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**GEORGE ELIOT AND THE SCIENTIFIC METHOD**

**CAMPINA GRANDE  
2018**

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Final paper submitted as partial requirement  
for the degree in English Language and  
Literature at the State University of Paraíba.

**Major:** English literature.

**Supervisor:** Professor Valécio Irineu Barros,  
M.A.

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## RESUMO

Este ensaio monográfico está inserido no campo de estudo interdisciplinar da Literatura e Ciência. Ele se propõe a investigar a forma na qual a ciência influenciou o método literário da escritora realista do século XIX George Eliot através de uma análise de variadas citações retiradas de trabalhos de ficção e não-ficção dela. Se argumenta que Eliot adotou e defendeu o realismo literário porque ela o entendia como uma forma de aplicar o método científico à literatura, conseqüentemente seguindo as suas convicções morais e intelectuais que haviam a levado ao cientismo. Nesse entendimento, também se propõe que Eliot agiu como uma “reaproximadora” dos discursos das humanidades e das ciências, que existiam como um até o século XIX mas que se separaram de forma consideravelmente dramática durante o curso de sua vida. Assim, curtas observações sobre as implicações do seu método científico literário são feitas, considerando essas não apenas para seus escritos mas também para o discurso das humanidades e das ciências em geral.

**Palavras-chave:** Literatura. Método literário. Cientismo. Realismo.

## ABSTRACT

This monographic essay is inserted into the interdisciplinary field of study of Literature and Science. It proposes to investigate the way science informed the literary method of nineteenth-century realist writer George Eliot through an analysis of varied extracts from fiction and non-fiction works of hers. I argue that Eliot adopted and defended literary realism because she understood it as a way to apply the scientific method to literature, hence honouring her moral-intellectual convictions which had led her to scientism. In the same vein, I also propose that Eliot acted as an earlier 're approacher' of the discourses of the humanities and the sciences, which had existed as one up to the nineteenth century but started to separate quite dramatically during her lifetime. Thus, brief observations are made upon the implications of her scientific-literary method, considering those not only to her writings but to the discourse of the humanities and the sciences in general.

**Keywords:** Literature. Literary method. Scientism. Realism.

To my mother, for her long-lasting support, without which I would never have come to where I am now; and to my late grandmother, for instilling a love for education in our family, despite all the difficulties.

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## **NOTE TO THE READER**

This paper is written following the State University of Paraíba and the Brazilian Association of Technical Standards ('ABNT') guidelines for academic texts.

All emphasis found on quotations are from the originals, except when explicitly noted otherwise.

## CONTENTS

|   |           |
|---|-----------|
| <b>1 INTRODUCTION .....</b>                           | <b>9</b>  |
| <b>2 HISTORICAL BACKGROUND .....</b>                  | <b>11</b> |
| <b>3 GEORGE ELIOT AND THE SCIENTIFIC METHOD .....</b> | <b>14</b> |
| <b>4 FINAL CONSIDERATIONS .....</b>                   | <b>23</b> |
| <b>REFERENCES .....</b>                               | <b>26</b> |

## 1 INTRODUCTION

Distance promotes objectivity in observation, it has been claimed, but distance of time is yet to give the more than half-a-century-old interdisciplinary field of study of Literature and Science (here indicated by the capitalised first letter of each noun) a definition that properly accounts for the vastness of its aims and the varieties of its approaches. Perhaps that is a sign that the field is still in an embryonic stage, or perhaps that it is so rich in possibilities that it cannot be reduced by the rule and line of a definition. Perhaps, however, it is the nature of the field itself—standing between not only the literary and the scientific realms, but also (and mainly) between the humanities and the sciences—that clouds things a little bit. Meyer (2018, p. 1), for example, had to resort to numbering when opening his introductory essay on the field in order to account for such an ‘innovative’ area of research:

Over the past four decades, and in ongoing dialogue with science studies, the innovative interdisciplinary field of Literature and Science has become a dynamic platform for investigation into the many ways that the humanities and sciences share (1) a fundamentally pluralistic outlook; (2) common cultures, discourses, and practices; and (3) a commitment to expanding the range and capabilities of empiricist approaches. (MEYER, 2018, p. 1)

The mention of investigating ‘common cultures’ is opportune. Meyer is clearly alluding to C. P. Snow’s Rede Lecture, delivered at the University of Cambridge in 1959 and later published as *The Two Cultures and the Scientific Revolution* (henceforth *Cultures*), which has been generally understood as the beginning and turning point in the debate about the humanities and the sciences. Beginning and turning point because even though the discussion about the divide between those two areas of knowledge had (to some extent) already started in the nineteenth century, it was the lecture which laid the foundation on which most of the current conversation about the humanities and the sciences, and hence about literature and science (and here I refer to the discussion itself, as the uncapitalised first letters of the nouns show), on one way or another, stands on.

