

TRANSLATING SCIENCE POPULARISATION IN THE EIGHTEENTH CENTURY: THE ROLE OF WOMEN IN THE TRANSMISSION OF SCIENTIFIC KNOWLEDGE

Mirella Agorni

Università Cattolica del Sacro Cuore, Milan

ABSTRACT

The subject of this article is women's popularisation of scientific texts in the eighteenth century. Starting from an analysis of the remarkable surge in female writing in Britain in the second half of the eighteenth century, the article attempts to draw a partial or metonymical picture of this phenomenon by means of two case studies which take us beyond the borders of the British Isles. The former concerns Giuseppa Eleonora Barbapiccola's Italian translation of Descartes' *Principles of Philosophy* (1722). The latter illustrates Elizabeth Carter's English translation of an Italian treatise on Newton's optics, Algarotti's *Newtonianismo per le Dame* (1737), which became in fact a handbook for women as a result of the translator's intervention. Both examples illustrate the fundamental role of women in the dissemination of scientific knowledge.

KEYWORDS: translation history, translation studies, women's history.

RESUMEN

El tema de este artículo es la popularización de los textos científicos escritos por mujeres en el siglo dieciocho. Comenzando el análisis en el notable surgimiento de la escritura científica femenina de la segunda mitad del siglo dieciocho, el artículo intenta dibujar un cuadro parcial de este fenómeno mediante el estudio de dos casos que nos llevan más allá de las fronteras de las Islas británicas. El primero es el relativo a la traducción al italiano que hace Giuseppa Eleonora Barbapiccola de los *Principles of Philosophy* (1722) de Descartes. El segundo tiene que ver con la traducción al inglés del tratado italiano sobre la óptica de Newton, *Il Newtonianismo per le Dame* (1737) de Algarotti. Ambos ejemplos ilustran el papel fundamental de las mujeres en la diseminación del conocimiento científico.

PALABRAS CLAVE: historia de la traducción, estudios de traducción, historia de mujeres.



1. BRITISH WOMEN'S WRITING IN THE EIGHTEENTH CENTURY AND THE BIRTH OF THE FEMALE READER

In the second half of the eighteenth century, women appeared to play a fundamental role in British culture. Not only did their writing feature an unprecedented dimension, but it also showed a distinct homogeneous character which allowed women to find an early “room of their own” in the literary marketplace.¹

According to critics such as Armstrong (1989), feminine identity was used instrumentally in the development of a so-called domestic sphere, soon appropriated by a middle class that was still in the process of defining itself in the course of the eighteenth century. Feminine identity was based on an ideology that highlighted the importance of (inner) qualities of mind over (external) physical appearance, but this contrast in fact masked the opposition between traditional aristocratic notions of display (meant in terms of rank and status) and the emerging interest in the natural qualities of the individual. The female image was exploited to embody this new subjectivity, as it represented a kind of power different from those already existing.

The “age of sensibility”, a period running from 1740 to the 1770s, witnessed the emergence of a stress on feelings and sympathy in the discourses of medical science, religion, philosophy and literature. The new emphasis on individual perception and feelings represented a reaction against the early capitalist tendencies of the great commercial development which was taking place in Britain at the beginning of the eighteenth century (Barker-Benfield 1992; Barker and Chalus 1997; Sode-man 2014). Women appeared to exert a peculiar kind of authority over the field of emotions and domestic life, and this had two main consequences: firstly, female images were used instrumentally in a variety of publications and secondly women's writing received unprecedented attention.

Yet, this development cannot be interpreted as a signal for the emergence of proto-feminist tendencies in British in this historical period, The feminine has to be considered as a broad discursive position to be adopted irrespective of the writer's actual sex. Whereas many cultural historians have argued that sensibility indicated the “feminisation” of culture in general and of men in particular, I am of the opinion that, during the period in question, it rather pointed to an instrumental use of gender traits traditionally considered as feminine (Johnson 1995,14).

The new ideology of femininity developed slowly during the decades which spanned from around the mid-eighteenth to well into the nineteenth century in Britain, emerging as a discursive mode initially used in conduct books, magazines and novels for women. Conduct books had traditionally been addressed to aristocratic male readers in the seventeenth century, but in the eighteenth century they began to target almost exclusively young women. Both Richetti (1994) and Armstrong (1989) have argued that the eighteenth century British conduct book

¹ Cfr. Brophy-Bergen 1991; Gallagher 1994; Johnson C. 1988; Schellenberg 2005; Spencer 1986; Todd 1989; Turner 1994.

and the feminine novel after the mid-century somehow foresaw the way of life they depicted, as they anticipated social and economic changes which would in fact take place in the following century.² Furthermore, as Kelly (18) has pointed out, by the mid-century a domestic notion specifically linked to the feminine had already been developed “not only in Britain, but also in France and elsewhere in the continent”. Such a domestic notion was one of the main components of the ideological changes responsible for the emergence of a productive economy centred on the individual, that is a person who strived to set *herself* apart from the world of aristocratic patronage and privileges. Women’s disenfranchisement from the dominant political order made it possible for them to be moulded into a model for the new, modern individual. Thus, the birth of a modern, pre-bourgeois self was anticipated by new definitions of femininity. As Armstrong (66) has memorably put it, “the modern individual was first and foremost a female”.

