

CROSSING THE BOUNDARIES: APHRA BEHN AND JOHN WILKINS POPULARIZING THE “NEW SCIENCE”*

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ABSTRACT

In seventeenth-century England various people tried to eliminate the boundaries between elitist science and popular opinions. Among them were John Wilkins, one of the founders of the Royal Society, and Aphra Behn, the first professional woman writer in this country. This article focuses on three main points: the conception of horizontal and vertical cultural transfers (Wilkins and Behn as promoters of the “new science,” language as an instrument of cultural transfer); Wilkins’s and Behn’s activities in separating science and religion; the growing interest to sciences among English people of both sexes in the 1690s and in the beginning of the eighteenth century.

KEY WORDS: New science, religion, literature.

RESUMEN

En la Inglaterra del siglo XVII, varios escritores intentaron borrar los límites entre la ciencia elitista y la opinión popular. Entre ellos estaban John Wilkins, uno de los fundadores de la Royal Society, y Aphra Behn, la primera escritora profesional en aquel país. Este artículo se centra en tres cuestiones principales: el concepto de transferencias culturales horizontales y verticales (Wilkins y Behn como promotores de la “nueva ciencia”, y el lenguaje como instrumento de transferencia cultural); las actividades de Wilkins y Behn para separar ciencia y religión; y el creciente interés por las ciencias entre la población inglesa de ambos sexos en la década de 1690 y a principios del siglo XVIII.

PALABRAS CLAVE: nueva ciencia, religión, literatura.

Science became fashionable in seventeenth-century England. Even king Charles II himself was interested in the new discoveries in science and patronized the Royal Society established in 1662. Restoration period and the end of the 17th century in England are rich of brilliant scientists, who raised the European science to a higher level: Robert Boyle, Isaac Barrow, John Wallis, Robert Hooke, and, finally, Sir Isaac Newton. But this is only the surface. There were many other people who took their part in promoting sciences: minor scientists (such as William



Gascoigne, the person who invented micrometer and a telescope with two convex lenses) and amateurs (among them the Duke of Buckingham). The latter ones were often called “virtuosi.” Before the Restoration this term described a collector or connoisseur of objects d’art, a student but not a scholar. Such a person combined features of a scholar and courtier. An excellent example of an English virtuoso both before and after Restoration is John Evelyn, a famous diarist who travelled a lot, visited museums and private collections and made interesting reports. He was close to the founders of the Royal Society, and so was Samuel Pepys, who even became its President in 1684. After Restoration the term “virtuoso” took a new meaning, that is, a collector in science. Even scientists sometimes called themselves “virtuosi.”¹ There were also various people who tried to bring new scientific discoveries to a wider public. They tried to eliminate the boundaries between elitist science and popular opinions. At the origin of this process stood the “father” of the “new science” in England, the famous Francis Bacon. He did not think the new scientific discoveries should be confined to a small elite group of scientists, but might be shared by all mankind.² Among his numerous works was also the famous little novel *The New Atlantis*, which was a kind of a propaganda of the “new science” and had so many original scientific ideas, that they could be the source for several works of science fiction.

The major figure in this process in the middle of the century was John Wilkins, Bishop of Chester and Warden of Wadham College, a gifted educational administrator, as well as an interesting thinker, generating many original scientific ideas, such as an idea of a telegraph. As early as in the 1630s he published a work discussing the latest discoveries in astronomy. The first edition was called *The Discovery of a World in the Moone* (1638), and Wilkins discussed there the possibility of a journey to the Moon, as well as the possibility that it was inhabited. He based his work on a little-known, but very curious book by Johann Kepler *Somnium*.³ There was no English translation of it in Wilkins’s time (and there probably hasn’t been any till nowadays).⁴ The most interesting episode in this book is a voyage to the Moon, being the first modern scientific moon-voyage. As Marjorie Nicolson points out, “when Kepler’s travellers reach the Moon, fantasy drops away, and we find ourselves in the new world in the Moon [...], not with a writer of romance [...], nor

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¹ Marjorie HOPE NICOLSON, “Virtuoso,” *The Dictionary of the History of Ideas*. The Electronic Text Center at the University of Virginia Library, 8 August 2004. <<http://etext.lib.virginia.edu>>.

² Marjorie HOPE NICOLSON, *Science and Imagination* (Hamden CT: Archon, 1976) 190.

³ *Job. Kepleri Mathematici Olim Imperatori Somnium sive Opus posthumum de Astronomia Lunari*. Divulgatum a M. Ludovico Kepplero Filio, Medicinae Candidato, Francofurti, 1634.

