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Experimental essay by Robert Boyle as an emerging genre in Early Modern England

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The focus of the article is one of the most influential genres in the perspective of science communication in Early Modern England and evolution of science writing as a whole — the genre of an “experimental essay” (R. Boyle). Despite the fact that the essay as a genre is widely used in most diverse contexts, the research works on the experimental essay are still not so many. The article is aimed at giving an analysis of the emergence and development of the experimental essay in the historical pragmatics perspective. The essay is put against the context of its precursors (M. de Montaigne and F. Bacon), as well as the sociocultural background of Early Modern England. The personality of Robert Boyle is considered as the portrait of an epoch — the ideal of a “gentleman-scholar” and a “Christian virtuoso”. Boyle was against Scholasticism in support of the inductive method of experimental philosophy, which was later given as a methodological doctrine of the Royal Society. A talented scholar and educated person, Boyle realized the necessity of finding the best text genre as an effective way of persuading the readers and reaching his own goals. These rhetorical experiments were conducted by Boyle throughout his life: from the lengthy treatises to essays, essay-tracts, and essay-articles. Boyle’s searches are between literature and science; his literary technology is provided in the proemial essay, which gives a certain methodological program of the experimental essay: brevity, perspicuity, the “naked way of writing”. The analysis of Boyle’s essays helps see the practical realization of the principles of the experimental essay: dialogicity of writing, detailed account of the experiment, involved, narrative discourse.

Keywords: Boyle, experimental essay, experimental philosophy, proemial essay, gentleman-scholar.

Introduction

An essay is one of the most common academic genres nowadays; this genre is an essential component of the academic writing course design worldwide. In scientific settings, an essay is often used as the synonym of the science research article¹. Being a teacher of academic writing and working primarily with early-career researchers, I would like to explore the origins of the genre of an essay in the pragmatics perspective from the first

¹ Many English language teachers use the concepts “essay” and “research article” interchangeably, without taking into account the disciplinary context of writing.

attempts of Francis Bacon to the development of the genre of an experimental essay by Robert Boyle. This historical interdisciplinary perspective seems to be of interest to the modern science writers because an experimental essay, born and developed in the 17th century England, was used as a prototype of a research article.

The 17th century is the time of the Scientific Revolution, the emergence of modern science, and the rise of the English identity; the English language managed to replace Latin in the status of the language of science. The mid-17th century has seen the consolidation of the men of science, reaching its peak in the organization of the Royal Society in 1660 and its press organ, the first journal in the history of the English language called the “Philosophical Transactions of the Royal Society” (1665).

The focus of the article is the activity of Robert Boyle as the creator of the ‘experimental essay’. One of the leading intellectual figures of the 17th century, Boyle is an “experimentalist, a methodological empiricist, and an influence on John Locke and the empiricist tradition, like Descartes” [Jones 2020]. Russian scholar Igor Dmitriev compared Robert Boyle to Mikhail Lomonosov, claiming that “if M. Lomonosov was first and foremost a “cultural icon” for Russia, the leading merit of Boyle is in integrating the experimental approach into the cultural and religious framework of his epoch” [Dmitriev 2017: 24].

Despite a leading role of Robert Boyle for science and scientific writing, in Russia he is hardly known to the general reader. In Anglo-American tradition, some research has been done on the biography and the role of this natural philosopher from the perspective of history and philosophy of science [Hunter 1989; Harwood 1991; Maxwell 2012; Anstey 2000; Hunter 2009; Vanzo, Anstey 2019; Macintosh et al. 2022] and scientific method of inquiry [Gascoigne 2009; Agassi 2012]. Several works are devoted to the overall trend of putting Boyle’s legacy in the sociohistorical context of the epoch [Atkinson 1999; Montgomery 1996]. The genre of a scientific article is the focus of several works from the discursive [Peters 2009] and diachronic perspective [Gross et al. 2002; Banks 2008; Bazerman 1988]. The genre of an experimental essay is analyzed as a part of the “literary technology” by Steven Shapin [Shapin 1984], put against an essay by Michel de Montaigne by James Paradis (1987), given a structural and linguistic analysis in the special chapter by Maurizio Gotti and Scott Black [Gotti 2003; Black 2006].

