assumed in the medieval west as a primary method of explaining the natural world up to the dawn of modern science (which itself owes a great debt to Aristotelian thought), and serves to this day as the largely taken-for-granted intellectual foundation of the modern academic library. And while the "European tradition" of *thought* might be synonymous with the "Platonic tradition,"[3] the "European tradition" of *scholarship*, the means of systematically addressing the questions generated by Plato, is the brainchild of Aristotle.

This chapter begins a two part examination of the thesis adopted in chapter four that the *intellectual basis* for the Alexandrian Library and Museum, despite whatever political machinations Ptolemy I may have set in motion by founding them, rested in Aristotle's philosophical and scientific thought.

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[2] Socrates' *maieutic* technique of asking questions allowed the respondent to formulate latent abstract concepts.

[3] Ibid.

First, a brief intellectual history of those Greek thinkers who lived before Aristotle provides context for the subsequent examination of Aristotle and his epistemology. This intellectual history is followed by a history of Aristotle and his school that orients the Library and Museum in the context of the philosopher's life and work. Aristotle's science and the intellectual milieu of the Lyceum are discussed and compared with that of the Museum. This study suggests that the Library and Museum not only supported an intellectual agenda rooted in Aristotle's philosophy, but also *institutionalized* the underlying Aristotelian *intellectual basis*. Specifically, the Museum was the materialization of the "scientific" component of Aristotle's complete scientific method.

Having argued that the Alexandrian scholarly community represented a materialization of Aristotelian science, chapter six then analyzes the philosophical basis of the use and organization of the Library collection to support this post-Aristotelian scholarly community. Chapter six discusses the relationships between this "pre-scientific" component of Aristotle's methods, induction and dialectic, and the Library of the Museum, and specifically the purpose, organization, and use of the Library's collection for these pre-scientific functions. Although the sequencing of chapters five and six appears odd, it is necessary to understand, first, what the Alexandrians were doing (science), followed by an analysis of how the Library supported their mission (pre-science).

Poetry and Philosophy

In order to fully understand the revolutionary importance of the Library and Museum, one must first consider the great advance in critical thinking that came with the birth of western philosophy.

Culminating the efforts of Socrates and Plato, Aristotle methodized the creation and systematization of knowledge, and he recognized *that collaborative effort* that *spanned time* was necessary to effectively organize knowledge into coherent systems of understanding. The Museum and Library embodied these two Aristotelian ideas: (1) that science is collaborative and accretive and (2) that science, to be coherent, must be logically structured. The former idea is revealed in the work accomplished in Alexandria during the Hellenistic period. The latter idea was embedded in the Library and Museum's institutional forms—patterns that served as basic paradigms for later academic institutions of research and higher learning. Both of these Aristotelian ideas required the accumulation and organization of written documents, processes that chapter six details as inherent to Aristotle's complete scientific method. Aristotle's philosophy and science, however, were themselves heirs to a profound tradition of Greek intellectual investigation. The Library and Museum, which "operationalized" Aristotelian philosophy on a massive institutional scale, may be fully understood only in light of these Archaic and Hellenic intellectual traditions.

The origins of Greek philosophy, however, are obscured by the dearth of recorded information surviving from prior to the fifth century BCE. Thales of Miletus (fl. ca. 585 BCE), for example, who is generally recognized as the first western philosopher, is

known to us only through brief mentions of him in the works of Aristotle and the Greek historian Herodotus. But Thales, though obscure his contributions to science might appear to be, represented a profound shift in the way that humans *discover* new knowledge—a revolution in abstract conceptualization.

Classicist and linguist Eric Havelock offered the Greek alphabet as the source for the development of the abstract thinking and linguistic precision necessary for science. The alphabet, unlike preceding scripts, encouraged "the production of unfamiliar statement, [and] stimulated the thinking of novel thought." [4] The alphabet separated the "knower from the known," it objectified the known by *recording it*, while maintaining the basic integrity of the writer's thought. The alphabetical characters provided their inscribers the ability to put in place ideas and ways of thinking that long outlived them.

Recognizing the power of spoken language, library historian H. Curtis Wright adopted the Parry-Lord thesis as a foundational element of Greek philosophy and academic librarianship. Albert Lord, expanding upon the work of fellow folklorist and Homerian scholar Milman Parry, concluded that "the epic singers from the dawn of human consciousness have been a deeply significant group and have contributed abundantly to the spiritual and intellectual growth of man."[5] Wright proposed that the creative improvisations of the *Homeridae*, the clan of bards who recited Homer, contributed much to the development of Greek philosophical thought. It was this strong

[4] Havelock, *Origins of Western Literacy*, 50.
[5] Albert B. Lord, *The Singer of Tales* (Cambridge, MA: Harvard University Press, 1964), vii.

oral culture's "cross-fertilization" with ancient Eastern "book culture" which culminated in the Library and Museum.[6]

Also worthy of consideration as contributing to the sweeping change in western thought was the generally secular worldview of the ancient Greeks.[7] Prior to the introduction of the Orphic cult, ca. sixth century BCE, Greek religion was exemplified by the "light-hearted polytheism of Homer,"[8] with its gods and goddesses who were "frankly human, except that they are immortal and more powerful than men."[9] Classicist John Burnet held that, with the possible exception of the agricultural deities Demeter and Dionysius, the Greek gods were not worshipped with much sincerity.[10] And, although the Greeks considered their myths to represent actual historical events, the critical-minded among them acknowledged that these stories had been corrupted with fantasy.[11]

Western philosophy possibly resulted from a confluence of these three elements: (1) the power of the alphabet, (2) the Greek's rich oral tradition, and (3) their skeptical but inquisitive nature—and no Greek thinker seemed to both recognize and intellectually encapsulate all these elements more than Aristotle himself. The development of the critical application of reason would proceed from its earliest beginnings to the Stagirite at a dizzying pace. But although Greek philosophy and science reached their zenith in the highly technical treatises of Aristotle and the subsequent application of these treatises'

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[6] Wright, *Oral Antecedents*, 139-140.
[7] John Burnet, *Greek Philosophy: Part I; Thales to Plato* (London: Macmillan and Co., 1914), 30.
[8] Ibid.
[9] Ibid., 28.
[10] Ibid.
[11] Paul Veyne, *Did the Greeks Believe in Their Myths? An Essay on the Constitutive Imagination*, trans. Paula Wissing (Chicago: University of Chicago Press, 1988), 60.

ideas at the Library and Museum, western philosophy's roots are in the poetry of Archaic Greece.

Hesiod (fl. ca. 700 BCE), the other great early Greek rhapsode besides Homer, described the gods as base and cruel in his *Theogony*.[12] But Hesiod's poetry revealed that, even at this early date, the cartoonish nature of the Greek mythology barely concealed a deep desire for knowledge. But, for the poets, the gods possessed knowledge of the truth. The "Hesiodic" epistemology, and "that of archaic Greek poetry in general, made the relationship between mortal poets and the divine Muses one of dependency and patronage."[13] To *know* was to receive *divine inspiration*. The knower was the *poet*, and the poet *received* knowledge as a gift from the gods. Hesiod relied, ultimately, not upon his ability to reason in order to develop his cosmogony, but on the pleasure of the Muses [emphasis added]:

> And this is what *those goddesses first to me made known*,
> The Muses of Olympos, maids of aegis-bearing Zeus:
> "You shepherds of the wilderness, mere bellies, poor excuse
> for men, *we can make falsities and fallacies seem true,*
> *But when we want we're able to give truthful statements too*."
> The ready-spoken daughters of great Zeus had this to say,
> And gave me a staff that they had plucked, a branch of flowering bay,
> A wondrous thing! And *breathed a god-inspired voice in me,*
> That I might celebrate the things that were and that shall be.[14]

The *poet* knows only through the intervention of outside agents. These agents, furthermore, are not necessarily trustworthy, for they "can make falsities and fallacies

[12] Robert Lamberton, *Hesiod* (New Haven, CT: Yale University Press, 1988), 98.
[13] Derek Collins, "Hesiod and the Divine Voice of the Muses," *Arethusa* 32 (1999): 242.
[14] Hesiod *Theogony*, 24-32.

seem true."[15] The poet, like the Near Eastern diviners, may never know for certain that what she receives from the gods is reliable.

First practiced by Thales, ancient Greek *philosophy* rested ultimately on epistemologies that base the acquisition of truth on the exercise of *human* reason. Thales believed humans have the capability, through their own efforts, of understanding the world around them. Thales set out to explain the natural world without recourse to the gods. The Milesian's goal was to identify the primary material substance of the cosmos (*Metaph.* 1.3.983b5), which he claimed was "water" after observing that "the nutriment of all things is moist" (*Metaph.* 1.3.983b20). Anaximander (fl. ca. 570 BCE) would substitute the "boundless" for water (*Ph.* 3.4.203b6), Anaximenes (fl. ca. 550 BCE) "air" (*Metaph.* 1.3.984a5), and Pythagoras "number" (*Cael.* 3.1.300a15). Leucippus (fl. ca. 440 BCE) and Democritus (fl. ca. 420 BCE), who represented the culmination of this pre-Socratic fascination with prime matter, posited "atom" and "void" as substrates (*Metaph.*1.4.985b5)

These early philosophers' conclusions appear crude, but their use of reason to formulate abstract understanding was radical. Thales' deduction that water is the substratum of all things came through the intellectual processing of observations. He *saw living things drinking water* and logically deduced that, since water is required by all things to survive, water must be the primary element of all things.[16] The pre-Socratic philosophers, unlike the poets, *reflected* upon *empirical observation* to facilitate

[15] Ibid; see also S. Marc Cohen, Patricia Curd, C.D.C. Reeve, eds. *Readings in Ancient Greek Philosophy: From Thales to Aristotle* 3rd. edition (Indianapolis: Hackett, 2005), 2-3, and David Roochnik, *Retreiving the Ancients* (Maledn, MA: Blackwell, 2004), 12-117.

[16] Jonathan Barnes, *The Presocratic Philosophers: Volume I; Thales to Zeno*. (London: Routledge and Kegan Paul, 1979), 11.

reasoning and reach the truth concerning the natural world. It would seem to be a natural development therefore, that philosophers and scientists would find value in *reflecting upon the observations of other philosophers and scientists* in the development of their own ideas—hence the need for scholarly communication.

In the mid-to-late fifth century BCE, Socrates shifted the philosophical conversation from a general focus on physical science to morality and ethics. What is known about Socrates comes primarily through Plato's dialogues, in which he is a central character. It is not known for certain how much of Plato's portrayal of Socrates (Socrates either did not record his own ideas or they were lost) represents Socratic thought and how often the "character of Socrates" acts as a mouthpiece for Plato's ideas. But the general thrust of Plato and Aristotle's presentation of Socrates' philosophy shows that the historical Socrates used argument to point out the inadequacy of others' knowledge claims in pursuit of the "true definitions" of "big concepts" like "Beauty" and "Love."[17] Furthermore, Socrates validated the critical examination of reality (philosophy) as the pursuit of answers to these fundamental questions of existence, claiming that "the unexamined life is no life for a human being."[18] In the process Socrates equated, and likely for the first time in the West, critical thinking and philosophy with education.[19]

Plato, Socrates' student, used his teacher's approach to philosophy as a starting point for his own intellectual investigations into reality. Plato is notable, however, for being the first *systematic* philosopher in the West. That is, Plato's philosophy allowed all

[17] Aristotle, in *Metaph.* 13.4.1078b17, wrote that "Socrates occupied himself with the excellences of character, and in connection with them became the first to raise the problem of universal definitions."
[18] Plato, *Apologia*, 38a.
[19] *Routledge Encyclopedia of Philosophy*, s.v. "Socrates."

questions to be potentially answered without contradiction to his overall philosophical model. He did this through developing and applying a unifying theory, i.e., that there exists an objective world of ideal forms that is "true" reality as opposed to the "reality" in which we exist. The knowledge-seeker, furthermore, may apply a *method of discovery* (Platonic dialectic) to uncover and unify the "known" into a coherent system. The valid means of knowing reality is to reject the metaphorical "cave" (i.e., the phenomenal world of illusion and opinion) for the sunlit world of the truth (i.e., the world of the ideal forms as illuminated by the ultimate form of the "Good").[20] Plato's development of a programmatic approach to understanding an ontologically unified reality seems to lend itself naturally to the creation of *institutions* for applying education, theory, and method.

Socrates attracted a group of students as well as engaged in philosophical conversation with anyone who was willing. This communal/collaborative approach to intellectual discovery greatly influenced Plato (and by extension, Aristotle). Following Socrates' execution (499 BCE) Plato founded his own intellectual community and the first true philosophical school, the Academy. This was an "epoch-making" development in education.[21] The Academic model of higher education was a permanent (i.e., the school had a fixed physical presence) intellectual community dedicated to both education and innovative philosophical discovery, and was not "designed to immerse all in the one true faith, the one creed, or the one true theory" (like earlier institutions such as that of Pythagoras).[22]

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[20] Plato *Respublica*, 514a-516b.
[21] Grayeff, *Aristotle and His School*, 17.
[22] Robin Barrow, *Plato* (London: Continuum, 2007), 130.

Plato's discussion of the education of "philosopher kings" in book seven of the *Republic*,[23] which outlines a regimen of mathematics, dialectic, and discussion of "the Good," suggests that the Academy was *not* a professional school, but an institution founded on the collaborative discovery, understanding, and transmission of philosophical truths.[24] The Academy served as the model for Aristotle's school, the Lyceum, and by extension the Museum of Alexandria.

Aristotle's philosophy and science was inestimably influenced by Socrates' shift of philosophy's emphasis from physics to human-centered issues and Plato's proto-systematic approach to philosophy and science,[25] as well as philosophy's humble beginnings in physics. Aristotle combined these two intellectual inputs, the Milesians' belief that the truth may be found in the phenomenal world with Plato's dedication to systematic philosophy and communal intellectualism (modeled for Plato by his own teacher, Socrates). What Aristotle developed, as a result of his discourse with his distant and immediate intellectual *forebears*, was a method grounded in experience, both remembered and recorded, *and* the systematic application of reason.

Aristotle

Aristotle defined a systematic *method* for gathering and organizing information to form explanatory structures—the sciences. Plato certainly had a systematic method of discovery, his dialectic, and this method influenced Aristotle's approach to establishing

[23] Plato *Respublica*, 535a-540b.

[24] Ian Meuller, "Mathematical Method and Philosophical Truth," in *The Cambridge Companion to Plato*, Richard Kraut, ed. (Cambridge: Cambridge University Press, 1992), 171.

[25] In *Mag. Mor.* 1.1.1183b9-11 Aristotle claimed that Socrates' "science" was the study of the virtues. Plato expanded Socrates' examinations to include metaphysics, politics, and mathematics.

knowledge claims. But Plato's surviving writings, and there is reason to conclude that these writings represent his complete recorded output, [26] offer *no systematically defined recipe* for doing philosophy or science beyond the murkily outlined dialectical process. In contrast to Plato, Aristotle's *treatises*, which clearly conveyed *Aristotle's* ideas (as opposed to the Platonic *dialogues*, in which it is never quite certain whether the ideas expressed accurately convey the beliefs of the author, speaker, or both), left post-Aristotelian scholars with enough instructions to conclude *how* to apply Peripatetic method to acquire knowledge. This was Aristotle's great gift to western philosophy and science. While the Socratic/Platonic method appears to have been transmitted primarily *orally*,[27] Peripatetic method was *recorded* and systematically used *recorded documents*. It is not surprising, therefore, that the Academy did not remain doctrinally "Platonist" for long after Plato's death.[28]

The Lyceum, Aristotle's philosophical school, was a proving ground for philosophical and scientific theories and locus of the development of hierarchically structured sciences. The Library and Museum continued this Aristotelian iteration of the Academic approach to communal learning, the philosophical school, and provided a locus for the Aristotelian approach to the orchestrated group effort of systematic discovery. In the early days of the Alexandrian Museum the "way of knowing" had

[26] With a few exceptions, including the *Apology* and *Menexemus* (both speeches), and the *Epistles*, Plato's surviving works are entirely dialogues. There are probably no Platonic *treatises*. Terence Irwin, in "The Platonic Corpus," in *Oxford Handbook of Plato*, ed. Gail Fine (Oxford: Oxford University Press, 2008), 64, concluded that "the Platonic Corpus is unusual among the works of Greek authors by being, as far as we know, complete. No reference in any ancient author attests the existence of any work by Plato that does not appear in our Platonic corpus."

[27] John Dillon, *The Heirs of Plato: A Study of the Old Academy (347-274 BC)* (Oxford: Clarendon Press, 2003), 16-17.

[28] By the end of the fourth century BCE, it had fallen under the sway of the Skeptics (Grayeff, *Aristotle and His School*, 54).

shifted noticeably from poetry to philosophy and science. Although officially a shrine to the Muses, the Museum scholars, unlike Hesiod, did not rely on those goddesses' fickle good graces. According to Strabo, by the third century BCE the Alexandrian scientist and (Head) Librarian Eratosthenes was referring to poetry as nothing more than a form of entertainment.[29] And while there were indeed poets working at the Library and Museum, the men operating at Alexandria are referred to in the ancient literature generally as "philosophers,"[30] "philologists" ("those who are fond of learning"),[31] or "Peripatetics," which by the early third century BCE had become a term synonymous with "philosophers."[32] Who was the man then who inaugurated this new era in scholarship?

Aristotle's Early Life

By some happy twist of fate, Aristotle was born during an ideal time and place for developing and exercising his remarkable intellect. The second century CE Roman historian Diodorus Siculus celebrated the classical Greek world of the mid-fifth to the early fourth century BCE: "…plenty brought increase to the arts, and the greatest artists of whom we have on record… flourished at that time; and there was likewise great advance in education, and philosophy and oratory had a high place of honour among all Greeks, and especially the Athenians."[33] Even Macedonia, Greece's backwater cousin to the north, contributed to the transcendent cultural and intellectual climate of the age, most notably through the Macedonian kings' continuing patronage of Aristotle.

[29] Strabo 1.2.3.
[30] Ibid., 1.2.2.
[31] Ibid., 17.1.8.; Athenaeus 1.22.
[32] Grayeff, *Aristotle and His School*, 39.
[33] Diodorus Siculus 12.1.3-4.

Aristotle was born in 384 BCE in Stagira Chalcidice, an eastern Thracian province bordering Macedonia to the north. The town was far removed from Athens, the intellectual center of Greece at the time. [34] Barbarians had previously occupied the area,[35] and at the time of the Aristotle's birth the town was no more than a tiny Greek colony under the control of Amyntas III (reigned ca. 393-370 BCE), king of Macedonia and father to his heir, Philip II (reigned 359-336 BCE). The town's sole claim to notoriety came from its being the birthplace of the philosopher.[36] This association, however, served it well. Philip II of Macedonia, who had destroyed Stagira in 349 BCE, would rebuild it as a gift to Aristotle.[37]

Nichomachus, Aristotle's father, was personal physician to Amyntas III and traced his family's lineage to Asclepius, Greek god of medicine.[38] Aristotle inherited his own interests in biology and medicine from his father, manifesting in his unflagging love for the structures found in living organisms, no matter how ignoble the particular *species*.[39] His father's example probably also fostered in Aristotle an appreciation of the importance of empirical observation when engaging in philosophy and science. Aristotle, in turn, would transmit this love of medicine and its methods to Alexander.[40]

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[34] Diogenes Laertius 5.1.

[35] Marcellinus 27.4.9.

[36] Stagira is often referred to in ancient geographical surveys simply as "Stagira, birthplace of Aristotle" (Marcellinus 27.4.8-9.; Strabo frag. 7.33 Jones).

[37] Plutarch *Vit Alex.*, 7.2; Dio Chrysostom *Second Discourse on Kingship*, 79; Aelian *Varia Historia*, 3.17.

[38] Diogenes Laertius 5.1.

[39] Aristotle would write in *Part. An.* 1.5.645a3 that "For if some [animals] have no graces to charm the senses, yet nature, which fashioned them gives amazing pleasure in their study to all who can trace links of causation, and are inclined to philosophy."

[40] Plutarch *Vit. Alex.* 8.1.

Philosophical Pedigree

Nichomachus died when Aristotle was a teenager (Aristotle's mother, Phaestis, had died when he was a young boy). The young Aristotle was fortunately left independently wealthy. His relationships with the Macedonian kings and his continuing influence among politicians and the powerful men of the Greek world (e.g., Alexander's general Antipater) would expand this personal wealth.[41] Aristotle was never without the means necessary to pursue a life of contemplation (he was considerably wealthy at the time of his death),[42] which he did with a zest that earned him the title "prince of philosophers."[43]

At age seventeen (ca. 367 BCE) Aristotle traveled to Athens to study at the Academy under Plato, who by that time had established himself as the most renowned philosopher in the western world. Aristotle, in turn, would become the greatest of Plato's students.[44] He remained at Plato's Academy for approximately twenty years (ca. 367-347 BCE),[45] first as a student and later as an instructor. Aristotle's preeminence at the Academy was no small feat. His colleagues included, among many other exceptional minds, Xenocrates of Chalcedon, a statesman, philosopher, and head of the Academy from 339 to 314 BCE, and the famed mathematician, astronomer, and geographer Eudoxus of Cnidos (lived ca. 390-ca. 340 BCE). Aristotle would outshine them all.

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[41] Pausanias 6.8.

[42] Diogenes Laertius 5.11.

[43] The veneration of Aristotle stretched into the Middle Ages and spanned East and West. The twelfth century CE Jewish scholar Maimonides referred to Aristotle as "the chief of the philosophers" in his *The Guide of the Perplexed* (Chicago: University of Chicago Press, 1963), 29. Dante Alighieri, the thirteenth century poet, identified Aristotle in *Inferno* 4.131 as "the master of those who know, ringed by the great souls of philosophy."

[44] Diogenes Laertius 5.1.

[45] John Philoponus *Against Proclus*, 8.32.

During Aristotle's stay at the Academy, the school was not particularly doctrinaire, as it would later become under the Neo-Platonists.[46] Plato, whose own ideas evolved significantly over his own career as a philosopher, did not discourage his students from developing philosophy in new directions. Felix Grayeff wrote that Plato set the problems to be addressed in a loosely organized atmosphere that encouraged innovative techniques. The old philosopher likely encouraged Aristotle to follow his own path.[47]

Although Plato and Aristotle maintained different and oftentimes opposing ontological and epistemological views, most evident in Aristotle's dismissal of the Platonic theory of ideal forms (*An. Post* 1.22.83a33), Aristotle greatly respected his teacher.[48] Ancient commentators, however, paid an inordinate amount of attention to the conflict between the two philosophers, often reducing Aristotle to the role of cartoon bully. Such accusations are likely the anti-Peripatetic propaganda of rival schools.[49] Aristotle loved Plato, lionizing him in fragments of his lost dialogue *On Philosophy*,[50] elegizing him as "a man whom the wicked may not properly even praise,"[51] and recommending to "the kings those connected to Plato by birth."[52] Aristotle's deep respect

[46] Speussipus (lived ca.407-339BCE), Plato's successor to the headship of the Academy, would even rejected the theory of the forms.

[47] Grayeff, *Aristotle's School,* 55-56.

[48] Diogenes Laertius, in *Life of Plato*, 3.37, wrote that Aristotle was at times the only student that would sit through Plato's entire lectures.

[49] Aelian, using Epicurus (a major rival of Aristotle) as source material, reported that Aristotle bullied the aging Plato, forcing him to change his teaching habits: "It was clear that Aristotle had aggressive designs, as he put very arrogant questions to him [Plato], to some extent in a spirit of refutation, which was unjust and unfair. As a result Plato abandoned his walk out of doors and strolled with his companions inside" (*Varia Historia*, 3.19).

[50] Jaeger, *Aristotle*, 138.

[51] Aristotle frag. 650, 673 Barnes.

[52] Aristotle frag. 654 Barnes.

for Plato, however, is perhaps best reflected in the Stagirite's appropriation and modification of his teacher's approach to philosophy (which itself had evolved from Socrates). Aristotle, although making a profound mark on the history of philosophy and science, was the product of his forebears.

Without Plato there would have been no Aristotle. Any contributions to scholarly communication made by Aristotle must be considered in light of Plato's contributions to philosophy. Aristotle was, for all intents and purposes, a Platonist, although one excited by the *physical* world of our experience and ready to explore its workings down to the minutest detail.[53] He displayed this Platonism through his continuing dedication to Socratic/Platonic questions, his attempts at systematizing theoretical science through *adapting*, *applying*, and *codifying* Plato's *method*, and his unflagging devotion to the contemplative life and its communal expression. Aristotelianism, even at the time of its complete maturity, was an *evolved* Platonism rather than a radical departure.

The extent of Aristotle's debt to Plato is clear when considering Aristotle's philosophical agenda. Aristotle, like Plato, championed the idea that there is an objective truth. The diligent and rigorous seeker of knowledge, furthermore, may *know* this objective truth through the application of *a systematic method of exploration*. So, while Aristotle rejected Plato's ontological and epistemological dualism, his old master provided him with the spadework (i.e., the application of reason) necessary for building his own "philosophical edifice."[54] Aristotle, furthermore, adopted Plato's idea of the *philosophical school* as a necessary tool for the education of philosophers and scientists

[53] Athenaeus 8.32.
[54] Grayeff, *Aristotle and his School*, 40.

but developed it as a locus of systematic inquiry and scholarly cooperation. The development of the idea of the philosophical school may be traced from the Academy, to Aristotle's own school, the Lyceum, to the Alexandrian Museum.