The argument made by Snow is well-known and still pertinent to this day: Western society, he argued, had been divided into two cultures—namely the one of the ‘literary intellectuals’ (representing the humanities<sup>1</sup>) and the one of the scientists—which were characterised by ‘a gulf of mutual incomprehension’ (1998, p. 4). It is here, then, that

<sup>1</sup> Snow does not mention the humanities by name at any point in *Cultures*, but the way he employs ‘literary intellectuals’ is what has allowed it to be understood as an encompassing term for the humanities rather than a restricting one for literature only.

Literature and Science presents itself as fruitful, for, as Meyer (2018, p. 1) proposes, it should aim to allow people to ‘know more about how the sciences and humanities inform one another’, i.e. to act as a mediator of the two cultures, and that is why it is important ‘to grasp the essentials of this still emerging field’. To do that, however, we must first understand the ways in which Literature and Science has approached such a task.

Meyer, discussing the development of Literature and Science, identifies two waves which characterise the larger aims of the field: a first-wave Literature and Science that developed through two phases, with the first being ‘largely limited [...] to consideration of the influence of science on literature, whereas the subsequent one complicates this stance by emphasizing the influence of literature on science instead’ (2018, p. 4), and a second-wave Literature and Science in which ‘the field triangulates any number of foci in the arts, the non- or extra-literature humanities, and the social sciences’ (2018, p. 6). Those waves are not mutually exclusive, nor are the phases of the first one: they have existed side by side, even though they can be regionally marked—according to Meyer (2018, p. 3), first-wave Literature and Science generally characterises the field in Britain, while in America the second one has become more common.

This monographic essay is inserted in the first wave, first phase of Literature and Science for it aims to delineate how the scientific method influenced the literary method of the Victorian realist author George Eliot, and then to comment on the implications of that not only to her works but also to the relationship of the humanities and the sciences. The case for that lies in two reasons: the first is because George Eliot is one of the richest authors in the English language when it comes to literature and science, and the second is because the nineteenth century presents itself as a very appropriate time to situate a research about literature and science *and* the humanities and the sciences given that it was during that century that the division between the two cultures occurred. Before proceeding to the analysis itself, however, we must first understand the historical basis that led to that division—a division that may seem natural from a contemporary point of view, but which is indeed a very recent thing.

## 2 HISTORICAL BACKGROUND

In the Western world, the roots of the humanities and the sciences lie in ancient Greece, specially in the works of the two most influential post-Socratic philosophers. Plato seemingly favoured the world of the ideas through the theory of Forms, while his student Aristotle seemed to have more certainty on what is physical. In a sense, it can be argued that the ideological battle historically set between Plato and Aristotle constitutes a proto-discussion between the humanities and the sciences: with Plato being regarded, as Bulmer-Thomas (1984, p. 107) puts it, as ‘an obstacle to the progress of science’, even though evidence that he held the theory of Forms as personally true is textually scarce; and Aristotle, with his focus on the natural world, as the basis of the sciences, even though his astrophysical beliefs ended up being more damaging than helpful to European astronomy in the long run. Those ideological differences, however, were not strong enough to characterise a division between the common discourse that existed and continued to exist at and after that time.

When Alexandria fell to Rome and Greek culture and knowledge were absorbed by the Romans, so was their common discourse, with much of it remaining as the standard of the Western world’s intellectual life up to the Scientific Revolution, which then laid the foundations on which modern science was able to develop. One of those foundations was the realisation that there was a ‘proper way’ for the sciences to study the world, a standardised approach which would allow them to investigate something without the influence of philosophical, religious or aesthetic forces. The scientific method, as it has been called, can be summarised in three steps—observation, creation of hypothesis and experimentation—and all those, Hawley and Holcomb (2005, p. 16) make clear in their explanation of the scientific view, are used to support the effort of finding truths that are ‘independent of humanity’:

In science, the ultimate judge is the empirical data, the *objective* observations. The truth, whatever it may be, is independent of humanity; but it can be known and understood, at least in approximation. The results of a set of observations, that is, of an experiment, must not depend upon who makes the observations. The test of any theory lies in its ability to make predictions that can be tested by further experiments. Regardless of the internal consistency of a theory, or its philosophical or aesthetic appeal, it is the data that judge the success or failure of that theory. (HAWLEY; HOLCOMB, 2005, p. 16)

The scientific method was of vital importance not only to the transformation of science into its modern form but also to its eventual separation from the humanities. In the

nineteenth century, the scientific method was greatly championed by those who were making sure that science would grow in precision, power and acceptance (Thomas Henry Huxley being a famous example). The sciences, which had long been grouped under the general term of ‘natural philosophy’, started to actively branch out during that century, with many associations, institutes and university departments emerging with the intent of dealing with the newest scientific discoveries. The knowledge produced in turn allowed science to become more and more specialised, and then eventually its own field of knowledge and discourse. Equally important, however, is the fact that that knowledge shifted the way society saw (and depended on) science, evidenced by the growing support it enjoyed during that time.

The nineteenth century was an era of evolution and revolution. In particular, a great number of the techno-scientific developments that most drastically affected the way of living originated in the English-speaking world, the result of Britain being the first country in history to industrialise. The term ‘scientist’, for example, was not only coined in the nineteenth century but in the English language as well. That probably partially explains why the rupture between the humanities and the sciences presents itself so markedly in the English language: as Clarke and Rossini (2011, p. 1) notes, for example, German assumes that every academic discourse is a scientific one (*Wissenschaften* representing all disciplines, and then *Geisteswissenschaften* the humanist ones and *Naturwissenschaften* the natural ones), and even Portuguese, although similar to English, still avoids a dichotomic division by separating the scientific discourse into two (*Humanas* representing the humanist disciplines, *Exatas* the mathematically-dependent ones and *Biológicas* the rest of the natural sciences). But in English this division has been mainly dichotomic: the humanities and the sciences, everything in one or another, and nothing else in between.

Not everyone was happy with the scientific growth, however. Science seemed to attack that which poets held as most fundamental, and therefore became a source of particular resentment to many of them. If in the end of the eighteenth century Blake had already decried that ‘Art is the Tree of Life. [...] Science is the Tree of Death’ (1927, p. 430), then in the beginning of the nineteenth century Keats delineated how ‘all charms fly / At the mere touch of cold philosophy’, for it ‘will clip an Angel’s wings / Conquer all mysteries by rule and line’ (1865, pp. 147-148). In America the situation was not so different: Poe questioned why science ‘preyest [...] upon the poet’s heart’, a ‘Vulture, whose wings are dull realities’ (1906, p. 64), and when Whitman ‘heard the learn’d astronomer’, he could not help but ‘became tired and sick’ (1892, p. 31).

As science developed its own discourse and became its own field of knowledge, however, it was only a question of time before it started attacking the humanities. Most notably, Howarth (1968, p. 177) calls attention to an 1883 passage by William Thomsom (1889, pp. 73-74) which was particularly much quoted in twentieth-century Physics books:

I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of *science*, whatever the matter may be. (THOMSOM, 1889, pp. 73-74)

And although such a close-minded view on knowledge has certainly not endured, the passage illustrates with clarity how by the end of the nineteenth century the discourses of the humanities and the sciences were already understood as fundamentally different from each other.

### 3 GEORGE ELIOT AND THE SCIENTIFIC METHOD

George Eliot is probably one of the first names to come to the mind when one thinks about literature and science in the nineteenth century English literary tradition. The great Victorian novelist was, with all the might that the word evokes, an erudite of extensive interests, as easily evidenced in her fiction and non-fiction, published and private writings. Eliot's erudition was the result of a life of brief formal education and long informal learning. As a child and a teenager, she was afforded an education which not many in England—even less women—were privileged to have. The death of her mother when she was sixteen forced her to finish her formal studies, but her love for learning never declined. By her earlier twenties, Eliot had already studied at least four foreign languages (French, Italian, Latin and German); by her middle twenties, she was already a notable translator; and by her earlier thirties, the assistant editor (effectively, the main one) of *The Westminster Review* (henceforth *Westminster*).<sup>2</sup>

