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Abduction and Aristotle's Library

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Some recent aristotelian scholarship, predominantly German in inspiration, has stirred speculation about the authenticity of the body of Aristotle's writings, the so-called *corpus aristotelicum*.[1] The doubts about authenticity originate from a reconsideration of reports about the transmission of the aristotelian library which are found in some ancient writers. In his work, "The Logic of Drawing History from Ancient Documents,"[2] Peirce uses an account, found in both Strabo and Plutarch, to explain textual problems encountered in reading Aristotle as well as to exemplify his own method of abductive reasoning. Although Peirce himself does not question the Stagirite's ultimate authorship of the corpus, he deliberately chooses to take the reports of ancient authors seriously and seems to display a sharper historical perspicacity and a greater textual sensitivity than many of his contemporaries in this matter. While refraining in this paper from a detailed analysis of the strengths and weaknesses of the authenticity debate, I would like to examine in detail Peirce's analysis of the story and present, in a format more schematic than his own, the way in which his abductive reasoning unfolds.

The present paper is divided into two-parts of disproportionate size: the first part reproduces the reports of the two ancients writers accompanied by some explanatory remarks; the second and longer section illustrates Peirce's own employment of these reports to illustrate his own logical method of abduction. The aim of the paper is to show in a concrete way how Peirce himself thought the method of abduction was to work. Some final questions will be raised about its success.

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[1] P. Moraux, "Das Schicksal der Bibliothek des Aristoteles," in his *Der Aristotelismus bei den Griechen* (de Gruyter, 1973), pp. 3-94; I. Düring, "Notes on the History of the Transmission of Aristotle's Writings," *Symbolae Philogiae Gotoburgenses*, 66 (1955), pp. 37-71; F. Grayeff, "The Problem of the Genesis of Aristotle's Text," *Phronesis* 1 (1956), pp. 105-122; A.-H. Chroust, "The Miraculous Disappearance and Recovery of the Corpus Aristotelicum," *Classica et Mediaevalia*, 23 (1962), pp. 50-67.

[2] The sections that will be considered in this paper are only a few of the whole piece entitled "The Logic of Drawing History from Ancient Documents." The original title " The Logic of Drawing History from Ancient Documents especially from Testimonies" is subdivided into the following sections: 1). Abstract; 2). The Theory of Balancing Likelihoods; 3). Criticism of the Theory of Balancing Likelihoods; 4). The Logic of Science; 5). Regularity and Explanation; 6). Abduction, Induction, and Deduction; 7). Three Kinds of Induction; 8). Abduction; 9). The Logic of History.

All citations will be from the *Collected Papers of Charles Sanders Peirce, Vol. VII: Science and Philosophy*, ed. by A. Burks (Cambridge: Harvard University Press, 1958). This volume is a continuation of the work done in the previous six volumes which were edited by Hartshorne and Weiss. All citations will be to the section numbers of the text. {To the best of my knowledge, the new Peirce edition has not reached editing the material relevant to this topic.}

PART ONE: *Ancient Reports*

Peirce's own summary of the reports of the transmission of the library is found in 7.234 of his works. Perhaps it is worthwhile to reproduce the reports of both ancient writers before commenting on them. Strabo's report occurs in the *Geography*, 13.1.54 where he writes,