⁴ See NICOLSON, *Science and Imagination*, 58 n.1.

yet with a poet; our guide is a true scientist” (Nicolson, *Science* 75). Kepler’s work is almost unique among modern cosmic voyages, as there is no utopia in it, but a detailed description of the topography of the Moon, and he presents to the reader a really strange world. Wilkins’s *Discovery* was published four years after the *Somnium*. It is through this book English readers became acquainted with Kepler’s imaginary voyage to the Moon, and Kepler’s book influenced nearly all the English writers on cosmic voyages (Nicolson, *Science* 77). In 1640 Wilkins’s book was enlarged by the second part called *A Discourse Concerning a New Planet Tending to Prove That ‘Tis Probably Our Earth Is One of the Planets*, where Wilkins defended the Copernican system.⁵ Among his successors was Aphra Behn, the first professional woman writer in England. At first sight, she was not much interested in physics or mathematics, but in love intrigue and the psychology of her characters. Though Aphra Behn was not only a poetess, a playwright and a prose writer, but also a translator, and in her translations she expressed her interest in the new trends in science. The most intriguing work here is her own preface to the *Discovery of New Worlds* (1688) —the English version of *Entretiens sur la Pluralité des Mondes* by Bernard B. de Fontenelle. She called it *An Essay on Translated Prose* (1688), and it is a rare example of a theoretical writing by Behn.⁶ In the present article I shall discuss issues such as cultural transfer in seventeenth-century England and the roles played in it by Wilkins and Behn, the problem of separating scientific and theological knowledge, and the problem of interrelations between the popular works on science and popular literature.

It is reasonable to distinguish between horizontal and vertical cultural transfer.⁷ Horizontal cultural transfer or exchange stands for processes of spatial diffusion and transfers which occur among people of the same social group. An excellent example of it is the process of francophilizing English culture in the Restoration period (1660-1689). Aphra Behn as a translator was a part of this process. Vertical cultural transfer transgresses social borders. Popularizing science (in Wilkins’s and Behn’s cases, astronomy) is a part of the vertical cultural transfer, and both Wilkins and Behn were agents of this transfer. They wanted to present the complicated scientific matters to a wider group of literate English people, not scholars. Therefore, they chose English language (not Latin) as the language of the publication.

The main instrument in any cultural transfer is language. In seventeenth-century Europe the problem of language became acute. On the one hand, the division between two languages —the language of poetry and the language of science— took place. While Kepler still spoke one united language, Harvey already

⁵ I have examined four editions of Wilkins’s book —1638, 1649 and two editions of 1684. I used the last one for the purpose of referencing, as it is likely that Behn was acquainted with it.

⁶ Behn does not mention Wilkins anywhere in her *Essay*, but the echo of her acquaintance with his book is already in the title of her translation —*A Discovery of the New Worlds*— compare to the title of the first part of Wilkins’s book —*A Discovery of a New World*.

⁷ The following terms and their explanation were proposed by Prof. Bernd Roeck from the University of Zurich.





spoke like a true scientist.⁸ On the other hand, even a more important process took place. It was the decay of Latin as the international language of scientific discourse. Latin, the language of the famous “Republic of Letters,” in the seventeenth century served the purposes of the horizontal cultural transfer, i.e., it was in Latin that the information about the new scientific discoveries was spread from one scientist to the other or from one group of learned people to the other. To promote vertical cultural transfer it was necessary to make translations from Latin into vernaculars.

There are several possible answers to the question why Latin started losing its dominant position. The rise of Protestantism did much to promote the use of the vernacular languages, because Latin was often associated with the Catholic church. The market of books expanded, as there appeared new readers, not familiar with Latin. Some writers considered educational purpose as their motive to publish in vernaculars.⁹ Among the latter ones was John Wilkins, who tried to make scientific discoveries accessible to ordinary literate people. In one of his works he openly claimed, that he wrote his books in English “for the capacity of every unlettered ingenious artificer” (Qtd. Maat 8). But he also worried about the whole process of spreading scientific knowledge. In his “Dedicatory” to *An Essay Towards a Real Character, and a Philosophical Language* he makes an interesting statement, which concerned both horizontal and vertical cultural transfers:

I am very sensible that the most usefull inventions do at their first appearance, make but a very slow progress in the World, unless helped forward by some particular advantage. Logarithms were an Invention of excellent Art and usefulness, And yet it was a considerable time, before the Learned Men in other parts, did so farr take notice of into use. The Art of Shorthand, is in its kind an Ingenious device, and of considerable usefulness, applicable to any Language, much wondered at by Travailers [var. travellers] that have seen the experience of it in England; And yet though it be above Threescore years, since it was first Invented, 'tis not to this day (for ought I can learn) brought into common practice in any other Nation.¹⁰

Here Wilkins points out a very important aspect of transferring inventions and discoveries: time aspect. This process (even if taking into consideration only horizontal cultural transfer) was (and still is, sometimes) very slow. How to make it faster? Wilkins goes on:

⁸ See Marjorie HOPE NICOLSON, *The Breaking of the Circle* (New York: Columbia UP, 1960) 123-124.