2. WOMEN AND LEARNING IN EIGHTEENTH-CENTURY ITALY

In order to chart the origins and evolution of women’s increasing importance in British eighteenth-century culture, it would be necessary to widen the scope of this research both from a chronological and geographic point of view, so as to take into account the literature on the so-called *querelle des femmes* produced in Europe since the Middle Ages. An ambitious task for a cultural historian, it goes beyond the scope of this article. Here I shall limit myself to use current historical research in two case studies, drawing a complex picture of the ways in which women exploited certain modes of writing —translation in particular— in order to step into the eighteenth-century “Republic of Letters”. I shall go beyond the geographical borders of the British Isles by drawing into my picture a sample of Italian culture, limited to a short analysis of the role of women in the dissemination of scientific knowledge in the first part of the eighteenth century.

Factors such as the spread of literacy, the progressive secularisation of European’s culture and the waning importance of Latin as the only language of knowledge represented a new opening for women into the publishing world, and more generally into the field of knowledge. As Cavazza (238) has argued, women played a central role both by organising and participating in the socializing practices of the *salon*, started in seventeenth-century France, and soon becoming the centre of diffusion of Enlightenment culture all over Europe. What is more, in the course of the century women were to play an important role both as consumers of texts

² “The early British novel, whether written by a man or a woman, presents domestic life as its recurring central subject and, with its focus on the interior and private lives of characters, moves dramatically away from the traditional concern of literature with public life and masculine heroism in love, war and politics” (Richetti xiv).



and producers of a peculiar type of “mediated” writing, which included translation and adaptation, or rather, popularisation of scientific knowledge.

The importance of Italy in the Enlightenment period has often been undervalued. Owing to the Catholic Church’s condemnation of Galileo in 1633 and the following embrace of Aristotelian theories in both institutional and private settings, Italy has traditionally been considered as one of the most backward provinces in Europe in this historical period. Slow to receive the effects of the new philosophical and scientific developments produced in countries such as France and Britain, Italy demonstrated a strong opposition towards any glimpse of intellectual freedom. Yet, Findlen (1999, 314-5), among other scholars, has shed light on one of the most characteristic traits of Italian *Illuminismo*, that is the role of women in intellectual life, and particularly on their active involvement in the diffusion of modern scientific knowledge (cfr. also Schiebinger 1989, Lawrence and McCartney 2015). Travellers witnessed with a certain amount of surprise the number of learned women or *filosofesse* to be found in this country, as Findlen (1995, 169) points out: “By the middle of the eighteenth century, almost every Italian city with some pretension to culture lay claim to at least one scientifically learned woman”. The same author mentions early women travellers such as Lady Mary Wortley Montagu, marvelling at this phenomenon, and we could add at least another two examples: firstly, Lady Ann Miller, who travelled to Italy with her husband and published her account as “Written by an English Woman” in 1776. After her visit to the University of Padua, Miller described the monument to “Helena Cornaro Piscopia”, a member of the Venetian nobility who had been “honoured at Padua with the Degree of Doctor in Philosophy for her great learning” (Miller 1776, III, 216; cfr. Agorni 2002, 128). The second example is represented by Hester Thrale Piozzi, the well-known British *salonier* connected with Doctor Johnson’s literary circle, whose travel account was published in 1789. Piozzi narrates her visit to Bologna University and describes the Italian practice of accepting women both as students and teachers at well-known universities. She mentions one of the most celebrated cases, that is Laura Bassi’s, who was the first woman to hold a chair at Bologna University:

This university has been particularly civil to women; many very learned ladies of France and Germany have been and are still members of it; - and la Dottoressa Laura Bassi gave lectures not many years ago in this very spot, upon the mathematics and natural philosophy, till she grew very old and infirm; but her pupils always handed her very respectfully to and from the Doctor’s chair. (Piozzi 132)³

Paradoxically, in spite of its lagging behind in terms of scientific vivacity, Italy appeared to be more advanced than any other part of Europe as far as gender

³ Laura Maria Caterina Bassi (1711–1778) received a doctoral degree from the University of Bologna in 1732 and was the first woman to hold a chair in experimental physics at a university in Europe.

issues were concerned, specifically in the field of women's education.⁴ And this was widely acknowledged all over Europe.

As has already been pointed out, Findlen (2003a) has argued that Italian women were especially prominent in the fields of sciences, or natural philosophy as it was called at the time. This is not to deny that their role in the literary field was less important, as female poetry received a great deal of attention, and women were admitted as members of the most prestigious literary circles in Italy. Yet, the fact that a few of them held teaching positions and university chairs in the scientific areas was certainly perceived as a rather unique event by other European countries. Not only were women involved in the diffusion of scientific knowledge, but they also contributed to the popularisation of the new ideas produced by foreign thinkers such as Descartes, Locke, Newton, Boyle and Leibniz. Many of their works were still included in the *Index Librorum Prohibitorum* of the Catholic Church, although their circulation was ensured by *salon* conversations and by the activity of the numerous academies scattered over the territory. Women's presence was significantly linked with Italy's urge for modernisation, as Findlen (1999, 316) has noticed:

The presence of learned women in Italy's academies and universities made them among the most visible emblems of the arrival of modern knowledge in this increasingly provincial corner of the Republic of Letters. Through the publicity surrounding these women's activities, in conjunction with a growing number of Italian treatises that explored the most recent developments in the experimental and mathematical sciences, Italian scholars announced to the world that they had entered the new age of learning.