"From Scepsis came the Socratic philosophers Erastus and Coriscus and Neleus the son of Coriscus, this last a man who not only was a pupil of Aristotle and Theophrastus, but also inherited the library of Theophrastus, which included that of Aristotle. At any rate, Aristotle bequeathed his own library to Theophrastus, to whom he also left his school; and he 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. Theophrastus bequeathed it to Neleus; and Neleus took it to Scepsis and bequeathed it to his heirs, ordinary people, who kept the books locked up and not even carefully stored. But when they heard how zealously the Attalic kings, to whom the city was subject, were searching for books to build up the library in Pergamum, they hid their books underground in a kind of trench. But much later, when the books had been damaged by moisture and moths, their descendants sold them to Apellicon of Teos for a large sum of money, both the books of Aristotle and those of Theophrastus. But Apellicon was a bibliophile rather than a philosopher; and therefore, seeking a restoration of the parts that had been eaten through, he made new copies of the text, filling up the gaps incorrectly, and published the books full of errors. The result was that the earlier school of Peripatetics who came after Theophrastus had no books at all, with the exception of only a few, mostly exoteric works, and were therefore able to philosophise about nothing in a practical way, but only to talk bombast about commonplace propositions, whereas the later school, from the time the books in question appeared, though better able to philosophise and Aristotelise, were forced to call most of their statements probabilities, because of the large number of errors. Rome also contributed much to this; for, immediately after the death of Apellicon, Sulla, who had captured Athens, carried off Apellicon's library to Rome, where Tyrannion the grammarian, who was fond of Aristotle, got it in his hands by paying court to the librarian, as did also certain booksellers who used bad copyists and would not collate the texts -- a thing that also takes place in the case of the other books that are copied for selling, both here [at Rome] and Alexandria."[3]

This account, according to Peirce, "is confirmed"[4] by the one given in Plutarch's Sulla 26:1-3:

"Having left Ephesus with all his ships, he [Sulla] landed in the Piraeus on the third day, and after he was initiated into the Mysteries, took for himself the library of Apellicon of Teos which contained most of the books which were not yet known to the public of Aristotle and Theophrastus. It is said that after it was brought to Rome, Tyrannion the grammarian arranged the titles and Andronicus of Rhodes who received the writings from him published them and edited the titles which are now current. The older Peripatetics seem themselves to have been cultured and learned, but they did not have access to many of the works of Aristotle and

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[3]*The Geography of Strabo*, trans. by H.L. Jones (Cambridge, 1960), vol. 6, pp. 109-113.

[4]See section .233.

Theophrastus nor were these clear. This is because the inheritance of Neleus to whom Theophrastus left the books fell to men who were unworthy and uneducated."[5]

In his own account Peirce tells us that Aristotle's will makes no mention of his library. Although Peirce himself merely mentions this in passing, the absence of any reference to a library in the will of Aristotle has become the focus of recent scholarly interest.[6] Peirce then recounts that Theophrastus wills the library to Neleus of Scepsis -- something clearly indicated in the testament of Theophrastus. After a considerable passage of time the books get edited, finally reaching the state in which they are employed in the later tradition.[7] In short, Peirce presents a readable account of the information provided by the two ancient authors, supplementing their accounts with a few brief references to other writers in antiquity.

Part Two: Peircean Analysis

Peirce's aim is to illustrate how his theory of abduction functions in relating the present status of the corpus aristotelicum to the reports of ancient writers. He outlines his basic theory of

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[5]See the remarks by R. Flaceliere and E. Chambry in *Plutarque: Vies* (Paris, 1971), Tome VI. According to the comment on p. 219, Plutarch would not be an independent confirmation of the story since, according to the editor, he uses Strabo as a source: "mais je suis persuadé que les détails donnés par Plutarque dans le passage immediatement précédent (26:1-3) sur la destinée des livres d'Aristote et de Théophraste sont empruntés aussi a Strabon, 13,1,54: la même dénomination *d'idiotai anthropoi* appliquée aux héritiers de Nelée de Skepsis se lit chez Strabon et chez Plutarque." He repeats this in his comment on p. 339, noting the Strabo passage and adding, "(ce doit être ici la source de Plutarque)." Whether the single expression 'uneducated men' be taken as sufficient evidence of a dependency relation is a matter for the reader to decide.