Academy to Lyceum

Aristotle left the Academy in 347 BCE (aged 37), reportedly in a pique after Plato left control of the school to his nephew Speussipus.[55] Plato's model of scholarly/educational community, however, served as Aristotle's educational *modus operandi* until the latter's death in 322 BCE. Both the intellectual enclave at Assos and Aristotle's "school" at Mieza (where he taught Alexander and his cohort, ca. 342-339 BCE) were, if on a miniature scale and much less formally structured, philosophical "institutions" of higher learning that centered on the Platonic idea of communal education and, [56] in the case of the "oligarchy of wise men" at the court of Hermias, communal research.[57]

Aristotle appeared, in fact, to be constantly on the lookout for talented colleagues to aid him in his scientific research. For example, the philosopher is said to have spent approximately two years (ca. 345-343/2 BCE) in Mytilene, Lesbos engaging in zoological inquiries with the help of Theophrastus.[58] Soon after Alexander the Great's elevation to the Macedonian kingship (336 BCE), Aristotle (then approximately 50 years

[55] Diogenes Laertius 5.2.

[56] William Smith, in the *Dictionary of Greek and Roman Biography and Mythology* (Boston: C. Little and J. Brown, 1870), 319, concluded that while the school at Mieza was in session for the education of Alexander, Plutarch's references in *Vit. Alex.* 10 to Alexander's close companions, particularly Nearchus, Ptolemy, and Thearchus, suggest that they were his "classmates." Aristotle would have welcomed such a familiar pedagogical arrangement.

[57] Jaeger, *Aristotle*, 113.

[58] Aelian *Varia Historia*, 4.17.

old) would found a true rival to the Academy, the Lyceum (founded ca. 335 BCE), with the financial support of the Macedonian king and the protection of Alexander's general Antipater (lived 397-319 BCE). The Lyceum, Aristotle's own philosophical institution, reflected the Stagirite's distinctive and highly developed science.

Aristotle taught for thirteen years at the Lyceum, located at the grove of the Apollo Lycus in Athens. The Lyceum emulated the Academy in many respects. It was a *permanent* institution of higher education and Aristotle and his colleagues delivered lectures to the cream of the Greek youth in a post-Platonic communal educational environment. The Lyceum also inherited the freedom given at the Academy to explore new intellectual avenues. The scholarship of the Lyceum, considering the range of topics covered by Aristotle in his own writings, of which approximately only 20 percent have survived, was comprehensive in nature. Diogenes Laertius' list of Aristotle's works illustrates the immense scope of the philosopher's studies (although it is not certain how many are wrongly attributed), listing works on the differences of the voices of similar animals, drunkenness, philosophers who have treated meteorology, stones, music, flattery, oratorical precepts, the history of geometry, the crater of Mount Etna in Sicily, and the education of children.[59] Many subjects were taught, and Aristotle attracted students with diverse intellectual interests.

This freewheeling approach to philosophy and science was by no means normative to classical Greek philosophical schools. The Epicureans, for example, felt that

[59] Diogenes Laertius 5.22-27.

their philosophy was complete in itself, and the Stoics focused primarily on ethics.[60] This "Platonic/Aristotelian stamp" would be evident in the work being accomplished at the Library and Museum. For, although philology made up a considerable portion of the early era Alexandrian scholarship, there emerged a wide range of exploration in a variety of intellectual disciplines.

Aristotle, however, differed from Plato in that the Stagirite believed that scientific progress was an ongoing movement from confusion toward organization through perpetual dialectic (*Ph.* 1.1.184a22). Humans slowly came to a fuller realization of how the world works through constantly building upon their own and *others' knowledge* as part of a systematic process. This view contrasts with the Platonic conception that every human possessed an immortal soul that had a complete knowledge of reality that was lost with the trauma of birth (*anamnesis*), and that *solitary thinkers* must *recollect* their knowledge through ratiocination.[61]

In the historical sense, philosophers and scientists build upon the works of past thinkers in a slow crawl toward the most complete understanding of reality (*Soph. El.* 1.34.183b16; see also *Metaph.* 2.1.994b12). Aristotle compared the work of the earliest philosophers to that of children (*Metaph.* 2.10.993a15) but he recognized that "every man has some contribution to make to the truth… For advancing from true but obscure judgments he [the philosopher] will arrive at clear ones, always exchanging the usual confused statement for more real knowledge" (*Eth. Eud.* 1.6.1216b30; see also *Ph.* 1.1.184a22). Philosophy and science, therefore, constantly mature by means of the

[60] Grayeff, *Aristotle and His School*, 59-61.
[61] Plato *Phaedrus*, 249c.

systematic exchange, evaluation, and metamorphosis of ideas. They are collective endeavors extending through time, and even the brightest intellectual stars of the present are but the latest thinkers in a "succession of men who have advanced [philosophy and the sciences] bit by bit, and so have developed them into their present form" (*Soph. El.* 1.34.184b30).

This epistemological standpoint, that knowledge results from an accretive process, warranted both the creation of communities of scholars (i.e., gathering together those most capable of working in concert to construct each of the sciences), as well as the development of systematic methodologies of discovery to be used by these communities. The scholars of Aristotle's school operated under a *philosophical mandate*—working together to create knowledge was part of a *Peripatetic doctrinal position*.

The Lyceum was an incubator for theoretical and scientific knowledge that relied upon group effort. It was during this period of Aristotle's life that he wrote many of his scientific treatises. These treatises, including the *Parts of Animals* and the *Meteorology*, display the sophisticated level of scientific work that occurred during Aristotle's term as the school's "dean," and the scope and detail of these projects suggests that members of the Lyceum worked actively alongside Aristotle in the creation of scientific knowledge. The *Constitutions of Greek Cities* (not published before 329/328 BCE),[62] of which only the *Constitution of Athens* has survived, was one such particularly massive research project. The finished project contained over 158 Greek constitutions and could only have been completed by means of an orchestrated team effort. The Roman politician and

[62] Jaeger, *Aristotle*, 327.

natural historian Pliny the Elder (lived ca. 23/24-79 CE) wrote of another great work undertaken at the Lyceum on zoology which consisted of nearly fifty volumes,[63] further illustrating the large-scale concerted efforts of scholarship developing at the Lyceum.

Lyceum to Museum

Aristotle would not see the spread of his ideas to Alexandria. A wave of anti-Macedonian sentiment swept over Greece upon Alexander's demise (323 BCE). The king's sudden death at Babylon foretold Aristotle's own end. The Greeks harbored distaste for Alexander that at times bordered on abject hatred. For, regardless of his massive successes, the king's ruthless destruction of Thebes (335 BCE) was still fresh in the Greek consciousness,[64] and despite his cultural pretensions, Alexander was always seen by the Greeks as a foreign tyrant. Following Alexander's death the Athenians attempted to reestablish their democracy and strained against the Macedonian yoke.

Aristotle's long-held ties to the aristocracy (e.g., Philip, Alexander, Antipater) marked him as a sympathizer. To avoid, in his own words, allowing the Athenians to "commit two offences against philosophy,"[65] the first sin being the execution of Socrates, Aristotle fled from Athens to his mother's estate at Chalcis, a city on the Aegean island of Euboea. He died there of a chronic stomach ailment in the latter part of 322 BCE.[66] Aristotle was sixty-two years old and at the height of his intellectual powers. During his amazing intellectual career the Stagirite firmly methodized the pursuit of knowledge

[63] Pliny (the Elder) *Naturalis Historia*, 8.17.43-44.
[64] Plutarch *Vit. Alex.*, 11.4-6.
[65] Aelian *Varia Historia*, 3.36; see also Aristotle frag. 667 Barnes.
[66] Censorinus *De die natali*, 14.14.

begun by the pre-Socratic philosophers and greatly advanced by Plato, leaving his successors with robust means of discovery.

Considering that Ptolemy I was a close companion of Alexander, a keen observer of both Alexander's thoughts and actions, and likely a student of Aristotle (whether the last's knowledge came to Soter through Alexander or the philosopher himself is ultimately unimportant), it is not surprising that, upon becoming the king of Egypt, Soter acted as patron for his own institution of higher learning and scholarship.[67] He went to the Peripatetic philosophers for help in setting his plans in motion. Demetrius of Phalerum was a man that Soter knew would, like Aristotle, be proficient in *systematically* setting up an institution for engaging in scholarship. At any rate, by 300 BCE the Academy, as classicist John Dillon wrote, was losing momentum,[68] and though it possessed a philosophical identity, it had no well-defined research agenda. The Lyceum, however, was at the turn of the century still a stunning success story, and its scholars were highly sought after commodities.

The variety of scholarship performed at the Museum and organized at the Library suggests that the Alexandrians inherited the open-ended intellectualism of the Lyceum (and Academy). The work performed at the Museum was varied and experimental. The new Alexandrian literature exploded old forms and styles. Apollonius Rhodius' *Argonautica*, for example, updated the epic style of Homer to reflect Hellenistic insecurities and punctured traditional ideas concerning heroism. Alexandrian science used novel approaches to discovery (sometimes surprisingly so). The preeminent Greek

[67] This process was repeated with the Pergamene kings' endowment of their great library.
[68] Dillon, *Heirs of Plato*, 234-235.

physicians of the age, Herophilus of Chalcedon and Erasistratus of Ceos (both flourished in the first half of the third century BCE), for example, reportedly performed vivisections of condemned criminals and rewrote what was then known concerning human anatomy (the Hellenistic world could be an exceedingly cruel place).[69]

Classicist and philosopher Felix Grayeff suggested that the following passage from Aristotle's *Metaphysics* affords "insight into the working of the school [the Lyceum], its spirit and organization" [emphasis added]:[70]

> The investigation of the truth is in one way hard, in another easy. An indication of this is found in the fact that no one fails entirely, but every one says something true about the nature of things, and *while individually they contribute little or nothing* to the truth, by *the union of all a considerable amount is amassed* (2.1.993a27).

This Peripatetic "commencement address" might easily have been given to the scholars of Alexandria;[71] the passage accurately describes the work being performed at the Museum of Alexandria during the first one hundred and fifty years of its existence. The members of the Museum echoed the scholars of the Lyceum with their communal efforts of scholarship but on an expansive scale. The Museum's inaugural project consisted of the collection and recension of Greek literature—an immense undertaking that would have certainly required careful management. The cataloging of the Library's collection under Callimachus was another enormous scholarly enterprise that likely took many dedicated scholars and multiple years to complete fully. The enterprise was so large, in fact, that Blum concluded that the *Pinakes* was likely not finished until after

[69] Celsus *De Medicina, Prooemium*, 23-24; Tertullian *De Testimonio Animae*, 10.
[70] Grayeff, *Aristotle's School*, 65-66.
[71] Ibid.

Callimachus' death [72] And finally, the considerable amount of knowledge being continually amassed at the Library was evidence of the fruit of the Museum's communal scholarship—the *union of all*. Aristotle's philosophical and scientific discoveries have survived to the present day, largely through the agency of the tools for engaging in scholarship that he helped define. Although Aristotle did not live to see his library used for philosophy and science during the Peripatetic school's late fourth century BCE apex, he would, through the work of his heir Demetrius of Phalerum, "[teach] the kings in Egypt how to arrange a library."[73]

And even if Aristotle's methods have been superseded by the modern "scientific method," the philosopher defined the basic structure of what a science is. This structure became *institutionalized* in organizations charged with the goal of scholarly discovery. The Library and Museum were the first and the greatest of these post-Aristotelian institutions. To understand how the Library and Museum "embedded" Aristotle's science in its own institutional structure it is necessary to consider the Stagirite's theories concerning epistemology and knowledge creation.

The Institutionalization of Aristotelian Science

For Aristotle, to philosophize was to exercise one's reason and thus engage fully in the specific function that makes us human beings (*Eth. Nic.* 1.7.1098a3). For "All men by nature desire to know" (*Metaph.* 1.1.980a23), and it is "owing to their wonder [*aporia*, i.e., perplexity] that men begin and at first began to philosophize" (*Metaph.* 1.2.982b10).

[72] Blum, *Kallimachos*, 152.
[73] Strabo 13.1.54.

Aristotle adopted this concept that philosophy is engaging in perplexity from Plato.[74] Philosophers take stock of nature's puzzles,[75] and, by working through their perplexity (a highly unpleasant state of uncertainty),[76] they are rewarded with the scientific understanding (*epistêmê*) of reality.

Epistêmê is objective knowledge of reality. To have *epistêmê* is to know why a thing cannot be otherwise, to know its *cause* (i.e., its "essence"), for "men do not think they know a thing till they have grasped the 'why' of it" (*Ph.* 2.3.194b16). Aristotle's systematic methods of working through perplexity, beginning with consideration of *phainomena* (appearances) and culminating with the use of the reason to programmatically construct the sciences, offers the philosopher and scientist (for Aristotle the two were essentially one and the same) a means of gaining and organizing *epistêmê* into hierarchical structures that explain reality in a logical fashion. The scholars of the Lyceum and the Museum engaged in perplexities of every sort and in an open-ended Aristotelian fashion that focused on the perpetual *accumulation* of knowledge.

Truth through Systematization

In making forms inherent to the phenomenal world in an immediate sense, Aristotle concluded that the philosopher and scientist systematically use both reason and observation to move from particulars to abstracted universals (i.e., moving from "Callias the man" to a full understanding of the abstracted *species* of "human"). This systematic,

[74] Plato's Socrates was in a perpetual state of wonder and who, in the *Theaetetus*, 157, said that "philosophy begins in wonder, and Iris [the rainbow] is the child of Thaumus [wonder]."

[75] Examples of such puzzles are Zeno's arguments that motion is impossible, described in *Ph.* 239b10-240a15.

[76] Plato *Meno*, 80a-b.

logical approach to knowing allows the philosopher and scientist to make clear the essential nature of universals through acquiring the *epistêmê* relevant to them (*An. Post.* 2.3.90b25).

Aristotle's predecessors certainly used logic when developing their philosophical arguments. Parmenides of Elea (fl. mid-fifth century BCE), the great "monist" philosopher, couched his logic in murky poetry.[77] Plato made tentative steps towards developing a logical method *qua* science in his *Thaeatetus, Sophist,* and *Statesman* with the introduction of the method of division (*diairesis*). In Platonic division, which represented a late-period iteration of Plato's epistemology and ontology, the essence of particular things or concepts are defined by beginning with their broad *genus* and then specified through a series of binary divisions in which one of two alternatives must be selected. This system, with its hierarchical structure and consideration of *genus* and *species* classification and the "truth," had a great impact on Aristotle's logical method and science.[78]

Aristotle, however, credited himself—solely—with the invention of *formal logic*:[79] "Of the present inquiry, on the other hand, it was not the case that part of the work had been thoroughly done before, while part had not. Nothing existed at all" (*Soph. El.* 1.34.183b34). This claim, while remarkable, is defendable. Unlike in his other works,

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[77] Barnes, *The Presocratic Philosophers*, 9-20.

[78] The *Sophist* introduced subject and predicate roles in syntax, which were readdressed by Aristotle in his *Categories* and *De Interpretatione*. Plato also introduced the idea that *genera* may be divided into species, although he presented the idea in a rather simplistic, binary manner: "Should we not say that the division according to classes which neither makes the same other, nor makes other the same" was the "business of dialectical science" (*Sophist,* 253d).

[79] The *Routledge Encyclopedia of Philosophy*, vol. 3 (London: Routledge, 1998), 701, defines formal logic as abstracting "the form of an argument from an instance of it that may be encountered, and then it evaluates the form as being valid or invalid."

Aristotle's logical treatises do not reference any similar contributions from preceding philosophers, for there was "absolutely nothing else of an earlier date to mention" (*Soph. El.* 1.34.184b1).

Understanding Aristotle's formal logic is important to understanding the history of science. Aristotelian science provides the basic rules by which the individual sciences, as well as the knowledge asserted within these sciences, hangs together as self-contained systems. Logic allows the Aristotelian philosopher or scientist to determine whether an argument legitimately reaches its conclusion and how these conclusions relate to each other within the schema of a particular science.

This need of a formal logic for philosophy followed from Aristotle's recognition of the power of language in structuring thought and developing knowledge. Aristotle's logic systematizes the way in which words might be used to reveal the truths of nature through vocal and literary signification in the context of formally structured arguments. The six treatises of the *Organon* (the "instrument") provide a systematic method for the rigorous assignment of meaning to terms and these terms' subsequent organization into watertight logical proofs that require a particular resolution by necessity. Logic is not a science but an instrument for rigidly constructing sciences in a rigorous and defendable manner.

Scientific Demonstration

The third book of the *Organon,* the *Prior Analytics,* describes in minute detail how to construct tripartite logical arguments, syllogisms, consisting of a major premise, a minor premise, and a conclusion that follows the two premises out of necessity. The

perfect syllogism is the most scientific (*An. Post.* 1.14.79a18) and follows the pattern "If *A* is predicated of every *B* [the major premise], and *B* of every *C* [the minor premise], *A* must be predicated of every *C* [the conclusion]" (*An. Pr.* 1.4.26a1; see also 1.4.25b32). The classic example of a syllogism in this form is "All men are mortal [major premise]. Socrates is a man [minor premise]. Therefore, Socrates is mortal [conclusion]." Assuming that both premises are valid, the conclusion that Socrates is mortal follows necessarily as a result of the major and minor premises sharing "man" the middle term, or *cause*. The cause of Socrates' mortality is because he is a man. To know the *cause* is to have scientific knowledge, *epistêmê*, of why a thing cannot be otherwise.

While legitimate syllogistic deductions must be logically valid, they need not be *scientifically valid*, that is, they need not result in *epistêmê* or even be based on true premises. Aristotle clearly stated the goal of the *Analytics*, however, as providing the exposition of a method for determining scientific validity: "First we must state the subject of the enquiry and what it is about: the subject [of the *Analytics*] is demonstration, and it [the *Analytics*] is about demonstrative understanding [*epistêmê*]" (*An. Pr.* 1.1.24a10). A logical "demonstration" *demonstrates* the necessary truth of the conclusion, the "reasoned fact." Without this capacity for expanding knowledge, Aristotle's logic would serve little purpose besides being a tool for mental gymnastics. Aristotle provided the requirements for a successful demonstration:

> If, then, understanding [*epistêmê*] is as we posited, it is necessary for demonstrative understanding in particular to depend on things which are [1] true and [2] immediate and [3] more familiar than and [4] prior to and [5] explanatory of the conclusion (for in this way the principles will also be appropriate to what is being proved). For there will be deduction even without these conditions, but

> there will not be demonstration; for it will not produce understanding (*An. Post.* 1.2.71b20).

Demonstrative syllogisms, therefore, must (1) have true major and minor premises that are (2) themselves first principles of the science (*archē*) or are derived from the *archē* of the science (First principles are the basic axioms of the science, they are the things that "we just know" are true).[80] The major and minor premises of the syllogism must be (3) more readily apparent (i.e., already known) than the conclusion, which (4) must logically follow from the premises and (5) therefore be explained by the two premises (through the middle term which the major and minor premises share—the cause).[81] The result of a demonstration is the *scientific proof* of why things actually are the way that they are in a manner that transcends mere belief.

Armed with *epistêmê*, the philosopher or scientist is able to hierarchically map out the structure of any scientific domain through showing their causal links. The *species* human, for example, is placed hierarchically beneath its *genus*, animal, because of the *essential cause* that specifies it from all other animals—the ability of human beings to reason.

The Archē

Demonstrations being based on scientific first principles gives demonstration its privileged epistemic status and legitimizes its conclusions. Without the ability to base a deduction on the indemonstrable *archē* of a science, no demonstration is possible, and

[80] In arithmetic for example, we "just know" that one equals one—it is a basic axiom of arithmetic and is undemonstrable in that it cannot be proven through any more basic logic.

[81] The middle term in a demonstrative syllogism allows for a fact to become a *reasoned fact*, i.e., *epistêmê*, "for the middle term is the explanation, and in all cases that is sought" (*An. Post.* 2.2.90a5).

therefore no *epistêmê* (*An. Pr.* 2.16.64b35; 1.3.72b19; *An. Post.* 2.19.100b10; *Metaph.* 4.3.1005b1). Aristotle's epistemology hinges on the acquisition and comprehension of these *a priori* axioms; things that "[people] just know are true." Arguments not traceable to indemonstrable *archē* result in either the infinite regress of deductions, in which the premises of a syllogism must always be proved by a previous syllogism, ad infinitum, or circular arguments, in which a premise is held eventually as a proof for itself (*An. Post.* 1.3.72b8). Therefore, if sciences are built on principles so intuitively primary that they cannot be reached through reasoning from anything more primitive, scientists have found the firmest possible ground for the truth.

Since the *archē* are indemonstrable, there are no "meta-principles" from which they originate, i.e., there is no equivalent to the Platonic form of the "Good" illuminating them. The sciences, furthermore, may not share first principles (*An. Post.* 1.9.76a13). All sciences, therefore, possess their own basic truths that define them and differentiate them from each other:

> A science is one if it is of one *genus*—of whatever things are composed from the primitives and are parts or attributes of these in themselves. One science is different from another if their principles depend neither on the same thing nor the ones on the others. There is evidence for this when one comes to the non-demonstrables; for these must be in the same *genus* as the things demonstrated. And there is evidence for *this* when the things that are proved through them are in the same *genus* and of a kind (*An. Post.* 1.28.87a36)

Through recognizing the absoluteness of the first principles, Aristotle *compartmentalized the sciences*. His theory provided the rationalization for the separate scientific disciplines. Aristotle said, in fact, that the number of individual sciences might be infinite (*El. Soph.* 1.9.170a22). And since each of the sciences had different

characteristics, different methods were required to flesh them out (upon knowing the first principles): "The minute accuracy of mathematics is not to be demanded in all cases, but only in the case of things which have no matter. Therefore its method is not that of natural science" (*Metaph.* 3.3.995a12; see also *Eth. Nic.* 1.3.1094b13).

The Museum as the First University

Aristotle, despite being a polymath of the highest caliber, considered it unrealistic for the individual philosophers to spend their effort on too many endeavors and advocated focusing effort on particular disciplines (*An Post.* 1.12.77b5). Theophrastus, for example, specialized in the science of botany. Aristotle's separation of the sciences did not, however, result in chaos. All of the sciences shared the unifying explanatory power of logical demonstration. And, as described in chapter six, philosophers and scientists shared pre-scientific techniques that helped illuminate their disciplines.

Figure 1 below outlines Aristotle's epistemology. Through specifying a reasoned fact by logically demonstrating its cause and grounding the assertions in the *archē* peculiar to them, scientists hierarchically build their science from the basic principles to the most specific through a series of causal linkages.

In the Aristotelian fashion, the scholars of the Museum engaged in an open-ended scholarly venture (although a non-sectarian one). The idea of the academic university as a collection of discrete scientific departments (faculties) organized hierarchically and unified under the *aegis* of the larger institution was derived from Aristotle's conception of the structure of the sciences (see Figure 2, below).

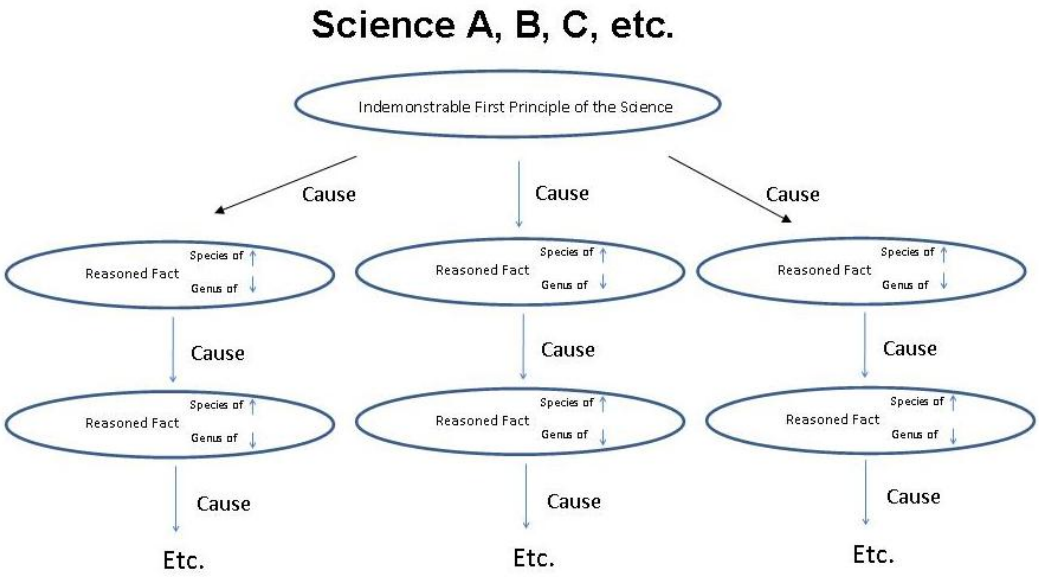

Fig. 1. The Structure of Aristotle's Sciences.

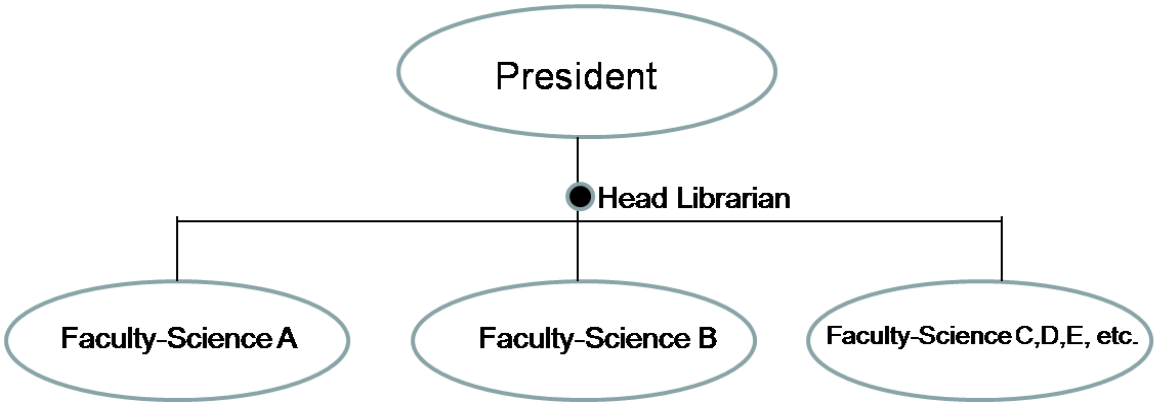

Fig. 2. Structure of a University.