The present paper is aimed at analyzing the experimental essay in the context of the emerging natural and experimental philosophy. Our research questions are the following:

- What are the general features of the experimental essay in the implementing of the inductive method in Early Modern England of the 17th century? What is its macrostructure and microstructure?
- How does the experimental essay stand out from the text genre of its precursors (e. g. Francis Bacon’s essays) and pave the way for the further attempts?

Materials and Methods

In our research, we use the interdisciplinary approach with the extra-linguistic and linguistic features blurred in our analysis. This approach can also be specified as a socio-logically-based approach as the language functions in the scientific domains. The leading methodology is pragmatics. The area of research is observational pragmatics as well as philosophical and cognitive pragmatics, with the main method being a discourse analytical one.

Discourse analytical method is applied in the historical pragmatics perspective. Historical pragmatics is getting to be a paradigm shift in the modern humanities: “What was marginal in the 1970s has come to be of central interest, above all pragmatics” [Traugott 2008: 207]. Historical pragmatics has been foregrounded, as “in the course of fifteen years, the position of historical pragmatics within pragmatics has changed from marginal to central” [Taavitsainen, Jucker 2010: 4].

Historical pragmatics is defined as “an empirical branch of linguistic study, with focus on authentic language use in the past” [Taavitsainen, Fitzmaurice 2007: 13]. Among the three areas of historical pragmatics are “the language use in earlier periods, the development of language use, and the principles of such development” (p. 6). While we analyze the birth of the genre of an experimental essay, the language use is traced in the sociocultural context of the early modern England that allows us to claim the “discourse-oriented historical linguistics” [Brinton 2001: 140] to be our area of research.

The materials are the texts of Robert Boyle articles published in the “Philosophical Transactions of the Royal Society”; however, as Boyle served as a philosopher, a critic, and a writer, we have found it essential to address his other works as well.

Robert Boyle against the Social, Educational, and Cultural Background of Early Modern England

In order to better understand the personality of Boyle, we need to characterize the historical period of England in terms of its social values, intellectual views, and cultural context.

Elizabethan England (1558–1603) brought to life a growing number of universities and subsequently growing prestige of education and knowledge. “A university education became the norm for the great crown servants of the Elizabethan era — the Cecils, the Bacons, and their like” [Shapin 1991: 284]. At the same time not all matriculants were from gentry and aristocracy. University students were of various social status — the gentry’s sons for whom education was a platform on the way to succession and crown service, the poor with their ambitious plans to find clerics jobs, and “scholars” and “fellows” who were traditionally of plebeian origin. The term “scholar” had a broad meaning at that time; any child or a young person undergoing a private or public education could be called a scholar. There is one thing worth mentioning. The image of a scholar was associated with a “pedant”. The very name signified its negative attitude towards Scholasticism as well as an identity of a scholar. “Literally trivial pursuits — grammar, rhetoric and logic, and, by imputation, the whole form and substance of Scholasticism — were increasingly condemned as nothing but pedantry” [Shapin 1991: 292], and at Oxford gentlemen had lessons in riding, dancing, and vaulting. What is more, a pedant was known for his solitary pursuits, bad temper, and love to lecturing.

It was true that another, positive image of a person with education and love to natural philosophy was needed. This person should be a gentleman, a scholar, and a man with virtues, which made an image of a gentleman-scholar, or a “Christian virtuoso”². A perfect example of such a person was Robert Boyle.

² *The Christian Virtuoso, showing, that by being addicted to experimental philosophy, a man is rather assisted, than indisposed, to be a good Christian* (1690) is one of the last books Boyle wrote that summarized his religious views.

Robert Boyle (1627–1691) was one of the most rich people of the Anglo-Irish descent. He got his formal education at Eton College. Despite the fact that he spent only three years there, he managed to get fundamental knowledge in law, medicine, philosophy, mathematics, theology. After his journey in Europe, Boyle returned to Stalbridge where he showed his great interest in the experiment and experimental philosophy. Later he moved in Oxford, and his most prolific period began. In London he didn't only continue doing his research but also found his supporters. These people later formed the so-called Invisible College, a formal precursor of the Royal Society. Among the members of the Invisible College were John Wilkins, Christopher Wren, and John Locke.