However, scholars such as Cavazza (242) and Findlen (2003b) have demonstrated that the Italian women who excelled in the scientific fields kept a low profile, in spite of playing such a fundamental role in the culture of their time. For example, they generally did not publish their work in their own name.⁵ Women's attitude towards authorship was extremely ambivalent in the first part of the eighteenth century in Italy (as well as in Britain, where it was to rise dramatically only in the latter part of the century, as has been said in Section 1). Yet, female writing

⁴ Yet, as Cavazza (241-2) has argued, women were in reality considered as "educational experiments", who played a fundamental role at symbolic level, as the prestige of female knowledge was thought to increase the fame of the city hosting them. This is the reason why the exceptional positions granted to a few women (such as memberships of prestigious academies or university posts) did not encounter strong public opposition.

⁵ One famous exception was that of Maria Gaetana Agnesi, who published her *Analytical Institutions for the Use of Italian Youth* in 1748, a popularisation of Cartesian analytic geometry and the new mathematical concepts developed by Newton, Leibniz and Euler, written in the Italian language. In her preface, Agnesi makes clear her pedagogical aim, as her book had been primarily composed to help her instruct her brothers. The text became immensely popular within and outside Italy: Agnesi was offered an honorary Chair in Mathematics at the University of Bologna, which was however refused. On this topic see Findlen 1995.



did have a place in the publishing marketplace as women found ways to make their voices heard, albeit in mediated forms.

Findlen (1995) has aptly described some of their strategies in an article discussing women's role in the circulation of knowledge in eighteenth-century Italy. By highlighting women's function as "synthesizers and translators" of fundamental scientific texts, but also as teachers of modern scientific theories in Italian academies and universities, the American historian gets very close to defining these activities in Lefevere's terms of rewriting (1992). Women were indeed protagonists in the circulation of knowledge, a process, I shall argue, that went well beyond Italian borders (whatever they be in this historical period).

3. WOMEN DISSEMINATING SCIENTIFIC KNOWLEDGE IN EIGHTEENTH-CENTURY ITALY: GIUSEPPA ELEONORA BARBAPICCOLA, "TRANSLATRESS" OF DESCARTES

One of the first Italian women to take upon herself the task of translating science, specifically Descartes' *Principles of Philosophy*, was Giuseppa Eleonora Barbapiccola (ca.1700-ca. 1740),⁶ who published her work in 1722. She was a member of Giambattista Vico's literary circle in Naples, where she became friends with some of the most important intellectuals of that town, and eventually gained access into a famous academy such as Accademia degli Arcadi.

Cartesian philosophy occupied a special place in the lively cultural atmosphere of Naples, in spite of the strong aversion of the Catholic Church, which had banned Descartes' works since the middle of the seventeenth century (cfr. Findlen 1995; Messbarger & Findlen 2005). Hence, Barbapiccola did not embark on the task of introducing Cartesian philosophy anew, but rested on a rather solid tradition.

Barbapiccola added a preface to her work, boldly entitled "The Translatress (*Traduttrice*) to the Reader". Descartes himself appeared to offer the translator the possibility of highlighting the importance of women's education, particularly in the field of natural philosophy. In fact he had simply dedicated his work to Elisabeth of Bohemia, but Barbapiccola exploited this fact in order to address women in general, and legitimate her claim in favour of women's education (Findlen 1995, 7; 2005a, 37-8). Descartes was not her only source of legitimation: Barbapiccola took advantage also of her (male) contemporaries, and quoted Paolo Mattia Doria, who belonged to the Neapolitan circle of Vico and was a strenuous advocate of women's

⁶ Women did not start translating in the eighteenth century: there is a long and non-forgotten tradition of female translation since the Middle Ages (Krontiris 1992; Patterson Hannay 1986; Uman 2012). However, two works in particular on the new scientific methods must have exerted a certain influence on eighteenth-century women translators, and they are Aphra Behn's translation of Fontenelle's *Conversations on the Plurality of Worlds* into English in 1688 (cfr. Agorni 1998) and Emilie du Chatelet's French translation of Newton's *Principia*, published in 1759.



education.⁷ Barbapiccola used his name to support her cause and this enabled her to ask her readers a fundamental, if rhetorical, question: “who, provided that has even a mediocre knowledge of history, does not know how many women in every age have distinguished themselves in various literary pursuits?” (Findlen’s translation, 2005b, 48).