'I enjoy all subjects—all study', Eliot once wrote in a letter (1885, p. 322), explaining the impetus of her intellect. 'Science, history, poetry—I don't know which draws me most', and a simple look into her reading list immediately reveals a life of diligent contact with a variety of written works, in a variety of languages, and about a variety of subjects. Even though she highlights how all those subjects were equally important to her, the fact that she put science in the first position of her interests should not be ignored, particularly when we understand that the sciences were indeed one of the leading of her lifelong passions. Not only her works abound with scientific metaphors and imagery, but her letters, journal and diary entries reveal readings and studies in numerous scientific subjects such as astronomy, biology, geology, mathematics and even phrenology.<sup>3</sup>

Eliot is one of the most interesting authors when studying literature and science, not only because she was so keen to both and intermingled them in quite varied ways in her works, but also because she lived in a crucial time of scientific consolidation. Not only had she inherited a world of growing scientific support (and dependence) when she was born in 1819, with the manufacturing innovations brought by the Industrial Revolution dramatically

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2 The *Westminster* being an extremely influential journal in Britain along the nineteenth century, home of many liberal writers, and one which published articles on the most varied topics, including literature, philosophy and science.

3 Phrenology, the study of how cranial features would possibly reveal the personality and intellect of humans, is today widely understood as a pseudoscience, but was seen as a serious scientific subject during the first half of Eliot's life.



changing the landscape of human activity, but she was also to witness many other scientific developments and revolutions during her lifetime, from the first use of anaesthesia in 1842 to the publication of Charles Darwin's *On the Origin of Species* (henceforth *Origin*) in 1859. Eliot's interest in the natural sciences received its greatest incentive in 1854 as the result of her union to George Henry Lewes, man of letters and sciences. Stimulated by his interest in the theoretical (and eventually observational) study of the natural world (particularly in the fields of biology and psychology), Eliot was to incorporate it in her own writings. It is in that sense that Fleischman (2010, p. 95) finds the link between her literary beliefs and science in 'naturalism', i.e. in the scientific side of realism.

Discussing realism as an epochal artistic movement, C. Levine (2012, p. 84) notes that it 'is most often associated with nineteenth-century fiction' and identifies 'three broad explanations' (2012, p. 86) for its rise during that time. The first has in Georg Lukács and Henry Shaw its main exponents: it holds that realism developed as a reaction to the social changes caused by the economic and political revolutions of the time, with the individual now playing a significant role in the emerging new reality. The second sees realism as mainly a task of answering questions related to the nature of truth, i.e. as an epistemological endeavour, with Ian Watt and George Levine providing examples of that: for the former, the realist novel was a response to the growing empiricist philosophy of the time; for the latter, a reflection of a very diverse and growingly secular intellectual landscape. Finally, the third and 'less well known than the other two' is found in the 1920s Russian formalists and claims that realism depended on innovation and shock to continue to present audiences with works that felt real (i.e. as representing reality truthfully).

In what concerns George Eliot, the second explanation—which for reasons of succinctness I shall name as the epistemological view—presents itself as the most appropriate to explain her adherence to and defence of realism. C. Levine (2012, p. 86) notes that Watt 'points to the widening influence of empiricist philosophy, which [...] imagines that truth may best be found by the individual, depending on her own lived experience, independent of tradition', whilst G. Levine (apud C. LEVINE, 2012, p. 87) is directly quoted as claiming realism as a 'secularizing movement directed against the falsehoods of earlier imaginations of reality'. The nineteenth century was indeed an era of secular growth: in Europe, for example, religion had never suffered so many foundational attacks against it, with the highest example being found in Darwin and his *Origin*, which allowed humanity to see a developing and diverse living world without the action of a designer.

In the source of this secularising culture was the search for truth. Since the Greek and Roman times, philosophy and religion had respectively assumed a central role in the Western world when it came to explaining what was real, what was not, and how to discriminate between those; in the nineteenth century, however, science emerged as a strong contender for such an important role, and one which could hardly be ignored in any way or form. As McKechnie and Alder (2012, p. 2) note, from the nineteenth century on ‘scientific discoveries and influential publications [...] had philosophical implications’ that clashed with predominant, long-held modes of thought (such as Christianity), and literature was to reflect that. After all, as the epistemological view and the reaction view (to name the first explanation of the rise of literary realism that way) lead us to understand realist writers as respectively responding to the philosophical and social developments of their time, then it would be expected that nineteenth-century realists would themselves attempt to convey some kind of secular truth too.<sup>4</sup> In that sense, the search for truth was a shared objective of both scientists and realists.