There is remarkably little evidence that points toward the administrative structure of the Library and Museum as it consisted beyond that it was communal and under the leadership of a high priest who served as its president.[82] Enough is known, however, to allow for putting forward the argument that the Museum was structured around the basic ideas set forth in Aristotelian science of the hierarchies of the sciences.

Alexandria possessed a medical school that represented a defined entity likely falling hierarchically beneath the umbrella structure of the Museum. This suggests that other clearly defined disciplinary "faculties" existed as well. The medical school was created at approximately the same time as the Library and Museum (ca. 300 BCE) by Herophilus of Chalcedon. This tie to the Museum is supported because Herophilus, like the other scholars at the Museum, received financial support from Ptolemy I.[83] Soter even loosened the laws concerning human dissection for the Herophilus,[84] who took full advantage of this allowance for the purpose of *scientific research* in the general post-Aristotelian mode of the Museum's other departments. The resulting new knowledge in anatomy "led to the discovery of so many new structures and capacities in the human body that the Greek language was simply unable to name them all."[85] Finally, a certain Chrysermus, according to a second century BCE inscription on a Delian statue, was both

[82] Strabo 17.1.8. The president was appointed by Ptolemy as a modern governor appoints the president of a university, and this person in turn appointed the Head Librarian.

[83] Celsus *De Medicina, Prooemium,* 23-2.

[84] Ibid.

[85] John Vallance, "Doctors in the Library: The Strange Tale of Apollonius the Bookworm and Other Stories," in *The Library of Alexandria: Centre of Learning in the Western World*, ed. Roy MacLeod (London: I.B. Taurus, 2000), 97.

a head of the medical school and an executive manager of the Museum.[86] The medical school, therefore, "formed an important part of the work of the Mouseion."[87]

Not all scholars agree that the medical school was integral to the Museum. In 1989, the classicist Heinrich von Staden rejected the affiliation of the Alexandrian medicine and the Museum, stating that "there is no independent evidence to confirm that this Chrysermus was a research physician rather than a layman who had been appointed both central administrator of public medical services and Museum chairman by Ptolemy."[88] But the limited evidence is not adequate proof of a separation (especially when considering the general dearth of evidence surrounding the Museum) between the medical school, a scholarly institution, and the Museum, a putative religious association of scholars of all stripes.

If one accepts that a faculty of medicine existed as a defined scholastic unit, then it is reasonable to conclude that the other sciences enjoyed equivalent distinction, that there were indeed "faculties" for the other sciences, as opposed to a school of medicine and "all of the other scholars." This argument is further bolstered by the increasing specialization found at the Museum.

Table 1 illustrates the wide range of disciplines found at the Museum, including geography, history, literature, mathematics, physics, engineering, philology, astronomy, philosophy, medicine, architecture, and engineering. [89] These disciplines likely had their own faculties at the Museum. The *Pinakes*, for example, divided the works of the Library

[86] Fraser, *Ptolemaic Alexandria*, vol. 1, 371.
[87] Ibid.
[88] Heinrich von Staden, *Herophilus: The Art of Medicine in Early Alexandria* (Cambridge: Cambridge University Press, 1989), 26-27.
[89] See page 86-87.

ultimately for the faculties' use, and this division appears to have been performed at its root by subject (i.e., discipline) class. Callimachus also referred to authors in the *Pinakes* by their specializations: one fragment states that "Eudoxus [of Cnidos, lived ca. 390-ca. 340 BCE], son of Aischines, of Knidos, astronomer, geometer, physician, legislator" and another that "Kallimachos incorrectly lists Prodikos among the orators; because he [appears] in those verses evidently as a philosopher."[90] The Museum scholars were classified quite specifically by *what they did* and/or *what they studied*, and the Library collection was divided up to facilitate those who did similar things.

Polymaths at Alexandria, furthermore, were viewed with a mix of awe and derision, suggesting this departmentalization. Eratosthenes of Cyrene (lived ca. 275-194 BCE) was nicknamed *pentathlos* (the "pentathlete") because of his excellence in many fields of learning, as well as the derisive nickname *beta*, because he was versatile in many fields, but first in none (i.e., "*alpha*").[91] The Peripatetic Hermippus of Smyrna (fl. 3rd century BCE), on the other hand, was referred to as the "Callimachean," because of his specialization.[92]

The Library and Museum of Alexandria, besides sharing two immediate and clearly defined historical connections with Aristotle, (1) Aristotle to Alexander to Ptolemy to the Library and (2) Aristotle to Theophrastus to Demetrius to the Library, displayed certain characteristics that betray a link between Aristotelian science and the physical manifestation of his philosophy in its institutions. Aristotle's philosophy is a

[90] Callimachus frag. 429, 431 Blum.
[91] *Suda*, Adler epsilon 2898
[92] Athenaeus 2.58c.

systematic and hierarchical method for structuring clearly delineated scientific fields, and the Museum represented the "real world" *institutionalization* of the Aristotelian sciences in a manner described in his treatises: a set of clearly defined faculties (*dunamis*) for understanding that which falls within their domain of operation (*Metaph.* 10.4.1055a30). The Museum reflected this structure through its division into discreet departments of knowledge.

But if the Peripatetic Demetrius of Phalerum modeled the Museum's organizational structure on Aristotelian's concepts of the division of the *sciences*, why would he suggest the need for an attached library? The Museum's faculties were distinct units with their own basic first principles. They all, however, shared in and contributed books to the Library of Alexandria. Chapter six argues that the Library's collection was a manifestation of the *pre-scientific* portion of Aristotle's complete scientific method, and that it complemented the Museum's realization of Aristotelian philosophy and science.

Chapter 6: The Alexandrian Library and Aristotelian Pre-Science

The structure of the Library and Museum of Alexandria reflected the structure of what has come to be known as Aristotelian science in fundamental ways. The Museum was divided into faculties of scholarship in the Aristotelian manner, providing loci for the mapping of individual academic disciplines. The Library was organized in support of this mission. Granting that, since the Museum scholars were engaged in theoretical scholarship, they were using the collection of the Library to facilitate this scholarship, the questions arise: what, if any, are the philosophical foundations for the Library's use as a tool for creative scholarship? Why and how was the Library organized for the Museum scholars' use?

This chapter examines the philosophical basis of the use and organization of the Library collection. It argues that the Library reflected the pre-scientific portion of Aristotle's complete scientific method. First is an examination of Aristotle's pre-scientific method of induction (*epagoge*). Evidence in the classical literature is given that a post-Aristotelian inductive method was used by the scholars of the Museum. Furthermore, this Alexandrian *epagoge* was not limited to empirical observations alone, but it included the inductive analysis of written documents, which suggests the need for a library. Next, the necessity for the library as a tool for post-Aristotelian pre-science is bolstered with a consideration of philosophical dialectic: Aristotle's other pre-scientific method which *explicitly* requires the systematic, logical manipulation of opinion. It is

argued that dialectic was a mature philosophical method at the time of Aristotle's death (i.e., it was in use at the Lyceum and therefore used by Demetrius of Phalerum), and that a collection of written documents, a *library*, is necessary to perform post-Aristotelian philosophy and science. Finally, this chapter contends that the Library of Alexandria served as a stockpile of "esteemed opinion" (*endoxa*)—the working materials of dialectic—and that methods suggested in Aristotle's *Topics* concerning the collection, organization, and use of such a stockpile of materials for pre-science share similarities with methods used at the Alexandrian Library. These similarities, coupled with the clear link between Alexandria and key Peripatetic personalities (outlined in chapters three and four) strongly suggest that the Library collection was a physical manifestation of an Aristotelian stock of propositions that was carefully classified and organized for post-Aristotelian scholarship and knowledge creation.

The materialization of Aristotelian pre-science at the Library signaled a shift in the way in which collections of library documents were used at information institutions. What resulted from this meeting of Aristotelian thought, the Hellenistic fascination with oriental culture, and Ptolemy I's disposition towards gigantism (a trait endemic to the *diadochi*, e.g., Pharos, highest of all known lighthouses) was a wholly novel form of information institution, and one that clearly differentiates it from the Near Eastern protolibraries. This model, which may plausibly be termed the "post-Aristotelian" paradigm of the academic *library*, subsequently informed more than 2500 years of academic libraries. Modern academic libraries are genotypes of the Library; they are clear descendents of this Hellenistic prototype.

Collection as Preliminary to Science

The modern academic library is a tool for science and scholarship and is an aid to creating theoretical knowledge, which is subsequently added to the body of human knowledge in a continuous, accretive communication process. To better understand how modern academic library collections evolved out of ancient Greek philosophy, it is necessary to take into account Aristotle's pre-scientific methods.

The sciences are built around their individual first principles (or 'down" in a hierarchy). But how does the Peripatetic philosopher or scientist acquire the first principles of an academic discipline if these principles cannot be proven through demonstration? If the scientist "just knows" all of the *a priori* first principles *de facto*, the scientist is "a sort of perfect knower, directly intuiting universal and necessary truths."[1] The idea of the perfect knower is absurd—philosophers and scientists cannot simply start from a "position of knowing." That would make them demigods and exclude the need for additional puzzling or reasoning. Firm ground for demonstrative reasoning must be *obtained* (*Top.* 8.1.155b4), for even the seemingly obvious *axioms* of science are not always immediately self-evident, even to the expert.

Aristotle proposed that the *archē* are known only through intuition (*nous*) (*An. Post.* 2.19.100b6), a natural capacity of human beings that allows researchers to move from a position of unfounded belief to comprehension of the first principles (*An. Post.* 2.19.99b26). Unlike *epistêmê, nous* does not involve the use of demonstrative reasoning

[1] Cynthia A. Freeland, "Nourishing Speculation: A Feminist Reading of Aristotelian Science," in *Engendering Origins: Critical Feminist Readings in Plato and Aristotle*, ed. Bat-Ami Bar On (New York: State University of New York Press, 1988), 158.

(or any reasoning for that matter), relying instead upon direct insight into the nature of reality, although researchers still need to "come to know them [the first principles]" through the use of certain pre-scientific processes that prompt them into the *nous* state (*Eth. Nic.* 6.6.1140b31).

Considering, for Aristotle, that *nous* cannot result from logical demonstration, other methodological procedures are required. These methods make up Aristotelian pre-science. Aristotle's pre-scientific methods—induction and dialectic—presuppose the *collection* of materials for the purpose of *organizing* the truth into intelligible structures. These pre-scientific methods—though this qualification makes them no less important to the conduct of Aristotelian science as a whole—rely on data that, while epistemologically opaque i.e., (observation and opinion) nonetheless contain *truth*.

Aristotle's methods contrast with Platonic science, in which there is no evidence that materials need be systematically collected in order to support knowledge claims. The Platonist's task is to "remember" knowledge through the process of recollection (*anamnesis*), and there is dubitable truth in the material world and in its *recorded products* of scholarship: "there is no radiance in our earthly copies… they are seen through a glass dimly." Plato's science suggests the rejection of "earthly copies" to become "rapt in the divine."[2] Plato's later dialogues however, such as the *Sophist* and its abstruse method of categorical division to define "earthly copies," did greatly influence Aristotle's methods. But Aristotle took Plato's indefinite methods of analysis and made them distinct.

[2] Plato *Phaedrus*, 249c.

Aristotle outlined two methods for invoking the state of *nous*: *epagoge* (induction) and (his extension) of dialectic. Aristotelian dialectic, to obscure matters further, in certain instances uses inductive procedures (*Top.* 1.12.105b10). The two methods, therefore, might overlap or represent a single method. This chapter argues that *epagoge* greatly benefits from the availability of a well-organized library of knowledge-based resources and that dialectic *calls for a library* that collects and organizes the recorded expressions of intellectual activity. Considering that there is evidence of both *epagoge* and dialectic being used at the Museum (whether separately or as part of a single process), the Library may logically be seen as supporting these methods' practice.

The *complete process* of Aristotelian philosophy and science, regardless of whether *epagoge*, dialectic, or both methods are used, consists of two components: (1) a pre-scientific climb from the world of "appearances" (*phainomena*) to the first principles using either *epagoge* or dialectic (or a combination of the two), followed by (2) the use of these discovered first principles to subsequently organize the sciences hierarchically through logical demonstration of reasoned fact (*epistêmê*). Aristotle's scientific process is illustrated in Fig. 3 below.

The library collection *as a tool* in the complete scientific process, however, is fruitfully compared to the ascending, pre-scientific stage of Aristotle's science. The Library may, in fact, be likened to a physical manifestation of the pre-scientific portion of this model. The Library was a reservoir of *materiel* collected for pre-science.

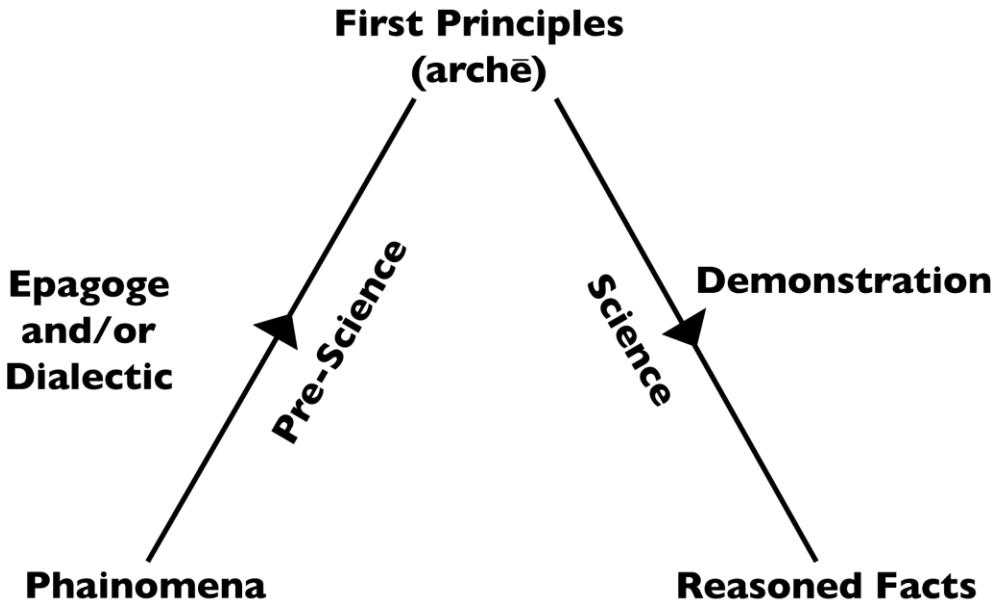

Fig. 3. Aristotle's complete scientific method.[3]

Epagoge: Collecting Phainomena

Prior to successfully engaging in logical demonstration, Aristotle required the philosopher or scientist to exercise *preliminary processes* (i.e., pre-science) that consisted of (1) the *collection of information* and (2) the collected information's analytical processing for the purpose of making rational abstractions concerning reality. Following Aristotle's description of scientific demonstration, which occupies the majority of the *Posterior Analytics*, he made it clear that *epagoge*, in which the first principles are secured from the observation of particular substances (i.e., the individual observable things) (*Top.* 8.1.156b14), is a preliminary method from which demonstration may then proceed. Aristotle's description of *epagoge* is uncharacteristically succinct:

[3] This illustration is based on Timothy A. Robinson's diagram in *Aristotle in Outline* (Indianapolis: Hackett Publishing Company, 1995), 41.

> When one of the undifferentiated things makes a stand, there is a primitive universal in the mind (for though one perceives the particular, perception is of the universal—e.g., of man but not of Callias the man); again a stand is made in these, until what has no parts and is universal stands—e.g. *such and such* an animal stands, until animal does, and in this a stand is made in the same way. Thus it is clear that it is necessary for us to become familiar with the primitives [*archē*] by induction [*epagoge*]; for perception too instils [sic] the universal in this way (*An. Post.* 2.19.100a15).

Induction of the universal through the perception of the particulars appears to allow for the generalization necessary to enter the intuitive state of *nous* and acquire the first principles (*An. Post.* 1.18.81a38). This rigorous comparison of likeness between particular things sparks a meaningful insight (*nous*) concerning their common properties (*Top.* 2.18.108b24). It is not clear, however, whether practicing *epagoge* (or any other method) is *absolutely* necessary to enter into a state of *nous*, or is the only method available for acquiring the state of intuition that leads to recognition of first principles. Aristotle, however, warned against positing first principles without first engaging in pre-scientific processes (*Ph.* 8.1.252a22).

The basic materials for induction are the "appearances" (the literal translation of the Greek *phainomena*).[4] These *phainomena* appear at first blush to be *sense data* (at least to modern scientists who have inherited the scientific legacy of Francis Bacon) obtained through empirical observation. In the physical sciences,[5] Aristotle indeed often advocated using the immediate perception of the researcher's environment to support scientific discovery (*Cael.* 3.14.297b19; *Gen. Corr.* 1.2.316a10; *Metaph.* 1.1.980a22). In astronomy, for example, the *phainomena* are collected for analysis by means of

[4] *Greek-English Lexicon*, comp. Henry George Liddell and Robert Scott (New York: Harper & Brothers, 1897), s.v. "φαίνω."

[5] *Martha Nussbaum, *The Fragility of Goodness: Luck in Greek Tragedy and Philosophy*, rev. ed. (Cambridge, MA: Cambridge University Press, 2005), 243.

observations made through the senses. In the astronomical treatise *On the Heavens* Aristotle explained that,

> This view [that the Earth is at the center of the cosmos] is further supported by the contributions of mathematicians, since the phenomena [*phainomena*]—the changes of the shapes by which the order of the stars is determined—are fully accounted for on the hypothesis that the earth lies at the centre" (*Cael.* 3.14.297a2).

The *phainomena* (i.e., data) of astronomy are the personal observations that astronomers make from *looking* skyward.[6] Through induction, the astronomer is able to generalize to the first principle that the Earth sits at the center of the *cosmos*. After completing this inductive process the astronomer proceeds with demonstrative arguments that organize the science of astronomy in relation to this first principle.[7]

Although *epagoge* certainly relies upon the scientist's own observations, the above description of an induction in astronomy is interesting in that the *further support of other scholars*, in this case mathematicians (the Greeks treated astronomy as a branch of mathematics), were considered before fully accepting the conclusion that the earth is at the center position of the *cosmos*. This *received* evidence, i.e., evidence *collected* by the astronomer from other, *human* sources is arguably a sort of *phainomena*.[8] And one assumes, considering the complex nature of Greek mathematics, that Aristotle accessed this received evidence in the form of recorded documents.

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[6] Aristotle linked the senses directly with knowing and elevated eyesight above all senses other (*Metaph.* 1.1.980a22-27).

[7] Matej Vesel, "What is Revolutionary in the Copernicus *Revolutions*," *Filozofski vestnik* 25, no. 2 (2004): 178.

[8] G.E.L. Owen, "'*Tithenai ta phainomena*'," in *Logic, Science and Dialectic, Collected Papers in Greek Philosophy*, ed. Martha Nussbaum, (London: Duckworth, 1986), 240; See also Nussbaum, *Fragility of Goodness*, 244.

Epagoge at Alexandria

The philosophers and scientists of the Museum used personal empirical observations as part of their research. And, as in Aristotle's science, the methodical collection of personal observations served as a preliminary to the construction of scientific theories. For example, the physician Erasistratus of Ceos (fl. first half of the third century BCE), one of the founders of the Alexandrian medical school and, according to Diogenes Laertius, a former disciple of Aristotle's protégé Theophrastus,[9] reasoned that the human stomach is responsible for "grinding food" during digestion (as opposed to "putrefying it"). Erasistratus reached this conclusion after performing multiple, *systematic* vivisections of living humans,[10] for

> no one can apply remedies for [for maladies] who is ignorant about the parts themselves; hence it is necessary to lay open the bodies of the dead and to scrutinize their viscera and intestines… Erasistratus did this in the best way by far, when [he and the other founder of the Alexandrian medical school] Herophilus of Chalcedon laid open men whilst alive—criminals received out of prison from the [Ptolemaic] kings—and whilst these were still breathing, observed parts which beforehand nature had concealed, their position, colour, shape, size, arrangement, hardness, softness, smoothness, relation, processes and depressions of each, and whether any part is inserted into or is received into another.[11]

Erasistratus used this empirical data, which he and his master Herophilus of Chalcedon carefully gathered from a reported 600 vivisections,[12] to accurately model the human

[9] Diogenes Laertius 5.57.
[10] Celsus *De Medicina*, *Prooemium* 20.
[11] Ibid., 23-24
[12] Tertullian *De Testimonio Animae*, 10. Tertullian, being a Christian, might have exaggerated the number of vivisections.

nervous system. Erasistratus and Herophilus, through their careful use of observation and abstract reasoning, founded the science of anatomy.[13]

Another disciple of Theophrastus, the Peripatetic philosopher Strato of Lampsacus,[14] nicknamed "the physicist"[15] and royal tutor (ca. first decade of the third century-ca. 286 BCE) to Ptolemy II, was well known for his physics experiments involving observation.[16] Strato abstracted a first principle of physics, that "what is moving traverses the last part of its journey in the shortest time"[17] through a simple observational experiment:

> For when water is pouring down from pots, if one watches its course from a high place, it clearly flows continuously higher up, but lower down it falls scattered to the floor. So if it did not always travel faster in the later place, this would never happen to it.[18]

Such attention to empirically observable *phainomena* appears to have been used by the Alexandrian scientists *across the disciplines* regardless of personal philosophical affiliation. The Museum was a scholarly community exhibiting a decidedly post-Aristotelian epistemological approach, with careful collection of *phainomena* being followed by reasoning to a conclusion. In geography, for example, the polymath and (Head) Librarian Eratosthenes estimated the circumference of the earth through specific

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[13] Anthony M. Alioto, *A History of Western Science* (Englewood Cliffs, NJ: Prentice-Hall, 1987), 91-92.

[14] Diogenes Laertius' *Life of Theophrastus*, 5.53-57., reports that Theophrastus gave Strato joint control of the Lyceum and made him an executor of his will.

[15] Diogenes Laertius 5.58.

[16] Cohen and Drabkin, *Source Book in Greek Science*, 211 fn1.

[17] Simplicius *in Aristotelis de Physica Commentarii*, 916.12-15.

[18] Ibid., 916.15-19.

observations followed by reasoning to an abstract conclusion (by noting the noontime angles of shadows in Alexandria and Cyrene at noon).[19]

Considering their penchant for active investigation through observation, Timon of Phlius' accusation that the Alexandrians were endlessly arguing "well-propped pedants" was rather unwarranted. [20] Many of the Museum scholars were assiduous *doers*. Like the members of the Lyceum, they actively *collected materials* (i.e., observations) for the purpose of reaching theoretically abstract scientific conclusions.

The Alexandrian scholars were post-Aristotelian researchers in that they valued the use of empirical observation as a means of generalizing to the *axioms* (or at the least defensible knowledge claims) of the individual physical sciences. This is shown by surveys of expert opinion, or "doxographies," which focused specifically on the individual disciplines practiced by the Museum scholars and similar scholarly communities such as that at Pergamum. Every science had its own doxographies, and these doxographies their discipline-specific axioms; there was no Platonic "meta-science," with its single-root *genus* axiom (i.e., the "Good") being practiced at the Museum. Aristotle, however, also used induction in his explorations of the practical philosophic fields of ethics and politics, a fact generally overlooked by Aristotle scholars until the latter half of the twentieth century. In the *Eudemian Ethics,* the definition of the "good man" (i.e., the man that best fulfills his teleological potential as a man: a first principle of ethics) is defined through the use of induction (7.15.1248b21). But, while the

[19] Cleomedes *On the Orbits of the Heavenly Bodies,* 1.10, trans. T.L. Heath, in Morris R. Cohen and I.E. Drabkin, *A Source Book in Greek Science*.Cambridge (MA: Harvard University Press, 1958).

[20] See chapter 3 note 65 above.

basic evidence of Aristotle's ethics and politics are also *phainomena*, these "appearances" are not primarily empirical observations but esteemed opinion (*endoxa*) (*Eth. Nic.* 7.1.1145b1). This conflation of data types has led to confusion, particularly among those who equate Aristotelian *phainomena* with "hard facts."[21] But, while the line between "hard facts" and opinion seems clear to many modern scientists, it was not so clearly delineated to the ancient philosopher and scientists, including the scholars of the Museum.

Eratosthenes, for example, used the "*testimony* of the men who had been in [various] regions [of the Earth]" [emphasis added] to conclude that the inherited geographical surveys of his time were inaccurate and in need of major revision.[22] For, concerning the matters that the geographer "regards as fundamental principles of his science," he must rely upon the work of those scientists who came before him.[23] Strabo, himself a renowned geographer working at Alexandria, described his colleagues' approximation of empirical observation with the collection and analysis of expert opinion [emphasis added]:

> … the *greater part of our material* both they [other geographers] and I *receive by hearsay* and then form our ideas of shape and size and also other characteristics, qualitative and quantitative, *precisely as the mind forms its ideas from sense impressions*—for our senses report the shape, colour, and size of an apple, and also its smell, feel and flavor; and *from all this the mind forms the concept* of apple. So, too, even in the case of large figures, while the senses perceive only the parts, *the mind forms a concept of the whole from what the senses have perceived*. And men who are *eager to learn* proceed in just that way: *they trust as organs of sense* those who have seen or wandered over any region…[24]

[21] Nussbaum, *Fragility of Goodness*, 243.
[22] Strabo 2.1.5.
[23] Ibid., 2.5.2.
[24] Ibid., 2.5.11.

This is a post-Aristotelian statement of the methodical use of an inductive procedure grounded in Aristotelian epistemology and performed to arrive at abstractions which described the phenomenal world.[25] It is Alexandrian *epagoge* as practiced by first century BCE geographers (cf. *An. Post.* 2.19.100a15). The statement shows, furthermore, that while certain *species* of scholars operating at the Museum (e.g. the natural philosophers, biologists, etc.) actively engaged in personal observation as a means of establishing the basic knowledge of particular sciences, other scholars like Eratosthenes discussed previously generated and *recorded* observations for the same purpose.