In her preface, Barbapiccola goes on to provide a detailed historical review of women who played crucial roles in the past, distinguishing themselves for their learning in fields such as poetry, mathematics and philosophy, rhetoric, ancient languages, and so on. Barbapiccola’s list started from the early Greeks, going through medieval times, to end up with Christina of Sweden, one of the most educated women of the previous century and patron of Descartes. This tradition was a fundamental source of inspiration for the *traduttrice*, who was eager to highlight the benefits of education for women:

I have been greatly inspired by the example of these famous women. They have led me to believe that I could one day overcome the weakness of my sex, which only studies in order to know how to play games and to speak knowledgeably of fashionable clothes and hair ribbons. Bad education, not nature, encourages this defect. (Findlen 2005b, 55)

From this point onwards in her preface Barbapiccola began a personal, almost autobiographical, narrative in which she referred to her own education path, illustrating the steps that had led her to the field of science, and eventually to “Cartesian philosophy”. On the one hand, her references to religion as the highest source of inspiration of human undertakings were customary at the time, and appeared to rule out, or at least overshadow, individual will. On the other hand, however, the fact that a *traduttrice* used her personal experience to illustrate women’s possibility not only to learn scientific subjects, but also to make them accessible to the public (through translation) was a rare achievement in this historical period. Furthermore, the emphasis Barbapiccola placed on the importance of personal experience is an echo of the importance of the experimental method introduced by Galileo; the *traduttrice* significantly explains that the pragmatic attitude she found in Descartes’ theories triggered her admiration, as illustrated in the following passage (Findlen 2005b, 55):

I began first by cultivating languages and then, as much as my ability permitted, the sciences. Among the latter, I studied philosophy because its moral part makes us civil, metaphysics because it enlightens us, and physics because it informs us about the beautiful and wonderful architecture of this great palace of the world that God made as our home, since it is most indecent to live in it like brute animals. I heard it said that Cartesian philosophy was based on solid reasoning and certain experience, and proceeded with a clear method, deriving one thing from another,

⁷ Doria had published some rather contested works, in an attempt to conciliate traditional platonic doctrines with the modern philosophical thought of Descartes and Locke, cfr. Israel 2001.



for which it had acquired endless followers. For these reasons, I was more inclined to this philosophy than to any other.

Barbapiccola's own contribution to learning, however, went well beyond her personal experience. It has been pointed out earlier that the scope of her translation was not to introduce Cartesian philosophy into her cultural environment, which was already familiar with this philosopher's works. Rather, she redefined Descartes, by producing her own critical reading. Her argument was not original, since she wanted to demonstrate that this philosophical approach did not go against the precepts of the Catholic Church. But what is noteworthy is the degree of her personal involvement and the strength of her argumentation. In the passage quoted below, for example, Barbapiccola exploited the modesty convention as a strategy not to mask, but rather to reveal the boldness of her endeavour (Findlen 2005b, 59):

even though making a good defence of Descartes's philosophy is neither my subject nor am I worthy to undertake this task, since many eminent men have openly defended every line of his philosophy [...] yet it is necessary to justify myself in this task with a few brief words.

Her "brief words" in fact amounted to some nine full-length pages, in which she firmly refuted those critics who maintained that Descartes had departed from the "Word of God". Once again she used, or rather exploited for the sake of her argument, a number of what she believed to be the most authoritative sources of her time, such as Daniello Bartoli's treatise *L'huomo di lettere difeso ed emendato* (1645).⁸ Hence, the "ownership" of the concepts she brings forward is not at stake here, but the straightforward style of her argumentation is striking, as is apparent in the following extract (Findlen 2005b, 61):

There are two great evils, as the praiseworthy father Bartoli informs us in the place I cited: "searching for faith with philosophical curiosity and believing in philosophical things with the certainty of faith".

Findlen (2005, 41-3) has underlined the influence of one of the most important Neapolitan philosophers of the seventeenth century, Giuseppe Valletta (1636-1714) on Barbapiccola's reading of Descartes' work, especially, once again, as far as the controversial relationship between religion and Cartesian knowledge was concerned. Valletta had been one of the first philosophers to investigate this theme from a historical point of view, which enabled him to question the primacy of the Aristotelian approach dominating at his time. Barbapiccola made the most of these theories in her discussion, by introducing a detailed account of the way philosophy had been appreciated and employed by the Church since early Christianity. This

⁸ This book had an enormous success, going through over thirty printings in Italy. It was also translated extensively; cfr. Renaldo 1979.



narrative provided substance and force to her argument, and was clear evidence of her scholarly abilities.

Finally, the conclusion of her preface offers another demonstration of Barbapiccola's clever manipulation of her sources. She quoted an ample portion of a talk by Jacques Hyacinthe Serry (1659-1738), which had appeared in the periodical *Giornale de' Letterati* in 1718. Not only is this citation remarkable as it is extremely functional to the construction of (a perfect) argument, but what should also be noticed is the care she took in providing all the references for her quotations. This strategy would certainly gain her readers' trust in their scrupulous *traduttrice* (Findlen 2005b, 65-66):

As a crowning point, I estimate that it is well worth adding that which the most learned Father Hyacinthe Serry of the truthful Order of Preachers (Dominicans), who to his highest honor is a Professor at Padua, presented as a theory in one of his *Opening Lectures* for the beginning of classes in 1718 and happily proved. A short version of it appeared in the *Journal of Italian Scholars*, tome 31, article 12, page 431, reported with these following words: "that is, that the discoveries of modern philosophers should not be immediately rejected as contrary to the truths of our Holy Faith. Rather they should first be considered and examined carefully to see if they can agree with them, since many things which seem contrary to the Holy Faith at first glance really are not opposed to it. The Holy Documents often adapt their ways of speaking to the intelligence of the common people. But if we take them in their deepest sense, they agree with the Moderns. We can introduce many examples. Finally the spirit of God did not dictate Scripture to teach physics or mathematics but to demonstrate how to perfect our habits and to show us the pathways to Heaven, and not natural phenomena".