One of the most famous compatriots Daniel Defoe described Boyle in the following way: “the great and truly honorable Mr. Boyl, who was not a gentleman onely, not a man of birth and blood as to antiquity onely, but in degree also, being of noble blood and one of the families that has the most enobled branches of any in England and Ireland” [Defoe 1890: 69]. The “nobility” of Boyle is noticed and emphasized by contemporary critics and biographers as well, from “the aspiring adept” [Principe 1998] to “the diffident naturalist” [Sargeant 1995].

Speaking about the “transhumanist nature of scientific ambition”, John Hughes mentioned the twenty-four or so technologies Boyle hoped science might develop. They include curing diseases, organ transplantation, “the prolongation of life” and “the recovery of youth”: “He looked forward to men flying and working under water. He wanted the invention of means of superstrength and of impregnable armor. He imagined all kinds of useful drugs, including amphetamins, soporifics, euphoric, analgesics, and hallucinogens. He looked forward to the invention of fertilizers, electric light, global positioning systems (GPS), ocean liners, telemedicine, and genetic modification of plants and animals [Hughes 2012: 583].

All these characteristics were true, and Boyle came to be known as the symbol of the Royal Society, the embodiment of all the ideal features that the society members proclaim — a “gentleman-scholar” and a “Christian virtuoso”.

Boyle’s “Experimental Philosophy” as the Methodological Doctrine of the Royal Society: Discovery and Debate

Boyle was the first to use the term “experimental philosophy” in the title of the book; “Of the Usefulness of Experimental Philosophy”, published in 1663, opened up a whole discussion on the effective method and at the same time responded to the request of the Royal Society discourse community members.

The roots of this discussion on the method were in the Ancient Greek tradition. Since the Ancient Greek period until the 17th century, there was no strict division into theology, metaphysics, and science. The Aristotelian metaphysics was considered to be “the investigation into the nature of being” that largely used the principle of empiricism. According to Aristotle and his proponents, any human being could understand the world around him through contemplation and observation.

Francis Bacon (1561–1636) criticized such a false inductivism and proposed a real inductive method that is experimental in its essence. This method of inductive reasoning was described in the treatise “The Novum Organum” (1620) where Bacon stated that the man is the “minister and interpreter of nature”:

The men of experiment are like the ant, they only collect and use; the reasoners resemble spiders, who make cobwebs out of their own substance. But the bee takes a middle course: it gathers its material from the flowers of the garden and of the field, but transforms and digests it by a power of its own. Not unlike this is the true business of philosophy; for it neither relies solely and chiefly on the powers of the mind, nor does it take the matter which it gathers from natural history and mechanical experiments and lay it up in the memory whole, as it finds it, but lays it up in the understanding altered and digested. Therefore from a closer and purer league between these faculties, the experimental and the rational (such as has never yet been made), much may be hoped [Bacon 1960: 93].

In the time of Bacon, “natural philosophy” was the experimental science that dealt with physics, mathematics, mechanics, and alchemy. In the time of Boyle and Newton, natural philosophy and “experimental philosophy” (Boyle) brought together physics, chemistry, and other branches of natural science with diverse branches of philosophy — metaphysics, epistemology, methodology, philosophy of science. While actively opposing Scholasticism, natural philosophers disagreed about crucial questions of method. Could only senses and experience decide what theories are accepted or rejected (inductivism) or does reason play a role as well (rationalism)?

The emerging discourse community called the “Royal Society of London for the Improvement of Natural Knowledge” (1660) emphasized the need for the experimental method of natural philosophy. Its motto “Nullius in verba” (Take nobody’s word for it) both defined and determined the method and strategy of its members.

Symbolically, one of the major concepts of scientific communication was a noun “fact”. It is curious that the word was first documented in the Age of Empiricism, in the 1530s as “action or thing performed, anything done, a deed”³. The modern, empirical sense of the word was known from the 1630s and stems from the principles of the Baconian philosophy: “thing known to be true”. That is how our modern understanding of the empirical fact emerged — “a truth known by observation or authentic testimony”. Approximately at the same time the words “evidence” and “theory” entered into scientific usage.

