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Traversing disciplinary borders: The practice of note-taking and its epistemological significance

Abstract: The aim of the present paper is to canvass the recent literature devoted to the study of the relationship between the traditional scholarly practices of text management and the emergence of the modern scientific practices and ideas. My analysis will show that according to the most comprehensive approaches to the date there are two main areas where note-taking is seen as relevant to modern scientific concerns. First, the practice of note-taking aids the process of discovery and enables the edification of the scientific enterprise as the pursuit of epistemic advance. Second, note-taking functions as a means of enhancing the cognitive abilities of the main actors involved in the undertaking of discovering new truths about natural phenomena. I conclude by stressing that there is an epistemological potential that is inherent to textual practices and that this aspect needs further investigation.

Keywords: excerpting, commonplace-book, empirical research, note-taking, empirical observation, information

Introduction

Recently, a great deal of scholarly effort has been invested into highlighting the influence that textual practices may have exerted upon the development of modern scientific practices and into examining how the practices in question helped shape the modern scientific framework. Academic writers interested in this subject matter paint a picture of the continuity of certain practices albeit a continuity that presupposes alteration and adaptation to different needs, standards and values. The continuity in question concerns the import of practices fostered within an epistemological context in which knowledge was largely understood alongside bookish terms into an epistemological context in which knowledge is understood in connection with sustained empirical research.

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My goal here is to survey the recent literature on the issue in order to discern more clearly what aspects of the modern scientific enterprise are subject to the impact of textual practices. I claim that there are two main issues. First, textual practices are able to aid the process of discovery by furnishing the necessary resources for the consolidation of a repository of empirical information that can function as a firm foundation for scientific reasoning. Additionally, the identity of the modern scientific undertaking as the pursuit of epistemic advance is also worked out in connection with textual practices since the repositories of information and the engagement with them engender an epistemological scenario in which the production of novel connections and the search for latent undiscovered knowledge constitute the main features. Second, textual practices generate a stock of cognitive exercises that allow for the sharpening of certain intellectual abilities that are required in order to engage in the scientific activity in the first place. Once the burden of memorization is no longer the main consumer of cognitive powers with the advent of notebooks and card indexes functioning as external memories, working with notes became an excellent opportunity or strengthening scientific reasoning or for constructing scientific hypotheses.

The main protagonist of the current debate is the so-called *ars excerpedi* and its subsequent adjustments operated by early modern thinkers preoccupied with the study of natural phenomena. A good start for understanding what excepting amounts to is a recent definition of this intellectual practice clothed in some of the most general and abstract terms possible: "We understand excerpting as a process in which individuals or groups of individuals select and process texts, information, and data, and store them for later use" (Décultot et. al. 2020, 170). The emphasis here is on the existence of a selection mechanism that involves the mobilization of a variety of procedures and media with the aim of reshuffling actual arrays of signs. The relocation of excerpted material to a different media than the original one is also paramount when speaking about excepting in a proper sense. The most frequent examples of such media that one can find in the literature are notebooks and index cards stored in filing cabinets (Décultot et. al. 2020, 170; see also Blair 2010, 26). Although excerpting is recognized as an intellectual practice with ancient origins, the main focus is on techniques developed in the context of humanist and Jesuit learning, since therein one is confronted with an engagement of institutional proportions with these practices. A considerable amount of attention has been devoted by humanist and Jesuit pedagogues to finding the best procedures and their reflections and recommendations have survived in numerous writings. In the case of humanist authors, the activity of excerpting is related to the rediscovery of ancient sources, a desideratum that they pursued in a programmatic manner.

The ancient logico-rhetorical function of the *loci communes* was remodeled in order to serve as tools for text management. They were operative in choosing material from certain sources and they also acted as general headings under which relevant excerpts might be subsumed and stockpiled. Excerpting is not reduced to the mechanical accumulation of textual passages. It is primarily a cognitive exercise, since it requires one to carefully judge what exactly is that one is looking for when reading a text. Since they were initially embedded in a rhetorical culture where the cultivation of memory was the essential ingredient, excerpts were assembled in a systematic fashion preferably in bound manuscripts. With time however pre-arranged systems of notes were disavowed and the demand for more flexible collections increased significantly. This inaugurated the birth of the "culture of pure facts". This is the intellectual climate that fosters the creation of context-free small units of textual information suitable for random reassembling or for citation as evidence in support of certain theoretical claims (Zedelmeier 2020, 498-502).