This apparent equivalency of *phainomena* types (observation and opinion) blurs the line between personal observation and received opinion. Where, if he didn't travel to the ends of the Earth himself, did Eratosthenes get his source material? Where did other Alexandrian scholars who used a similar method find their *phainomena*? Strabo provided the obvious answer in his *Geography*: Eratosthenes had "read many historical treatises—with which he was well supplied if he had a library as large as [the astronomer] Hipparchus [of Rhodes, lived ca. 190-ca. 126 BCE] says it was." [26] Eratosthenes' library, *the* Library, served as a tool for his work. It provided the geographer with the necessary working materials for *creating* a more accurate map of the known world,[27] much of which he had not seen himself.

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[25] Although Strabo had previously been a Peripatetic, by the time he wrote his *Geography* he had likely become a Stoic (*Oxford Classical Dictionary*, 2nd ed., s.v. "Strabo"). Classicist G.C. Richards, in "Strabo: The Anatolian Who Failed of Roman Recognition," *Greece* 10, no. 29 (February 1941): 82, concluded that Strabo largely rejected Aristotelianism. Strabo's statement concerning the geographer's method, however, suggests that a derivation of Aristotle's methods were being used by the broader scientific community of geographers which was neither Peripatetic nor Stoic.

[26] Strabo 2.1.5.

[27] Ibid., 2.1.1.

Eratosthenes subsequently added his own *Geography* to the Library collection. And, approximately one-hundred and fifty years after Eratosthenes, Strabo found it *de rigeur* as a part of scientific procedure to track down Eratosthenes' work in the Library collection to use in the creation of his own contribution to the science.[28] However, Alexandrian scholars across academic disciplines were not remiss in using the recorded works of their colleagues and intellectual *forebears* (and certain disciplines like philology would use entirely the recorded works of others).

Although the philosophers who worked before Aristotle used observation to arrive at their conclusions, the Stagirite was the first to definitively *systematize the use of observation based upon clear epistemological foundations*. At Alexandria, previous research was used in the same manner as personal observations to arrive at knowledge claims: *other people's* observations had *epistemological worth* similar to personal observations. Aristotle's basic methods of inquiry had been adopted as general scientific methods at Alexandria. In the process *epagoge* was adapted and transcended any specific allegiance to Aristotelianism as a distinct school. The Aristotelian paradigm of induction, or the Alexandrian modification of that paradigm, had expanded beyond the Peripatetic school, and had done so very shortly after Aristotle's death. The use of induction at the Museum, even if not dogmatically Peripatetic, had an Aristotelian pedigree. The preliminary collection of materials had become part of the legitimate conduct of science, and at the very least suggested the need for an attached library for productivity's sake.

[28] Daniela Dueck, *Strabo of Amasia: A Greek Man of Letters in Augustan Rome* (London: Routledge, 2000), 11-12. Strabo spent some time in Alexandria with his close friend Aelius Gallus, the early first century CE prefect of Egypt, as chronicled in the *Geography* 2.5.12. Strabo used many works from the Library in this act of creation including those of Homer, Anaximander, Hecataeus, Democritus, Eudoxus, Dicaearchus, Ephorus, Polybius, Poseidonius, and Hipparchus (Strabo 1.1.1).

Dialectic

The Alexandrian geographers' use of recorded documents for abstracting from the observations of others appears to have made collection of a library a matter of simple efficiency. However, the connection between Aristotelian *epagoge,* Alexandrian induction, and the collecting and organizing of a library as a function of post-Aristotelian science still requires some speculation. Aristotle made only brief mention of *epagoge* and never once mentioned the inductive method's use in relationship to libraries. The use of induction, however, was also a feature of Aristotelian dialectic (*Top.* 1.12.105a10; 1.14.105b27; 1.18.108b7). Fortunately, Aristotle documented his dialectical method in much more detail than he did the *epagoge* described in the *Posterior Analytics*. The *Topics*, which contains Aristotle's explanation of dialectic, is in fact the longest treatise in the *Organon*. When *epagoge* is mentioned by Aristotle he does so in a cursory way, suggesting that its use is common knowledge to his students. According to Diogenes Laertius' list of Aristotle's works, the philosopher appears not to have written any treatise dedicated specifically to the method. A careful consideration of his treatises' *explanation* and *use* of dialectic supports the proposition that libraries, as stockpiles of expert *endoxa*, were necessary for the practice of philosophical dialectic. The Library, the first post-Aristotelian academic library, was such a stockpile.

The following sections outline Aristotle's dialectical method while maintaining the position that dialectic was a *mature* pre-scientific tool used by Peripatetics at the beginning of the Hellenistic age. There is, however, an ongoing debate among Aristotle scholars concerning dialectic's specific use for pre-science, or whether the method was

even used for philosophy and science at all (for either of the two purposes stated in *Top.* 1.2.101a35). The method, as argued in the Appendix to this study (see page 265), at the very least appears to have been *necessary* for the successful performance of Aristotelian philosophy and science (even if it is possibly not *wholly sufficient* in itself as pre-science), and to have served such a role in Aristotle's *mature scientific methodology*. Demetrius of Phalerum, having inherited this method of scholarship, recognized that a stock of propositions (i.e., *endoxa*, see *Top.* 1.10.104a9) is necessary for science (*Top.* 1.13.105a20), i.e., a collection of knowledge based resources: a *library*.[29] Demetrius, as *councilor* to Ptolemy I, naturally collected a library for the Museum scholars. Furthermore, the *Topics*, Aristotle's treatise which outlines his dialectical procedure and was a work that Demetrius surely read or had heard recited, provides instructions for creating and organizing a stockpile of propositions. Aristotle's "recipe for a library" may have, in fact, been actualized at the Library.

Dialectic Prior to Aristotle

The *Topics*, the treatise that follows the *Analytics*, introduces a second pre-demonstrative method: philosophical dialectic. The Parmenidean apologist Zeno of Elea (fl. mid-fifth century BCE), however, is credited with dialectic's (the art of discussion)

[29] There is no available *recorded* evidence that Demetrius of Phalerum, the Peripatetic link between Aristotle and the Library, conducted his own scholarship in the Aristotelian manner, i.e., that he began his own researches with a dialectical review of previous philosophers (requiring a library). It is possible to infer, however, that Demetrius did indeed use Aristotle's method because of the following: (1) he was a Peripatetic associated with a Peripatetic school, the Lyceum, which used dialectic, (2) he learned philosophical methods from the doxographer Theophrastus, who "pursued his researches on topical and methodological lines already laid down by Aristotle" (*Oxford Classical Dictionary*, 2nd ed., s.v. "Theophrastus"), (3) his style was "philosophical" (Diogenes Laertius 5.82), implying that he himself used research methods inherited from Theophrastus and Aristotle, the latter of whom was considered the "prince of philosophers," and (4) Demetrius founded the Library as an appendage to a Museum, mimicking the structure of the Lyceum and setting up a virtual database of *endoxa* for dialectic.

first use.[30] Zeno had the habit of putting forward an opponent's argument, such as that physical movement exists and then refuting the argument by showing the contradictory nature of his opponent's premises. The sophists (itinerant relativistic philosophers who taught the art of persuasion for a fee) of the fifth and fourth centuries BCE were masters of this sort of refutation, or rather its perversion, *eristic* (the skillful use of any deceit to win an argument).[31] During its pre-Socratic stage, therefore, dialectic appears to have served as a device for demolishing an opponent's arguments in debates. And, while those engaged in such activity might be philosophers, discourse was used to persuade opponents into accepting a certain position rather than as serving as an instrument for creating new knowledge.

Socrates pressed argumentation into the service of philosophy. Through engaging in conversation with his students, rivals, or whomever else he might encounter in the *agora*, the "gadfly of Athens" used his *elenchus* (the "Socratic Method" by which the truth is revealed through cross-examination) to expose his conversational partner's sloppy reasoning and ill-formed ideas concerning "big idea" concepts like virtue or justice.[32] But, in stark contrast to the sophists' use of discourse, Socrates' method rooted out *true* definitions for abstract concepts. Socrates' use of dialectic for the purpose of establishing the objective truth resulted in two streams of ancient philosophical dialectic, the

[30] Aristotle frag. 65 Barnes; Diogenes Laertius 3.48.

[31] Socrates, in *Phaedrus*, 267a-b, opined that the sophists Tisias and Gorgias, "by force of eloquence make the little appear great and the great little, disguise the new in old fashions and the old in new fashions, and have discovered a method of speaking on every subject either concisely or at infinite length."

[32] Aristotle also adopted the term *elenchus* but specifically to describe techniques for uncovering sophists in debates (*Soph. El.* 1.8.169b20).

"Platonic" stream which continued the Socratic tradition of oral discourse, and the "Aristotelian" stream that ultimately validated the use of recorded discourse.

Plato commandeered Socrates' *elenchus* and elevated it to the status of supreme science. For Plato, dialectic (Plato was the first to give the term technical significance in philosophy) alone went "directly to the first principle… the eye of the soul, which is really buried in an outlandish slough [i.e., opinion and belief], is by her [dialectic's] gentle aid lifted upwards."[33] Dialectic is the *summum bonum* of Plato's philosophy—the "coping stone of the sciences."[34] It is through engaging in a ratiocinative process that takes into account—but devalues— particular substances and opinions, and consequently recorded documents, that the philosopher obtains knowledge of the forms and hence knowledge of objective truth.[35]

Collections of documents, therefore, are of limited use to the Platonist in the pursuit of scientific knowledge. Books cannot defend themselves against attack and therefore may only be used for persuasion and not knowledge.[36] What results from a library's use is mere opinion. Opinion is useful in Platonic dialectic, so far as it allows for pointing out assumptions concerning concepts. But Plato clearly stated that the only purposes for writing, and therefore for a *collection of written materials*, is for recreation and archiving "memorials to be treasured against old age."[37] Plato considered writing, like all art (*techné*) and opinion, to misrepresent reality. Reading handicaps the intellect,

[33] Plato *Respublica*, 533c-d.
[34] Ibid., 534e.
[35] Ibid., 534a-b. Plato wrote here: "As being is too becoming, so is pure intellect to opinion. And as intellect is to opinion, so is science to belief, and understanding to the perception of shadows."
[36] Plato *Phaedrus*, 275d-e.
[37] Plato *Phaedrus*, 276d.

and Plato wrote that those who use books "will appear to be omniscient and will generally know nothing; they will be tiresome company, having acquired not wisdom, but the show of wisdom" (wisdom may only be acquired through the ratiocination of Platonic dialectic).[38] He went so far as to proclaim that "no discourse worthy of study has yet been written in poetry or prose" (an extraordinary claim, made even more so considering that it is *recorded* the brilliant dialogue the *Phaedrus*).[39]Prior to Aristotle, and therefore prior to Alexandria, there is no evidence that written documents or a collection of documents were necessary for any sort of *methodical process* of philosophical dialectic.

Aristotelian Dialectic

Aristotle learned Plato's method of attacking and resolving philosophical problems during his stay at the Academy. It was there that he heard Plato lecture on the esoteric points of dialectic and trained in the method with his fellow students. Aristotle maintained the Socratic/Platonic tradition of dialectic, if in an amended form, for use in his own philosophical enterprise. Dialectic became not the supreme means of obtaining knowledge, but a systematic method—through its use of formal logic and the application of various argumentative techniques called *topoi*—of using *endoxa* (and therefore likely recorded documents) to provide ground from which demonstration might proceed (*Top.* 8.1.155b4). Table 3, below, defines the technical terms for types of opinions (*doxa*) as used by Aristotle and Plato respectively.

Note that Plato did not use the term *endoxa* (or its antonym, *adoxa*) in his dialogues. Aristotle fully salvaged opinions as truth bearing entities and provided

[38] Plato *Phaedrus*, 275a.
[39] Ibid., 277e.

instructions, *his* dialectic, on how to tease the truth out of them. He made opinions (endoxa) the legitimate and necessary building blocks of knowledge creation. Aristotelian dialectic, according to the Peripatetic commentator Alexander of Aphrodisias' (fl. early 3rd century CE), "proceeds through what is approved [the *endoxa*]."[40] Because Aristotle considered *truth* to be *inherent* in reality, he saw certain opinions, *endoxa*, as reliable because they contain a share of this *truth*. The truth is, therefore, *inherent* (if not always easily determinable) in the *endoxa*.

Table 3 Aristotle and Plato's definition of terms regarding opinion.

	doxa	***endoxa***	***adoxa***
Plato	Opinion or "thought[s] of the mind" concerning the nature of the world of becoming (the perceptual world), as opposed to knowledge, i.e., "a thought of the mind" concerning the immutable world of being (the forms) (*Respublica* 533a; see also *Meno* 97e-98a).	N/A.	N/A.
Aristotle	(Mere) opinions. All opinions are by their nature uncertain: "[an opinion is] about what is true or false but can be held otherwise" (*An. Post.* 2.33.89a1).	Opinions considered reliable because they are held by convention or by experts (*Top.* 1.1.100b20).	Implausible opinions considered unreliable because they are in opposition to *endoxa* held by convention or experts (*Soph. El.* 1.1.173a27)

The exposition of Aristotle's dialectical method for extracting the truth from the *endoxa* is contained in the *Topics* and the *Sophistical Refutations*. Like *epagoge* and the post-Aristotelian cross-disciplinary collection of the *phainomena* at Alexandria, dialectic is an umbrella method. Aristotelian dialectic may be used to obtain and hone effective arguments concerning any of the arts or sciences (*An. Post.* 1.12.77a28; *Top.* 1.1.100a21;

[40] Alexander of Aphrodisias *On Aristotle's "Topics 1,"* 1.2.

Rh. 1.1.1354a1; 1.2.1356a31). Structurally, dialectic uses either *epagoge* or the deductive syllogism to create logically defensible, if not impregnable, arguments (*Top.* 1.1.100a25).

Dialectic, through its use of opinion, requires a substantially less rigorous standard of proof than demonstration to arrive at acceptable conclusions. The strength of a dialectical argument rests only on Aristotle's epistemological assumption that what is reputable (the *endoxa*) has *some* claim to the truth. Aristotle claimed that all human beings, by their nature (*Metaph.* 1.1.980b22), aim at the truth: the "proverbial door, which [teleologically] no one can fail to hit" (*Metaph.* 2.1.993b5). Esteemed opinions, therefore, maintain some share in the truth, for though "no one is able to attain the truth adequately… no one fails entirely, but everyone says something true about the nature of things" (*Metaph.* 2.1.993a26). Although e*ndoxa* (as do personal observations in *epagoge*) cannot lead directly to *epistêmê*, they represent a starting point from which discovery may proceed, and firmly established facts may be subsequently organized. But the truth concealed in these opinions must first be carefully analyzed and teased out with the goal of allowing the researcher some insight into reality. The *endoxa*, therefore, must be collected, organized, and intellectually manipulated. As luck would have it, the post-Aristotelian scientist did not need to memorize all of these *endoxa*, for they primarily used *expert opinions* accessible over time in the form of *recorded documents*.

Expert *Endoxa* as Knowledge-Based Documents

Aristotle considered those opinions *endoxa* that are accepted "by everyone or by the majority or by the wise—i.e., by all or the majority, or by the most notable and

reputable of them [i.e., experts]" (*Top.* 1.1.100b21). These three constituencies' (everyone, the majority of citizens, and the experts among them) commitment to the truth of their positions lends credibility to their opinions.

The opinions of the wise, especially those opinions concerning esoteric or specialized subject areas, are especially worthy of consideration, for "the man who has been educated in a subject is a good judge of that subject" (*Eth. Nic.* 1.3.1094b28; 6.11.1143b12). Alexander of Aphrodisias explained that the opinions of experts are trusted because experts are delegated authority by all or by the majority, and someone "might assent to a claim, as being an approved one [an *endoxon*] of Hippocrates in medicine, of Archimedes in geometry or of Aristoxenus in music."[41] An inquirer trusts the opinions of the wise person and the specialist because they presume that training has sharpened the expert's acumen concerning the topic.

In practice, Aristotle privileged the expert opinion above the *endoxa* of "everyone" or the "majority." In his *Meteorology* Aristotle used "old writers" as a near equivalent term for "expert" (2.2.353a29). The Stagirite recommended that children be educated by the state to *read* these expert works, holding that *literacy is a necessary tool for acquiring knowledge* (*Pol.* 8.2.1337a37), it is a means of accessing *endoxa*. Aristotle, himself, tended to cite these "old writers" of *endoxa* so often in his own treatises that, if it were not for the fact that he mentioned *endoxa* of "all or the majority" as viable, one might easily assume that, to Aristotle, *endoxa* was a synonym for "knowledge-based *documents*" or "scrolls."

[41] Ibid., 1.20-25.

If Aristotle's own frequent use of expert opinion and his known possession of a personal library of expert *endoxa* suggests that *endoxa* were *becoming* knowledge-based documents, the Library, with its estimated 700 thousand knowledge-based documents, essentially cemented the convergence of the two concepts. But how then were the *endoxa* collected and organized at the Library used?

Philosophical Dialectic

The *Topics* gives three purposes for reasoning from esteemed opinions: "intellectual training, casual encounters, and the philosophical sciences" (*Top.* 1.2.101a25-27). As intellectual or "gymnastic" training, dialectic was useful for winning the highly regimented dialectical contests that took place in Greek intellectual circles, including the Academy. Dialectic for "casual encounters," is similar to gymnastic dialectic but less formal and may occur anywhere, including the street. Philosophy, the last use for dialectic, is the least explicated of the three purposes.

Aristotle clearly stated at *Top.* 1.2.101a35, however, that dialectic is used to fulfill important pre-scientific functions:

> For the study of the philosophical sciences it [dialectic] is useful, because the ability to puzzle on both sides of a subject will make us detect more easily the truth and error about the several points that arise. It has use in relation to the principles used in the several sciences. For it is impossible to discuss them at all from the principles proper to the particular science in hand, seeing that the principles are primitive [that is, they may not be proven through demonstration] in relation to everything else: it is through reputable opinions about them that these have to be discussed, and this task belongs properly, or most appropriately, to dialectic; for dialectic is a process of criticism wherein lies the path to the principle of all inquiries.

This passage, in addition to acknowledging explicitly dialectic's use in philosophy, points out two valuable applications of the method useful to the philosopher and scientist: (1) as an analytical tool, and (2) as a means of reaching the *archē*.

As an analytical instrument, dialectic allows the philosopher to "puzzle on both sides of an issue." A survey of *endoxa* creates a firm starting point for research, for "people who inquire without first stating the difficulties are like those who do not know where they have to go" (*Metaph.* 3.1.995a32). Faced with differing or contradictory *endoxa*, the investigator is able to "untie the knot" that the various opinions present by using dialectical analysis to evaluate the difficulties that arise (*Metaph.* 3.1.995a28). Through a rigorous reasoning process involving induction, deduction using formal logic, or a combination of the two, the philosopher or scientist then achieves "conviction" concerning the matter in question (*Eth. Nic.* 7.14.1154a22). Now knowing the current state of discourse on a particular topic, the philosopher may proceed in her exploration of the subject, adding her own contributions. The use of a library for analyzing "both sides" of an issue seems axiomatic to the modern scholar, but the *Topics* suggests that the philosophical/scientific use of collections of *recorded documents* was not methodized until Aristotle.

The second and more controversial use for philosophical dialectic, introduced at *Top.* 1.2.101a37, is as a means of reaching first principles of sciences. According to Aristotle, dialectic *contributes directly towards the generation of new knowledge* (*Top.* 1.10.104b1): it is a source of the indemonstrable *archē*. Dialectical reasoning, through its use of *epagoge*, encourages the generation of the abstractions, again through induction,

necessary for arriving at the first principles (*Top.* 1.18.108b7). Here is where the line blurs between the *epagoge* of the *Posterior Analytics* and the dialectic of the *Topics.* The previously given examples of Alexandrian *epagoge* might arguably have been instances of philosophical dialectic. Historian of philosophy Aant Elzinga referred to Aristotle's process as "doxographic induction,"[42] in which the scientist reviews existing opinion in order to generate the classificatory headings (i.e. the first principles) from which may proceeds the hierarchical classification of the sciences.[43] It is tempting to consider the *Topics* as providing specific instructions for manipulating *endoxa* as a data type within the larger pre-scientific method of *epagoge.*

Dialectic at Alexandria

Prior to Aristotelian science, the consideration of others' opinions was not a formalized part of scholarship or had any clearly defined *epistemological purpose* in the creation of knowledge. Aristotle's dialectic validated the careful manipulation of *endoxa* as a means of gaining a perspicacious view of a subject. The Stagirite's use of his own library suggests that the methodical consideration of expert *endoxa* in the form of recorded material had become increasingly *de rigeur* by the end of the fourth century CE. Museum scholars regardless of scientific discipline, and even if they were not performing dialectic in a strictly orthodox Peripatetic sense,[44] were using the Library collection as a post-Aristotelian tool for preliminary analysis, abstraction, and theory building.

[42] Elzinga, "Some Remarks," 11. "Doxography" is a neologism for the collection and study of the works of past scientists and scholars.

[43] Ibid.

[44] There were certainly, however, orthodox Peripatetic philosophers at Alexandria, such as Demetrius of Phalerum and Straton of Lampsacus. Nineteenth century classicist Eduard Zeller noted in

Alexandrian grammarians such as Zenodotus and Aristarchus of Samothrace collected alternate versions of Homer's *Iliad* and *Odyssey* at the Library. They analyzed these often very different editions, along with other relevant expert *endoxa* concerning philology and poetry (such as Aristotle's logical works, *Poetics,* and *Rhetoric*) to "untie the knot" caused by the conflicting versions. Through analyses the grammarians *created* authoritative editions of the rhapsode's epics.

John Vallance argued that early Alexandrian medicine increasingly relied, like philology, upon precursor-texts in their science, as opposed to the heavy emphasis toward empiricism of pre-Alexandrian medicine. While the early Alexandrian medical school certainly used empirical observations (e.g., Erasistratus and Herophilus' infamous vivisections) the school's researchers had "a tendency to seek authority in the ideas of the past" (unlike the pre-Alexandrian Hippocratic physicians).[45]

Although Strabo's excursion concerning the methodological procedure of the geographer is a description of post-Aristotelian induction, it also suggests geography's analytical use of dialectic.[46] Through collecting and carefully analyzing the previous accounts of thinkers, the Alexandrian geographers were able to "untie the knot" of inaccuracies obscuring the current state of geography, and establish a more accurate understanding of the known world.

Aristotle and the Earlier Peripatetics, trans. B.F.C. Costelloe and John H. Muirhead (London: Longmans, Green, and Co., 1897), 33 fn 4, that there was enough of an orthodox Peripatetic presence in Alexandria for the early third century CE Roman Emperor Caracalla to revoke their academic privileges as a result of Aristotle's (unfounded) complicity in the alleged poisoning of Alexander.

[45] Vallance, "Doctors in the Library," 101.

[46] See chapter 6 note 22 above.

So although the individual Alexandrian disciplines used their own methods for conducting the particular sciences, all shared the post-Aristotelian "umbrella method" of basing discourse on previously expressed expert opinion. For example, the famed Alexandrian geometer Apollonius of Perga (fl. second half third century BCE) reviewed the discoveries of previous mathematicians "more fully and more generally" in the process of arriving at his own theorems concerning conical sections.[47] In doing this Apollonius realized "that Euclid [the Alexandrian astronomer and geometer, fl. ca. 300 BCE] had not worked out the synthesis of the locus [of circular cones] with respect to three and four lines…," and completed Euclid's synthesis himself.[48] Similarly, Archimedes of Syracuse, who worked at Alexandria, would obtain, comment on, and elaborate upon a work of mathematician and astronomer Aristarchus of Samos (fl. first half of the third century BCE) to invent his own system of naming large numbers.[49]

This analysis of expert *endoxa* was an integral feature of Alexandrian scholarship from the Library and Museum's foundations through their final periods. The Egyptian astronomer Ptolemy (fl. 127-148 CE) used extensive references to the works of his scientific forebears to develop his own theories in his *Almagest*, including the Alexandrian astronomers Euclid (fl. ca. 300 BCE), Timocharis (fl. early third century BCE), Eratosthenes, and Hipparchus of Nicaea (fl. mid second century BCE). The second century CE Alexandrian physician Galen relied heavily on clinical research.[50] But Galen

[47] Apollonius Perga *Conics*, 1.2.2-4.28, in *Selections Illustrating the History of Greek Mathematics*, vol. 1, trans. Ivor Thomas (Cambridge, MA: Harvard University Press, 2000), 283.
[48] Ibid., 1.2.2-4.28.
[49] Archimedes *The Sand Reckoner*, p. 221-232, in *Works*, ed. T.L. Heath (New York, Dover, n.d.).
[50] Arthur John Brock, "Introduction," in Galen, *On the Natural Faculties* (Cambridge, MA: Harvard University Press, 1916), xxxi.

also arguably relied even more on the "acquisitions of biological science dating from the time of Aristotle… and reinforced by discoveries in anatomy by the Alexandrian school."[51] Galen's treatises were rife with the discussion of the expert *endoxa* of previous thinkers. He performed these reviews to identify the mistakes of the past and glean the authentic knowledge of past intellectuals before providing his own intellectual contributions to medicine. And, though Galen urged that physicians use an *apodeictic* method (i.e., logical demonstration),[52] he advocated the non-doctrinal review of previous research:

> The fact is that those who are enslaved to their sects are not merely devoid of all sound knowledge, but they will not even stop to learn [from *endoxa*]! Instead of listening, as they ought, to the reason why liquid can enter the bladder through the ureters, but is unable to go back again the same way [an *endoxon*]… they refuse to learn.[53]

Galen's remarks suggest that he equated "learning" and "listening" with *reading*—which he certainly did much of himself in the process of writing his treatises. The Alexandrian scholars were surveying the expert *endoxa* of earlier philosophers and scientists as late as the sixth century CE. The Alexandrian philosopher Simplicius of Cilicia's (fl. ca. 530 CE) *Commentary on Aristotle's Physics*, written nearly one millennium after Theophrastus' *Doxography of Physics*, adopted Theophrastus' style. But, in addition to citing thinkers mentioned by Aristotle and Theophrastus, Simplicius' survey of scholars included later thinkers such as Alexander of Aphrodisius.[54] Furthermore, Simplicius' commentary on the *Physics* is valued for its *original content*.