[6]A.-H. Chroust, "Estate Planning in Hellenic Antiquity: Aristotle's Last Will and Testament," *Notre Dame Lawyer*, vol. 45 (1970), p.661: "According to Strabo, Aristotle donated his personal library to Theophrastus, probably at the time he fled Athens, perhaps in order to indicate that he wanted Theophrastus to be his "successor". Since Aristotle was a metic in Athens, under the existing Athenian laws he could not have owned any real property there. The Lyceum was a 'municipal' building and, hence, was not his to bequeath." Also on p. 653 ft. 103 he writes: 'While the preserved wills of Theophrastus, Straton of Lampsacus, and Lycon, all scholars of the Peripatus, are replete with provisions regarding the 'school' and the school property, Aristotle's will makes no reference whatever to such a 'school' or school property (or library) or, for that matter, to any property in Athens. For the whole history of Western philosophy this fact constitutes probably the most important aspect of Aristotle's last will and testament. It might compel historians of Ancient philosophy to radically revise (and discard) the cherished thesis that Aristotle had a distinct school in Athens over which he presided." On the basis of this lacuna in the will and the accounts of transmission, Chroust speculates in his later work, Aristotle (London, 1973), 1, xi-xii, "Presumably, at some future time, we might, whether we like it or not, be compelled to rename the present *Corpus Aristotelicum* and call it more discriminatingly *Corpus Scriptorum Peripateticorum Veterum*, that is, a 'collection' of writings which not only includes authentic *Aristotelica*, but in all likelihood also contains authentic Peripatetica. In other words, in the light of Theophrastus' last will and testament (D. L. V. 52), this 'collection' might also contain compositions of the Early Peripatetics (down to approximately the year 287-6 B.C.).

[7]It is this passage of time which leads Chroust to think of multiple authorship. Not only Chroust is of this opinion. F. Grayeff (see ft. 1) presents the thesis that the two editors, Tyrannion and Andronicus, gathered material from different sources for their editions of Aristotle, i.e., from the centers at Rhodes, Athens, and Alexandria. Consequently what we do possess is not from the hand of Aristotle alone. In his *Aristotle and His School* (New York, 1974), p.82 he writes:

"It appears, therefore, that Andronicus's edition of the corpus reflects the teaching not only of Aristotle, but of two or three generations of Peripatetic philosophers. Nevertheless, Andronicus published his edition as the sole work of Aristotle. Nor could he have done otherwise because, at least since Apellico's time, the treatises had been known as the work of Aristotle."

historical research, one which he hopes will be more fruitful than the method employed by many of his contemporaries. The unhappy results of many nineteenth century historians suggested to him that a different method must be employed, one that would not permit historians to ignore positive evidence in favor of probabilities supporting a theory which they found more preferable.

In order to support his position Peirce engages in an elaborately developed application of his theory to the case of the Aristotelian library noted above. Peirce does first set forth the principles that regulate the formation of an hypothesis (in this case, the hypothesis that Strabo does explain the textual difficulties encountered in reading Aristotle). However, he seldom refers back, in an explicit way, to the principles he outlines in the prior, methodological, part of his paper, and thus it is sometimes difficult to see what rules justify each particular move in the application of his method. These principles will be discussed first and then their interaction with the particular case in question will be examined. The method that historians were employing at the time the article was written (1901) rested on the theory of balancing likelihoods (henceforth TBL). This method he explains through a brief summary and an example. Peirce does not devote a great deal of time to sorting out the difficulties inherent in this approach, since his aim is to present his own method, one that might avoid the glaring mistakes attached to the use of his opponent's method (7.169). Nonetheless, he does provide some criticisms of it.

His criticisms of this method are expressed in paragraphs .176-182. First, he notes that the method of balancing likelihoods is unsuccessful in the study of ancient history precisely because the evidences, especially testimonies, offered as facts are very seldom independent. By this, Peirce seems to mean more than the mere dependence of one author on another author, for even the TBL has a problem with such procedure. In such a case, an author, in reporting an event, is often relying for his information upon a contemporary or some former author, and it would be illegitimate to set forth all the testimones received as if they were all of equal and independent value. For instance, it would be incorrect to balance three independent sources which are opposed to a certain position against five interdependent sources which are supportive of the same position and conclude in favor of this latter position as having the greater probability. Peirce notes that the real problem is the difficulty of finding testimony that is not influenced by the author's own attitude regarding the antecedent probability of a certain account (event).   Thus, he notes, the accounts of Thales' life, in which the Pre-Socratic reportedly falls into a ditch while speculating on the heavens, might indeed be influenced by the Greek conception of the wise man. For all that, it need not invalidate the accuracy of the account.[8] Second, there is no way of determining the credibility of an author when he relates a certain event, even if one summons up his whole record of reporting as witness to his reliability or inaccuracy. The author must be considered as standing in a unique relation to each state of affairs that is narrated, and therefore statistics are of no help in ascertaining whether what is being reported in a particular case is true or false. Third, the method of history should not employ the demonstrative kind of reasoning, yet this is what is being attempted, Peirce maintains, even when one uses a calculus of probabilities.