As many Royal Society fellows, Boyle served as a critic and a writer of philosophical works. Boyle described the very process of research. At first, a scholar should identify “a general survey of the subject”, which is referred to as “primary titles”. The heads “respect the Heavens, or concern the Air, the Water, or the Earth” (Boyle, p. 186). Then, by going deep into the particulars, an inquirer proceeds to form a set of second titles. In such a way a natural history is born. According to Michael Hunter, his use of “heads” and “inquiries” was a special means of organizing his data, “setting himself an agenda when studying a subject and soliciting information from others” [Hunter 2007: 1]. Such an agenda could meet the concern of Early Modern Royal Society for systematic data collecting.

The experiments should be conducted in front of the Royal Society fellows. Such a technology of “human witnessing” accounted for a collaborative nature of science. Despite the fact that science is a collective endeavor, producing the detailed account of an experiment should be under individual authorship. This helps authors be responsible for the experimental design and inadvertent errors that may occur during the experiment, as well as readers who would be able to replicate an experiment.

³ See: *Online Etymology Dictionary*. <https://www.etymonline.com/search?q=Fact>.

The errors could be “biased underreporting of the research” [Bishop, Gill 2020: 80] when the scholar hides negative facts that don’t support the hypothesis of the author. Boyle encouraged the author not to do that and the audience to be active readers while replicating the experiment.

Though Boyle was against the absolute reliance on the published data, his attitude to citations is more than contradictory. On the one hand, review of other works should not be an essential part of the author’s writing; however, authors are expected to acknowledge the source.

Prioritizing an experiment as a “matter of fact” over theory, Boyle was looking for an appropriate form of knowledge production and exchange. By doing that, Boyle was against the Systems:

[That] I wish for, as to systems, is this, that men, in the first place, would forbear to establish any theory, till they have consulted with... a considerable number of experiments, in proportion to the comprehensiveness of the theory to be erected on them [Boyle 1661: 6].

Boyle’s Essay as a “Contribution into Early Modern Science and a Chapter in the Story of the Essay’s Evolution”⁴

This section focuses on the “experimental essay”, a genre that was adopted and adapted by Boyle to use for the effective communication of experimental data in the short form, which was a good alternative for lengthy documents, such as tracts and treatises. However, this genre didn’t appear from scratch; it had quite a substantial, if not rich, tradition of writing essays.

Genres System and the Rhetorical Tradition of the 17th Century England

The 17th century saw the process of vernacularization of science when philosophers started writing and later publishing their research in English. In the late medieval period, the leading genres were treatises, tracts, and dialogues, which were written in Latin. The vernacularization boom gave birth to new genres. During the transition period, natural philosophers continued writing in Latin and English. Francis Bacon wrote treatises and tracts in Latin along with a historical biography and a utopian novel in English. Bacon was also the first to bring an essay form in English. It is the essay that later became his favorite genre.

Bacon didn’t think much of his essays, considering them “but as recreation of my other studies”; however, by 1625 Bacon had published 58 essays, and in the history of English writing Bacon came to be known as the father of the genre of an essay as well. He called a collection of works “*Essaies or Counsels, Civil and Moral*” (1597) “observations and contemplations on different themes”. These observations were on different facets of the human and public life: “Of religion”, “Of death”, “Of ambition”, “Of riches”, “Of beauty”, “Of war and peace”, “Of honor and reputation”.

Bacon was not the only person who wrote essays. The autobiographical tradition, introduced by M. de Montaigne, developed in early modern England in the aphoristic

⁴ Cited from: [Black 2006: 67].

tic writings by Ben Jonson (see “Timber of Discoveries”, 1641); character sketches by Sir Thomas Overbury and Nicholas Breton; and meditative prose by Robert Breton, Sir Thomas Browne, and John Donne, whose “Meditations” can well be seen as having an essayist spirit.

Another branch of essay evolution was argumentative philosophical treatises by Thomas Hobbes and John Locke, whose “An Essay Concerning Human Understanding” (1681) appeared to be the most influential one.