One of the most interesting elements of this work from a strictly Translation Studies perspective concerns the intended readership of Barbapiccola's translation: did the *traduttrice* intend to target only or mainly female readers? She appears to be rather ambiguous on this point. On the one hand, she stated that she had decided to translate Descartes' work "in order to share it with many others, particularly women who, as the same René says in one of his letters, are more apt at philosophy than men" (Findlen 2005b, 55). And yet, real-life women do not seem to have been her intended audience, or at least not only them, given the display of erudition demonstrated by her preface. In fact women appear to stand, in a symbolic way, for a larger readership, one that needed to be assisted, or facilitated in its appreciation of a scientific work by means of an introductory paratext. These lay persons, eager to know the new philosophical ideas coming from abroad, could take advantage of the insights offered by a translation. As Barbapiccola herself put it (Findlen 2005b, 56):

In every age it has been customary to translate books into contemporary languages. Thus, the Romans transposed into Latin the most noteworthy Greek works, both histories and works of doctrine. Once the common people no longer used the Latin language, books written in it were transferred into other languages that succeeded it, in particular into Italian during the flowering of the sixteenth century, and into



French in the past century when more than ever reading was established. This has been a great advantage for those who know no other language than their mother tongue and yet desire to learn. This way the path is open to them, not only to enjoy reading books but also to extract that profit from them that the sciences, which are attached to the study of things rather than words, contain.

Translation is a practice that facilitates the circulation of knowledge via a transfer of texts, ideas, scientific advances, etc. —in a word, it makes modernity travel. The ideal recipient of this movement is the common reader, well represented, in a metonymical way, by the image of women, and their being *tabula rasa* vis-à-vis the benefits of education. The fact that the *traduttrice* is a woman herself adds value to her enlightening project: she can draw upon her own experience, and represents a role model for her (female and male) readers. Findlen (1995, 184) has described this aspect of Barbapiccola's work in the best possible way when she writes: "Imagining herself as a facilitator of knowledge, she was one of the first Italian women to suggest that popularisation was a woman's domain".

4. AN ANGLO-ITALIAN REFRACTED CONNECTION: ELIZABETH CARTER'S TRANSLATION OF FRANCESCO ALGAROTTI'S POPULARISATION OF NEWTON'S OPTICS "FOR THE LADIES"

As already pointed out, that Italian women were active in the dissemination of knowledge, particularly scientific knowledge, was well known in the rest of Europe. However, this does not mean that there existed a direct connection among different cultural environments: women of the middle-upper classes did travel, particularly from the Northern to the Southern regions of Europe, but the literary circles which had admitted them tended to be rather culture and language-specific. To my knowledge, there is no evidence of a direct exchange among learned women living in different European regions in the eighteenth century. Men intellectuals, on the other hand, were more encouraged to travel and literary and scientific institutions, such as the numerous academies and societies scattered over most of the European territory, were keen on exchanging ideas and providing connections. This was precisely the path that led Francesco Algarotti (1712-1764) to learn, appreciate and popularise Newton's theories, particularly his work *Opticks* (1704).

Born into a rich merchant family in Venice, Algarotti studied at Bologna University, where he became familiar with the modern advances in natural philosophy and mathematics, and developed an interest in the work of Laura Bassi (Findlen 2003, 61). A true heir of the Renaissance, Algarotti became a polymath and an assiduous traveller and enjoyed an early cosmopolitan lifestyle. England was one of his favourite countries, and he was elected a Fellow of the Royal Society in 1736. One year later he wrote his most successful work, *Il Newtonianismo per le Dame, ovvero dialoghi sopra la luce e i colori*, a popularised version of Newton's theories of optics. This short treatise was extremely successful as it was published



in four editions and translated into three languages in the author's lifetime.⁹ It was immediately included into the *Index Librorum Prohibitorum*, although the Church revoked its verdict for the revised editions published in 1746 and 1750 respectively.

In his introduction, Algarotti dedicates his work to the French philosopher Fontenelle, who in 1698 had published a popularisation of the Copernican system under the title *Entretiens sur la Pluralité des Mondes*. Fontenelle had been an exponent of *salon* culture, and had introduced a new, light way to popularise scientific knowledge by publishing a fictional dialogue between two characters: a philosopher and his pupil, an aristocratic Marquise (cfr. Agorni 1998). As Findlen (2003, 60) has noticed, the philosophical dialogue had a long tradition, revitalized by Galileo, but no one before Fontenelle had thought about introducing a woman as an active participant in the discussion: "Fontenelle was the first to imagine that this dynamic would appeal to a heterogeneous audience for science. The Marquise was his *tabula rasa* whose head he filled with ideas, a woman who knew nothing of science and wanted to know virtually everything".

It is not difficult to see the appeal of this text for a passionate admirer of modern scientific knowledge as Algarotti, who was keen on disseminating Newton's ideas. His Marchioness had to be instructed from the basics, as she was not familiar even with the most elementary laws of physics. However, at the end of the volume she became a true disciple of Newton, to such a degree that the philosopher had to warn her that she should not display her knowledge, and remain within the limits of female modesty. This was not the sort of comment to be expected in a text promoting women's education, and in fact Algarotti's appeal to female readers is probably the most discordant aspect of his work.