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[51] Ibid., xxxiii.
[52] Galen *On the Doctrines of Hippocrates and Plato*, 1.3.
[53] Galen *On the Natural Faculties,* 1.13.35.
[54] Simplicius *Aristotle's Physics 4.1-5, 10-14*, 700-706.

He effectively used nearly a millennium of earlier scholarship in the process of updating Aristotle's *Physics*.[55]

Post-Aristotelian analytical reviews of expert *endoxa* had become a feature of Alexandrian scholarship, and they remain an important part of *scientific method* today. "Aristotle's pre-scientific method" had become "Alexandria's pre-scientific method," nay, the "western world's pre-scientific method."

If, as argued in the Appendix, one accepts that the *mature iteration* of Aristotle's dialectic (i.e., at the time of his death) maintained a positive and necessary pre-scientific relationship with the discovery of theoretical knowledge, it may also be assumed with reasonable probability that Demetrius of Phalerum knew and used the method at the Lyceum (ca. mid 330's to late 320's BCE). Ptolemy I in turn knew that Demetrius was well-versed in setting up and running a scholarly community since Demetrius had worked closely with Theophrastus, who had traveled with Aristotle to Athens and likely helped the Stagirite set up the Lyceum. Demetrius did this in turn at Alexandria. Providing additional support to the thesis that Aristotle's pre-science served as the philosophical basis for the Library collection, parallels may be drawn between specific instructions given by the philosopher in his *Topics* for setting up a stock of propositions (*Top.* 1.14.105a34-1.15.105b35) for practicing dialectic and the organization of the Library of Alexandria for use in scholarship. Books one and eight of the *Topics* outline these instructions for how "to build a library." In these books Aristotle counseled the

[55] *Encyclopaedia Britannica*, s.v. "Simplicius of Cilicia."

dialectician how to *collect*, *classify*, and *catalog* propositions in carefully constructed *stockpiles*.

Collecting a Library

The first "instrument" of successful dialectic is "the securing of propositions," i.e., the creation of a set of *endoxa* from which to draw when building deductive or inductive dialectical arguments (*Top.* 1.13.105a22; see also 1.4.101b11).[56] As with empirical observations, *endoxa* should be *collected* by the philosopher or scientist. Aristotle stated the necessity of possessing a "good stock of definitions [i.e., epistemologically basic propositions, which are again, *endoxa* (see *Top.* 1.4.102a24)]; and [to] have those of reputable and primary ideas at your fingertips; for it is through these that [dialectical] deductions are effected" (*Top.* 8.14.163b19) (note: these same propositions are grist for dialectical *induction* as well) (*Top.* 1.8.103b1). For Aristotle, the stockpiles of propositions served as a way to avoid being forced into *ad hoc* dialectical arguments, which "were rather difficult to produce" on the fly (*Top.* 8.14.164b19). These organized stocks of *endoxa* are a memory tool for affecting Aristotelian pre-science.

Aristotle's language objectifies *endoxa*. *Endoxa* are materials maintained in a *stock*: "A store or supply accumulated."[57] These reserves are to be kept at arm's length, i.e., at one's *fingertips*, ready for consultation—and therefore carefully organized. Aristotle even made an explicit connection between these *endoxa* and knowledge-based documents in *Top.* 1.14.105b13, when he wrote that dialecticians should select *endoxa*

[56] Aristotle suggested, at *Top.* 8.14.163b3, that if the dialectician can find no partner, they should argue with themselves. This is arguably what the dialectician *qua* philosopher does when working through the *endoxa*.

[57] *Merriam-Webster's Collegiate Dictionary*, 10th ed., s.v. "stock."

from "written handbooks of arguments." Among Aristotle's lost works are treatises with titles like *Arguments for the Purposes of Refutation, Propositions, Epicheiremes* [dialectical arguments], and *Objections* that suggest they might be such dialectical handbooks (and that dialectical handbooks made up part of his library—which would mean that *at least one* of the Lyceum library's functions was for engaging in dialectic). [58]

Furthermore, although *endoxa* may be collected from "all or the many," book eight of the *Topics* privileges expert opinion. Aristotle advised dialecticians to "secure from those skilled in deduction their premises, from inductive reasoners [sic] their parallel cases; for this is the thing in which they are respectively trained" (*Top.* 8.14.164a15). This suggestion is not surprising, for according to Aristotle the *endoxa* put forward by experts, *theses*, accounted for nearly *all* of the dialectical problems discussed by the mid to late fourth century BCE (*Top.* 1.12.104b35). A *thesis* is worthy of consideration due to the "cognitive authority" of its originator (*Top* 1.12.104b19-20), and Aristotle's personal library, if we are to judge by the titles of his own works alone, which included *On the Laws of Plato, Precepts of Xenophanes,* and *Doubts Connected to Homer*, was largely a collection of such expert *endoxa*.[59]

The Lyceum was the first educational institution to actively and systematically use an academic *library* as a major philosophical/scientific instrument for accomplishing scholarship. Plato certainly owned a personal collection of scrolls. The philosopher was an avid collector of books and is reported to have bought "three books of Philolaus the Pythagorean for ten thousand denarii" (a massive sum of money) to add to his personal

[58] Diogenes Laertius 5.22-23.
[59] Ibid., 5.22-28.

collection.[60] However, the Socratic/Platonic method of master-student verbal exchange and Plato's disdain for recorded language likely discouraged the methodical use of a library collection as a tool for the creation of new knowledge. This is not to say, however, that a library of the later Academy did not serve a *de facto* "Peripatetic" function in emulation of the Aristotelians.

Aristotle's library, like Plato's, was a personal possession. But although this "treasure of knowledge" was handed down from headmaster to headmaster, the scrolls, the *expert endoxa*, were effectively community possessions used in the collaborative advancement of philosophy and science.[61] The Lyceum collection expanded around a core of scholarship that included Aristotle's own work, a huge corpus that Diogenes Laertius said consisted of four hundred and forty-five thousand two hundred and seventy lines.[62] Aristotle's collection increased in size as a result of the scholarly efforts at the school during Aristotle's headship and after he left Athens, e.g., its inclusion of the 158 *Constitutions of Greek Cities*. Furthermore, the collection's works were used to aid in the creation of additional knowledge (the *Constitutions* for example, likely served as reference resources for investigations in political science).

A stockpile of "materialized *endoxa*" (scrolls), his library, served as Aristotle's "database" for dialectic. This is evidenced in Aristotle and Theophrastus' treatises which "show a comprehensive knowledge of literature and could not have been written at all without such a library."[63] Therefore, when Aristotle advised that the dialectician collect

[60] Aulus Gellius *Noctes Atticae*, 3.17.1-2.
[61] Grayeff, *Aristotle and his School*, 59.
[62] Diogenes Laertius 5.27.
[63] Blum, *Kallimachos*, 52.

endoxa for dialectic, the philosopher, for all practical purposes meant for them to create a library of scrolls containing expert *endoxa*—a *library* of knowledge-based documents. Aristotle himself possessed such a *physical* library of *expert endoxa*.

Aristotle's library remained in Athens until it was left in the hands of Neleus of Scepsis (ca. 288/5 BCE), at which time it began a journey that left it as either the core collection of the library of Appellicon at Rome or the Library of Alexandria. [64] The decline of the Lyceum as a philosophical research institution coincided with the loss of their library. The loss of the school's dialectical stockpile of *endoxa* quite possibly hobbled its research agenda. [65]

But the Aristotelian idea of a stock of expert *endoxa* attached to a philosophical school survived the Lyceum's nadir. Demetrius of Phalerum, having seen Aristotle's collection as *an integral part of a philosophical and scientific community,* naturally suggested to Ptolemy I the necessity for a library to be collected for the scholars of the Museum. The pharaoh was familiar with the methods of Aristotle, likely knew these methods' worth, and agreed to Demetrius' plans. Regardless of the evidence of a Peripatetic connection between specific Peripatetic *personalities* and the Library and Museum, because a massive collection of *knowledge-based resources,* a stockpile of expert *endoxa* based most likely on Aristotle's library, was held at a scholarly community suggests the Library's post-Aristotelian nature.

The Library of Alexandria served as a database of *expert opinion* for the Museum scholars' intellectual work. The Library collection was massive, as large as 700 thousand

[64] See Athenaeus 1.3a-b, and Strabo 13.1.54 respectively
[65] See chapter 1 notes 6 and 7 above.

volumes, but the range of scholarly endeavor at the Museum was also impressive. The Alexandrian scholars needed a huge stockpile of expert *endoxa* for their work, and they also needed a stockpile that was *accessible*. Conveniently, Aristotle not only suggested that the dialectician collect *endoxa*, but also provided instructions for organizing stockpiles of *endoxa* for their use in philosophy and science.

Classifying the Collection

A stockpile of *endoxa* is all but useless if the dialectician is unable to retrieve the appropriate, needed *endoxa* when called for. Aristotle held that propositions should be *classified* by intellectual area so that they might be easily recalled during dialectic. In keeping with his hierarchical organization of the sciences as discussed in the *Posterior Analytics*, he advised that the stockpiles of *endoxa* be classified by *genus* and *species* in "sketch-lists." These sketch-lists were to organize propositions "under separate headings, e.g. 'On Good', or 'On Life'—and that 'On Good' should deal with every form of good, beginning with the essence" (*Top*. 1.14.105b13). The *endoxa*, Aristotle advised, should be classified under the appropriate headings for which they "mostly tend to fall" (*Top.* 8.14.163b22). Aristotle suggested three top-level classifications: "some are ethical propositions, some are natural science, while some are logical" (*Top.* 1.14.105b19). And, although he does not provide more specific headings under these top-level classifications, one might venture that the classification schema corresponded to the hierarchically constructed individual sciences in which the philosopher or scientist was operating.

The librarians of Alexandria set out to classify their collection from the Library's earliest days. That "Alexander of Aetolia edited the books of tragedy, Lycophron of

Chalcis of comedy, and Zenodotus of Ephesus those of Homer and the other poets,"[66] meant that the intellectual organization of the Library collection began as early as the first half of the fourth century BCE, near, or soon after Zenodotus' elevation to Head Librarian (ca. 282 BCE).

Zenodotus, who was made Head Librarian and placed in charge of the recension project by Ptolemy II, was a student of the grammarian Philetas of Cos (fl. second half of the fourth century BCE),[67] who served as tutor to Ptolemy II prior to Strato of Lampsacus. This means that Zenodotus was at the Museum at the Library's foundation and, as a grammarian, likely worked at the Library prior to Demetrius of Phalerum's exile. Zenodotus would have witnessed first-hand any early attempts of Demetrius at organizing the collection. Demetrius too was an experienced grammarian.[68] The Phalerian, as a Peripatetic grammarian, knew how to properly organize *endoxa* for analysis. Might Demetrius and Zenodotus have talked shop?

These nascent attempts at organizing the Library culminated in the mid-third century BCE with Callimachus' *Pinakes*. Like Aristotle's sketch-lists, the *Pinakes* classified *endoxa* to have materials at a scholar's "fingertips." And, as with Aristotle's recommendation, the *Pinakes*' classification of expert *endoxa* was based on a hierarchical *genus/species* model. In fact, Aristotle's three major divisions of *endoxa*: ethics, natural science, and logic, share a basic similarity with two of the three known divisions of Callimachus' *Pinakes*: law, oratory, and miscellanea. Law is related to ethics, and oratory

[66] See chapter 4 note 25 above. It is telling that the early classification at the Library was performed to facilitate the recension of Greek literature, a scholarly endeavor.

[67] *Suda*, Adler zeta 74.

[68] Tertullian *Apologetica*, 18.5.

is a cousin of dialectic (and therefore a relative of logic). The *Pinakes* was apparently quite hierarchically sophisticated (naturally, it would seem, considering that it cataloged such a massive collection). The *Pinakes* even contained a sub-classification under miscellanea for "Writers on dinners [i.e., 'cookbooks']."[69]

In any case, as suggested in the *Topics* and possibly materialized in the *Pinakes*, the librarians of Alexandria were engaged in hierarchically organizing a stockpile of intellectual materials for the purpose of these materials subsequent retrieval and use in a scholarship that went beyond maintaining a "stream of tradition."

This innovation, the division of knowledge by theoretical dictum, is in stark contrast to the preceding Near Eastern protolibrary classifications and was signally prefigured by Aristotelian philosophy. In light of the evidence, it is probable that the Callimachean "principle of classification" was *based* on Aristotle's theory of science. And considering that Aristotelian dialectic changed the use of collections of *endoxa,* it is possible that the Alexandrian librarian implemented the Stagirite's instructions regarding the pre-scientific organization and use of stocks of *endoxa*, or those instructions as filtered through Theophrastus, Demetrius, and those post-Aristotelians who followed them. The likely Peripatetic connection to the *Pinakes*, i.e., the use of Aristotelian theory to organize a collection for the systematic conduct of philosophy and science, would serve as a model for the majority of post-Alexandrian classification schemes.[70]

[69] Athenaeus 6.244a.
[70] Blum, *Kallimachos*, 245.

Cataloging the Collection

In the *Topics*, Aristotle suggested that, after hierarchically classifying *endoxa*, it might be helpful for the dialectician to *catalog* the *endoxa* as well. He proposed *keying the endoxa of individual experts to the sketch-list classification scheme*: "In the margin [of the sketch-list], too, one should indicate also the opinions of individual thinkers, e.g. that Empedocles said that the elements of bodies were four; for any one might assent to the saying of some reputable authority" (*Top*. 1.14.105b13). Not only does Aristotle's recommendation suggest the creation of *encyclopedias* and annotated bibliographies for use in scholarly research, but library catalogs as well.

As with Aristotle's annotated sketch-lists of *endoxa*, the *Pinakes* was an annotated catalog of expert *endoxa* for use in scholarship. It was, furthermore, a catalog of works (as opposed to "things," i.e., as was the case of the Near-Eastern "shelf-list" catalogs). The *Pinakes*' subject/author class/work classification system anchored individual works hierarchically. The following fragments suggest the *Pinakes'* Aristotelian origins. The first fragment displays that authors were *classified* by subject, the second that entries were *described* at the author level, and the third that *individual works* were provided a *bibliographic description* (i.e., cataloged):

> (1) Kallimachos incorrectly lists Prodikos among the orators; because he [appears] in those [verses] evidently as a philosopher.[71]
>
> (2) In order that I may also mention the verses of the poet and orator Dionysios Chalkus; he was called 'Bronze' because he advised the Athenians to employ bronze currency, and this statement is recorded by Kallimachos in his *List of Orators*.[72]

[71] Callimachus frag. 431 Blum.
[72] Callimachus frag. 430 Blum.

(3) Callimachus in his *Table of Miscellany*; he writes as follows: 'Writers on dinners: Chaerephon; dedicated to Pod.' And then he subjoins the beginning of it, 'Since you have often bidden me (and adds the size) 'in three hundred and seventy five lines.'[73]

Unfortunately, although Aristotle quite possibly classified and cataloged his personal library in a similar manner, by means of annotated sketch-lists, no catalog has survived. He did, however, provide the conceptual tools for post-Aristotelian librarians to catalog their collection. Furthermore, any cursory reading of the philosopher's treatises shows that Aristotle's doxographies routinely classify and annotate expert *endoxa*: first Aristotle provided broad headings (although these headings were often subject/author, as opposed to the *Pinakes'* subject/author class/work), and then the Stagirite followed these classificatory headings with explanations of the *endoxa* of the individual experts. The following example is from the *Physics*:

> The second set [of physicists] assert that the contrarieties are contained in the one and emerge from it by segregation, for example Anaximander and also all those who assert that what is one and many, like Empedocles and Anaxagoras; for they too produce other things from their mixture by segregation. These differ, however, from each other in that the former imagines a cycle of such changes, the latter a single series. Anaxagoras again made both his homogeneous substances and his contrarieties infinite, whereas Empedocles posits only the so-called elements (1.4.187a20).

Both Aristotle, and the Alexandrian librarians, therefore, divided knowledge hierarchically by intellectual categories, and then recorded the individual expert *endoxa* (in Aristotle's case the expert *endoxa*, in the Library's *works* containing the expert *endoxa*). Both of these registers are encompassed within an overarching classificatory scheme.

[73] Athenaeus 6.244a.

Finally, in the *Organon's* first logical treatise, the *Categories,* Aristotle noted that terms may be predicated ontologically of subjects in ten different ways (i.e., they describe the ways in which the subject *is*) (*Cat.* 1.4.1b20), and the *Topics* associates these ten *categories* with the dialectical consideration of *endoxa*. Aristotle noted that propositions (again, propositions are synonymous with *endoxa*) should be distinguished by their "categories of predication," that is, the ways in which a subject is predicated to reality (*Top.* 1.9.103b2020). These categories were what "a thing is, Quantity, Quality, Relation, Place, Time, Position, State, Activity, [or] Passivity" (*Top.* 1.9.103b21). All of Aristotle's *categories* are used to describe things ontologically, and such descriptions' relationship to cataloging is obvious as are these ideas' development for bibliographic classification techniques. Though the Near Eastern scribe divided their proto-library collections in an *ad hoc* manner depending upon the specific contextual situation and the make-up of the collection, they had no known theories of classification or cataloging. The post-Aristotelian librarians inherited from the Stagirite the *philosophical theory* that a predefined classificatory template is of use to specify the characteristics of objects.

Although there is no evidence that Callimachus based the *Pinakes* on Aristotle's *Categories*, it is tempting to posit the connection between Aristotle's assigning of various ontological values to substances and the post-Aristotelian librarians' bibliographic description of literature. The *Pinakes,* according to Blum's assessment, described its entries as a combination of various *identifying qualities,* that is, the ways that the work "is," essentially the *categories of predication* in which it may be described, including

author, biographical data, title, incipit, and number of lines.[74] At the very least, the kernel of the idea that things might be *classified* and *described* (i.e., ontologically "known") in distinctive ways had been planted.

The "Post-Aristotelian" Library

Aristotle truly was the "philosopher of common sense." He recognized and systematized the communal discovery of knowledge, and he did so while fully validating the use of opinion and recorded documents as a means towards creating knowledge. Although Aristotle adopted Plato's basic model of philosophical/educational community (which Plato, in turn, had inherited from Socrates), the Stagirite's contributions to scientific method transformed the way that post-Aristotelian intellectual communities used *collections of recorded opinion* in the pursuit of discovery.

For the post-Aristotelian academic communities, scholarly communication became, to an appreciable degree, text-based. In less than one century, *collections* recorded opinions became a necessary tool for use by scholarly communities. Both *epagoge* and dialectic, therefore, would find a library useful in the pre-scientific process. The Alexandrian scholars certainly used expert *endoxa* in induction, and the Library bears the hallmarks of an Aristotelian stock of *endoxa.* Demetrius of Phalerum was likely well versed in both induction and *epagoge* and saw the Library as a necessity for performing the scientific method that he was familiar with.

[74] Blum, *Kallimachos,* 152-153.

Aristotle valuated recorded expert opinion in the pursuit of knowledge, extended Platonic dialectic to create a logical method of manipulating *endoxa*, and codified this method into a systematic and *recorded* recipe. Furthermore, the Stagirite's historical connections with those figures responsible for the creation of the first great academic library in the ancient world, which appears to have used these methods, make apparent the philosopher's influence in the creation of a new paradigm of scholarly communication.

Following Plato's lead, Aristotle ingrained the idea that the world might be explained through applying a *systematic* method, extending this method in a manner to necessitate library collections. Even if the philosophical and scientific communities which directly followed Aristotle, as well as modern research universities which operate today, did not use their library collections in a dogmatically Peripatetic fashion, they used and continue to use them *methodically* for scholarship. Modern western scholarship, regardless of particular paradigmatic basis, reviews knowledge (e.g., academic literature reviews) based resources in the process of creating theoretical knowledge.

Chapter 7: Re-assessing the Post-Aristotelian Library

The dominant paradigm of the academic library originates in Aristotelian philosophical thought. The modern academic library represents millennia of orthodox views concerning "what it means to do science" located ultimately in the foundationalist epistemology of Aristotle.[1] Modern scholars, fortunately, are presented with "a proliferation of contending paradigms [that is] causing some diffusion of legitimacy and authority."[2] Critical and cultural studies approaches offer researchers the analytical and conceptual tools necessary to examine structures of social power that have been institutionalized and used to dominate minority groups. Postmodernist views such as feminism and queer theory have identified culture as a "domain of struggle" in which the creation and transmission of knowledge is contested between the dominant culture and minority groups.[3] Considering the importance of academic libraries in forming and legitimating conceptions of reality and "truth," they warrant further analysis as cultural institutions and potential implements for establishing and enforcing hegemonic control.

It is tempting to conclude that the Library and Museum subverted millennia of scribal power and replaced narrow and stagnant canons of literature with a wide-ranging, ever-expanding body of philosophy, science, and art. In this view, the "dominant paradigm" discussed in this study, the Greek alphabet's forced obsolescence of the

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[1] Patti Lather, "Critical Inquiry in Qualitative Research: Feminist and Postcritical Ethnography," in *Foundations for Research: Methods of Inquiry in Education and the Social Science*, eds. Kathleen deMarrais and Stephen D. Lapan (Mahwah, NJ: Lawrence Erlbaum Associates, 2004), 206.

[2] Ibid., 206.

[3] Joe L. Kincheloe and Peter McLaren, "Rethinking Critical Theory and Qualitative Research," in *The Sage Handbook of Qualitative Research*, 3rd ed. eds. Norman K. Denzin and Yvonna S. Lincoln (Thousand Oaks, CA: Sage Publications, 2005), 310.

scribal classes shifted the dominant intellectual paradigm from the authoritative "streams of tradition" to a visionary intellectual milieu of unrestrained knowledge creation. It is likewise tempting to conclude that the custodians of this brave new world of scholarship were rational, enlightened philosophers and scientists with no explicit or implicit ulterior motives besides "objective" knowledge creation. This idealization of post-Aristotelian scholarship, the Library, and the subsequent institutions of higher learning which emulated the Museum and Library is in need of critique from alternative perspectives. A feminist perspective allows for valuable insight into how Alexandrian scholarship maintained the *status quo* and the hegemonic authority of the dominant cultural elite. Aristotle scholar, Cynthia Freeland noted that Aristotle's dialectical method is ripe for reconsideration;[4] what follows is an attempt to provide such a critique.

A powerful indictment of the utopian view of the Library and Museum is the argument that the Alexandrian institutions were used as tools for entrenching male Greco/Macedonian hegemony. This control buttressed the male elite's cultural and political domination over women, slaves, and non-Hellenized peoples under a post-Alexandrian Macedonian political authority. The scholars of Alexandria, as well as the philosophical tenets that were the basis and determinants of their inquiries, legitimated the culturally and politically conservative (and socially oppressive) end of perpetuating the elite class of wealthy, leisured, Greek (or Hellenized) males. And although it is inaccurate to conflate the Alexandrian scholars' monopoly on knowledge with the Near Eastern and Egyptian scribes' "stream of tradition," both the Greco/Macedonian and the

[4] Freeland, "Nourishing Speculation," 158-160.

"scribe driven" civilizations' protolibraries were ultimately exclusionary entities. Both served as instruments for cultural/political dominance.

The male dominated culture of the ancient Greeks modeled its "ideal human" on the exemplar of the traditional Homeric hero and ignored the voices of women and other politically disenfranchised groups. The Library and Museum were powerful forces in maintaining this *status quo.* Although women possessed political power in Greek comedies such as Aristophanes' (lived ca. 457-ca. 385 BCE) *Lysistrata* and *Ecclesiazusae*, female equality was limited to the stage (and men even played the female roles). The fifth century BCE dramatist Sophocles' *Ajax* best captured the prevailing Greek attitude towards women with its infamous maxim: "silence graces women."[5]

The women of ancient Greece were, from the Archaic period forward, treated as inferior to Greek men. Even if a woman was a member of the Greek upper class she effectively had no power, wealth, or influence.[6] The Greeks relegated females to predetermined roles. Women were slaves, prostitutes, or veiled "decent" women forced into lives of "complete invisibility."[7] "Free" women, like children and slaves (and one must remember that many women were literal slaves), were essentially the property of male family members. Feminist political philosopher Susan Moller Okin wrote that this identification of women with property had, by the end of the fourth century BCE and the

[5] Sophocles *Ajax*, 290-291.

[6] Lloyd Llewellyn-Jones, *Aphrodite's Tortoise: The Veiled Woman of Ancient Greece* (Swansea: Classical Press of Wales, 2003), 121.

[7] James Davidson, *Courtesans and Fishcakes: The Consuming Passions of Classical Athens* (New York: Saint Martin's Press, 1998), 128.

beginning of the Hellenistic age, become "automatic to the Greek mind."[8] Feminist philosophers and cultural studies scholars have argued that foundationalist ways of knowing, such as those of the ancient Greeks, have served as instruments for consolidating this elite male domination as well as eclipsing other valid ways of knowing, for "traditional Epistemology [the use of capitalization signifies an assumption of absolutism] has *not* been able to present a generality but rather has represented a male perspective as if it is general, neutral, and inclusive of women."[9]

Philosophy as a Tool for Domination

Feminist historian of philosophy Genevieve Lloyd held that Greek philosophy developed into an effective tool for controlling women: "From the beginnings of philosophical thought, femaleness was symbolically associated with what reason supposedly left behind, the dark powers of the earth goddesses."[10] This fear of feminine power resulted in what Lloyd identified as the separation of the "rational" male from the "irrational" female. The dichotomous categorization of the sexes into positive (male) and negative (female) maintained the intellectual and political superiority of the male. It artificially excluded women from sharing in rationality and reason, and by the sixth century BCE it had quickly become the dominant paradigm for establishing objective

[8] Susan Moller Okin, "Philosopher Queens and Private Wives: Plato on Women and the Family," *Philosophy and Public Affairs* 6, no. 4 (Summer, 1977): 362.