⁹ See Jaap MAAT, *Philosophical Languages in the Seventeenth Century: Dalgarno, Wilkins, Leibniz* (Amsterdam: ILLC, 1999) 8-9.

¹⁰ John WILKINS, “Dedicatory.” *An Essay Towards a Real Character, and a Philosophical Language* (London: Printed for Gellibrand, and for John Martin Printer to the Royal Society, 1668), n. pag.

The only expedient I can think of against it is That it be sent abroad into the World, with the reputation of having bin considered and approved of, by such a Society [Royal Society] as this; which may provoke, *at least*, the Learned part of the World, to take notice of it and to give it such encouragement as it shall appear to deserve. (“Dedicatory” n. pag. My emphasis)

Wilkins wants his book to be known by a wide range of people in different countries, but he suspects it will get only to those of elitist groups. Though he hopes his “design [...] should happen to come into common use” and “tend to the Universal good of Mankind” (“Dedicatory” n. pag.). Therefore, Wilkins strives to make his work instrumental not only in horizontal, but also in vertical cultural transfer.

What was the “design” which Wilkins thought so important for all mankind? It was an ambitious work to invent a so-called “Universal language” (or philosophical language) —a task not unknown for seventeenth-century scientists and scholars. Wilkins was not the first person in his century to work on the universal means of communication. Both Descartes and Bacon expressed their interest in the universal language. Though, while Bacon only discussed “real characters” and did not suggest this kind of writing as a new universal medium of communication, Descartes was against it (Maat 15, 22). The latter did not exclude the possibility of inventing a universal writing system, but thought it inconvenient (Maat 22).

Nevertheless, many seventeenth-century successors of Descartes were not content with Latin as the language of scientific discourse and strove for a new language. Jaap Maat discussed several causes for this process: the Renaissance tradition, the break in the language unity, represented by Latin, the connection with the new science and even the connection with mysticism (5-7). Though the latter cause was to some degree important for Wilkins, the link between the new science and the emergence of his universal language design was much more important. He clarified his position in his early work *Mercury* (1641). An advantage of the universal language is the facilitation of “the spreading and promoting of all Arts and Sciences; Because that great part of our Time which is now required to the Learning of Words, might then be employed in the Study of Things” (Qtd. Maat 2).

Wilkins’s artificial language, based on a profound knowledge of several European and non-European languages, as well as on a categorization of things, was not only universal, but also philosophical. A philosophical language approaches an ideal what a language should be like. It expresses real meanings of things. Therefore, such a language not only promotes the better communication between people, but also provides better understanding between them. Wilkins saw his “invention” as a means of cultural exchange between nations.

But he failed. His language was too difficult to study. The final irony was that his *Essay*, written in English with a purpose to overcome language barriers, was translated into Latin on the request of various scholars on the Continent (including Leibniz) to make it more accessible (Maat 8). Wilkins’s Esperanto-like project became one of the first in a series of other inventions of artificial languages.



We do not know exactly whether Aphra Behn was interested in the universal language schemes, but she was attracted by the language of signs.¹¹ Her *Essay on Translated Prose* also touches the problems of language from another point of view. The title of the *Essay* has a double meaning. It supposes that the work is dedicated to the problems of translation, which is a part of the horizontal cultural transfer. It is true that the lesser part of the *Essay* is dedicated to the translation between languages and to linguistics. But there is another meaning. “Translation” in Behn’s case becomes not only a translation from French into English, but also a transfer of scientific ideas from one social group to the other. In Behn’s case again, the recipients of these ideas were not literate people on the whole, but literate women. It should not be forgotten, that women were deprived of scientific knowledge in seventeenth-century England, and Behn tried to change this situation.