To avoid these difficulties, Peirce will urge that his own abductive method be employed. In this way, Peirce argues, man will be able to learn from history, rather than remain confined within the limits of his own preconceptions of the past, preconceptions which will sometimes force him to reject outright as false information which is really factual (7.181 and 182 ft. 7).

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[8]Peirce notes (.176): "Of all the modern mathematicians whom I have known, there have been perhaps not over one in five, of whom I should not hesitate to believe such a thing."

Peirce's own method for studying history is best summarized in the abstract which precedes the article as it appears in the *Collected Papers*: "This scientific procedure consists, according to Mr. Peirce, in carefully framing a hypothesis, in tracing out the experiential consequences of that hypothesis, and in testing those consequences by comparison with facts not taken into account in the formation of the hypothesis." (7.163) One can see respectively in this summary the three types of reasoning put forward by Peirce as constitutive of the scientific method: abduction, deduction, and induction.[9] However, the first type of reasoning (abduction) plays a key role in the historical enterprise. A person is presented with a number of disparate facts which he wishes to unify into some theory; the historian wishes to find something that will explain an otherwise confused and tangled situation. Thus, the historian differs from the natural scientist who is often engaged in supporting some general law by means of which similar phenomena can be understood (induction), and he differs from the mathematician who is already in possession of a theory and is primarily engaged in deducing its consequence (deduction). Peirce insists on the distinction between induction and abduction and notes how they are unfortunately lumped together, and indicates how their methods are opposed. Abduction starts with facts and moves to an explanatory hypothesis. Induction starts from a hypothesis and moves to supportive facts. As he succinctly puts it, "Abduction seeks a theory. Induction seeks for facts." (.218)

A more detailed analysis of Peirce's theory of scientific method in general or even his theory of abduction in particular cannot be given here. What is germane and important, however, is that Peirce furnishes us with some criteria which are supposed to guide a person in adopting (both choosing and testing) an hypothesis that will be suitable for explaining certain historical phenomena, in this case, the condition of the Aristotelian corpus.

Peirce enumerates six rules that should be followed when engaging in the process of hypothesizing (7.225 - 7.230). After adding to this list a rule to which he had pointed earlier, we arrive at the following list:

R0). The hypothesis proposed should be capable of being submitted to experimental verification.[10]

R1). The hypothesis should be able to explain all the facts relevant to the case in point.[11]

R2). The investigator must maintain that the principal testimonies are true unless or until the opposite is established.[12]

R3). Hypotheses with objective probabilities of a high degree should be favored while those that have only a subjective probability or an objective probability of a low degree should be dismissed.[13]

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[9]These are developed in sections .202-206.

[10]See earlier .220. Peirce makes reference to the positivist Comte who wishes to exclude any "metaphysical hypothesis". This would be one "which has no experiential consequences." (.203)

[11]"Now the first rule which we should set up is that our hypothesis ought to explain *all* the related facts." (.225) Again, see also .220.

[12]"The second rule is that our first hypothesis should be that the principal testimonies are true; and this hypothesis should not be abandoned until it is conclusively refuted." (.226)

[13]"The third rule will be that probabilities that are strictly objective and at the same time very great, although they can never be absolutely conclusive, ought nevertheless to influence our preference for one hypothesis over

R4). Each item of an hypothesis should be tested singly.[14]

R5). Of two hypotheses of equal merit, an expansion and intensified examination of the facts should be the arbiter.[15]

R6). Financial consideration demands that generally the hypothesis which can be most economically tested be the first submitted to examination.[16]

It is possible to add to these a principle (hypothesis) that, Peirce says, seems to guide all reasoning: "That hypothesis is that the facts in hand admit of rationalization, and of rationalization by us." (.219) Though Peirce here clearly enumerates these rules, it is not always clear, as was already mentioned, how they function in the example provided by Peirce. Furthermore, the sense of verification (R0) that is operative when dealing with historical accounts is somewhat elusive and tied to an ambiguity of the term "fact" which is present in Peirce's account and which seems to raise a problem for his methodology.