[9] Barbara J. Thayer-Bacon, *Relational "(e)pistemologies"* (New York: Peter Lang, 2003), 3, 16.

[10] Genevieve Lloyd, "Reason, Science, and the Domination of Matter," in *Feminism and Science*, eds. Evelyn Fox Keller and Helen E. Longino (Oxford: Oxford University Press, 1996), 42.

truth.[11] The superiority of elite males, when backed by the epistemic authority of philosophy, justified the subjugation of women and other minorities (both male and female) by Greek men. Philosophy cemented these "others" as being excluded from "defining reality" and forced their acceptance of elite-determined "truths."

Even Plato, whose ideal republic argued extraordinarily that "Men and women alike possess the qualities which make a guardian [a philosopher ruler of the ideal state],"[12] and who is considered a proto-feminist philosopher by many scholars,[13] was accused of de-sexing women in the process of transforming them into philosopher rulers. Feminist scholar Arlene Saxonhouse argued that Plato's women philosophers were no longer female:

> By forcing her to participate in the activities of the male warriors and later philosopher rulers, Socrates [Plato's mouthpiece in the *Republic*] removes from woman her original *phusis*—that particular specialty in which she excels. Woman's sexual, bodily nature is forgotten and she becomes almost irrelevant in Socrates' best city.[14]

Feminist historian of philosophy Jane Roland Martin went further than Saxonhouse in her critique of Plato's "philosopher queens." Martin concluded that the women guardians, through taking on traditional masculine traits like aggressiveness,

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[11] Genevieve Lloyd, *The Man of Reason: 'Male' and 'Female' in Western Philosophy* (London: Routledge, 1984), xix.

[12] Plato *Respublica*, 456a-b.

[13] Gregory Vlastos, in "Was Plato a Feminist?" in *Feminist Interpretations of Plato*, ed. Nancy Tuana (University Park, PA: Pennsylvanian State University Press, 1994), 12-14, listed the rights given to women in the *Republic* that were denied to them in Athens: (1) Right to Education, (2) Right to Vocational Opportunity, (3) Right to Unimpeded Social Intercourse, (4) Legal Capacity, (5) Right to Sexual Choice, (6) Right to Own and Dispose of Property, and (8) Political Rights.

[14] Arlene Saxonhouse, "The Philosopher and the Female in the Political Thought of Plato," in *Feminist Interpretations of Plato*, ed. Nancy Tuana (University Park, PA: Pennsylvania State University Press, 1994), 72.

became men.[15] There was no room in Plato's philosophy, as a result, for the natural female. Plato's stratified utopia is easily accused, in fact, of proposing the establishment of intellectual elite class (the guardians) which elevates those who best embody the ideals of the "rational Greek male:" "Then will it be our [the founders of the ideal city] duty to select, if we can, natures which are fitted for the task of guarding the city?"[16]

Plato's views on women present what Okin referred to as a seemingly "unresolvable enigma";[17] a tension exists between the equality of the *Republic* and the many deeply misogynistic statements found in the *Republic* and other dialogues. For example, although Plato offered women equivalent social status to men in his republic, he said that they were inferior to men in almost every field,[18] and he claimed in the *Timaeus* that females were cowardly males reborn as women.[19]. While these contradictions are often passed over by modern scholars as "lapses," Okin countered, "Plato was not the kind of thinker we can readily believe forgot his beliefs, especially on a subject to which he devoted considerable amount of attention in some of his major dialogues."[20] Plato's attitudes towards women, while superficially contradictory, suggest the dismissal of the female based upon a male-centric ontology; philosophy became a tool for domination, and if women did not "become" men, they remained inferior.

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[15] Jane Roland Martin, *Reclaiming a Conversation: the Ideal of the Educated Woman* (New Haven, CT: Yale University Press, 1985), 30-31.

[16] Plato *Respublica*, 374a-e.

[17] Susan Moller Okin, *Women in Western Political Thought* (Princeton, NJ: Princeton University Press, 1979), 15.

[18] Plato, *Respublica* 455c-d.

[19] Plato, *Timaeus* 90e.

[20] Okin, *Women in Western Political Thought*, 27.

Philosophy and Class Structure

The exclusion of women, Aristotle scholar Cynthia Freeland argued, was not so much the result of sexism, as it was class bias.[21] The treatment of women by the Greek male elite was one symptom of a wider program of oppression through class stratification. Greek philosophical thought, culminating with the political and biological works of Aristotle, was a tool for stratification, it subordinated all "others" (i.e., females, slaves, etc.) hierarchically below Greek male citizens (even *metics*, free Greek male non-citizens, were inferior; ironic considering that Aristotle was not a citizen of Athens).[22]

Although political power in the late classical and Hellenistic periods remained largely in the hands of powerful—but not particularly philosophical—men, the "philosophical hegemony" of Plato's ideal republic was arguably institutionalized *de facto* by the Academy, Lyceum, and Museum of Alexandria. The ancient Greeks' philosophical history routinely supported the intellectual exclusion of women and minority groups through its legitimization of a classed society.

Aristotle, like nearly every post-Platonist until the dawn of the modern age, ignored Plato's arguments for female equality but embraced Plato's class stratification of society. The Stagirite considered both females and slaves as subhuman because of a supposed deficiency of deliberative faculty (*Pol*. 1.12.1260a12). Aristotle also excluded non-Greeks, whom he considered brutes and "natural slaves" (*Pol.* 3.14.1285a19) and

[21] Cynthia Freeland, "Nourishing Speculation," 157; see also Elizabeth Spelman, "Who's Who in the Polis?" in *Engendering Origins: Critical Feminist Readings in Plato and Aristotle*, ed. Bat-Ami Bar On (New York: State University of New York Press, 1993), 99-125.

[22] This concept was systematized by the third century CE Neoplatonist philosopher Plotinus with his "Great Chain of Being" (which, borrowing concepts from Plato and Aristotle, orders all substances hierarchically from the deity down).

therefore easily and legitimately enslaved and controlled by the rightful rulers of the world, the Greeks: "For foreigners, being more servile in character than Hellenes, and Asiatics than Europeans, do not rebel against a despotic government. Such kingships have the nature of tyrannies because the people are by nature slaves" (*Pol.* 1.6.1255a27).

In the case of slaves and foreigners, this inequality resulted from what Aristotle perceived to be a *complete* lack of rational capability (*Pol.* 1.13.1260a11). Although Aristotle allowed women some limited use of reason, he considered them inferior to men for biological reasons (*Part. An.* 2.2.648a12; *Pol.* 1.13.1260a11). Aristotle thought that females were impotent males malformed because of a lack of uterine heat during their mothers' pregnancies (*Gen. An.* 1.20.728a18; 4.6.775a16). The philosopher even classified women as "monstrosities"—but monsters necessary for the perpetuation of the human *species* (*Gen. An.* 4.3.767b6). In the end, both of these minorities, non-Greeks and women, were for Aristotle nothing more than instruments for the fully "rational" males to use in supporting their interests, be that use accomplished through forced labor, domestic servitude, or childbearing.

So, although Greek male citizens were fully human and superior to all lower strata of humanity, women and slaves remained necessary to society, but were ultimately inferior.[23] According to Aristotle this hierarchical ordering of human beings served a *teleological* purpose: "For that some should rule and others be ruled is a thing not only necessary, but expedient; from the hour of their birth, some are marked out for subjection, others for rule" (*Pol.* 1.5.1254a20). Without the continued subjugation of

[23] Okin, *Women in Western Political Thought*, 93.

women and maintenance of a system of slavery, both characteristics of the "well-ordered" Greek city state, the *polis,* would ultimately fail.[24]

Logic as a Tool for Exclusion

How did the Greeks justify this philosophical segregation? Specifically, the philosophical use of logic may be charged with providing substantially for the continued subjugation of women and other minorities and doing so under the aegis of reasoned truth. Logic, an artificial language, limits available knowledge and discourse concerning the "truth." The late nineteenth century pragmatist philosopher William James concluded that no logic was capable of capturing the theoretical nature of reality, which "exceeds our logic, overflows and surrounds it."[25] The Greek philosophers combined their foundationalism with the use of argument, a process inherently biased towards the purposes of the particular logic's innovators, in this case the elite male intellectuals. The result was a viciously limited set of truths, truths were used to exclude opposing viewpoints and enforce control.

Feminist historian of philosophy Andrea Nye identified the *philosophical use of logic* as the elite Greek male's tool for consolidating and maintaining power. Plato's method of division, the proto-logic which greatly influenced Aristotle's formal logic and science through its hierarchical ordering of reality, rigidly compartmentalizes what is "knowable." Plato's division is a binary system in which every *genus* is divisible into two *species,* forcing the respondent of a philosophical discourse into one of two

[24] Elizabeth Spelman, "Who's Who in the Polis?" 100.
[25] William James, *A Pluralistic Universe* (Cambridge, MA: Harvard University Press, 1977), 96.

predetermined answers (e.g., the *genus* "exchange" is divisible into either "giving" or "selling," with no other possible *species*).[26] This variation of the Socratic dialogue from Plato's later period prevents two-sided discussion.[27] There is no middle-ground in Platonic division, and the "target" of the logical exchange is forced into accepting reality as defined by the philosopher logician, who holds *epistemic* authority.

Therefore, the elite male—the philosopher—has complete control of the philosophical conversation through his control of logical division.[28] He determines the only possible choices that his conversational partner is allowed to make and tells them how they *must* perceive reality (otherwise they will be exposed as insane or idiotic).[29] Theaetetus, a young Athenian, assumes the role of passive respondent in the *Sophist*. He does not waver from Plato's Procrustean formula of logical division, selecting from the two predetermined choices, and is made to look the fool if he questions the logic of the questioner (identified in the *Sophist* as "the Stranger"). Nye held that since women and slaves lacked any political power, they were forced to bow to the "intellectual superiority" of Greek men and "made to play the role of Theaetetus."[30] The minority groups of ancient Greek society agreed to the boundaries established by the philosophers. Reason became a method for defining reality for a specific elite group (the philosophers), and using the authority given by philosophy to enforce political control of those who fell outside of this reality.

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[26] Nye, *Words of Power*, 26.
[27] Ibid., 33.
[28] And, if Jane Roland Martin was correct in her conclusion that Plato "masculinized" *all* of the ideal city's guardians, there is never the possibility of anything but male determined categories in Plato's division.
[29] Nye, *Words of Power*, 34.
[30] Ibid., 37.

The stage was set for Aristotle's "scientific" subjugation of women and minorities. Aristotle took the inflexibility of Platonic division, with its ability to force thought into inviolable categories, and associated it with his *epistêmê*. Aristotelian logic, with its "skillful combination of terms in statements to produce necessary conclusions,"[31] and scientific capability of establishing *cause* (i.e., the essence of a thing, what specifies it from its *genus*) gave these same elite Greek male philosophers and scientists the authority to determine what was objective *truth.* And for Aristotle, to speak openly against what was considered objective truth was nothing but incoherent babbling. The philosophers and scientists now had the ability to back their conclusions with indisputable and watertight logical arguments.

According to Nye, Aristotle's logic establishes *cause* beginning with the individual *species* (e.g., man) and then proceeds to define *genus* (i.e., animal). For Aristotle, the substance "man" (who was in actuality the Greek male citizen) was the paradigmatic starting point for classifying *everything* in the *cosmos*. Man's cause, his *rationality*, is actually an artificial conclusion derived from a preconceived idea of how the male philosopher perceives himself. The use of formal arguments to construct structurally correct syllogisms around this cause gives the assertion the weight of truth: "Logic needs no respondent [there is no room left for argument]; it has reduced to silence any possible hearer and even the second thoughts of the logician himself."[32]

After establishing the superiority of the narrowly defined substance "man" by assigning him rationality as his formal cause (his essence), Aristotle was then able to

[31] Ibid., 41.
[32] Ibid., 59.

subordinate all other substances to man. Women, slaves, and everything other than this Aristotelian "man," groups that the Greek philosophers did not perceive as fully realizing the rational principle in the manner they themselves did, were duly subordinated through science.[33] Women became to the Greeks, as feminist philosopher Simone de Beauvoir wrote, "A womb, an ovary; she is a female—this word is sufficient to define her."[34] Other groups were reduced to being tools of the elite. Logical demonstration removed minority groups from intellectual discourse.

Aristotelian Pre-Science and Exclusion

Considering that Aristotle's *logical* method of dialectic relies on sets of esteemed opinions or *endoxa*, the removal of voices from the philosophical conversation limits the truth available for post-Aristotelian science. Freeland argued that the Aristotelian dialectical knowledge base was patriarchal and predominately male: the limitations set by Aristotle's logical method *gendered* dialectic and the scientific enterprise.[35] Therefore, what might be discussed and discovered by philosophy and science is curtailed. Dialectic (as well as the *epagoge* of the *Posterior Analytics*) was "masculinized" by the limitations set by Aristotle's logic. The opinions of women, slaves, and, to a lesser extent, non-Greeks were largely excluded from any stockpile of *endoxa* used in dialectic. Tellingly, nearly all of Aristotle's own doxographies are limited to the opinions of male elite intellectuals: the Greek philosophers, scientists, and poets. There are no opinions of

[33] Ibid.

[34] Simone de Beauvoir, *The Second Sex*, trans. and ed. H.M. Parshley (New York: Alfred A. Knopf, 1971), 3.

[35] Freeland, *Nourishing Speculation*, 158-159.

women counted as *endoxa*.[36] And even though the Stagirite stated that the opinions of everyone and the many are of equal value to that of experts, Aristotle paradoxically (or hypocritically) discounted the opinions of the *hoi polloi*, who "talk without consideration about almost everything" (*Eth. Eud.* 1.3.1214b33).[37]

Arguably chauvinism, actuated by logical argument, narrowed the range of what *endoxa* was considered acceptable (that of Greek or Hellenized Greek males) and put artificial limits on the *endoxa* contained in the post-Alexandrian ancient academic libraries. Feminist philosopher of education Barbara J. Thayer-Bacon argued that the restriction of communication to "scholars" or "experts" "limit[s] the reach of our understandings… Our standards of epistemic worth are not independent of the particular inquirer seeking to establish the standards…"[38] Jonathan Barnes noted that, for the ancient Greeks, as a result of the vicious restriction of the pool of *endoxa* to male elites, *truths* were excluded from consideration in the dialectical process.[39]

As a result, Aristotle's pre-science "refused to consider certain propositions as possible bearers of the truth."[40] Although Alexander the Great's ideal of the "*brotherhood* of *man*" [emphasis added] blurred the line between Greek and foreigner, the "experts," whose work formed the Library's collection of *endoxa* were Greco/Macedonian or Hellenized *men*. Members of the Museum were exclusively what

[36] Cynthia Freeland, "On Irigaray on Aristotle," in *Feminist Interpretations of Aristotle*, ed. Cynthia Freeland (University Park, PA: Pennsylvania State Press, 1993), 78.

[37] Perhaps the *hoi polloi* are looked down upon because it is made in part of women, slaves, and non-citizens (and therefore not entirely "human").

[38] Thayer-Bacon, *Relational "(e)pistemologies*," 70.

[39] Jonathan Barnes, "Aristotle and the Methods of Ethics," *Revue Trimestrielle 133-134* (1980): 510.

[40] Ibid.

Freeland termed "the great men, the wise, powerful, and famous ones," those who created and had access to scholarship that incorporated an Aristotelian "conservative deference to tradition—of course in [Aristotle's] case a patriarchal tradition."[41] And although the Hellenistic world saw the elevation of many "barbarian" men to the status of "human" through their adoption of Greek culture (they lost part of their identity to become Greek men), women and slaves remained politically disenfranchised, philosophically excluded, controlled, and exploited.

The Academic Library as Conservative Force

This historical study argues that Aristotle's logical/philosophic method served as a foundation for the Library of Alexandria's collection and represents a materialization of Aristotelian philosophy. The Library, therefore, must be reconsidered as elite male intellectuals' tool for imposing and maintaining hegemonic control over the minority groups of the Hellenistic world. The body of recorded *endoxa* maintained and produced at the Library was a source of this continued domination. This Alexandrian *endoxa* defined truth and served as the primary tool for creating new truths. Post-Alexandrian academic libraries institutionalized the collection of "elite *endoxa*" and legitimized the exclusion of other groups and ways of knowing. Greek philosophy rendered alternative epistemological approaches invalid.

The *endoxa* of Greek male elites, as a result of their supposed capacity to best realize the rational principle, imposed and perpetuated authority concealed by appeals to

[41] Freeland, *Nourishing Speculation*, 159.

reason. The lack of outside viewpoints and alternative perspectives limited the possible knowledge obtained from using the collection of *endoxa*. New knowledge, as a result, remained firmly within the Epistemological limitations established by the collection. Galen, for instance, although responsible for great advances in medicine, perpetuated the Aristotelian idea—hundreds of years old—that women were malformed, "half-baked" men.[42] Furthermore, the Alexandrian scholars never questioned the ethics of slavery.

In light of the argument that Aristotelian philosophy served to limit credible knowledge to the opinion of a small class of intellectual elite, the post-Aristotelian Hellenistic academic libraries do not appear terribly different than the Near Eastern protolibraries in terms of their use to maintain the *status quo*. The protolibraries served the interests of the scribal class, also elite males. Similarly, through defining what is "real" or "acceptable," the dominant cultures of the post-philosophical ancient West used logical method to put limits on knowledge and entrenched the academic library as a tool for perpetuating the ruling class. And, if Greek philosophy was responsible for separating the knower from the known, making knowledge external, objective, and removed from everyday lives,[43] the Library represented the ultimate expression of this idea. The truth, the known, became the *physical* property of the intellectual elite and the state. The scrolls of the Library, remained firmly under the control of the dominant culture.

[42] Nancy Tuana, *The Less Noble Sex: Scientific, Religious, and Philosophical Conceptions of Woman's Nature* (Bloomington, IN: Indiana University Press, 1993), 22.

[43] Barbara J. Thayer-Bacon, "Closing the Split between Practical and Theoretical Reasoning: Knowers and the Known, *Educational Philosophy Theory* 31, no. 3 (1999): 342.

Enduring Consequences?

Ethicist Benjamin Wiker wrote:

> …if ideas have consequences, then it follows that bad ideas have bad consequences. And even more obvious, if bad ideas are written down in books, they are far more durable, infecting generation after generation and increasing the world's wretchedness.[44]

Culturally or politically successful ideas tend to become philosophical, scientific, or religious dogma. William James wrote that a philosophical "truth" was "a useful practice first becoming a method, then a habit, and finally a tyranny that defeats the end it was used for."[45] Two tyrannical ideas (tyrannical over women and minorities) born of Greek philosophy were the notions that truth is *objective* and that truth is *indisputable*. Aristotelianism became a restrictive method of defining people, limiting their realities, and placing knowledge out of the reach of many. Aristotle not only created the logic necessary for "proving" objective truth, but also constructed and recorded the *method* for systematically achieving success at the venture. He cemented philosophical schools as the loci for performing and teaching this method, and he inspired, most notably realized in the Library, the use of recorded collections of documents for maintaining and extending this domination.

Eighteen hundred years after Aristotle, the medieval Christian theologian and philosopher Thomas Aquinas (lived ca. 1224-1274 CE) maintained the Aristotelian idea that women are necessary, hierarchically subordinate "monstrosities," with biblical

[44] Benjamin Wiker, *10 Books that Screwed up the World: And 5 Others that Didn't Help* (Washington, DC: Regnery Publishing, 2008), 2.

[45] James, *Pluralistic Universe*, 99.

references: "as different grades belong to the perfection of the universe, so also the diversity of human sex to the perfection of human nature."[46] Elsewhere Aquinas, using a great many *books* no doubt retrieved from a *library*, synthesized *endoxa* from Plato, the Peripatetic Andronicus of Rhodes, the Carthaginian bishop Cyprian (lived ca. 200-ca. 58 CE), John Chrysostom (lived ca. 354-ca. 407 CE), and the Neo-Platonist Christian theologian Augustine (lived 354-430 CE) to provide his own logical argument for why women should maintain modesty in their outward apparel.[47]

The Renaissance saw a continuation of the Aristotelian scholasticism of the Middle Ages,[48] and "in the sixteenth [century CE] he [Aristotle] reigned almost supreme in Europe and America."[49] The sixteenth century Spanish theologian Juan Ginés de Sepúlveda (lived 1494-1573 CE) even used Aristotle himself as an authoritative *endoxa* to argue that Amerindians were "natural slaves" and therefore legitimately conquered and enslaved: Sepúlveda declared that "[the Amerindians are] as children to adults, as women are to men. Indians are as different from Spaniards as cruel people are from mild people."[50] Women and marginalized "others" like the Amerindians were again relegated to the role of Theaetetus (and *endoxa*, again, was used to perform the deed). They could do effectively nothing but accept these philosophers' conclusions as truth or pay the consequences. Even in the late twentieth century, studies like *The Bell Curve* drew upon the body of expert *endoxa* to help perpetuate class stratification. Richard J. Herrnstein

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[46] Thomas Aquinas *Summa Theologica,* 1.99.2.; see Tuana, *Less Noble Sex*, 21-22.
[47] Ibid., 2.2.169.1.
[48] Paul Oskar Kristeller, "Renaissance Philosophies," in *A History of Philosophical Systems,* ed. Vergilius Ferm (New York: Books for Libraries Press, 1950), 227.
[49] Lewis Hanke, *Aristotle and the American Indians*: *A Study in Race Prejudice in the Modern World* (Chicago: Henry Regnery Company, 1959), 56.
[50] Ibid., 47.

and Charles Murray's identification of the "cognitive elite" appears unnervingly and negatively Aristotelian.[51]

There are, fortunately, visible cracks in the post-Aristotelian paradigm. Communication theorist Harold Innis wrote that "Western civilization has been profoundly influenced by communication and that marked changes in communications have had important implications."[52] Innis theorized "oligopolies of knowledge," in which groups control communications media to maintain power, and that "inventions in communication compel realignments in the monopoly of knowledge."[53] Cuneiform aided in the rise of the scribal elite, and the alphabet helped replace this intellectual *junta* with the knowledge monopoly of the philosopher and scientist. Following Innis's reasoning, the major changes in information technology of the late twentieth century and early twenty-first should do much to shake up the "knowledge equilibrium." Steps, however, should be taken to democratize the control of knowledge in order to prevent the creation of a new "oligopoly of knowledge" (perhaps creating a "democracy of knowledge" instead). Information professionals stand on the front line of this challenge.

Library 2.0

One challenge to the post-Aristotelian library paradigm is the "Library 2.0" model of the early 2000s. Library 2.0 employs cutting edge information technology as well as an

[51] Richard J. Herrnstein and Charles Murray, *The Bell Curve: Intelligence and Class Structure in American Life* (New York: The Free Press, 1994), 509-511.
[52] Harold A. Innis, *The Bias of Communication* (Toronto: University of Toronto Press, 1951), 3.
[53] Ibid., 3-4.

interactive communication model to empower users who might otherwise be silenced by exclusion or intimidated by the academic library.

Major advances in information technology in the late twentieth century altered how information is created, disseminated, and used. The Internet and World Wide Web began a revolution in communication, moving from the traditional "push" model of communication, in which the information provider controls the message which the consumer receives, to an interactive model in which the line between message producer and message consumer is blurred. Interactive "Web 2.0" technologies, including social networking sites, weblogs, wikis, online productivity applications, etc., have done much to "democratize" the production and transmission of information.

Although the new technology is invaluable in the twenty-first century model of online computing, the underlying shift in the communication process is even more revolutionary. In a forward thinking essay published in 2006 librarians Michael E. Casey and Laura C. Savastinuk borrowed the Web 2.0 model for the library, naming it "Library 2.0."[54] The Library 2.0 model, while benefiting from technology, transcends it.

Library 2.0 involves "user-centered change. It is a model for library service that encourages constant and purposeful change."[55] It "empowers library users through participatory, user-driven services."[56] Through giving the user a role in determining the services offered by the library, library users *contribute* to the collection. Users might, for example, use the new information technology to add value to information by "tagging" it

[54] Michael E. Casey and Laura C. Savastinuk, "Library 2.0: Service of the Next-Generation Library," *Library Journal* (September 1, 2006): 40.

[55] Ibid.

[56] Michael E. Casey and Laura C. Savastinuk, *Library 2.0: A Guide to Participatory Library Service* (Medford, NJ: Information Today, 2007), 5.

for better retrieval, identify areas in need improvement, offer evaluations of the information in the collection, and otherwise *reinsert* the "views of the many" into the academic library (becoming valid *endoxa*). The extension of traditional library resources to include such information sources as the World Wide Web offers alternative information resources and serves as a valuable repository for "non-expert" voices that might otherwise have been silenced by the post-Aristotelian library collection. Furthermore, the potential positive collaborations between expert and non-expert users in these "democratized" academic libraries will do nothing but enrich the scholarship that emerges from them.

New ways of thinking about the academic library—such as the Library 2.0 model—potentially move the library from the post-Aristotelian "push model," one that collects, authorizes, and proffers expert *endoxa*, to an interactive "push-pull" collaborative model that encourages participation. But new approaches bring new challenges. Librarians face issues such as expanded potential sources of misinformation and disinformation that must be evaluated, and the education and empowerment a new brand of library user.