The Church's decision to include *Il Newtonianismo* into the *Index Librorum Prohibitorum* cannot be explained simply by the fact that the text endorsed Copernicus' heliocentric theory: other works by Newton, such as *Principia Mathematica* and *Opticks*, had not been condemned. What was perceived as dangerous was Algarotti's eagerness to present Newton's experimental methodology as highly innovative in comparison with the scholastic, authoritative tradition still predominating in Italy. The new empirical method brought about a reassessment of knowledge which could be applied not only to the field of knowledge, but also to civil life. In Britain, it had produced a form of government that combined the needs of the people with the authority of the ruling classes:

Per non parlarvi ne meno più della Fisica, che pare esser all'Osservazioni il campo più proprio per le loro scoperte, non son esse a cui la Politica dee quell saggio non ideale Governo, che più belle del sole del Mezzogiorno rende le nebbie del Nord, in cui la libertà del popolo è conciliate colla superiorità de' Grandi, e coll'autorità del Sovrano? La Metafisica, quel perpetuo bivio della Ragione, à pur loro l'obbligo d'un

⁹ The text was eventually published in 31 editions and translated into six languages (cfr. Hall 37).



sistema certo dell'origine, e del progresso delle nostre idee, e noi del conoscimento di noi medesimi. (Algarotti 1737, 153)¹⁰

It seems that Algarotti's agenda in his *Newtonianismo per le Dame* was in truth the popularisation of a system of thought which was perceived as radically different from the one dominating in Italy, where the Church still retained its temporal power.

The style and the language of this work were part of the project: a scientific treatise written in Italian, rather than Latin, was a deliberate strategy to address a readership much wider than that of the educated readers who could read Newton in the original Latin. As a consequence, the appeal to the ladies functioned metaphorically in order to target a category of readers who did not benefit of the privileges of education.

At the same time, the fictitious appeal to the ladies enables Algarotti to employ a witty literary style aimed at entertaining the readers. Critics such as Casini (1978, 98) and Hall (1984, 39) have argued that the lively style of this work should not be taken as evidence of its being in fact addressed to female readers; on the contrary, by targeting a large, unidentified readership, Algarotti was effectively opening the way to a widespread appreciation of the inductive methodology in his country.

However, Algarotti's use of the discourses of femininity typical of his time is extremely ambiguous (cfr. Agorni 2002). The exploitation of the female image enables the author to adopt a bold and gallant language which becomes almost misogynist and rich in erotic allusions. It can be assumed that, as a matter of fact, *Il Newtonianismo* was not an edifying reading for women.

Two passages are particularly explicit on this topic. The first appears in a discussion of the importance of the senses in the perception of reality, when Algarotti illustrates the concept of touch by using the image of a blind sculptor:

noi abbiamo avuto l'esempio di uno scultore, che benché cieco scolpiva però palpando de' ritratti assai tollerabili. E per le Dame credesi, ch'è non volesse ritrarne la testa senza il busto. (1737, 94)¹¹

Another example is when the philosopher explains the phenomenon of the refraction of light:

¹⁰ Carter translated this passage as follows: "not to say any Thing further of Natural Philosophy, which seems a Province the most adapted to the Discoveries of Observations, is not Politics indebted to these for that wise and real Government, which renders the Southern Suns less pleasing than the Cloudy Regions of the North, where the Liberty of the people is made compatible with the Superiority of the Nobles, and the Authority of the Sovereign." (Algarotti 1739, II, 17).

¹¹ Carter translated the passage in the following way: "We have the Example of a Statuary, who tho' he was blind, yet by the help of his Feeling made tolerably good Likenesses. [(And when it came to sculpting Ladies, it may be imagined that he would have wished to bring forth not the head only but also the bust.) my translation] Algarotti 1739, I, 153).



ecco una cosa, m'interrup'ella, che io non a molto, essendo nel bagno, osservai attentamente, che mi sorprese, e di cui m'inquietava la ragione. Altro ella non è, soggiuns'io, che la rifrazione che soffrono i raggi passando dall'acqua nell'aria. Egli sarebbe una buona cosa lo spiegarvene minutamente gli effetti, e gli scherzi sul margine del vostro bagno. Sapete voi quanti curiosi d'Ottica fareste? (1737, 118).¹²

The female reader appears to be only a rhetorical device in Algarotti's work, where women fictional characters are used instrumentally to entertain and instruct a large percentage of the reading public eager to find a "shortcut" to scientific knowledge. Thus, women's education was not a fundamental aspect of his project.

However, what happens if Algarotti's appeal "to the Ladies" is taken at face value? This was indeed the case of Elizabeth Carter's translation into English, published as *Sir Isaac Newtons' Philosophy Explain'd for the use of the Ladies. In Six Dialogues on Light and Colours, Translated from the Italian of Sig. Algarotti*, only two years after the first edition of the original work.

Commercial interests had already begun to exert a strong influence on the production of translation in the eighteenth century. Publishers and booksellers were usually responsible for the selection of texts to be translated and had a strong impact on the translator's approach. Natural philosophy, physics and mathematics were in great demand in the British early popular press, and yet it seems difficult to justify the need to translate a new simplified version of Newton's *Opticks*, originally published in Italian. A number of simplified accounts of Newton had already been published in English and were still available.¹³ The commissioner of Carter's translation was Edward Cave, publisher of the popular periodical *Gentleman's Magazine*.