Aphra Behn was not the first woman in England to popularize science among women. She had an important precursor in this task, Margaret Cavendish, Duchess of Newcastle. Gerald Meyer estimates that “there had been no attempt to direct sciences to feminine minds” before the year 1653, when Cavendish’s first book, *Philosophical and Physical Opinions*, was published.¹² Margaret Cavendish was a noblewoman, wife to a “virtuoso,” William Newcastle. She was personally acquainted with many scholars of her time, among them Descartes, Hobbes, Huygens and Wilkins. She rejected Baconian experimentalism and was devoted to Cartesian rationalism. Meyer considers Cavendish “the perfect eccentric for the task of bringing science to conventionally “untutored” minds” (Meyer 2) that is, an excellent mediator in vertical cultural transfer. She published her utopian, semiscientific romance *The Blazing World* at the same time as *Observations upon Experimental Philosophy* to attract female audience.

The Duchess of Newcastle took one more step to change relations between women and science. On May 30, 1667 she visited the Royal Society (Gresham College). She did not want to resemble Milton’s Eve, who knew her place in the Scale of Being and, therefore, waited for Adam to explain complicated scientific problems to her (Nicolson, *Science* 182-83). Margaret Cavendish came herself and watched Boyle’s and Hooke’s demonstrations with a great admiration. Her step was received in different ways by different people. John Evelyn liked her, Samuel Pepys did not.

There were not many female admirers of the Duchess, who was called “Mad Madge” and considered almost insane. She served a model for numerous satires on learned women, but did not become a model for a “scientific lady” in England.

¹¹ See my paper at the ESSE conference in 2002: Violetta TROFIMOVA, “Aphra Behn’s Scientific Ideas and Their Reflection in Her Prose Writings,” *Revisiting and Reinterpreting Aphra Behn*. Ed. Margarete Rubik, Jorge Figueroa-Dorrego, Bernard Dhuicq (Entrevaux: Bilingua GA, 2003): 43-49.

¹² Gerald DENNIS MEYER, *The Scientific Lady in England 1650-1760: An Account of Her Rise with Emphasis on the Major Roles of the Telescope and Microscope* (Berkeley: U of California P, 1955) 2.

Aphra Behn, more realistic than Margaret Cavendish, a woman of another background, a former spy and a professional playwright, found a new example for a woman interested in sciences. The model was created in 1686 by Bernard Bovier de Fontenelle, French writer and philosopher, incidentally influenced by Wilkins. Fontenelle's Marchioness in *Entretiens sur la Pluralité des Mondes* had a lot of charm and wit, but lacked Cavendish's eccentricity. She was admired and respected by her friend, who explained her some elements of Cartesian philosophy and Copernican theory. As Nicolson and Meyer suppose, the Marchioness opened a new era for "scientific ladies" in England (Nicolson, *Science* 184-85; Meyer 21-23). Attracted by this charming and provocative character, Aphra Behn decided to translate Fontenelle's book into English.

Behn considered women themselves partly guilty for their ignorance, as they did not pay enough attention to knowledge, but "lose so much time at their Toylets in a less charming Study."¹³ Criticizing women for their love of dress, she also tries to present them as full human beings, changing "des Hommes" in French original into "Men and Women" in her own translation. This ambiguous attitude to women's question, implying both criticism of her own sex and its defence, characterizes not only *The Essay on Translated Prose*, but also other Behn's works.¹⁴

Popularizing astronomy was not the only aim for Wilkins and Behn. No less significant for them was to propose a separation of science from religion. For Wilkins, astronomy is a "particular science."¹⁵ First, Wilkins and Behn make various statements, proclaiming the independence of science from the authority of the Bible. They use this strategy to draw readers' attention to this problem. Wilkins starts already from the titles of the chapters, for example:

Proposition v. That the words of Scripture in their proper and strict construction, doe not any where affirm the immobility of the Earth.

Proposition vi. That there is not any Argument from the words of Scripture, Principles of Nature, or observations in Astronomy, which can sufficiently evidence the Earth to bee in the center of the Universe.

In the second book Wilkins still insists on the impossibility of applying Biblical notions to the scientific methods:

¹³ *The Works of Aphra Behn*, ed. Janet Todd, vol. 4 (London, Pickering and Chatto, 1993) 88. As a translator she added these words in the body of *The Discovery*.

¹⁴ See her stories such as *The Unfortunate Happy Lady*, *The Nun* etc.