Implications

Academic libraries, as repositories of "the memory of mankind," no doubt have aided in the creation of new knowledge. But they have also served to support the hegemony of male elite (they arguably are the memory of *man*kind). Although this indictment of the philosophical bases of western scholarship and academic libraries'

exclusion of alternate conceptions of what constitutes legitimate knowledge is harsh, it is warranted. Continuous research in this area is vitally important in order to institute positive change. Challenging the dominant paradigm behind the academic library allows for (1) identifying how the history of philosophy, science, and information institutions have molded cultures and instituted patterns of control in societies, (2) empowering those who have not traditionally been stakeholders in the dominant culture's process of knowledge creation, (3) educating and empowering users concerning the potential biases within and uses of "traditional" library collections and emerging sources of information, (4) educating information professionals concerning the potential biases within and uses of "traditional" library collections and emerging sources of information, and (5) empowering information professionals as agents of change.

Understanding the Peripatetic origins of the post-Aristotelian academic library is necessary to fully understand the theoretical underpinnings of how scholarship uses information. It is reckless for the modern information professional to ignore the philosophy behind the library. The information professional must maintain a close eye on their profession.

The modern academic library must be continuously reassessed in light of its theoretical basis to fully understand its roles—both positive and negative—in shaping and influencing modern democratic societies. This task allows for the development of alternative conceptions of the library that question, improve upon, or even subvert the dominant post-Aristotelian paradigm of the academic library outlined in this study. The early twentieth century pragmatist philosopher of education John Dewey said that "while

logicians have spent much time discussing how to apply their logic *to* the world, they have given almost no examination to their own position, as logicians, *within* the world which modern science has opened."[57] The librarians of Alexandria were essentially logicians, they *collected* and *organized* the dialectical *endoxa* used in philosophies and sciences based upon foundationalist Epistemologies. And their position was one of epistemological authority.

Library and information science professionals should examine, beginning with the Greeks, the ways in which traditional foundationalist logics have influenced the philosophical constitutions of academic libraries, and how they continue to influence them. Performing such analysis will, at the very least, give professionals insight into how library collections exclude others as a result of the institutionalization of a biased philosophical system. Acknowledging that the modern western academic library originated from an elite male dominated civilization and represents and potentially still supports a "Big Truth" science will allow librarians to identify problem areas and encourage change and diversity through incorporating alternative viewpoints.

[57] John Dewey and Arthur F. Bentley, *Knowing and the Known* (Boston, MA: Beacon Press, 1949), 205.

Chapter 8: Conclusion

The Library and Museum of Alexandria were colossal intellectual achievements. The image of Alexandria as the center of western intellectual thought outlasted the Greco-Roman and Byzantine civilizations. The Library *as a concept* extended through the millennia to the present. It survived the bleak European Middle Ages, a time that scorned the pursuit of scientific knowledge as pagan and vile.[1] It inspired Arab scholars of the first millennium CE, who were untouched by the rabid anti-intellectualism of the medieval world. The memory of the Library's greatness passed into the European enlightenment, where Edward Gibbon, the eighteenth century English historian and author of the *Decline and Fall of the Roman Empire*, referred to Alexandria's Greek quarter as "the residence of kings and philosophers,"[2] and wrote that "every scholar, with pious indignation has deplored the irreparable shipwreck of the learning, the arts, and the genius of antiquity" caused in some measure by the loss of the Library.[3] Today, modern innovations and institutions are frequently compared to the Library, including the World Wide Web. And, in the first decade of the twenty-first century, a new library opened in Alexandria "dedicated to [recapturing] the spirit of openness and scholarship of the original *Bibliotheca Alexandrina*."[4]

The Library of Alexandria was an integration of ancient western philosophical and scientific thought. This study shows that the primary impetus for Alexandria's

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[1] William Manchester, *A World Lit Only By Fire: The Medieval Mind and the Renaissance; Portrait of an Age* (New York: Little, Brown and Company, 1993), 9.
[2] Gibbon, *Decline and Fall*, vol. 1, 243.
[3] Ibid., vol 3, 176.
[4] Biblioteca Alexandrina, "overview," http://www.bibalex.org/English/Overview/overview.htm.

position in the history of library and information science (LIS) may be traced to the work of Aristotle, and that the Library represented an actualization of Aristotelian method. This philosophical, not political, basis made the Library *qualitatively different* than those collections of documents that came before it. This chapter summarizes the preceding investigation of ancient information institutions, reiterating the thesis that the Library represented a shift in *scholarship* related directly to Aristotle's philosophy: the paradigmatic purpose of information institutions shifted from the maintenance of the "stream of tradition" to theoretical knowledge creation. This chapter also discusses the importance of this study's findings to the modern professions of LIS and proposes avenues for future exploration in this area.

From Stream of Tradition to Knowledge Creation

Information institutions prior to Aristotle were *purpose driven* and *goal focused*. The motivating "philosophy" behind protolibraries was pragmatic and conservative. Mesopotamian, pre-Alexandrian Egyptian, and Mycenaean protolibraries maintained the dominant cultural and political values of the civilizations within which they supported. These protolibraries' roles developed largely as a result of the limitations of the civilizations' syllabic scripts and the development of elite scribal classes that maintained a vested interest in conserving their socio-cultural status. Furthermore, the imprecise syllabic scripts and the intelligentsia's pragmatic use of information for conservative reasons hindered the development of philosophy and theoretical science and helped maintain the *status quo*.

These protolibraries, as a result, were collected for *maintaining* the structure of the society through perpetuating cultural "streams of tradition" embodied in records and millennia-old authoritative canons of "literature." The proliferation of recorded information in the form of primarily economic and religious documents, however, encouraged the creation of sophisticated organizational methods for retrieval. But there is no evidence that these bibliographic methods had any philosophical underpinnings beyond that of providing for an easily workable collection of documents. Because of the effectiveness of the scribal system, the basic structure of Near Eastern protolibraries remained essentially the same for thousands of years. Even alleged departures from this basic model of protolibary, such as the great library of Assurbanipal or the Ramasseum, did not deviate from the basic goal of maintaining the cultural/political *status quo* through enforcing a pragmatically effective, expertly organized, and theoretically lacking intellectual *stasis*.

The development of western philosophy likely resulted from a combination of (1) the Greek alphabet, which allowed for very precise written expression, (2) the Greeks' rich oral tradition, and (3) the Greeks' general disposition towards skepticism and inquisitiveness. Greek philosophy rested ultimately on epistemologies that employed human reason and abstraction of concepts to describe reality. Considering the three factors above, it seems that it was only a matter of time before the power of recorded language would be used *methodically* in the philosophical process of creating new knowledge. But while Archaic and classical Greek protolibraries prior to the flowering of Aristotle's philosophy and science contained great works of literature, there is no evidence that the collections were used as part of a systematic process in the creation of

knowledge. Plato, certainly the most eminent philosopher prior to Aristotle, even wrote that recorded materials *could not* be used in such a process. The first known western thinker to establish a *document based method of philosophy and science* was Aristotle of Stagira.

Aristotle's method differed from Plato's in that it fully validated the use of esteemed opinions, *endoxa,* in a systematic *scientific method*. Aristotle's two pre-scientific methods, *epagoge* and philosophical dialectical, both require the *collection* and *analysis* of esteemed opinions in the preliminary stages of theoretical knowledge creation (*epagoge* implicitly allows for the use of opinion as a type of *phainomena,* while dialectic does the same explicitly). It is a common sense conclusion that *knowledge-based documents* serve a necessary function in Aristotelian pre-science, as these documents are effectively *materialized endoxa* (that is, they are *explicit knowledge*: *inscribed* esteemed opinions).

Aristotle and the scholars of the Lyceum used libraries in the process of creating knowledge, and this library likely served as a dialectical "stock of propositions" as described in Aristotle's *Topics* (propositions being used by Aristotle as a near synonymous term for *endoxa*). Aristotle, furthermore, explained in the *Topics* how to manipulate these *endoxa* in the pre-scientific process, as well as how to organize the *endoxa* for their efficient use in philosophy and science. The process included the collection, classification, and cataloging of *endoxa*, and was based on codified philosophical and logical *theory*. Although Aristotle's personal library likely inspired Demetrius and Ptolemy to create the Library, the evidence regarding Aristotle's collection is limited. With the Library of Alexandria, Aristotle's theory realized its

potential. Alexandria *institutionalized* it, and the Library was the first and most influential "post-Aristotelian" library.

The Library fully materialized Aristotelian pre-scientific theory and served the scholars of the Museum in their process of knowledge creation. The Alexandrians' own contributions to knowledge were then added to the Library collection, where they were in turn used by later scholars to create knowledge. The Library (and arguably more than any of its predecessors, even Aristotle's personal collection) served as the model for other academic institutions in the Hellenistic and Roman worlds, including the library of Pergamum. And even though the Library and Museum were destroyed (although the exact date and circumstances of the catastrophe are uncertain), the *idea* of the academic library attached to a university was imprinted on the Library, the *archetypal academic library*: a collection of *knowledge-based resources* used by a scholarly community operating in distinct academic disciplines for the purpose of accretive theoretical knowledge creation (an idea manifested by Aristotle and in the Museum).

The Historical Link between Aristotle and the Library

There is a firm historical connection between Alexandria and Aristotle. This study argues that Aristotle made a profound intellectual impact on both Alexander the Great, Aristotle's "philosopher-king," and Ptolemy I (the latter being influenced either directly or through his companionship with Alexander). Soter continued Alexander's program of Hellenization in Alexandria, and as part of this *Kulturpolitik* gave material support for the creation of the Library and Museum—both post-Aristotelian intellectual entities. And although Ptolemy created and used the Library and Museum as political and cultural

tools, both served Aristotelian functions in terms of their *epistemological* foundations and purposes: the Museum reflected the open-ended nature of Aristotelian science and its clear disciplinary division, and the Library was a tool for engaging in a post-Aristotelian pre-Science. Ptolemy's choice of Demetrius of Phalerum, an orthodox Peripatetic who studied under Theophrastus and possibly Aristotle himself, cemented this intellectual connection between the Stagirite and the Library and Museum.

The Post-Aristotelian Academic Library

The Library was also greatly influenced by Ptolemy's encounter with Near Eastern protolibraries. The enormity of Ptolemy's "Alexandrian project" and his novel use of state patronage differentiate the Museum and Library from the Lyceum and Aristotle's library. The former pair might legitimately be claimed (together) as the first western university and an archetype for universities that followed. The Library's collection combined Aristotelian philosophical tenets with the gigantism and practical organizational techniques of state sponsored protolibraries. As such it was the first of its kind and differentiated from the information institutions that preceded it.

The deep roots of the Library lay firmly in Aristotle's incalculable intellect. It is its philosophical substratum and the evidence of its application that ultimately differentiates the Library from the preceding information institutions. Strabo's assertion that Aristotle "is the first man, so far as I know, to have collected books and to have taught the kings in Egypt how to arrange a library,"[5] appears at first consideration a throwaway sentence. The geographer, furthermore, made the claim and left it at that.

[5] Strabo 13.1.54.

Although the philosopher's historical connection with Alexandria supports Strabo's claim, the consideration of Aristotle's pre-scientific method adds a new layer of meaning to Strabo's assertion.

Whether the Library was used in a strictly Peripatetic manner by the Museum scholars is ultimately unimportant: Aristotle's pre-science had changed the *perceived* use of collections of knowledge-based resources. Library collections became *necessary* in a *methodical process of knowledge creation* (and the Museum scholars produced some of the greatest scholarly works ever known). This process was expressed in the structure of the disciplines explored at the Museum, and the Library served as a *fully realized* tool in the methodical exploration of these disciplines.

The Library fully realized Aristotle's philosophical innovations to shift the prevailing paradigm of the information institution from entities that *statically* maintained the intellectual traditions of a civilization to entities that *actively* created new theoretical knowledge. And although it is fallacious to claim a direct correlation between the structure of the Library and Museum and subsequent western libraries and intellectual communities, it is reasonable to suggest that, for better or for worse, the Library served more than any institution that preceded it as a basic model for 2500 years of higher learning.

Implications

The relationship between ancient philosophy and the development of the modern library, information science, and librarianship is worthy of continued research, analysis, and discussion. This study asserts that the theoretical roots of the modern academic

library are found in the philosophy of Aristotle and that these theoretical underpinnings were expressed in the Library of Alexandria. Why is this important?

Although there have been many studies of ancient information institutions, these histories tend to focus on the institutions' administration, technology, and morphological elements. There is little consideration of the theory or philosophy operating behind ancient collections, or these theories and philosophies' historical impact on the development of modern information institutions. This unfortunate "theoretical gap" extends well into the modern age, with treatments of LIS theory typically reaching only as far back as the early nineteenth century CE. This study extends the discussion of LIS theory back some two and a half millennia. Doing so opens the door for further discussion concerning the development of the philosophical basis of LIS. Addressing the development of LIS theory through the *entirety* of history aids in the discipline's professionalization, the education of new professionals, and provides a needed theoretical basis for future historical research.

Intellectual History and Professionalization

Library scientist Horst Kunze said that "Libraries are old; the librarian's image as an independent professional is relatively young."[6] Understanding the history of an occupation is a method of establishing it as a profession and insuring its continued status as such through giving the professional a circumspect view of history and theory. It

[6] Horst Kunze, "On the Professional Image and the Education of the Librarian," in *Toward a Theory of Librarianship: Papers in Honor of Jesse Hauk Shera*, ed. Conrad H. Rawski (Metuchen, N.J.: 1973), 515.

orients practitioners within their profession and allows them to distinguish their professional values from other groups. [7]

But LIS is in a crisis concerning its professional identity. The information explosion of the late twentieth century has been traumatic for LIS, raising questions concerning the professional identity of librarians. Librarian educator Richard E. Rubin identified some typical late twentieth century questions asked by librarians:

> Is the entire identity of the librarian inextricably linked to this physical entity [the library building]? If the new world of information transfer can be accomplished without such a physical institution, will the librarian also disappear? Are librarians capable of thinking of performing their tasks without a physical library, and is the rest of the world capable of thinking of them in this way as well? Will there be librarians without libraries?[8]

These questions reveal a deep lack of self-identity and firm understanding of the theoretical bases of LIS, which betrays an inadequate sense of history in the information professions. LIS has little sense of its own foundations and development. Library historian Jean L. Preer warned that "Lacking historical perspective, our [LIS] students may fail to understand the professional nature of librarianship, its contribution to society, and the values for which its stands."[9] How many new medical doctors know who Hippocrates was? But how many librarians have heard of Demetrius of Phalerum? Callimachus?

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[7] Stephen Pattison and Roison Pill, "Introduction," in *Values in Professional Practice: Lessons for Health, Social Care, and Other Professionals*, eds. Stephen Pattison and Roison Pill (Oxford: Radcliffe Medical Press, 2004), xiii.

[8] Richard E. Rubin, *Foundations of Library and Information Science* (New York: Neal-Schuman, 2000, 351-352.

[9] Jean L. Preer, "'Louder Please': Using Historical Research to Foster Professional Identity in LIS Students," *Libraries & the Cultural Record* 41, no. 4 (Fall 2006): 487.

Intellectual History and the Education of Information Professionals

Considering that the information explosion of the late twentieth century and the rapid advances in information technology have brought apparently radical changes to the information science professions, the question becomes: what benefit, if any, is provided through understanding the ancient academic library's relationship to Aristotelian philosophy or ancient philosophy? Library science philosopher and historian Jesse Shera offered the study of philosophy as a guard against the "tidal wave of vocationalism" that is characteristic of modern LIS education.[10] Shera argued that American library science education was developed by pragmatists and that these men and women wasted little time on philosophy, which was considered elitist and undemocratic. Both of these adjectives were antithetical to the spirit of the blossoming American library and librarianship (both of which set the benchmark for information institutions worldwide). These late nineteenth and early twentieth century educators focused instead on craft and process,[11] and this paradigm of professional education is still in effect.[12]

Not surprisingly, the LIS professions are conflicted. Although LIS is "dominated by the classic model of the profession, [and is] usually [compared] with the high-status professions of law and medicine," it continues also to be dominated by a "rational-bureaucratic model" that encourages bureaucratization, pragmatism, codification of

[10] Jesse Hauk Shera, *Libraries and the Organization of Knowledge*, ed. D.J. Foskett (London: Crosby Lockwood & Son, 1965), 176.

[11] "The New York Public Library: How the Readers and the Books are Distributed in the New Building," *Scientific American* 54, no. 21 (May 27, 1911), 527, for example, describes the modern library as machine, with the librarians depicted on the cover illustration as simply retrieval tools in a complex mechanism.

[12] Shera, *Libraries and the Organization of Knowledge*, 175.

procedure, technical prowess, and objective measures of performance.[13] While the "rational-bureaucratic model" is not devoid of worth, it risks producing theoretically shallow "information specialists," i.e., "clerks," instead of information professionals possessing a deep understanding of the intellectual origins and underpinnings of their profession. Self-reflective professionals are better prepared to think constructively and contribute intellectually to the ongoing conversation concerning the meaning and direction of librarianship.

The rational-bureaucratic model is out of step with what communication theorist Daniel Bell termed the "post-industrial society."[14] Post-industrial societies are service based and, being organized economically around knowledge, place a premium on theory. Theory allows for problem solving, planning, and forecasting.[15] Adopting Bell's position, LIS may be seen as in need of an update. Jesse Shera summed up librarianship's problem of professional self-identity:

> Librarianship itself must assume a full measure of responsibility for its failure to erect a theoretical frame of reference for the profession, within which its educational program can be viewed…. Because librarianship is much more than a bundle of tricks for finding a particular book, on a particular shelf, for a particular person, with a particular need, librarianship should not be merely the assimilation of facts, the mastery of specialized skills, or even the comprehension of a machine's *modus operandi*. The end of education is wisdom, where wisdom is the ability to relate means to goals, and proceeds toward this end through the training of the intellect.[16]

History provides examples for students and professionals to consider and assimilate into their professional makeup. These examples add "to the store of what it

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[13] Patricia B. Knapp, "The Library as a Complex Organization: Implications for Library Education," in *Toward a Theory of Librarianship: Papers in Honor of Jesse Hauk Shera*, ed. Conrad H. Rawski (Metuchen, N.J.: 1973), 488-489.

[14] Bell, *Coming of Post-Industrial Society*, 12.

[15] Ibid., 21.

[16] Shera, *Libraries and the Organization of Knowledge*, 174-177.

means to be a professional."[17] Furthermore, the extension of the theoretical substratum of LIS to a period well before the modern age deepens the library school student's understanding of the philosophical subtexts of what they do at work. Through understanding the ancient Aristotelian roots of their profession, which this study concludes holds today, LIS students are left with a more complete accounting of their professional makeup and the historical role of the library in structuring western ideas of science.

That the library has a Peripatetic basis does not imply that modern librarians are, or must become, Peripatetic. Twenty-first century information professionals, however, needs the historical knowledge to think constructively about the philosophical foundations of their profession. They should evaluate their role in perpetuating this clearly intellectual tradition (as well as consider the impact or potential effects of other philosophies on LIS), and should even challenge the dominant paradigm and the Aristotelian epistemological assumptions behind their work.

Exposure to the intellectual history of their profession provides information professionals with a sense of the philosophical depth and importance in their work. This deepened historical/philosophical consciousness facilitates new professionals' ability to think through the professional tasks that they undertake (even those that appear rote or repetitive). Thinking historically provides a means to link theory and practice in a meaningful manner to propel their profession forward. As a part of a well-rounded

[17] Preer, "'Louder Please'," 494.

education, it produces an accomplished person ready to apply knowledge to a variety of situations and problems.[18]

The results of this study have broad application in LIS education. Introduction to the ancient history of the modern library and the philosophical foundations of the library's shift to from institution serving to maintain the "stream of tradition" to dialectical tools for the creation of theoretical knowledge might be an important element of any comprehensive LIS foundations or basic theory course on either graduate or undergraduate level. The consideration of "when, how, and why" the Library of Alexandria came about should also be an integral part of any course focusing on the history and philosophy of libraries and/or librarianship, for such an analysis provides the context for better understanding all of those western libraries that came in the Library's wake.

Finally, the LIS professions have long been the target of stereotyping. Further extending the intellectual history of librarianship to before the Common Era will aid in mitigating these perceptions. Libraries and librarianship are profound things, but there are few information professionals who claim to have been, unlike medical doctors, "born librarians." A heightened public awareness of LIS's intellectual history will potentially improve the professional image and aid in recruiting future practitioners.

Future Research

In addition to its role in facilitating the education of information professionals, this study provides a new perspective from which to consider the pre-Aristotelian

[18] Malcolm S. Knowles, "Speaking from Experience: The Professional Organization as a Learning Community," *Training and Development Journal* 33, no. 5 (May 1979): 36.

information milieus as well as a lens through which to view post-Alexandrian historical events. There are several areas of potential future research.

(1) *The development of post-antiquarian European, Byzantine, and Arabic academic libraries*. The continued influence of Aristotelian thought on medieval, Renaissance, and modern libraries is in need of further exploration. An interesting potential area of study is the post-eighteenth century CE tension between the desire for philosophical harmony in a library collection and the continuing drive for practicality in the modern American library.

(2) *The contrast between western and Near Eastern libraries and libraries in other regions of the world.* In order to make this study manageable, it dealt entirely with western and Near Eastern information institutions. The development of libraries and librarianship in the Far East and sub-Saharan Africa warrant investigation as well. What sort of philosophies served as the basis of these non-Western collections? Has there been any syncretism between cultures? A comparison of western libraries with those of other cultures will allow a better understanding of both milieus and build an LIS history that provides a global perspective.

(3) *The creation of hierarchical classification schemes used in post-Aristotelian libraries (or which have influenced their organization).* Holding that Aristotelian logic served as the primary basis for the Alexandrian Library, it is worth further exploring the relationship between Aristotelian philosophy, later library classification schemes, and the perpetuation of the Aristotelian character of the academic library through history. One possible avenue of

exploration is the Aristotelian influence on the development and impact of the Dewey Decimal Classification System, as well as the DDC's impact on science and the post-Alexandrian model of the academic library.

(4) *The impact of Aristotelian philosophy on later developments in logic and other tools for managing libraries and aiding scholarly communication*. This is an area where Aristotelian philosophy and science interfaces with modern information technology as well as information retrieval theory. It is in need of fleshing out. What are the connections between Aristotelian logic and modern retrieval tools such as Boolean logic? Coming to grips with the "deep theory" behind concepts that many assume to be entirely modern will provide LIS students with a better understanding of important ideas presented all too often devoid of either historical or theoretical context.

(5) *The link between the development of the modern American library and Aristotelian political theory concerning republicanism*. The American library, and particularly the public library, developed out of ideas of republicanism, participative citizenship, and democracy. How did Aristotle's political theory influence this development and how is it reflected in the modern American library?

(6) *The continuing role of Aristotle's philosophy in molding how the academic library is used to define science and place limits on knowledge creation.* If the modern library originated from a particular epistemological viewpoint, how has this defined and limited its use and output? How has the academic library

changed since Alexandria? What may be done to make collections more inclusive and accessible?

(7) *The evolution (or regression) of the role of the information professional since the Hellenistic age.* This study focuses primarily on information *institutions.* The development of information professionals/workers is an area in need analysis. What are librarians? The answer *seems* obvious. But when considering the vast tracks of time in which individuals have performed the function of "librarian" (applying the term broadly), the answer is not so clear. Understanding the things that *every* librarian does, regardless of time, culture, and context, allows for the identification of the *archetypal* librarian—the librarian *qua* librarian. Such an understanding, furthermore, reveals the basic differences among "librarians" that stem from culture and context. Understanding the historical development of the information profession is valuable to both librarians and information scientists, allowing for the development of valuable historical perspective and fostering professional identity.

It is fashionable to predict what the "library of tomorrow" will be like. Most of these predictions see the academic library as becoming increasingly more dynamic in the face of the proliferation of information and new technologies. But, as this study suggests, modern libraries stand much to gain from looking to the past and training historically-minded information professionals.

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APPENDIX

Appendix: The Debate over Dialectic

While the temporal proximity of the Library and Museum and the personalities involved in its creation point strongly towards an Aristotelian connection between the Library collection and Aristotle's dialectic, the use of dialectic for the conduct of philosophy and science is not a foregone conclusion. The following "doxography" of modern views concerning Aristotle's dialect analyzes strands of thought concerning the method's purpose. Through a survey of four "alternative dialectics:" (1) the traditional view, (2) the received view, (3) "superior" dialectic, and (4) dialectic as a supplement to *epagoge*, it is argued that at the time of Aristotle's death dialectical method was a pre-scientific living method used for philosophy and science.

Philosophical dialectic, as a result of Aristotle's lack of clarity concerning its application, is the subject of dispute among classicists regarding its contribution to scientific discovery and its relationship to demonstrative science and *epagoge*. Arguments concerning the philosophical value of dialectic may be placed on a continuum bounded by two extremes, those that concluded that Aristotle's dialectic is *wholly non-philosophical* and serves a purely rhetorical function and those that concluded that dialectic is the tool by which philosophers and scientists arrive at the *archē* of a science.[1]

The Traditional View

Becoming uncommon are scholars who give no philosophical role to dialectic. Taking issue with the idea that the *Topics* was an early form of the logical method fully

[1] May Sim, "Introduction," in *From Puzzles to Principles? Essays on Aristotle's Dialectic*, ed. May Sim (Lanham, MD: Lexington Books, 1999), iv-v.

articulated in the *Analytics*,[2] Classicist Eleonore Stump argued that the *Topics* is just a reference work for sporting dialectic, "making it less a peculiar treatise on logic than a handbook on how to succeed at playing Socrates."[3]

Many classicists prior to the mid-twentieth century had a similar disregard for dialectic *qua* philosophy. Although most considered dialectic to be a philosophical method, they brushed it aside as a vestigial holdover from Aristotle's earliest period of intellectual activity.[4] Classicist Robin Smith noted that this "traditional view" of dialectic resulted from the *Prior Analytic's* generalizations "about the universal applicability of the syllogistic … [and therefore] the *Topics* and the *Sophistical Refutations* reflected an earlier state of Aristotle's thought than the *Prior Analytics.*"[5] These conclusions are astonishingly misrepresentative of dialectic. For, even if the *Topics* and *Sophistical Refutations* are disregarded as debilitated treatises, discursive treatment of *endoxa* permeates Aristotle's surviving works.