Let us now turn to the detailed example that Peirce provides which should incorporate the above rules and how, in the concrete, what the Logic of History is. Peirce first brings before our eyes, "the facts to be explained." (7.233) Now a "fact" in this article, can be understood either as something which serves solely to be the data for some explanatory theory, i.e., the explananda, or it can be understood as evidence which serves in the confirmation of a theory. In the present passage it is obvious that Peirce is using it in the former sense, and that in doing so Peirce is being consistent with his theory of abduction which demands that one start from the facts and seek an explanation of them. Peirce goes on to list in section .233, it seems, some troubling facts about the Aristotelian corpus and to account for these he invokes the passage in Strabo that contains, in his estimation, a plausible explanation. These facts can probably be reduced to four major ones and enumerated as follows:

F1). Diogenes Laertius reports that the Aristotelian corpus had 146 titles whereas the works we possess comprise only a third of this total.[17]

F2). Ancient writers note that Aristotle's work had a rather elegant style whereas the works we have today manifest a very dry academic style.[18]

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another; but slight probabilities, even if objective, are not worth consideration; and merely subjective likelihoods should be disregarded altogether. For they are merely expressions of our preconceived notions. Now one of the main purposes of studying history ought to be to free us from the tyranny of our preconceived notions."(.227)

[14]" The fourth rule will be that we should split up a hypothesis into its items as much as possible, so as to test each one singly." (.228)

[15]" The fifth rule will be that when we are in doubt which of two hypotheses ought to have precedence, we should try whether, by enlarging the field of facts which they are to explain, a good reason will not appear for giving one of them a decided preference over the other." (.229)

[16]" The sixth rule will be that if the work of testing a particular hypothesis will have substantially or largely to be done in any case, in the process of testing another hypothesis, that circumstance should, other things being equal, give this hypothesis which thus involves little or no extra expense, a preference over another which would require special work of no value except for testing it." (.230) See also .220.

[17]"Diogenes Laertius gives a catalogue of the writings of Aristotle, probably made in Alexandria, (but the date of it is a matter for conjecture,) which contains 146 titles, which Diogenes says had 445,270 lines, which would be more than three times the size of our edition. Yet this catalogue does not seem to refer to any large part of the substance of the works that we possess."

F3). A great deal of repetitiousness (both of passages and chapters) exists in the corpus.[19]

F4). In the corpus there is reciprocal referencing to the works by Aristotle.[20]

Now although there may appear to be only four facts to deal with, the issue of how one is to individuate a fact must be kept in mind. It is easy to generate a much larger body of data to be explained by subdividing the remarks of Peirce so that further distinct items emerge as significant explananda in this enterprise. Thus, the following seem to be easily formulated on the basis of the Peirce text. Their correlation with, or similarity to, one of the previous statements F1 – F4 should be clear from their denominative enumeration:

F1a). Reference is not made in the catalogue of Diogenes to a significant number of the works we possess.

F2a). Aristotle was known in Antiquity by a number of works which we do not possess.

F3a). Some lost works presumably agree substantially with works retained in the corpus.

F3'). "Intramural" repetition within the corpus:

F3'a). Repetition of whole books.

F3'b). Repetition of whole work.

F3'c). Repetition of passages.

F3'd). Repetition of definitions.

F3"). "Extramural" repetition: repetition between the lost works and the corpus.

Peirce does not give detailed citations from the corpus to support these remarks. However, it is relatively easy to find support for each of them. Consider only a few. (F2a) is established by citations from a whole range of authors in Antiquity, such as Plutarch, Alexander Aphrodisias, Cicero, Diogenes Laertius, etc. One need only consult one of the many editions of Aristotle's so-called "lost works" which have appeared during the last two centuries to establish that, indeed, there seem to have been a number of pieces which we simply do no longer possess as integral works.[21] Important works widely recognized in Antiquity would be Arisotle's <u>Protrepticus</u> and

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[18]"Moreover, down to the time of Cicero, Aristotle, whose reputation was more Roman than Greek, was chiefly known by works which we do not possess. The style of those works, as it is described, and as we see it in the fragments, was highly artistic; while that of the general mass of the works we possess is harsh and excessively condensed."