¹⁵ John WILKINS. *A Discovery of a New World, or, a Discourse Tending to Prove, That 'Tis Probable There May Be Another Habitable World in the Moon: With a Discourse Concerning the Probability of a Passage Thither, Unto Which Is Added, A Discourse Concerning a New Planet, Tending to Prove, That 'Tis Probable Our Earth Is One of the Planets.* In Two Parts. By John Wilkins, late Lord Bishop of Chester. The Fifth Edition Corrected and Amended. (London: Printed by J. Rawlins for John Gellibrand, at the Golden-Balls in St. Paul's Church-Yard, 1684) 175. All the subsequent references are to this edition indicated in brackets as WK with page number.



That the Holy Ghost, in these Scripture expressions, is pleased to accommodate himself unto the conceit of the Vulgar and the usual opinion: whereas, if in the more proper phrase it had been said, That the Earth did rise and set; or that the Earth stood still, & c. The People who had been unacquainted with that Secret in Philosophy, would not have understood the meaning of it and therefore it was convenient, that they should be spoken unto, in their own language. (WK 22-23)

The Bible is not an authority in scientific matters: “Because I conceive the Holy Writ, being chiefly intended to inform us of such things as concern our Faith and Obedience: we cannot thence take any proper proof for the confirmation of Natural Secrets” (WK 77). Theological knowledge concerns matters of Faith; science and philosophy explain the laws of the natural world. Aphra Behn agrees with Wilkins:

I hope I may be allowed to say, That the Design of the Bible was not to instruct Mankind in Astronomy, Geometry, or Chronology, but in the Law of God, to lead us to Eternal Life; and the Spirit of God has been so condescending to our Weakness, that through the whole Bible, when any thing of that kind is mentioned, the Expressions are always turned to fit the common Acceptance, or the Appearances of things to the Vulgar.¹⁶

One should not look for the explanations of astronomical or mathematical problems in the Bible. This book is important because of the other things written in it, which concern moral and spiritual sphere. For Behn, it is the Spirit of God which lives in the Church of Christ, as well as in the Bible, and the other matters should be left to the “Learned” to reconcile the differences between the versions and editions of the Bible (BN 18-19).

To support their statements, Wilkins and Behn give several common examples from the Bible concerning astronomy and geometry, which are contradictory to the latest scientific discoveries. These examples are the following ones: the Sun comes out of his chamber (19th Psalm): in BN (1700 edition, 14), and in WK (1684, 2nd edition, 26-27); Solomon’s molten-brass (brazen) sea (I Kings 7.23): in BN (10) and in WK (43); Sun stand still on Gibeon (Josh. 10.12): in BN (9, 14-17), in WK (28-29, 64).

The text of Psalm 19.5-6 “The Sun, like a Bridegroom, cometh out of his Chamber” (WK 26) was used as a proof against the Copernican System. Wilkins supposes it alludes “perhaps unto the conceit of ignorant people” (WK 26-27). Behn considers these words allegorical, and thinks “the Words of the Scriptures favour one Opinion as much as the other” (BN 14). Discussing the measures of

¹⁶ Aphra BEHN, “Essay on Translated Prose,” *Histories, Novels, and Translations, Written by the Most Ingenious Mrs. Behn*, vol. 2. (London: printed by W.O. for S.B., 1700): 9-10. All the subsequent references are to this edition indicated in brackets as BN with page number.

Solomon's molten-brass (brazen) sea, Wilkins draws the reader's attention to the fact, that its "Diameter was ten Cubits, and its circumference thirty; whereas exact proportion betweext the Diameter and the Circumference is not as ten to thirty, but rather as seven to twenty two" (WK 43). Behn also points out that

The Diameter of this Vessel was a Third of its Circumference: This is indeed commonly understood to be so, but is far from a Geometrical Exactness, and will not hold to a Mathematical Demonstration, as to the just Proportion between the Diameter and Circumference of a Circle. (BN 10)

Both authors prove the inexactness of the Biblical proportions in comparison to geometrical ones.

A final common example in both works concerns the words from Joshua 10.12 "Sun, stand still on Gibeon, and thou Moon in the Valley of Ajalon" (WK 28). Discussing this extract from the Bible, Wilkins points out two things:

- 1) That Moon "was now a little East from the Sun, being about 3 or four Days old, as commentators guess. Ajalon was three miles from Gibeon Eastward, and Joshua commanded the Moon to stand still there; because unto him it did then seem to be over against that valley; whereas, 'tis certain, if he had been there himself, it would still have seemed to be as much distant from him" (WK 29); Wilkins undermines the significance of the Biblical miracle by explaining it in terms of everyday experience; therefore, this example is not for or against Copernican system. And
- 2) That "whereas we translate that place in the tenth of Joshua, concerning the standing still of the Heavens; the original [Hebrew] word does properly signify Silence; and according to their Opinion, Joshua did only bid them hold their peace" (WK 64). Here Wilkins underlines a very important element in understanding Scriptures: the true significance of the Hebrew words in their original.