I will omit here a detailed discussion of the main types of common-place books and of the innovative contributions made by different early modern thinkers (most notably by Locke) to common-placing, since I am interested only in what recent studies have to say with regard to the epistemological significance of this endeavor. A comprehensive classification of these types of commonplace-books and an illuminating comparison between these and Locke's new method is given by Stolberg. According to Stolberg scholars were guided by five major requirements in their search for the best procedure of note-taking. Commonplace-books were evaluated with regard to their potential of bestowing order upon the notes they contained and of facilitating the easiest and simplest retrieval of information. The issue of avoiding the loss of space and of reducing the amount of time dedicated to entering selected material was also crucial (Stolberg 2014, 457).

I. In this section I will examine the results of what I consider to be the most comprehensive approach to the issue of the relationship between textual practices and the formation of the modern scientific enterprise. I am referring to Richard Yeo's pronouncements on this topic. Yeo's analysis takes into consideration different attitudes on the complex interactions between note-taking, memory and the new challenges posed by empirical research scientific. A plethora of authors are discussed including Robert Boyle, John Locke or Samuel Hartlib. Special attention is devoted to the role of the Royal Society of London as a promoter and instigator of sustained note-taking activities.

Yeo has argued that in the second half of the seventeenth century many of the figureheads associated with the Scientific Revolution were

interested in ascertaining the extent to which specifically textual procedures may be depicted as satisfying the epistemological requirements characteristic of empirical research. Those involved in scientific matters had to face the difficult task of managing a large amount of empirical information, something that they soon realized could not be carried out by deploying only the resources furnished by natural and artificial memory. In addition, given that the modern scientific enterprise presupposes an organized community of members working together towards the edification of a scientific archive that would contain all the individual observations, one can begin to comprehend how the practice of note-taking came to be understood as an optimal solution (Yeo 2014, 4-5).

This new intellectual ambiance associated with the pursuit of natural knowledge is described by Yeo in terms of "empirical sensibility" (Yeo 2014, 87). What was at stake here concerned the challenge of coordinating in a productive fashion information obtained via a myriad of sources with an emphasis on items connected with experience in a broad sense: sensory information, direct or indirect empirical observation or scientific experiments performed by oneself or by others. The main target was "empirical information of particulars, as understood in Bacon's project for the collection of natural histories" (Yeo 2014, 87). One needed workable methods that would ensure the consolidation of large archives of empirical information the processing of which was the duty of future generations of researchers. The idea is that the generation of knowledge (comparative inquires or inductive generalizations) is postponed until the amount of available information is large and diverse enough to sustain it.

Yeo reminds us of Francis Bacon's plea for careful and scrupulous accounts of regular natural phenomena in contrast to some investigator's propensity towards irregular natural events. The accumulation of particulars runs in the opposite direction to systematicity, the latter is to be avoided as much as possible. Early modern naturalists admitted however that the repositories in question should be allowed a limited degree of pre-structuring, if one was to be in possession of usable material (Yeo 2014, 86). The solution advocated by Bacon and endorsed by many natural historians and natural philosophers was a customized variant of the commonplace-book. The structural outlook of commonplace-books could be tailored such as to serve the needs of those engaged in the endeavor of stockpiling empirical information. In addition, the practice of assembling commonplace-books is accompanied by a set of intellectual virtues that would enable one to carry out this difficult and not immediately fulfilling mission. Among these, discipline and self-sacrifice seem to be the most prominent. The ideal compiler of empirical information is a patient and meticulous note-taker capable of forgoing personal judgment and someone

who is equipped with a willingness to take part within an undertaking the finality of which he can neither envisage nor enjoy (Yeo, 2014, 87-90).

According to Yeo we must reconsider all those antibookish pronouncements made by many early modern authors. They did not disregard the cognitive value of extracting information from past works, in fact this undertaking was seen as crucial for establishing a base for the comparative endeavors they were championing (Yeo 2014, 259). If Renaissance humanists were primarily concerned with note-taking and notebooks as means of dealing with the explosion of available books, early modern thinkers were dissatisfied with the lack of trustworthy material. As a consequence, they took it upon themselves to deliver the type of reliable information and in doing so they modified and adapted the inherited instruments: commonplace-books were fused with aspects belonging to journals. Also, the kinds of entries they comprised were diversified from the initial excerpts from books – they were know filled with weather reports, queries or records of conversations. The antibookish discourse has to be seen more along the lines of a plea for enlarging the allowed repertoire of sources rather than as a call for the complete abandonment of traditional forms of learning (Yeo 2014, 259).