[19]"The works we possess are also extremely repetitious. More than once, a whole book, or even a whole work, is substantially written again. And of the lost works, some, we are told by those who had seen them, agreed in substance with some of those in our possession. Shorter passages, and especially definitions, are often repeated almost verbatim."

[20]"Our Aristotle abounds in references to his own works, sometimes to lost works, but mostly apparently to the works we know under other titles, but the nomenclature of the titles in the references presents no fixity; the same work will receive from Aristotle himself various names,-unless he means to refer to some works that we do not know."

[21]One of the most widely available is the W.D. Ross edition, *Aristotelis Fragmenta Selecta* (Oxford: 1955). A translation exists in the older Oxford Aristotle. A newer collection (in English) is found in the Jonathan Barnes edition (translation) of Aristotle. Other scholarly Greek editions are found in the Teubner edition as well as the more recent Berlin edition by O. Gigon.

the Eudemus. (F3'a) is illustrated by the well-known duplication of books between the Nicomachean and Eudemian Ethics. Or, it can be exemplified by comparing the On Ideas (a lost work) with Metaphysics I, 9 where Aristotle presents his criticism of Plato's theory of Ideas; G. Fine has recently published a commentary on the former work and one can see the similar interest and substantive similarity between these. (F3'c) is illustrated by the effective replication of parts of Book V of the Physics and Book XI of the Metaphysics. Definitions are frequently repeated even within the same work.

Now these facts, Peirce thinks, are somewhat unquieting; they are explananda searching for a hypothesis. An adequate hypothesis to explain these facts, he believes, is found in the account given above by Strabo of the journey, adventures, and mishaps which the Aristotelian library underwent from the time of the death of Theophrastus to the editing of Andronicus (.234). It should be noted here that though the story put forward by Strabo is a fact in the sense that it is a document or testimony to be dealt with, it stands in an explanatory relationship to the other facts related above; indeed, it is these facts which turn the investigator's attention to this story as a plausible explanation of the problems of the Aristotelian corpus.

After having proposed a hypothesis that is capable of being in some way experimentally verified (Rl), it is incumbent upon the investigator to actually submit that hypothesis to the test. However, Peirce first dispenses with certain preliminary objections (PO) to the hypothesis before it should be admitted on probation. They are the following:

PO1). If all Aristotle's work were in only a single collection, how could some be otherwise known to the librarian?

PO2). How is cross-referencing to be explained?

PO3). How could have the editor been able to determine some works as spurious?

PO4). How explain the evidence of two separate acquisitions of the library?

Peirce readily finds answers to these and proceeds to the serious examination of the hypothesis.

In seeking support for the hypothesis, Peirce would seem to have available two sources: a) the reports by other ancient authors corroborating the veracity of Strabo's account;[22] b) the present Aristotelian corpus itself to provide internal evidence. Now Peirce does not develop the first line of evidence, though other writers (he mentions Plutarch, Athenaeus, and Porphyry) report substantially the same story that Strabo does. He does argue extensively, however, from the state of the corpus in support of the Strabo story. Rather than speak of evidence, however, he speaks of "consequences" which follow from it.[23] At this point Peirce's terminology seems to become somewhat fluid. He seems to think that there are two major "consequences" which would follow on the veracity of the story. The first consequence (C1) deals with the type (style) of works that Aristotle would have produced and the length of the individual papyrus sheets on

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[22]Perhaps it was the facile use by historians of multiple sources as automatically constituting corroborative evidence that made Peirce hesitant in using this first line. As he noted, the problem of achieving genuine independence (not only vis-à-vis the possible mutual interdependence of ancient writers but also vis-à-vis the dependence of each author on prior assumptions) is a basic one.