For Eliot, in particular, the search for truth was a lifelong goal, one which can be traced to long before her adhesion to realism and her start as a novelist; it can, in fact, be traced to the earliest of her intellectual foundations. It was, as indicated by her 22-year old self in a letter to her father, a matter of personal integrity. Explaining her renouncement of Christianity, Eliot (apud BODENHEIMER, 2018, p. 71) emphasises how, for her, ‘integrity’ depends on ‘convictions’ being hold as personally true, even in the face of different social expectations:

Such being my very strong convictions, it cannot be a question with any mind of strict integrity, whatever judgement may be passed on their truth, that I could not without vile hypocrisy and a miserable truckling to the smile of the world for the sake of my supposed interests, profess to join in worship which I wholly disapprove. (ELIOT apud BODENHEIMER, 2018, p. 71)

Or, as Ewen (2007, p. 442) puts it, ‘[s]he would never swerve from the paths of integrity she had marked out for herself’, and such paths of integrity required the world to be seen (and, later in her life, shown) in the way she—not others—believed to be true, even if that meant rejecting such a societal standard as being Christian. It is in that sense that by claiming that she cannot ‘without vile hypocrisy and a miserable truckling to the smile of the world [...]’

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<sup>4</sup> This seems to be supported, for, as C. Levine (2012, p. 85) notes, ‘[n]ineteenth-century realist writers typically declared an interest in conveying the “truth,” [...] but their characterizations of truth varied widely’.

profess to join in worship which [she] wholly disapprove[s]' that Eliot reveals her 'mind of strict integrity' as open to go against what G. Levine called 'the falsehoods of earlier imaginations of reality', and all through what Watt put as the 'own lived experience, independent of tradition'. Those two understandings of the world were very important to young Eliot, with the latter, in particular, being a part of her intellectual convictions even during a previously ardently-religious period, and something which she seemed to hint many years later in her *magnum opus* novel.

*Middlemarch: A Study of Provincial Life* (1871-72, henceforth *Middlemarch*) presents us with a young heroine that many scholars have had the care to draw similarities between her and the author in her younger years. In a scene of Chapter IV we find 19-year-old Dorothea Brooke and her uncle, Arthur Brooke, having a conversation about Edward Casaubon, the scholarly but older suitor who wants to marry her. Mr Brooke is trying to persuade Dorothea not to marry him, for he (and all the other characters) finds in Sir James Chettam, the intellectually simpler but younger suitor, a better match for her. The dialogue between them follows as such:

"I should not wish to have a husband very near my own age," said Dorothea, with grave decision. "I should wish to have a husband who was above me in judgment and in all knowledge."

Mr Brooke repeated his subdued, "Ah?—I thought you had more of your own opinion than most girls. I thought you liked your own opinion—liked it, you know."

"I cannot imagine myself living without some opinions, but I should wish to have good reasons for them, and a wise man could help me to see which opinions had the best foundation, and would help me to live according to them." (ELIOT, 1871, pp. 62-63)

Dorothea's argument can be used to clarify Eliot's early position on convictions. As the former and the latter agree, personal opinions should be an inherent part of one's character (Dorothea 'cannot imagine [...] living without some opinions', while Eliot cannot 'without vile hypocrisy [...] profess to join in [a] worship which [she] wholly disapprove[s]') but they need to be based on reasonable grounds (Dorothea's wants 'good reasons' for her opinions, whilst Eliot will not simply submit her convictions 'to the smile of the world') which in turn have to be rooted in the firmest of the foundations (Dorothea's wants the 'best foundation' for her opinions, while Eliot's search for those led her to abandon Christianity). If that does not happen, then they are not fit for their higher purpose of guiding one's life (Dorothea's 'to live according to them').

As it is evident, Dorothea is moving *towards* building her own convictions—even though her idea of how it should happen is already one—while Eliot already has hers. Perhaps it is the three-year gap between them, supported by the fact that Dorothea seems to represent Eliot in her earlier ardently-religious period, but the comparison still remains, for both do it by refusing to put social opinions over their personal ones. In fact, at least in what concerns Dorothea's case, it can be argued that her choice of conviction—to please her intellectual expectations (by marrying Casaubon) instead of the social one's imposed over her—is then made through 'her own lived experience, independent of tradition'. Young Eliot's renouncement of Christianity reveals her wish of finding for her 'opinions [...] the best foundation'—i.e. to transform them into convictions—and her growing interest in the sciences during the 1840s indicate that she knew the direction she should follow to achieve that.