Elizabeth Carter (1717-1706), daughter of the reverend Nicholas Carter, was a polyglot, because she learnt Greek, Latin, Hebrew, French, German, Italian and Spanish at a young age and later worked also on Portuguese and Arabic. Thanks to her father's connections, she started contributing poems to the *Gentleman's Magazine* and was commissioned two translations by Edward Cave, respectively from French¹⁴ and Italian. But it was her translation of *All the Works of Epictetus* from the Greek in 1758 that eventually brought her fame and social prestige.

¹² Carter's translation reads as follows: "This is the very Thing, said she, interrupting me, that I lately observed when I was in the Bath, and I was extremely surprised and puzzled to find out the Reason for it. It is nothing else, answered I, but the Refraction which the Rays suffer in passing from Air into Water. [(Twere a good thing to explain to you all the effects minutely on the rim of your bath. Do you know how much curiosity about Optics this would arouse?) my translation]. (Algarotti 1739, I, 119).

¹³ Populisers of Newton's theories included some of his disciples, such as Henry Pemberton (1694-1771) and John Theophilus Desaguliers (1683-1774), author of an allegorical poem, *The Newtonian System of the World, the Best Model of Government* (1728), and Joseph Addison, who was one of the most influential in the pages of his *Spectator*.

¹⁴ Cave sponsored the translation of two texts from the French by the Swiss theologian Jean Pierre de Crousaz, who had published two critical readings of Pope's *Essay on Man*. The two texts were commissioned to Elizabeth Carter and Samuel Johnson. Carter's work was published in 1738 whereas Johnson's project was eventually abandoned.



Carter's contributions to the *Gentelman's Magazine* put her in contact with a group of literary men and women, such as Cave himself, Samuel Johnson, Thomas Birch (Fellow of the Royal Society), Mary Masters and Jane Brereton. The debate of women and education was a frequent subject of discussion among this group and the *Gentleman's Magazine* published articles, letters and even poems on this topic, targeting a large readership made of both sexes (cfr. Agorni 2002).

As has been said earlier, Cave's selection of texts for translation was usually guided by commercial reasons, according to two main criteria: (relative) prestige of the original and public interest. In the case of *Il Newtonianismo per le Dame* prestige was represented by the scientific subject (natural philosophy) and by the Italian author's connection with the Royal Society. The interest of the public, however, appears hardly discernible, as many other books on Newton's philosophy were available at that time, as has already been pointed out.

Yet, given the popularity of conduct literature addressed to a female public and Cave's involvement on the debate about women and education, the most plausible explanation for Carter's translation is Algarotti's apparent concern for women's education. Conduct books circulating at this time tackled many subjects, from art to literature, economics and even medicine, but the scientific areas had never been touched upon. Hence, a popularisation of Newton's system of thought which targeted female readers would have been perceived as a daring novelty at the time.

The fact that this translation was effectively addressed to a female readership is confirmed by an analysis of its reception. Although the translation was published without the name of the translator (who did not print any translator's preface) the fact that the work had been accomplished by Elizabeth Carter was common knowledge. A poem dedicated to "Miss Carter", praising her translation, appeared shortly after the publication of her work. Algarotti's popularisation of Newton's theories was considered as a radical innovation, as a first step into the process of making scientific knowledge available to female readers:

Now may the *British* fair, with *Newton*, soar
To worlds remote, and range all nature o' ver;
Of motion learn the late discover'd cause,
And beauteous fitness of its settled law. (Swan 1739, 322).

Furthermore, in 1739, Thomas Birch reviewed Carter's translation in the literary journal *History of the Works of the Learned*, highlighting the fact that a translation produced for the benefit of women had been realised by a woman:

The *English* Translation has this remarkable Circumstance to recommend it to the Curiosity of the Public, as the Excellence of it will to the Approbation of all good Judges, that as the Work itself is design'd for the Use of the Ladies, it is now render'd into our Language, and illustrated with several curious Notes, by a young Lady, Daughter of Dr. *Nicholas Carter*, of Deal in Kent. (Birch 1739, 392)



Hence, Algarotti's fictitious appeal "per le Dame" seems to have been taken literally in its English translation. If this was indeed the case, what happened to the gallant language and erotic allusions of the original?

The English translator was extremely consistent in her work, and took a bold step so as to make her translation into a coherent text. She modified, in fact censured, all those traits in which Algarotti's style appeared to run against its supposed appeal to a female public. The two examples quoted earlier are a case in point. The passage about the blind sculptor does not include the second part referring to the female body:

We have the example of a Statuary, who tho' he was blind, yet by the help of his Feeling made tolerably good Likenesses. (Algarotti 1739, I, 153).

A similar intervention was adopted in the example about the refraction of light, where the philosopher's titillating comment was omitted.

This is the very Thing, said she, interrupting me, that I lately observed when I was in the Bath, and I was extremely surprised and puzzled to find out the Reason for it. It is nothing else, answered I, but the Refraction which the Rays suffer in passing from Air into Water. (Algarotti 1739, I, 119).

The result of these interventions makes Carter's translation into an extremely coherent text with greater scientific rigour than the original itself.