[23]"Having thus reviewed all the supposed difficulties of this hypothesis and having found that they are not serious, we may admit it upon probation, and proceed to trace out its consequences." (.239)

which he wrote them. The second consequence (C2) deals with the filing and storage of these sheets. It is difficult to formulate these in two simple statements, simply because they are actually quite complex; Peirce's statement of them is relatively diffuse. In addition, it seems that he makes a significantly large number of assumptions in their formulation. For instance, with regard to (C1) Peirce assumes that the type of works "*should be expected* [italics mine] to belong to" unfinished works, lecture notes, outlines of theories, etc.(.239) He then engages in an elaborate and ingenious tabulation of the number of lines per papyrus sheet.[24] With regard to (C2) Peirce has to make a number of assumptions regarding the pasting and storage of the papyrus sheets. These two consequences seem to be foundation for some others. However, these others he seems to refer to as "phenomena to which our hypothesis points". One is tempted to think of these as constituting pieces of evidence for the hypothesis. Perhaps *being a phenomena* relative to, and *being a piece of evidence* in support of, a given hypothesis is simply the case of being a "grue" property – what is a predictable phenomena becomes evidence when confirmed. Given the supposition of the Strabo account about the library's history and editing, one might, then, refer to the following as phenomena (P) or as evidence (E) in support of that account:

Pl). Errors or banalities where something more insightful/original was expected.

P2). Errors or puzzling occurrences often at about 70 Bekker lines.

P3). Transposition of certain passages often at about 70 Bekker lines.

P4). Regular omissions of matter of page length size.

Peirce turns his attention to the corpus, specifically to the Prior Analytics, to find instances which would exemplify omissions (P4) and transpositions (P3) and readily finds examples for both. He then begins to examine the text for some blunders (P1,P2).[25] He lights on a fascinating example in one of the later chapters, c. 25, where he takes up Aristotle's analysis of abduction (*apagoge*) and argues that the only way to make good sense of the passage is to suppose that the text had been altered.[26] Peirce remarks at .251 that, "Such a singular corruption of the text could hardly have taken place without an Apellicon; but with him, it was easy enough."   In the end, Peirce concludes that his method has proved far superior to that of the German historians who have discounted the Strabo report and, in doing so, have ended up only, "believing whatever they are inclined to believe." (.255)

CONCLUSION: *Final Evaluation*

How successful is Peirce's account? Leaving aside the historical accuracy of the Strabo for the moment, one must ask whether Peirce has successfully carried through his investigation and

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[24]This is really so intricate that it could well deserve a paper itself. He first selects certain works of the corpus upon which to speculate, counts their length in terms of Bekker lines, adds space for titles to the works, leaves room for a "fudge factor" to cover variation in normal handwriting, etc.

[25]Peirce does not, it seems, clearly raise separate cases for each of these.

[26]The syllogism appears to be "Whatever is equal to a rectilineal figure [E] is (able) to be squared [D]; a circle [F] is equal to a rectilineal figure; thus, a circle is is (able) to be squared," where the letters stand for the usual middle, major, minor. Peirce insists that "equal to lunes" be substituted for [D]. (The lune is a crescent-like shape drawn around a circle.)

justified the hypothesis which he proposed. One way to answer this is to consider whether the rules he provided above were followed and are adequate.

Peirce proposed a hypothesis that was capable of being tested (though admittedly in a way different from the procedures of the physical sciences) and thus fulfilled (R0). He accepted the principal testimonies as true, viz., that of Strabo and those of the other writers (R2). He was not blindly following some preconception is adopting this hypothesis or following current sentiment against it to reject it a priori (R3). He found that his hypothesis was able to explain the facts and even deviations that might stand in the way of its acceptance (R1).[27] The question of the cost in verifying the hypothesis can be bracketed as not really all important to the present topic (R6). Thus, it seems that all Peirce must show is that the testing of the hypothesis has conformed to Rules 4 and 5; he will then be able to say that he has successfully carried through with his method and shown the truth of the proposed hypothesis. However, it is precisely at this point that difficulties begin to arise and the ambiguity noted earlier in the sense of "fact," "phenomena" becomes crucial.