In 1851, the Eliot who was now writing for the *Westminster* was far-away from the Eliot who had horrified her father due to her non-religious beliefs, but the most dramatic changes in her life had not happened in the nine-year period between the time when the letter was written and 1851, but in fact in less than two years. For it was in the 1849 that her life changed completely: her long-ill father, who she had been nursing for quite long now, died; she travelled to Switzerland and back again to England, but this time to live in London; and she became the assistant editor of the *Westminster*. Now fully able to dedicate herself to an intellectual life, it is in her January 1851 review of R. W. Mackay's *The Progress of the Intellect* that we find the first clear evidence of Eliot's acceptance of the type of science that would underpin her literary method:

[Mackay is] [h]olding, with Auguste Comte, that theological and metaphysical speculation have reached their limit, and that the only hope of extending man's sources of knowledge and happiness is to be found in positive science, and in the universal application of its principles; [...] There is, undeniably, truth in this view. (ELIOT apud PINION, 1982, p. 3)

The mention of Comte must not deceive us into reducing her convictions to Positivism, even though the Comtean teachings indeed much informed many of her lifelong beliefs.<sup>5</sup> Instead, Simon's (apud VOGELER, 1980, p. 408) distinction between Positivism and scientism appears to be the most appropriate to explain Eliot's convictions, with the latter (which represents the 'admiration of the natural sciences and the effort to extend their

5 Eliot found in Comte's teachings agreement to many—but not all—of her convictions; those included, as Pinion (1982, p. 6) delineates it, the fact that 'she and Comte held that education and science are fundamental to progress, that religion needs to be at one with scientific truth, and that self-interest should be subordinated to altruism and general welfare'.

methods and values to other disciplines’<sup>6</sup>) being a better description of Eliot’s own approach to science—both at this point in time and later in her life—and in accordance with her call for the ‘universal application of its principles’. In fact, our point of focus must be her claim of ‘extending man’s *sources* of knowledge’ through the ‘universal application of [the scientific] *principles*’, and I put emphasis on ‘sources’ and ‘principles’ because it reveals Eliot’s acceptance of the scientific method as providing a universal ‘foundation’ for the pursuit of truth, which here appears as ‘knowledge’. Empowered by such understanding, Eliot was now on track to meet—and accept—the literary method which she would champion and eventually employ into her fiction.

It is in her April 1856 review of John Ruskin’s *Modern Painters III* that Eliot, now much closer to become a novelist, reveals what Herman (1996, p. 20) calls the ‘central formulation of her creed’ by approvingly writing that:

The truth of infinite value that [Ruskin] teaches is *realism* — the doctrine that all truth and beauty are to be attained by a humble and faithful study of nature, and not by substituting vague forms, bred by imagination on the mists of feeling, in place of definite substantial reality. (ELIOT apud HERMAN, 1996, p. 20)

Eliot is here defending and defining the literary method that which she herself would later become the main name in English literature. Realism, either as an artistic technique or as an artistic movement, has been historically difficult to define; C. Levine (2012, p. 84) notes, for example, that despite decades of extensive scholarship on the topic, ‘no consensus has ever emerged among scholars about the essential qualities of a realist novel’. Aided by Ruskin’s work, however, Eliot indicates that her understanding of such a new ‘doctrine’ is very clear, and that her enthusiastic defence of it is rooted on the fact that her scientism had now a way to enter the arts; for even though she does not directly mention science here, the concepts behind a ‘humble and faithful study of nature’ and ‘definite substantial reality’ are evidently suggested by the scientific method—being, as a matter of fact, the representation of the first step of it, observation (or, more precisely, *objective* observation).