The 17th century was also the time of what can be called “utilitarian” prose writing: travels, biographies, diaries, journals, pamphlets, letters. The “Philosophical Transactions of the Royal Society” emphasized the “close affinities between the essay and the letter, both characterized by informality, spontaneity, and a measure of egotism on the part of the author” [Hesse 1997: 103]. The journal became a wonderful possibility for the search of the optimal form of an essay in its realization of the “genre shifts in relation to neighboring genres — the treatise, the article, the letter, the character sketch, the short story” [Hesse 1997: 103]. No matter what the searches were, the essence of the essay, formulated by the essayist Sir William Cornwallis the Younger as early as 1600, remains: an essay is a tentative practice work, “like a Scrivenor trying his pen”, the result being prose that at best is “undigested motions” [Hesse 1997: 104].

“Experimental Essay” (Robert Boyle) in the Context of Essay Tradition

Boyle got interested in the genre of an essay in his early years, and this interest was sustained throughout all his life and career. As Boyle’s career started with ethical writings, he exploited the format of an essay eagerly in his early works, known as moral essays: “Of Time and Idleness”, “Of Good Language”, “Of Natural Philosophy and Filsofers”, “Of Cold, Of Atoms”, to name just a few. Judging by the titles, there are connections between the ethical and scientific writings, and “both interests coexisted throughout his life and encouraged him to move from private analysis and reflection to written communication” [Harwood 1991: XXI]. The focus of his ethical and philosophical works was in the constant search for the better form and genre that could reach the author’s goal to persuade the audience. “Rhetorical experimentation encouraged Boyle to investigate the dynamics of persuasion, that is, the connection between textual features and readers’ responses” [Harwood 1991: XLVII]. The rhetorical diversity is present in the range of different text genres: letters, dialogues, reports, descriptions, sermons, meditations, and oratory.

The dichotomy between “rhetorical” and “philosophical” writing would be present in his later works, which are to be known as an “experimental essay”. Being a fellow of the Royal Society, Boyle was looking for a short form of reporting the results of an experiment. “In adapting the essay to the goals of the experimentalist, Boyle shifted its focus from the internal, psychological world of Montaigne’s uniquely personal speculations to the external, physical world of the replicable material process” [Paradis 1987: 60].

For Boyle, more than for Montaigne and Bacon, an essay referred both to literature and to the experimental action. The 17th century is the time when “we are in a kind of no-man’s land between ‘literature’ and ‘science’” [Montgomery 1996: 98]. An essay became a “literary technology” as an “essential knowledge-producing technology, by means of which the phenomena... were made known to those who were not direct witnesses” [Shapin, Schaffer 1985: 25].

This literary technology was described in an “important methodological statement” (S. Black), given in A “Proemial Essay”, an introduction to “Certain Physiological Essays” (1661), where Boyle explained and justified ethical and philosophical reasons of borrowing the essay form.⁵ He compared essays to books that represented “systems”. Boyle criticized the systems:

...when men by having diligently studied either chemistry, anatomy, botanics or some other particular part of physiology, or perhaps by having only read authors on those subjects, have thought themselves thereby qualified to publish complete systems of natural philosophy, they have found themselves by the nature of their undertaking, and the laws of method, engaged to write of several other things than those wherein they had made themselves proficient, and thereby have been reduced, either idly to repeat what has been already written by others on the same subjects, or else to say anything on them rather than nothing, lest they should appear not to have said something to every part of the theme which they had taken upon themselves to write of [Boyle 1661: 3].

According to Boyle, such a systematical writing is nothing but a “rhapsody of trite and vulgar notions, scarce worth the perusing” [Boyle 1661: 3]. Meanwhile, this “vanity of thinking men obliged to write either systems or nothing” could suppress “sober and modest men” who conduct experiments and report findings.

The authors of such systems claimed theories that “are grounded but upon few and obvious experiments” and therefore had a great chance of being false. The authors had better “set themselves diligently and industriously to make experiments and collect observations.”

The “great convenience of essays” was in providing new information, “without tedious repetition of what others have said already.” The hypothesis can be supported or refuted in the course of the experiment, and the author should provide the minute details of this experiment, so that the readers would have an opportunity to draw their own observations and conclusions with the author. Such a collective way of writing goes well with the technology of “human witnessing” when the experiments were performed in front of the audience, mainly members of the Royal Society. Thus, brevity and objectivity were considered to be essential features of an essay.