I believe that Descartes's call for enlarging the avenues of inquiry gives an almost complete inventory of sources from which material was generally introduced into notebooks. He includes here reflections obtained through introspection, conversation with others, travel or experimental reports: "Resolving to seek no knowledge other than that which could be found in myself or else in the great book of the world, I spent the rest of my youth travelling, visiting courts and armies, mixing with people of diverse temperaments and ranks, gathering various experiences, testing myself in the situations which fortune offered me, and at all times reflecting upon whatever came my way so as to derive some profit from it" (Descartes 1985b, 115).

II. This section explores the results of Alberto Cevolini's inquiry on the issue of knowledge management and the emergence of the idea of science as the pursuit of epistemic advance. Cevolini convincingly integrates several methodological approaches including the scrutinizing of historical material and the employment of a neo-Darwinian explanatory framework. According to Cevolini another manner of speaking about common-place books and other instruments of managing information (card indexes), empirical or otherwise, is in terms of "forgetting machines" (Cevolini 2016a, 13). This marks a shift regarding the manner in which the epistemic status of memory was being construed. From the standpoint of the earlier rhetorical culture, notebooks were integrated in a framework in which their primary function was being determined in terms of their relationship with

memory and their ability to contribute to the enhancement of eloquence. Since a capacious memory was required for rhetorical performance, notebooks were presented as the perfect repositories for the necessary information, and in addition, they were advertised as the best tool to help one remember. But since the need to deal with "information overload" (Blair 2010) produced massive collections of notes that could clearly not be stored in the mind, other advantages of note-taking were brought to the fore.

The accent is thus moved from strengthening the mental operations associated with memory toward enriching archival mechanism conceived as "secondary memories" (Cevolini 2016a, 13). Investigators become "users" in the modern sense of the term, they find themselves in the presence of a machine that will deliver results once it is accessed with the help of "search engines" such as indexes. The key issue here is that archival systems such as the commonplace-books or filing cabinets encourage forgetting in the sense of diminishing the pressures put on memory while at the same time ensuring the retrievability of the information stored in virtue of the presence of abstract ordering instruments, thus softening the initial impact of forgetting (Cevolini 2016a, 13-15).

Another important effect of the use of archival devices concerns the potential for dismantling the fixed traditional structuring of knowledge by inaugurating an open-ended and future oriented ethos of investigation. For instance, there was no limit as to the number of entries that one might introduce under a specific heading in a common-place book. Another, more exciting aspect, concerns not the volume of material hosted by the secondary memories in question but the multitude of novel connections that might be drawn between the items that constitute them, thus enabling a "cognitive expansion" in addition to the one in volume (Cevolini 2016b, 157-160).

The main lesson to be drawn here is that secondary memories host knowledge in a latent state, they instantiate themselves as territories that can reward the explorers with more that the recuperation of previously stored material by conveying genuine novelty. The advantage is a double one. First, we are awarded with new connections between entries, but on a secondary, more fundamental level, "connectibility" itself is reinforced. Every interaction with the archival system enhances the combinatory potential of the entire structure. The general implication is that what is deposited in these storehouses is not a fixed body of knowledge but a space in which the potential enlargement of knowledge is nourished. The cultivation of memory is thus replaced as an intellectual desideratum with the idea of institutionalizing the pursuit of epistemic advance. The idea of simply attaching new information to an enduring edifice of knowledge without affecting its overall stricture is lost. Investigators are now confronted with

and motivated by "unexpected cognitive opportunities" (Cevolini 2016b, 172).

The practice of note-taking has also contributed to the establishment of the idea of novelty or innovation. The ideal of chasing new knowledge is itself a new intellectual phenomenon and the explanation of its success lies in the fact that it modifies in a significant way the sense in which the idea of the new itself was understood. Something new is not simply something that is opposed to what is handed down to us via tradition. It is understood as knowledge that has not been previously articulated and not as something that contravenes to a certain tradition. The contrast between the territory of that which is known, and that realm of the unknown is thus created: "Knowledge was now understood as a contingent observation of reality, i.e., an ever perfectible system that could be likely improved if the search was continued" (Cevolini 2016a, 178).

The printing culture enables the formation of official and professionalized channels for the communication and dissemination of scientific knowledge. The result is the edification of a scientific community in which investigators are motivated to pursue novelty and stimulated to share their findings with the remaining members of the community by publishing their work. Knowledge is secured in virtue of the fact that science reproduces its procedures, with the amendment that this does amount to saying that the process in question entails the exhaustion of a finite stock of resources. Borrowing a formulation from Niklas Luhmann, Cevolini depicts science as an "autopoietic system", that is science is dominated by a state of "restlessness" seen as the pursuit of epistemic advance (Cevolini 2016b, 179).