Although most classicists active prior to the mid-twentieth century ignored dialectic, some renowned scholars acknowledged it as a surviving element of Aristotle's mature philosophical method. Aristotle scholar George Grote wrote that dialectic was "an introductory exercise before the didactic [demonstrative] stage begins."[6] Being thoroughly conversant with those works related to the area of study was *required* to

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[2] Eleonore Stump, "Dialectic and Aristotle's *Topics*," in Boethius, *De Topicis Differentiis*. Translated by Eleonore Stump (Ithaca, NY: Cornell University Press, 1978), 160.

[3] Ibid., 173.

[4] Jaeger, in *Aristotle*, 369, wrote that the *Topics* was an "undoubtedly early" work and that the *Analytics* were written substantially later. Considering that Aristotle was generally considered by Jaeger and others to have shed Platonist ideas over the course of his career in an "evolutionary" manner, it is not surprising that his earlier works would be considered superseded by later works.

[5] Robin Smith, "Aristotle on the Uses of Dialectic," 336-337.

[6] George Grote, *Aristotle*, eds. Alexander Bain and G. Croom Robertson (London: John Murray, 1883), 47-48.

legitimize the philosopher or scientist's conclusions through demonstration.[7] A.E. Taylor largely dismissed dialectic but admitted its use for providing a defense against objections to first principles established through the use of *epagoge*.[8] W.D. Ross, the Scottish philosopher, stated "[Aristotle] himself [had] shown a better way, the way of science; it is his own *Analytics* that have made his *Topics* out of date."[9] But, while Ross dismissed the *Topics,* he retained dialectic as a method for researching practical philosophy and metaphysics.[10]

The Received View

Considering that Aristotle's use of *endoxa* is so apparent throughout his treatises, it is not surprising that twentieth century scholars would reconsider dialectic. The rehabilitation of dialectic as a primary pre-scientific method in Aristotle's philosophical enterprise began in earnest with G.E.L. Owen's influential essay '*Tithenai ta phainomena*' ("Saving the appearances"), which is known as the "received view" of dialectic.[11] Owen found evidence that Aristotle referred to both observation and *endoxa* as *phainomena* ("appearances") in a methodological passage in the *Nicomachean Ethics*, which precedes a discussion of *akrasia* (a vice in which someone habitually acts against their better judgment):

> We must, as in all other cases, set the phenomena [*phainomena*] before us and, after first discussing the difficulties, go on to prove, if possible, the truth of all the reputable opinions [*endoxa*] about these affections or, failing this, of the greater number and most authoritative; for if we both resolve the difficulties and leave the reputable opinions undisturbed, we shall have proved the case sufficiently (*Eth. Nic.* 7.1.1145b1).

[7] Ibid., 48.
[8] A.E. Taylor, *Aristotle*, rev. ed. (New York: Dover, 1955), 40.
[9] W.D. Ross, *Aristotle,* 3rd ed. (London: Methuen & Co.), 59.
[10] Ibid., 189.
[11] Robin Smith, "Aristotle on the Uses of Dialectic," *Synthese* 96 (1993): 335.

Owen noted that in the physical sciences, and particularly in the biological works, *Meteorology,* and *Physics,* the word *phainomena* refers to empirical observations.[12] What the *Nicomachean Ethics* provides as evidence, however, are "not the observed facts but the *endoxa*, the common conceptions of the subject."[13] Through acknowledging the parity of *endoxa* with empirical observations (the latter of which had long been assumed by scholars as a path to the *archē*), Owen rehabilitated philosophical dialectic, opened the *Topics* up for reassessment, and pointed to an explanation of philosophical dialectic's procedural usage in a philosophical treatise.

Expanding upon Owen's interpretation of *phainomena,* classicist and philosopher Martha Nussbaum combined observed data and *endoxa* into a single entity. Owen had acknowledged that, while the term *phainomena* is used interchangeably for both empirical observation and *endoxa,* there is a basic difference between the two forms of data.[14] Nussbaum held that Owen's conclusion that Aristotle equivocated over the meaning of *phainomena*, as sometimes observed fact and sometimes opinion, was incorrect. Considering that both empirical observations and *endoxa* necessarily involve the use of human interpretation (the ancient Greeks had no concept of "theory-neutral description" or " facts"),[15] *endoxa* and empirical observations are essentially the same and therefore both the raw materials of dialectic. The method at *Eth. Nic.* 7.1, therefore, might be applied beyond ethics to the "hard" sciences.

Following Nussbaum's lead, Jonathan Barnes considered empirical observations and *endoxa* to be one and the same, for they are "things that seem to be the case"

[12] Owen, "*Tithenai ta phainomena*," 240.
[13] Ibid.
[14] Nussbaum, *Fragility of Goodness,* 244.
[15] Ibid., 243.

(Barnes's translation of "*phainomena*") and not "the evident facts" or "observed facts."[16] Barnes reassessed Aristotle's methodological statement at *Eth. Nic.* 7.1, parsing it into three components: (1) *setting* down the *endoxa* relating to the subject of inquiry, (2) *puzzling* through the *endoxa* to purge infelicities, and (3) retaining the "most important" members of the original set, thus *proving* them.[17] The truth lies in the *endoxa* that remain. Barnes renamed dialectic the "method of *endoxa*."

"Superior" Dialectic

These post-Owen observations gave new life to dialectic as a tool for philosophy. But some scholars who followed Owen considered the dialectic of the *Topics* to be either a "proto-dialectic," or a method for "playing Socrates" with a fully developed, "superior" dialectical method, though perhaps briefly summarized in *Eth. Nic.* 7.1, being only intimated elsewhere. Classicist Terence Irwin argued that Aristotle developed two forms of dialectic. The earliest form of dialectic (the "pure dialectic" of the *Topics*) involved the collection of common beliefs to solve puzzles surrounding these *endoxa*.[18] Pure dialectic is useful for the gathering and "classification" of *endoxa* (i.e., the first function of philosophical dialectic described in *Top.* 1.2.101a35). It does not, however, "pretend to correct them [the *endoxa*], or to replace them with objective first principles" (i.e., the second function of philosophical dialectic described in 1.2.101a37).[19] A superior "strong dialectic," which Irwin held was what Aristotle developed after pure dialectic, bases its arguments on a privileged subset of *endoxa* that cannot be rejected without completely

[16] Barnes, "Methods of Ethics," 490.
[17] Ibid., 490-493.
[18] Terence Irwin, *Aristotle's First Principles* (Oxford: Clarendon Press, 1988), 8.
[19] Ibid., 466.

rejecting Aristotle's basic ontological suppositions (e.g., the principle of non-contradiction which holds that something cannot be and not be an element of something at the same time).[20] "scientific" version of dialectic in addition to sporting dialectic and dialectic for use in casual encounters, the latter two of which he considered to be the concern of the *Topics*. Since the "truth" of these suppositions may not be denied, their manipulation was useful for achieving first principles.

Similarly to Irwin, classicist Robert Bolton concluded that Aristotle developed a "scientific" version of dialectic in addition to a sporting dialectic and a dialectic for use in casual encounters, the latter two of which he considered to be the concern of the *Topics*.[21] This "scientific dialectic," though briefly commented on in various treatises (notably in *Top.* 1.2.101a35), was introduced and detailed in the *Sophistical Refutations* as *peirastic* argumentation (*Soph. El.* 1.8.169b24). Bolton held that, since Aristotle claimed that the premises of a *peirastic* argument are the "most *endoxon*" (i.e., everyone knows them) they are the most plausible and therefore most likely to be *true*. Bolton's "scientific dialectic" however, invalidates the relationship of Aristotle's philosophical dialectic with the Library (or any academic library for that matter), which collected "expert opinion" as a reservoir for housing *endoxa* used in the process of scientific discovery.

Contending that dialectic was practiced *solely* for sport and casual encounters, Aristotle scholar Daniel Devereux disputed Bolton's claims for a "scientific" dialectic. Devereux noted that *peirastic* is discussed in a treatise that is a handbook for identifying and puncturing sophistical arguments and that Aristotle himself said *peirastic* had an

[20] Ibid., 467.

[21] Robert Bolton, "The Epistemological Basis of Aristotelian Dialectic," in *From Puzzles to Principles? Essays on Aristotle's Dialectic.* Edited by May Sim (Lanham, MD: Lexington Books, 1999), 59.

affinity to sophistry that makes it effective for use in unmasking sophists (*Top.* 1.34.183b2).[22] Devereux's alternative explanation, however, also invalidates the use of a library collection for creative scholarship and illustrates the continuing disputes over dialectic's relevance to philosophy. While Irwin's pure dialectic is useful for science and would benefit from the use of recorded documents and a library, both Bolton and Devereux's claims do not satisfactorily address the obvious counterevidence that both Aristotle and the Museum scholars possessed libraries, and that these libraries were used for philosophical and scientific research.

Dialectic as a Supplement to *Epagoge*

Besides a few exceptions like Devereux, the post-Owen trend has been to reconnect dialectic with philosophy and science by recognizing in it an important pre-scientific role in discovery. But, despite its reinstated position, some scholars found the connection between *endoxa* and *archē* in need of reevaluation. Classicist D.W. Hamlyn concluded that Aristotle did not provide a firm argument for why dialectic should offer as its consequence unassailable knowledge of first principles. *Nous* (intuition leading to first principles) may, in fact, be achieved without engaging in any sort of dialectical reasoning at all.[23] Hamlyn suggested that classicists' conclusion that dialectic leads to *archē* was a misinterpretation of Aristotle's intentions, and that the aim of dialectic is instead to provide a "best explanation" from which demonstrations may proceed but does not establish the *archē*, which is the purpose of *epagoge*.

[22] Daniel Devereux, "Comments on Robert Bolton's *The Epistemological Basis of Aristotelian Dialectic*," in *Biologie, Logique et Metaphysique chez Aristote; Actes du Séminaire C.N.R.S—N.S.F., Oléron 28 juin-3 juillet 198* (Paris: Éditions Du Centre National De La Recherche Scientifique, 1990), 277.

[23] D.W. Hamlyn, "Aristotle on Dialectic," *Philosophy 65*, no. 254 (1990): 4.

Classicist Allan Bäck argued that Aristotle reached the *archē* through a method that was tentative, messy, and fallibilist (i.e., the first principles reached through dialectic may be disputed),[24] a method that incorporated both the evidence of the senses (through *epagoge*) and a review of *endoxa* (through dialectic). Dialectic by itself is *necessary* but not *sufficient* for understanding the *archē* of a science. Dialectic and *epagoge*, to Bäck, are two stages of the same method: "Aristotle stresses observation by direct acquaintance when the phenomena are ready at hand. Yet even then, e.g., in biology, he does not fail to review the theories of his predecessors. When he lacks such phenomena, he relies more on previous reputable opinions and custom."[25] In this way, dialectic may be seen as the root of the modern scientific tradition where scientists, by working through previous data sets and theories, and collecting additional data, make abstract observations.[26]

Robin Smith argued that proponents of the post-Owen "received" view of dialectic relied too much on *Top.* 1.2.101a37, where Aristotle stated that dialectic "has a further use in relation to the principles used in several sciences." This one sentence describing the association of dialectical debate and the acquisition of the *archē* is, Smith contended, the "only alleged proof that *archai* [first principles] are established dialectically."[27] According to Smith, philosophical dialectic is useful, due to its "examinative capacity," as part of the process of fully understanding the *archē*, but it is not a means to arriving at the *archē* themselves, which remains the task of *epagoge*.[28]

[24] Allan Bäck, "Aristotle's Discovery of First Principles," in *From Puzzles to Principles? Essays on Aristotle's Dialectic*, ed. May Sim (Lanham, MD: Lexington Books, 1999), 63.
[25] Ibid., 174.
[26] Ibid., 172.
[27] Ibid., 353.
[28] Smith, "Dialectic and Method in Aristotle," 53.

Aristotle scholar C.D.C. Reeve argued, similarly to Smith, that dialectic serves as a method for *clarifying* first principles obtained through empirical observation only prior to dialectic's application.[29] In astronomy, for example, researchers gaze skyward to gather data, and through induction philosophers and scientists generalize to universals. The subsequent use of dialectic allows the inquirer to straighten out these initially ill-defined first principles through presenting them with the esteemed opinions on the subject. Dialectic, as a result of this two-step process, "like the Owl of Minerva, [does] not appear on the scene until dusk."[30]

Owen MacLeod claimed that Aristotle did not practice the method at *Eth. Nic* 7.1 in his treatises. Aristotle, in fact, quite often emphasized "a movement away from *endoxa*,"[31] that is, he routinely rejected the *endoxa* before establishing his own first principles." MacLeod rejected that dialectic serves as a means to the *archē*: it "may rather be that dialectic is a path to understanding the *content* of a first principle"[32] by defining a proper starting place for beginning research and identifying how research should proceed from there.[33] This view recognizes the epistemological limitations of *endoxa* for achieving knowledge but allows for its use as a scientific research tool. Such a review resembles the modern scientific literature review in regards to purpose, it

> shares with the reader the results of other studies that are closely related to the study being reported. It relates a study to the larger ongoing dialogue in the literature about a topic, filling gaps and extending prior studies. It provides a framework for establishing the importance of the study as well as a benchmark for comparing the results of a study with other findings.[34]

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[29] C.D.C. Reeve, *Practices of Reason* (Oxford: Clarendon Press, 1992), 39-40.
[30] Ibid., 40.
[31] McLeod, "Aristotle's Method," 8.
[32] Ibid.
[33] Ibid., 13.
[34] John W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches,* Second Edition (Thousand Oaks, CA: Sage Publications, 2003), 39-30.

Aristotle's dialectic, therefore, was used to gain a perspicacious view of an area of inquiry and then move forward.

Summary

This survey of scholarship displays the variety of conclusions drawn concerning dialectic's purposes in Aristotle's philosophy. The conclusions of the pre-Owen scholars, who tend to write off dialectic as a philosophically obsolete method, and more current scholars like Stump and Devereaux who tenaciously held on to the idea that dialectic is divorced from philosophy, are unwarranted in light of the current scholarship, key passages in Aristotle's treatises which validate the method's use for philosophy and science, and the philosopher's own frequent reviews of *endoxa* in his earliest and latest treatises. By pointing out a methodological statement in a treatise that used *endoxa* to find the truth, Owen's "*Tithenai ta phainomena*" shifted the scholarly consensus from an attitude of general indifference towards dialectic to one that gives dialectic *some* role (but likely a significant one), as a pre-scientific method for successful philosophical research. Aristotle's reviews of *endoxa* are part of a methodical *process.* Therefore, after reasonably rejecting the conclusion that dialectic served *no* role in pre-science, the modern scholarship concerning dialectic suggests the five possible outcomes of philosophical dialectic:

(1) Dialectic legitimates scholarly research through showing that the scholar is conversant with the prevalent opinions and theories concerning an art or science (*Ph.* 8.1.252a22; *Metaph.* 1.5.987a3).

(2) Dialectic allows a scholar to puzzle over an issue, and through the reasoning process to identify scientific problems worth attacking (*Top.* 1.8.103b1; 1.14.105a34; 8.1.155b35).

(3) Dialectic (or a specific refinement of it) is *the* road to the first principles of *all* of the sciences (possibly even being synonymous with *epagoge*) (*Top.* 101a37).

(4) Dialectic (or a specific refinement of it) is *a* road to the first principles, particularly those of ethics (*Eth. Nic.* 7.1.1145b1), but not a panacea for reaching the *archē* of all of the sciences (*An. Pr.* 1.30.46a19; *Eth. Nic* 1.7.1098b3; 7.8.1151a15; *Eud Eth.* 1.6.1217a7).

(5) Dialectic supports *epagoge* by confirming or circumscribing the *archē* discovered by means of other methods (such as *epagoge* or habituation) (*Top.* 1.8.101a37; *Eth. Nic.* 10.8.1179a20).[35]

But it is also not important to this study whether dialectic represents a monolithic method for approaching pre-science, or it serves a narrower function in the scientific process. What *is* important is that dialectic, in some capacity, appears to be *necessary* for the successful performance of philosophy and science (even if it is possibly not *wholly sufficient* for reaching the truth).

Dialectic, furthermore, was used by Aristotle in his work, and appears to have been part of his mature scientific process. The *Topics* mentions scientific demonstration as a distinctly separate but coexistent philosophical methodology to dialectic (1.1.100a26; 8.11.162a15), as does the *Sophistical Refutations* (1.2.165a38), implying that these

[35] Furthermore, these conclusions, with the exception of conclusions (3) and (4), are not mutually exclusive.

treatises were updated to reflect Aristotle's evolving methodology. The *Posterior Analytics*, a later treatise than either the *Topics* or *Sophistical Refutations*, also makes a distinction between dialectic and demonstration (1.12.77a28; see also *Rhet* 1.2.1356a31). This distinction suggests that, although the Peripatetic extension of dialectical method was likely formulated early in Aristotle's career, being birthed in the gymnastic atmosphere of Plato's Academy, dialectic remained a *living* method that survived the discovery of demonstrative science and evolved to support the latter's use for *epistemic* discovery.

Perhaps the best evidence that dialectic was a method used at the Lyceum in the days of Demetrius of Phalerum is that Aristotle appears to have used it throughout his surviving works. The philosopher's immediate successors did likewise, and similar reviews of *endoxa* became obligatory in science for the next millennium. Aristotle systematically reported expert *endoxa* in his scientific treatises. In his philosophical, scientific, and other writings he reliably performed surveys of past thinkers. And, following these reviews of earlier *endoxa*, Aristotle just as dependably established the first principles of the science that he was treating. His reviews of *endoxa* are so often present at the beginning of his treatises, usually appearing before his exposition of the sciences' first principles, that they appear to be *part* of a scientific process. The structure of Aristotle's treatises, in fact, mimicked the structure of his scientific method.[36] The following is an example excerpted from the doxography at the beginning of Aristotle's *Physics*:

> The principles in question [i.e., the substrata of reality]must be either one or more than one. If one, it must be either motionless, as Parmenides and Melissus assert, or in motion, as the physicists hold, some declaring air to be the first principle,

[36] Robinson, *Aristotle in Outline*, 40-41.

> others water. If more than one, than either a finite or an infinite plurality. If finite (but more than one), then either two or three or four or some other number. If infinite, then either as Democritus believed on in kind, but differing in shape; or different in kind and even contrary (1.2.184b15).

Aristotle then proceeded to discuss what was right and wrong in the *endoxa* of his predecessors (such as his analysis of Anaxagoras, beginning at 1.4.187a20), before arriving at his own *archē* (*Ph.* 1.7.189b30). [37]

Every one of Aristotle's surviving treatises, besides those of the *Organon* (forty of forty-six known treatises), provides a review of previous thought in the subject area. These reviews of *endoxa* are, therefore, in his earliest works (e.g., the *Eudemian Ethics*),[38] as well as his latest projects (e.g. the *History of Animals*).[39] These reviews, furthermore, tend to be biased towards examinations of *expert opinions*. This suggests that by the time of Aristotle' death, the dialectical analysis of *endoxa* had become an entrenched step in his method. It further suggests that Aristotle, along with his students, were making use of the philosopher's library as a tool for this method. Theophrastus continued this "doxographical tradition" through his many surveys of past thinkers (a few of his works listed by Diogenes Laertius include *On Those Philosophers Who Have Treated Meteorology*, *Opinions on Natural Philosophy*, and *Commentary on Aristotle*).[40] Demetrius of Phalerum, in turn, was Theophrastus' protégé, would have known this method well, and possibly even helped his teachers collect and organize the *endoxa*.

The primary material for Aristotle's own use of dialectic appears to have been the *endoxa* of experts, which implies the use of documents, and he arguably used dialectical analysis as part of the scientific process until his death. Furthermore, all five of the

[37] Ibid., 40.
[38] Jaeger, *Aristotle,* 246.
[39] Ibid., 329.
[40] Diogenes Laertius 5.11.

"philosophical dialectics" described on pages 276-7 of this study presuppose the collection and organization of opinion into library collections as a matter of simple expediency in order to perform trustworthy scholarship.[41] The Library served this purpose for the Museum.

[41] Those scholarly views that have no need of library of *endoxa* for philosophical dialectic, such as Robert Bolton's *peirastic*, do not sufficiently account for the existence and use of such libraries in the creation of knowledge.

Vita

Stephen Edward Bales was born November 15, 1972 in Atlanta, Georgia. He received a Bachelor of Science degree in Religious Studies and a Master's in Information Science from the University of Tennessee Knoxville. The Doctorate in Communication & Information was received in December of 2008.

Corrections

The following errors have been corrected since the dissertation's submission to the University of Tennessee Graduate School (December 2008).

vii. Line 4. Changed "2476" to "246."
2. Line 12. Changed "acension" "ascension."
27. FN 14. ADDED "trans. Seux" to citation.
31. FN 26. Changed page numbers from 1023 to 1023-1024. Added "trans. Römer"
32. ADDED FN 33: Ibid. 9.
33. FN 34 changed from "Ibid. 9" to "Ibid."
40. FN ADDED Potts, "Before Alexandria," 21.
60 Line 8. Changed "collections" to "Collections."
62. Line 20. ADDED FN 130: Kenyon, *Books and Readers,* 60.
71. line 9. Changed "Ptolemies" to "Ptolemaic kings"
101. line 4. Inserted "Table 2" in the brackets.
136. ADDED TO FN 15. "see also S. Marc Cohen, Patricia Curd, C.D.C. Reeve, eds. *Readings in Ancient Greek Philosophy: From Thales to Aristotle* 3rd. edition (Indianapolis: Hackett, 2005), 2-3, and David Roochnik, *Retreiving the Ancients* (Maledn, MA: Blackwell, 2004), 12-117.
137. ADDED FN 16: Jonathan Barnes, *The Presocratic Philosophers: Volume I; Thales to Zeno*. (London: Routledge and Kegan Paul, 1979), 11.
156. FN 77 changed from "Jonathan Barnes, *The Presocratic Philosophers: Volume I; Thales to Zeno*. (London: Routledge and Kegan Paul, 1979), 9-20" to "Barnes, *The Presocratic Philosophers*, 9-20."
165. Line 19. Changed "displayed certain characteristics which" to "displayed certain characteristics that"
173. ADDED FN 5: Martha Nussbaum, *The Fragility of Goodness: Luck in Greek Tragedy and Philosophy*, rev. ed. (Cambridge, MA: Cambridge University Press, 2005), 243.
174. Line 12 ADDED FN 7 Matej Vesel, "What is Revolutionary in the Copernicus *Revolutions*," *Filozofski vestnik* 25, no. 2 (2004): 178.
174. FN 8: Changed "See also Martha Nussbaum, *The Fragility of Goodness: Luck in Greek Tragedy and Philosophy*, rev. ed. (Cambridge, MA: Cambridge University Press, 2005), 244," to "See also Nussbaum, *Fragility of Goodness*, 244."
188. Line 13. Added comma after "In practice"
213. REPLACED PARAGRAPH BEGINNING "Plato's views on women present…" WITH PARAGRAPH READING: "Plato's views on women present what Okin referred to as a seemingly "unresolvable enigma"; a tension exists between the equality of the *Republic* and the many deeply misogynistic statements found in the *Republic* and other dialogues. For example, although Plato offered women equivalent social status to men in his republic, he said that they were inferior to men in almost every field, and he claimed in the *Timaeus* that females were cowardly males reborn as women.. While these contradictions are often passed over by modern scholars as "lapses," Okin countered, "Plato was not the kind of thinker we can readily believe forgot his beliefs, especially on a subject to which he devoted considerable amount of attention in some of his major dialogues." Plato's attitudes towards women, while superficially contradictory, suggest the dismissal of the female based upon a male-centric ontology; philosophy became a tool for domination, and if women did not "become" men, they remained inferior."
214. line 10. ADDED sentence "Aristotle scholar, Cynthia Freeland noted that Aristotle's dialectical method is ripe for reconsideration; what follows is an attempt to provide such a critique."
214. ADDED FN 21: Cynthia Freeland, "Nourishing Speculation," 157; see also Elizabeth Spelman, "Who's Who in the Polis?" in *Engendering Origins: Critical Feminist Readings in Plato and Aristotle*, ed. Bat-Ami Bar On (New York: State University of New York Press, 1993), 99-125.
215. ADDED FN 23: Okin, *Women in Western Political Thought,* 93.
219. line 11. ADDED the sentence: "Freeland argued that the Aristotelian dialectical knowledge base was patriarchal and predominately male: the limitations set by Aristotle's logical method *gendered* dialectic and the scientific enterprise."
219 line13. ADDED FN 35: Freeland, *Nourishing Speculation,* 158-159.
220. ADDED FN 36: Cynthia Freeland, "On Irigaray on Aristotle," in *Feminist Interpretations of Aristotle*, ed. Cynthia Freeland (University Park, PA: Pennsylvania State Press, 1993), 78.

224. FN 46 ADDED “Tuana, *Less Noble Sex*, 22-23”
226. FN56. Changed “Savistinuk” to “Savastinuk.”
248. ADDED CITATION: Cohen, Morris R., and I.E. Drabkin. *A Source Book in Greek Science*. Cambridge, MA: Harvard University Press, 1958.
256. ADDED CITATION: Freeland, Cynthia A. “On Irigaray on Aristotle.” In *Feminist Interpretations of Aristotle*, edited by Cynthia Freeland, 59-92. University Park, PA: Pennsylvania State University Press, 1998.
262. ADDED CITATION: Roochnik, David. *Retrieving the Ancients*. Malden, MA: Blackwell, 2004.
264 ADDED CITATION: Vesel, Matej. “What is Revolutionary in the Copernicus *Revolutions*.” *Filozofski Vestnik* 25, no. 2 (2004): 167-186.
278. FN36. Changed from “See figure 3 page 172” to “Robinson, *Aristotle in Outline*, 40-41.”
279. ADDED FN 37: Ibid., 40.