According to Boyle, an author is just a humble servant of Nature; therefore, he “dare[s] speak confidently and positively of very few things, except of matters of fact” [Boyle 1661: 12]. Such a lack of assertiveness is in line not only with the definition of an essay as a tentative action but the tradition of sprezzatura — a term that originates from Baldassare Castiglione’s “The Book of the Courtier” (1528) and was defined as “a certain nonchalance, so as to conceal all art and make whatever one does or says appear to be without effort and almost without any thought about it” [Castiglione 2002: 32]. Humility, as a species of sprezzatura, was “not only a strategy for creating social distance, but a means by which gentlemen could distance themselves epistemically from those kinds of absolute judgements which were characterized as being vain, scholastic, or heretical” [Wintraub

⁵ The format of a proemial essay Boyle exploited as a preface to his other major works. The proemial essay was a good space to explain his philosophical stance and rhetorical choices. Boyle exploited the format of the ‘proemial essay’ in his treatises and tracts in the 1660s, the most typical of which are “New Experiments”, “Physico-Mechanical”, “Touching the Spring of Air” (1661), “Experiments and Considerations Touching Colours” (1664), “Certain Hydrostatical Paradoxes” (1666).

1997: 193]. However, sprezzatura and humility that was getting to be the style of a natural philosopher's writing paralleled the tradition of courtesy and eloquence, which was also a landmark of social and political status. Warning against "floridness" in style, Boyle claimed that the style of a natural philosopher should not "disgust his reader with flatness":

...for though a philosopher need not be solicitous that his style should delight its reader with his floridness, yet I think he may very well be allowed to take a care that is disgust not his reader by its flatness, especially when he does not so much deliver experiments or explicate them, as make reflections or discourses on them; for on such occasions he may be allowed the liberty of recreating his reader and himself, and manifesting that he declined the ornaments of language, not out of necessity, but discretion, which forbids them to be used where they may darken as well as adorn the subject they are applied to. Thus (to resume our former comparison) though it were foolish to color or enamel upon the glasses of telescopes, yet to gild or otherwise embellish the tubes of them, may render them more acceptable to the users, without at all lessening the clearness of the object to be looked at through them [Boyle 1661: 8–9].

One of the features of courtesy, which can be referred to a complex web of literary and discursive practices, is quite typical of scientific writing nowadays — *hedging*. That is why the author should provide no citations of other writers as all of them are not judges but witnesses.

Boyle expressed his understanding of the style of an experimental essay. The task of an author is "to inform readers, not to delight or persuade them"; thus, perspicuity ought to be esteemed at least one of the best qualifications of an essay. Such a perspicuity is seen as a "naked way of writing" where displays of humility and exhibition of theoretical innocence all complemented each other in the establishment and the protection of matters of fact" [Shapin 1984: 497].

Perspicuity means the lack of rhetorical ornaments when writing is "rather in a philosophical than a rhetorical strain" and the style "should be rather clear and significant, than curiously adorned" [Boyle 1661: 8].

A proemial essay paved the way to experimental essay as a journal article.

Essay as a tract and as a journal article: Robert Boyle as an author of the Philosophical Transactions of the Royal Society (1665–1691)

The form of an experimental essay was exploited successfully in the larger texts, and in this connection, the interrelation of an experimental essay and a tract is obvious. On the other end of the spectrum is a short model of an essay, where Boyle's function is an author and an active contributor to the "Philosophical Transactions of the Royal Society". In this section, we will give an overview of the macrostructure of both formats of an essay.