Incidentally, Wilkins stated in his *Essay Towards a Real Character* that his artificial language "will likewise contribute much to the clearing of some of our Modern differences in Religion, by unmasking many wild errors, that shelter themselves under the disguise of affected phrases; which being Philosophically unfolded, and rendered according to the genuine and natural importance of Words, will appear to be inconsistencies and contradictions" ("Dedicatory" n. pag.). In the *Discovery* Wilkins does the same thing: he unfolds the real meaning of the words, this time, in English, using Hebrew original.

In her *Essay*, Behn also points out that "The Valley of Ajalon is very near Gibeon" (BN 15), and that "the Moon was at that time very near the Sun" (BN 15). Then she discusses the effects of the Moon on the life on the Earth, and finally says, that this Miracle can signify only "an instant stop the course of Nature, and the whole Frame of the Universe was at a stand" (BN 17). Otherwise, "nothing less than two or three new Miracles all as great as the first, could have set the World in





Order again,” Behn adds ironically (BN 16). She also underlines the significance of the word “stand” in Hebrew (from the Buck’s Bible) —“be thou silent” (BN 14), so, “be thou silent makes as much for the Motion of the Earth, according to Copernicus, as for the Motion of the Sun according to Ptolomy” (BN 14). Drawing a somewhat different conclusion in the first part of her interpretation, Behn agrees with Wilkins in the importance of understanding Hebrew original.

Starting with mere statements to prove that science and religion are completely different spheres, John Wilkins and Aphra Behn come to proposing a new approach to Biblical texts. They both underline the importance of understanding properly the Hebrew original, not the translation of the Scriptures. Otherwise, it is impossible to grasp the true meaning of the text. R.A. Day justly called Behn “a pioneer practitioner of what would later be called the ‘higher criticism’ of Scripture.”¹⁷

Aphra Behn does not follow Wilkins’s book blindly. She ridicules his idea of the life on the Moon (taken and developed by Fontenelle) in her *Essay on Translated Prose*. Behn defends the Copernican system, but laughs at the fantastic ideas like the possibility of the other planets been inhabited.

Wilkins’s activities to promote “new science” were not always treated favourably by his countrymen. John Wilkins himself as well as the other members of the Royal Society with their experiments and sometimes abstract speculations became the object of satire in the famous play by Thomas Shadwell *Virtuoso* (1676). Sir Nicolas Gimcrack performs real experiments one could see at Gresham College, spends lots of money on microscopes, but does not want to understand mankind. Moreover, he “has been [for twenty years] compiling a Book of Geography for the World in the Moon” —quite a probable allusion to Wilkins’s *Discovery*.¹⁸ “Universal language” is also mentioned in the very beginning of the play, when Bruce is talking about young people making a tour around Europe: “They ride to Paris on: From whence they return with a little smattering of that Mighty Universal Language, without being ever able to write true English” (Shadwell 2). Such an ironic attitude towards Wilkins’s “design” was a common thing in Restoration period.

Sir Nicolas communicates with scholars from Russia and Lapland (there were 50 versions of Lord’s Prayer in various languages at the end of Wilkins’s *Essay*, among them a Russian one). Putting aside the irony in mentioning the most distant parts of Europe, it is reasonable to say that Shadwell describes an important role of the Royal Society and its members in cultural exchange between nations.

Wilkins was not the only prototype for Sir Nicolas Gimcrack. Boyle and Hooke also became objects for laughing at. Shadwell, probably, did not treat Wilkins’s wish to promote sciences in positive way, and in such a popular genre as a comedy

¹⁷ Robert ADAMS DAY, “Aphra Behn and the Works of the Intellect,” *Fetter’d or Free? British Women Novelists, 1670-1815*, ed. M. A. Schofield & C. Macheski (Ohio: Ohio UP, 1986) 372.

¹⁸ Thomas SHADWELL, *The Virtuoso, a Comedy, Acted at the Duke’s Theatre* (London: Printed by T.N. for Henry Herr., 1676) 16.

the first secretary of the Royal Society joined the other scientists to be satirized and laughed at.