One wonders why Peirce did not include what were the the facts which serve as confirming evidence (Pl, P2, P3 and P4) among the original facts which were the data (Fl, F2, F3, F4). The former are as equally given in the text as the latter. Now, the problem of distinguishing data from evidence does not arise in the same way when dealing with the physical sciences. In the case of a scientific abduction, a hypothesis is made on the basis of certain given (present) facts and one is able to predict (or retrodict), on the basis of that hypothesis, facts that are not present but which are sought to confirm that hypothesis. In the case of working by internal evidence from the Aristotelian corpus, however, it becomes clear that one is presented with the whole corpus and to decide which passages in it are to be taken as data and which as evidence might appear wholly arbitrary. In response to this Peirce might maintain that a general overview of the corpus indicates there is some problem and allows for the generation of an explanatory hypothesis which, in turn, allows one to make "predictions" about the state of certain parts of the texts, which predictions will be supported by an inspection of <u>particular</u> passages.

A greater difficulty presents itself, however, when one considers that there need be no <u>immediate</u> connection between what is brought forward as evidence in support of an hypothesis and the hypothesis itself. Peirce wishes to maintain that the Strabo account will be supported by the regularity of the occurrence of troublesome passages (P2), the seeming disappearance of passages of a certain length (P4), and the transpositions of certain chapters (P3). It must be noted, however, that these can only count as confirming evidence for the major hypothesis given in Strabo *if* other hypotheses are made which tie these to the main hypothesis. For instance, as noted above, Peirce conjectures that each page which Aristotle wrote contained about 70 Bekker lines of script. He conjectures that the original manuscript were rolled before storage. Both of these conjectures allow him to explain, given the account of Strabo, the regularity of the occurrence of the trouble spots in the text: moths were able to bore through a single place in the rolled manuscripts and thereby destroy the-text so that, when unrolled, portions would be missing at regularly repeating intervals (P2;P1). Similarly, the size of the sheets will explain how some sections were lost (P4) and how others were reshuffled (P3). Thus, rather than a single hypothesis, there is a whole network of hypotheses that come into operation; how they are each

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[27]As he claims in .235-238.

warranted is not always clear and thus the question arises whether R4 is really being observed. Moreover, one begins to suspect that there is some fundamental circularity lurking in the method Peirce is employing. This becomes particularly clear in his discussion of the syllogism in the Prior Analytics. In order to make this understandable, Peirce maintained that one must alter the text to find it a viable instance of apagoge (abduction). Peirce feels justified in making this change insofar as, *given Strabo's account*, he will be amending the corrupt text of Apellicon and returning to the accurate original reading intended by Aristotle. The problem is that Peirce will then go on to use this as evidence for the veracity of the account given by Strabo. He writes, "If we accept it [this changed reading], it affords a remarkable confirmation of the Scepsis story; because of the bold insertion it supposes to have been made in the text." (.253 - italics mine) Without admitting such a corruption of the text, one might be able to explain the syllogism's wording as consequent upon Aristotle having written it in haste, or because the Analytics were notes not yet ready for publication -- the latter being an assumption that Peirce himself is ready to employ in another context.

In support of Peirce's examination one can argue that he does uphold (R4) to the extent that he at least tries to examine the immediate consequence of the hypothesis by calculating the size of papyri through a detailed counting of Bekker lines. Further, Peirce could argue that it is not really a strange notion that one hypothesis should support another. He notes in his article on "Deduction, Induction, and Hypothesis" an instance from physical science where one hypothesis is supported by another, namely, the kinetical theory of gases which "is supported by the mechanical theory of heat." (2.639) Peirce, then, will argue that a theory is warranted insofar as it is able to explain the most facts in the simplest way; the best theory will be one that has both breadth and incomplexity. To achieve this one might be required to draw up other hypotheses, but by doing so an investigator will only be searching for the best hypothesis, the best explanation and could be construed as following Rule 5, if the hypotheses in question be seen as co-operative subordinate ones rather than competitive co-ordinate ones.

Whatever its weaknesses, Peirce's argumentation and his focus on the principles and method in doing history scientifically show not only how his theory of abduction might be applied but also how a reflective method can lead a historian to new insights.