Being one of the oldest persuasive genres, tracts were widely used for religious and political purposes. In his writing practice, Boyle combined these two words — tracts and essays — already in the title. In "Two Essays Concerning the Unsuccessfulness of Experiments", the author encourages a natural philosopher not to hide the negative results of the experiment in the form of a dialogue. The addressee of the dialogue is Pyrophilus, and Boyle uses expressive language to make the tone more friendly and even intimate in order

not to intimidate or discourage the author in the “serious and effectual prosecution of Experimental Philosophy”:

I am so very sorry, Pyrophilus, that to many (elsewhere enumerated) difficulties which you may meet with, and must therefore surmount, in the serious and effectual prosecution of Experimental Philosophy, I must add one discouragement more, which will perhaps as much surprise you as dishearten you, and it is, that besides that you will find (as we elsewhere mention) many of the Experiments published by Authors, or related to you by the persons you converse with, false or unsuccessful, (besides this, I say) you will meet with several Observations and Experiments, which though communicated for true by Candid Authors or undistrusted Eye-witnesses, or perhaps recommended to you by your own experience, may upon further try as disappoint your expectations, either not at all succeeding constantly, or at least varying much from what you expected [Boyle 1669: 43].

The necessity to report all the findings in the experiment, even if they are “no way sophisticated”, are essential for the truth:

In the next place, Pyrophilus, I observe, that even when the Materials employ'd about Experiments are no way sophisticated, but genuine, and such as Nature has produced them, or Art ought to prepare them, even then, I say, there may be a very considerable Disparity betwixt Concretions of the same kind and name, and which pass without suspicion for bodies of perfectly the same nature [Boyle 1669: 49].

Since 1665, Boyle had been an active contributor to the PTRS. Boyle's legacy contains 36 journal articles, the majority of them are letters. The epistolary tradition that dominated in the 17th century articles was closely connected with an essay. Boyle's articles are diverse in subject matter and length, but they were written in the inductive style. Papers in the inductive style open — after a brief, not obligatory introduction — with a description of instruments if any are used in the reported observations, and then reports, experiments, and their result, so that amateur readers can repeat them; one may add to this a brief coda with some speculation” [Anstey 2000: 180].

The style of letters is personalized: the author narrates all the details and describes emotions that accompany an experiment:

Sir,

In compliance with your Curiosity, I herewith send you my rude Notes about the Superficial Figures of contiguous Liquors, which, belonging to a Paper (concerning the *Pores* and *Figures of Bodies*), whereof they made the last part, and being themselves very indigested; I should by no means venture to expose them even to ales Critical eye than yours, if I didn't hope, that, though a more discerning Reader will sooner discover their Imperfections, yet he may be more inclined than an ordinary one would be to think them not useless trifles... [Boyle 1676: 775].

The article usually lacks introduction in our modern sense of the word but states the purpose of the research:

Nature having, as Zoologists teach us, furnished Ducks and other Water-fowl with a peculiar structure of some vessels about the heart, to enable them, when they have occasion to Dive,

to forbear for a pretty while respiring under water without prejudice; I thought it worth the trial, whether such Birds would much better than other Animals endure the absence of the Air in our exhausted Receiver. The Accounts of which tryals were, when they were made, registered as follows [Boyle 1670: 2011–2012].

Having its main purpose to communicate the matters of fact to the discourse members, Boyle started from the thesis statement:

Reflecting on that Question, whether Liquids gravitate upon Bodies immersed or not? I came to a Resolution, in my own thought, that they do gravitate; and one of the greatest instances that did occur to me was, that a bubble of Air, rising from the bottom, does dilate itself all the way to the top; which is caused by the lessening of the weight or pressure of the incumbent water, the nearer it is to the top [Boyle 1675: 316].

Along with a missing introduction, experimental essay lacks conclusion as a separate part of its macrostructure. Instead, Boyle used additional factual information about an experiment:

The Experiment mentioned in this Paper was tryd at a meeting of the Royal Society, February 17, 1691, by Dr. Slone, with a Success answerable to the Assertions of the Honourable Author, and that a drop or two of Spirit of Salt mixed with common Water would be by the same Method discovered [Boyle 1693: 639].

On the whole, the essay lacks a well-established format and is largely descriptive and narrative in nature.

Conclusion: Omnia mutantur, nihil inherit

The emerging genre of an experimental essay suggested by Robert Boyle was built into the context of philosophy and history of science in Early Modern England. In the philosophy of science, one of the key issues was searching for a suitable method in the time of declining Scholasticism and following the Baconian legacy of natural or “experimental philosophy” (R. Boyle).

The inductive method of natural philosophy is the core one in the essay of experience by Robert Boyle. The essay fits well into the emerging communicative practice of the Royal Society meetings with the technology of public demonstration and discussion of every experiment.