John Wilkins was a figure who attracted not only the playwright Shadwell, but also famous satirists like Samuel Butler and Jonathan Swift (Nicolson, *Science* 77, 113). His projects of “flying machines” were especially popular among the English writers.¹⁹ But there was also favourable reception of Wilkins and his works in the seventeenth and the beginning of the eighteenth centuries. He was admired by the members of the Royal Society, for example, by Robert Hooke, who made a nice tribute to him in the “Preface” to his *Micrographia*.²⁰ He was a tolerant man, who never went into extremes in religious matters, and did much to gather in the Royal Society people of different religious background, such as a Calvinist John Wallis and a Catholic Kenelm Digby. Because of this he was also respected by many of his countrymen.

Wilkins’s *Discovery*, based on an early example of science fiction —Kepler’s *Somnium*— served as a source for another early example of this genre —*L’Autre Monde ou les États et Empires de la Lune* (1657) by Cyrano de Bergerac (an interesting variant of both horizontal and vertical cultural transfers in the seventeenth century). Fontenelle, as it was mentioned above, was also inspired by Wilkins to write his *Entretiens*. In 1713 a German translation of Wilkins’s astronomical books appeared, and there was an eulogistic foreword by Johan Doppelmayr, a professor of mathematics, who considered them the best explanation of Copernicus then available.²¹ Wilkins’s book was quite popular in seventeenth-century England, the new wave of interest towards it rose in the 1680s (there were as many as two editions in 1684). Aphra Behn’s *Essay* was published only four years later; therefore, it was not “belated,” as R.A. Day called it in his article (372).

While Wilkins’s connection with the popular literature of his time is rich and well-discussed by modern scholars, the link between Aphra Behn’s scientific opinions and her (and other authors’) fiction and drama is not easy to establish. There are few references to science in her original novels, plays and poetry: “burning-glass” in her novel *Oroonoko*, medical opinions in her story *Dumb Virgin*, etc. Her main original work dealing with astronomy is the farce *The Emperor of the Moon* (1686). Dr. Baliardo, a gentleman obsessed with idea of the Moon been inhabited, has much in common with Gimcrack. There are numerous references to telescopes, microscopes and other scientific instruments in this farce. At the end of it even pseudo-Kepler and pseudo-Galileo appear, but only to convince Baliardo

¹⁹ See Jonathan SWIFT, *Izbrannoje*, trans. A.A. FRANKOVSKY, et al. (Leningrad: Khudozhestvennaja Literatura, 1987) 112, 285.

²⁰ J.J. O’CONNOR and E.F. ROBERTSON. *John Wilkins*. School of Mathematics and Statistics, University of St. Andrews, Scotland, 17 August 2002. <www-history.mcs.st-andrews.ac.uk/history/References/Wilkins.html>.

²¹ Barbara J. SHAPIRO, *John Wilkins 1614-1672: An Intellectual Biography* (Berkeley: U of California P, 1969) 38.

there is no such thing as life on the Moon. Dr. Baliardo is not a “virtuoso,” he is an adept of pseudo-science, and Aphra Behn is harsh towards such people. One can not find in her original works (known to the scholars) any reconsideration of the image of a scientist, “virtuoso” or “virtuosa.” Only 16 years after Behn’s death we see a change in this image in English drama. We find it in the play *Basset Table* (1705) by Susannah Centlivre, a popular playwright and a successor of Behn in English theatre. Centlivre makes a “virtuosa” the heroine of her play. Valeria is described as a “Philosophical girl.” She is interested in both speculative and experimental science. She reads Descartes and, certainly, Fontenelle. Whether it was Behn’s translation of *Entretiens* or not, is unclear. When she meets captain Hearty, the man her father wants her to marry, she asks him whether he is “convinc’d there is a World in every star” and adds, that “we, by our Telescopes, find Seas, Groves and Plains, and all that; but what they are peopled with, there’s the Quere.”²² Captain Hearty does not want “a Philosophical Gimcrack” for his wife and does much to unite her and her lover Lovely. An educated girl, Valeria is much more interested in studying insects with the help of a microscope, than getting elegant trifles as presents and spending time “in her toylet in a less charming study.” Moreover, her bedroom looks like a laboratory, where she conducts her experiments. As Marjorie Nicolson remarks, there is nothing more amusing in the popular literature of the microscope, than the response Valeria gives to her lover when he wants her to elope with him: “What! And leave my Microscope?” (Nicolson, *Science* 188).