Another type of manipulation emerges when the original's enforcement of a radical change in Italy, ideally represented by the inductive methodology of the British scientific tradition, is taken into account. The appeal was not reproduced in Carter's translation, and it is possible to speculate that she was unable to grasp its importance, probably because she was not sufficiently familiar with the socio-historical conditions of the geographical area generally known as "Italy" at that time. Hence, the scope of Algarotti's reforming project was definitely lost in its English version.

This is especially clear in the translation of a passage in which Algarotti compares the backward state of his culture against the dynamic situation of other European countries, which had assimilated the benefits of the modern scientific methods. When Algarotti writes that the progress of the modern age had not reached his country yet, and hopes that it will eventually get there, Carter translates "una volta anco per noi" (literally "for us too, at last") as "once more". Such a banal linguistic mistake made her version diametrically opposed to the main thesis of the original author. Here is the original passage and its English translation:

il Secolo delle cose venga una volta anco per noi, e il sapere non ad irruvidir l'animo, o a piatire sopra una vecchia e disusata frase, ma a pulir serva, se è possibile, e ad abbellir la Società. (Algarotti 1737, XI)

let the Age of Realities once more arise among us, and Knowledge instead of giving a rude and savage Turn to the Mind, and exciting endless Disputes and wrangling upon some obsolete Phrase, serve to polish and adorn Society. (Algarotti 1739, I, XVI)



Algarotti's appeal for renovation not only in the field of scientific knowledge, but also in a wider, though vague, socio-political sense, was not understood by the English translator and remained silent in her version. As a consequence, Carter's translation became an instructive handbook on natural philosophy specifically addressed to a female readership. Even the title seems to be consistent with this interpretation, as in English it reads as follows: *Sir Isaac Newton's Philosophy Explain'd for the Use of the Ladies*, laying a special emphasis on its pedagogical function. This is somehow less apparent in the original Italian: *Il Newtonianismo per le Dame, ovvero Dialoghi sopra la luce e i colori*.

5. CONCLUSION

Women's space of manoeuvre in the press and literary field was still rather restricted in early eighteenth-century Europe. Different developments would take place in different countries in the second part of the century: in Britain, the feminine novel was to emerge slowly, to blossom after the turn of the century, whereas in Italy it became extremely difficult for the generations of women who followed Laura Bassi to enjoy the same kind of scientific career she had had (Findlen 2003, 235). In the last decades of the century, the French Revolution was inspired by the universal principles of freedom and equality, and yet it seemed to be not as sensitive to the issue of women's subordination.

However, rather than stressing the limits of women's participation in the production of knowledge, and consider translation as a limited form of authorship, I would like to question the meaning of authorship itself in the case of such complex works as Carter's translation and Barbapiccola's preface. The dexterous use the latter makes of quotations from numerous authors, together with the depth of her historical perspective when she demonstrates women's role in history, as well as her analysis of the debated connection between knowledge and religion, are symptomatic of an originality of intent that gives shape and body to her project to popularise Descartes. The *traduttrice's* decision not only to put her name to her translation, but also to have her portrait, rather than the original author's, at the front of the book, may be interpreted as an early glimpse of self-awareness (cfr. Findlen 1995, 182-3).

In the case of Carter, whether her manipulation of Algarotti was consciously or unconsciously performed, or, whether it was the product of external pressures (by the commissioner, Edward Cave, and his circle, for example), must remain a matter of conjecture. Yet, as a result of her textual interventions, the contrast between the empirical and the metaphorical reader, which is a manifest weakness of Algarotti's work, is no longer present in the English translation. The empirical reader "borrows" the features of the translator and the handbook's pedagogic intention produces, or rather, projects the image of a new female reader. The fact that this reader, as a woman, belonged to the category of the non-educated readership made her paradoxically more receptive of the innovative power of the empirical scientific approach than her male counterpart. Hence, a new, modern type of female reader, free from the potentially restrictive cultural affiliations which characterised more



traditional categories of cultivated (male) readers, appears to be foreshadowed in Carter's translation of Algarotti.

In both cases women translators mediated, or rather re-mediated scientific texts that needed to be presented in a fresh light in order to reach a new potential readership: their works can possibly be considered as a strategy of text production with at least the same cultural import as original writing. Text production is meant here as a complex concept, combining the idea of individual agency with the cultural dynamics that have moulded it. Not only does this perspective emphasise the fact that meaning is essentially open to negotiation, but it also highlights the creativity of the roles and activities involved in translation. (cfr. Agorni 2005).

Barbapiccola's translation of Descartes' *Principles of Philosophy* was the only complete version in Italian until a new translation appeared in 1967 - by another woman, Maria Garin (Findlen 2005, 46). Barbapiccola herself did not produce other works in the scientific field, but published only a few poems. In spite of this, her reputation as a "Cartesian woman" spread out of the Neapolitan territory, as she was mentioned in Giovan Nicolò Bandiera's (1740) list of women who had distinguished themselves in the fields of science.

Carter's reputation as a celebrated translator was the result of another work of hers, *All the Works of Epictetus, which are Now Extant.. Translated from the Original Greek by Elizabeth Carter* published in 1758. This work brought her financial security (she earned nearly £1,000 for this translation) and social prestige, as she received two Royal visits in the last years of her life. She was considered as one of the most learned women of her time, and her name was included in several anthologies of women's writing.

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