The article dwells upon the personality of Robert Boyle as a perfect member of the Royal Society and an influential scholar and experimentalist in rhetoric of Early Modern England. According to J. Harwood, “with the possible exception of Descartes, no 17th century scientist was more self-conscious about the audience and style in discourse. No member of the early Royal Society pursued a wider range of rhetorical forms” [Harwood 1991: XXII]. This wide range of rhetorical forms includes an experimental essay and its types: from early moral essays to essay-tracts and essay-articles.

The experimental essay turned out to be a good match for the epistolary tradition, which was in bloom with the foundation of the “Philosophical Transactions of the Royal

Society” journal (1665). The first articles were written in letters that in their essence were experimental essays.

One more type of an essay — a proemial essay — reflects upon the creative laboratory of R. Boyle. The “naked way of writing” an essay that is characterized by its brevity, perspicuity, the lack of decorative elements in style paved its way in different journal articles of the 17th century and later, penned not only by Robert Boyle but by other authors as well.

The main purpose of such writing was to inform; therefore, all the minor details of the experiment were provided so that the amateur reader could replicate it. At the same time there was no any introduction; there was either genteel discourse of the letter that provided dialogic writing or narrative elements that introduced not only the subject matter but the author himself. The experimental essay was not the major format of writing. According to Ch. Bazerman, “the percentage of experimental accounts ranged from 5 to 20 per cent of each volume through volume 80 [Bazerman 1988: 65].

“A rhetoric of immediate experience” (John Harwood) changed into a rhetoric of argumentative inquiry by Isaac Newton. The experimental essay provided a platform for the modern research article. “Emerging from letters and essays and competing with books, this new medium developed a style and format that, eventually, would make it the preferred mode of presentation and debate for new claims of scientific knowledge” [Gross et al.: VII].

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Экспериментальное эссе Роберта Бойля как развивающийся жанр в Англии раннего Нового времени

Для цитирования: Alenkina T. B. Experimental essay by Robert Boyle as an emerging genre in Early Modern England. *Вестник Санкт-Петербургского университета. Язык и литература*. 2024, 21 (3): 623–637. <https://doi.org/10.21638/spbu09.2024.306>

В центре статьи — важный в контексте научной коммуникации XVII в. и для развития научного письма в целом жанр «экспериментального эссе». Несмотря на то что жанр эссе активно используется в самых разнообразных современных контекстах литературного, философского, педагогического, научного дискурсов, исследования об экспериментальном эссе едва ли можно назвать обширными. Цель статьи — дать анализ возникновения и функционирования экспериментального эссе в перспективе исторической прагматики. Для этого экспериментальное эссе Р.Бойля встраивается в контекст его предшественников (М. де Монтеня и Ф. Бэкона), а также социокультурный контекст натурфилософии Англии XVII в. Личность Бойля рассматривается как портрет эпохи — идеал джентльмена-ученого и христианина. Преданный науке и религии, Бойль выступал против схоластики в поддержку индуктивного метода экспериментальной философии, представляющей собой методологическую доктрину Королевского общества. Талантливый ученый и образованный человек, Бойль осознавал необходимость поисков оптимального жанра для эффективного убеждения читателя и реализации своих целей. Эти риторические эксперименты Бойль ведет на протяжении всей жизни — от увесистых трактатов до эссе как решения своих задач: первых морально-этических эссе, эссе-трактата, эссе-статьи. Поиски формы лежат в плоскости риторических и философских тем и мотивов: именно в этих границах Бойль использует диалог как вид философской литературы, с преобладанием исследовательской и дидактической функций, а также эпистолярную форму, в которую Бойль облакает задачу исследователя. Поиски Бойля находятся между литературой и наукой; свою «литературную технологию» он объясняет в эссе-предисловии, в котором приводит свою

программу жанра экспериментального эссе: краткость, ясность, «голый стиль письма». Анализ текстов Бойля позволяет прийти к выводу о диалогичности письма, тщательному описанию деталей эксперимента, вовлеченному, нарративному дискурсу.

Ключевые слова: Бойль, экспериментальное эссе, экспериментальная философия, эссе-предисловие, джентльмен-ученый.

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