III. Another interesting theme regarding the practice of note-taking in the early modern period that one can encounter in the recent literature concerns the impact of this practice on the major actors involved in the pursuit of empirical research. Note-taking and working with notes in general are presented as means of fortifying the cognitive capacities of natural historians and natural philosophers. Richard Yeo reminds us of what William Petty and John Beale were cautioning Boyle against, namely his avid reading. They took issue not with the magnitude of Boyle's endeavor but rather with his procedure which they saw as favoring memorization over scientific reasoning. Among the charges leveled against Boyle's cognitive habits one was that his strategy was lacking the order that is necessary for the transformation of the material resulting from reading into solid premises capable of participating within future sound inferences. The lack of order would also impede the possibility of using material derived from reading in building scientific hypotheses as well as the efficaciousness of scientific communication (Yeo 2014, 134).

The cultivation of memory required a significant effort on the part of the cognitive capabilities of scholars. With the generalization of the use of notebooks as archival systems the capabilities that were deployed in order to strengthen natural and artificial memory were freed and could be reemployed for other purposes. Most notably, scholars consciously embraced the benefits of abdicating from the ideal of keeping in the mind material that was considered worthwhile. The cognitive capabilities freshly liberated from the pressures of storing information in the mind can be put in the service of operations that are more high-order and abstract in nature (Cevolini 2016b, 159-160). There was a growing sentiment that the cognitive powers in question amount to a type of intelligence that one is endowed with and that one is free to access and mobilize. The natural domain that one is to investigate with these newly acquired powers is the realm of the unknown, of that which can yield epistemic advance (Cevolini 2016b, 159-160).

Descartes is indeed a clear example of this situation as Cevolini reminds us. The early pursuit of a *mathesis universalis*, undoubtably a difficult and highly abstract task, is carried out once the necessary powers are secured by entrusting information to a notebook instead of ones memory: "But before I embark on this task I shall try to bring together and arrange in an orderly manner whatever I thought noteworthy in my previous studies, so that when old age dims my memory I can readily recall it hereafter, if I need to, by consulting this book, and so that, having disburdened my memory, I can henceforth devote my mind more freely to what remains" (Descartes 1985a, 20).

This kind of personalization of the cognitive exercise in relationship with notes is evident in Locke's case, as Richard Yeo has convincingly argued. Locke has introduced a special type of entry into his notebooks, namely queries. These are demarcated as such by Locke with the help of the letter Q that is situated in the margin of the page where these queries are introduced. The content of the queries in question is constituted by different kinds of responses to the material gathered from Locke's part. They can be comments of various sizes or questions that Locke might have with regard to certain excerpted material, but they also encapsulate reflections that use the material as pretext for Locke's own speculations and extrapolations (Yeo 2020, 193-199).

Another interesting aspect about these queries is the fact that they are signed by Locke with his initials so as to clearly distinguish them as his own contributions. This kind of exploration is to be found almost entirely in Locke's notebooks dedicated to matters of nature (*Adversaria Physica*). There is also indication that a number of queries were introduced at a later time, thus proving that Locke was in the habit of coming back to his notes in light of additional information that he might have acquired in the

meantime. According to Yeo the main function of the queries was that of aggregating hypotheses with respect to causal factors. These hypotheses were subsequently tested via empirical methods. This process of "thinking with notes" converts the nature of excerpts. Their new role is that of basic units of information thar serve different purposes like inspiring future research projects or regulating those are already being implemented (Yeo 2020, 193-199).

Conclusion

Recent scholarship has managed to paint a picture of the emergence of the early modern scientific enterprise that takes into consideration its relationship to other, older intellectual practices and contexts of investigation. This is not to say that modern empirical research is the exclusive product of such methods as those employed by legal scholars or for that matter of bookish procedures. But one can neither ignore the fact that such methods possess epistemological significance and engender epistemic effects that can be considered relevant for the consolidation of the ideal of empirical research. The extent of the impact that scholarly procedures exerted upon the development of early modern science is indeed a bone of contention. In the course of this paper, I have put forward a survey of the recent literature on this topic and I have shown that there are at least two aspects of the modern scientific outlook that can be regarded as benefiting from the influence of leaned practices of text management. Textual practices are able to aid the process of discovery in a certain way and to function as cognitive enhancers for the characters involved in the pursuit of natural knowledge.

However, it seems to me that a more interesting conclusion to be drawn here is that there is an epistemological potential that is inherent to textual practices and that it is possible to exploit this potential in a variety of manners across different intellectual contexts. Fleshing out the details of this potential is perhaps a further step in this research endeavor.

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