What circumstances made it possible to appear such a character as Valeria? Firstly, it was the rise of popularity of sciences among English women in the 1690s, which reflected in a number of public lectures on scientific matters, attended by English women.²³ Secondly, it was English journalism which in the 1690s took part in the process of eliminating the boundaries between women and sciences. In 1690 the pamphleteer John Dunton founded a question-and-answer periodical called the *Athenian Mercury*. He wrote:

England has the Glory of giving rise to two of the noblest Designs that the Wit of Man is capable of inventing; and they are the Royal Society, for the experimental Improvement of Natural Knowledg; and the Athenian Society, for the communicating not only that, but all other Sciences to all Men, as well as to *both Sexes*. (Qtd. Meyer 52. My emphasis)

This declaration corresponded to Behn’s direct and indirect struggle against sex discrimination when she underlined women’s capacity for any kind of activities, including studying sciences.

²² Qtd. John Wilson BOWYER, *The Celebrated Mrs. Centlivre* (Durham, NC: Duke UP, 1952) 73.

²³ Patricia PHILLIPS, *The Adventurous Muse: Theories of Originality in English Poetics 1650-1760* (Uppsala: n.p., 1984) 43-44.

Thirdly, it was Fontenelle's *Plurality of Worlds* that influenced this reconsideration of the image of a learned woman. Besides Behn's one, there were several other English translations of this book.²⁴ Sir William Temple, a famous literary man, admired Fontenelle's book; Joseph Addison, a famous journalist, mentioned it in his numerous essays (See Meyer 22-23). Susannah Centlivre, who was obviously acquainted with early translations of Fontenelle's book, wrote the following light verses in the Gardiner edition, belonging to a well-known actress Anne Oldfield:

Plurality of Worlds! Such things may be
But I am best convinc'd with what I see;
Yet tho Philosophers such schemes pursue,
And fancy'd Worlds in every Planet view;
They can but guess at Orbs above the Skies
And darkly paint the Lakes and Hills that rise.
Now Cupid skill'd in Mysteries profound,
Points where more certainty of Worlds abound;
Bright Globes, that strike the Gazer with Surprise,
For they are Worlds of Love and in Ophelia's Eyes. (Bowyer 49)

This interest to Fontenelle's book, expressed by two famous Englishwomen—a playwright and an actress—answered Aphra Behn's wish to bring women to sciences.

In 1719 Fontenelle's Marchioness got her English successor—the heroine of a book entitled *Astronomical Dialogues Between a Gentleman and a Lady*, written by John Harris, Fellow of the Royal Society. Lady M. receives instructions in astronomy from her astronomer-friend. She has a copy of Fontenelle's *Plurality of Worlds*, of course (See Meyer 27-28). But only fifty years after Behn's translation of Fontenelle's book we see another example of both horizontal and vertical cultural transfers, when an English woman translated a book by foreign author, treating the new discoveries in sciences. It was Francesco Algarotti's *Il Newtonianismo per le dame* (published in Naples in 1737), an Italian work translated into English by Elizabeth Carter in 1739. The English version was dedicated to Fontenelle as an author of the first work on sciences designed not for the "Learned," but for "Ladies" (Nicolson, *Science* 188), but it should have also been dedicated to Aphra Behn, the woman translator of *Entretiens*, who was fully aware of the task she wanted to fulfill, a woman writer with a rare courage and freedom of mind.

In the 17th century we see the activation of the vertical cultural transfer in England. To the end of the century a new reading audience for popular books on science appeared—the female audience. While John Wilkins tried to make astronomy comprehensible to literate people of both sexes, Fontenelle and Behn popularized it among women. All of them rejected Latin as a language of scientific dis-

²⁴ Sir W.D. Knight (1687), Glanvil (1688), Gardiner (1715), etc.

course, choosing English, French and again English instead. The division between languages and the growing importance of the vernaculars, which took place in the beginning of the century, led to a search for a new synthesis, which reflected in the various universal language schemes. And though these projects failed and were almost forgotten, they influenced the cosmopolitanism of the Enlightenment. New editions of Wilkins's *Discovery* and Behn's *Essay* appeared in a very important period in European intellectual and social history, several years before 1689, the date of Glorious Revolution in England, and 1697, the time of publishing Pierre Bayle's *Dictionnaire historique et critique*—an early predecessor of the famous French *Encyclopaedia*. John Wilkins, Bernard Bovier de Fontenelle and Aphra Behn—a triad unnoticed and unacknowledged by scholars—did a lot to promote the new astronomical discoveries and to separate science and theology. Wilkins and Behn did not survive to become thinkers of the Enlightenment period (unlike Fontenelle, who lived up to the middle of the 18th century). But their freedom of thought, tolerance and dependence on reason made both of them important figures among the predecessors of Enlightenment writers and philosophers.