Perhaps the biggest indicator that Eliot’s defence of (and eventual adhesion to) realism had a strong scientific underlining is found in the fact that, just some months after the publishing of her glowing review of Ruskin’s work, she made the first overt reference to the

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6 In the English language, ‘scientism’ has a number of different definitions, some which are in great contrast with each other; in this essay, I will be sticking to Simon’s (apud VOGELER, 1980, p. 408) one.

employment of the scientific method to fiction. In the conclusion of her October 1856 essay *Silly Novels by Lady Novelists*, one of the final of hers to the *Westminster*, and published around three months before *The Sad Fortunes of Reverend Amos Barton*, her first piece of fiction, she states that:

No educational restrictions can shut women out from the materials of fiction, and there is no species of art which is so free from rigid requirements. Like crystalline masses, it may take any form, and yet be beautiful; we have only to pour in the right elements—genuine observation, humor, and passion. (ELIOT, 1883, p. 203)

In her past writings, Eliot had alluded to scientism but without directly mentioning literature; here, however, she is finally on the domain of literature and science. The natural sciences employ an empirical approach to reality, attempting to observe and describe it as it is, or as it presents itself to be; Eliot was attempting to do the same. She advocates for ‘genuine observation’ of life for the creation of ‘beautiful’ fiction, and in the science- and technology-revolutionised world of the Victorian era, what kind of observation could be more genuine than these applied by the scientific method? In fact, that can be seen in both her early and later novels. She accepted that observation based on the scientific principles could work when observing humanist subjects; she makes that point clear in *The Mill on the Floss* (1860), one of her early novels, by using the third-person narrator to directly inform the reader that:

[D]oes not science tell us that its highest striving is after the ascertainment of a unity which shall bind the smallest things with the greatest? In natural science, I have understood, there is nothing petty to the mind that has a large vision of relations, and to which every single object suggests a vast sum of conditions. It is surely the same with the observation of human life. (ELIOT, 1860, p. 4)

In *Middlemarch*, one of her later novels, Eliot also uses the third-person narrator to return to a similar idea presented in the previous quotation; she opens Chapter XL with a call for the reader to assume with her the position of an objective observer:

In watching effects, if only of an electric battery, it is often necessary to change our place and examine a particular mixture or group at some distance from the point where the movement we are interested in was set up. The group I am moving towards is at Caleb Garth’s breakfast-table in the large parlour where the maps and desk were: father, mother, and five of the children. (ELIOT, 1872, p. 321)

Both scientific mixtures and groups of people can be observed through the same point of view, Eliot argues, and thus scientific and humanistic observations can be the same in their approaches: objective in their intentions, impartial in their outcomes. That, however, should not lead us to think of her as naive; Eliot was aware that observation can be clouded by one's perceptions, and indeed made this clear in her first full-length novel. In the (famous) Chapter XVII of *Adam Bede* (1859), which is appropriately-titled 'In Which the Story Pauses a Little', Eliot returns to an idea presented in the opening of the novel—the image of the novelist's pen as a mirror which reflects reality—by using the narrator to directly address the reader and inform that:

I aspire to give no more than a faithful account of men and things as they have mirrored themselves in my mind. The mirror is doubtless defective; the outlines will sometimes be disturbed; the reflection faint or confused; but I feel as much bound to tell you, as precisely as I can, what that reflection is, as if I were in the witness-box narrating my experience on oath. (ELIOT, 1859, p. 2)

Yet she accepted that some kind of objective truth *could* be attained. In *Middlemarch*, the narrator notes that Dorothea 'was no longer struggling against the perception of facts, but adjusting herself to their clearest perception' (ELIOT, 1872, p. 259), and it is in that sense that Anger (2001, p. 82) declares that '[p]art of Dorothea's progress in *Middlemarch* is towards more accurate — because less subjective — knowledge', while also defending that '[f]acts matter to [Eliot] and she does believe in them' (2001, p. 83). The answer to such an impasse—the championing of objective observation whilst admitting that the same is not entirely possible—is found on Eliot's belief that *feelings* should also be a part of one's process of gathering knowledge, i.e. of attaining truth.

Eliot had a complex moral-aesthetic literary method that, as we know, was informed by her conviction that one should aim to have beliefs based on a solid foundation to support them. Feelings played a part on the impasse because, as Anger (2001, p. 86) puts it, '[b]y overcoming one's own viewpoint and imaginatively entering into the perspectives of others, one can transcend the limitations of subjective experience'. In other words, a shift of perspective would allow one to observe what kind of information gathered through observation had origins in the subjectivity of the observer, therefore allowing the same to achieve a more objective outlook. That is an important consideration that brings us to the role that Eliot saw herself as playing as a novelist. In fact, without that understanding, the following quotation, taken from an 1876 letter of hers, can easily lead us into



misinterpretation. After assessing her writings as ‘simply a set of experiments in life’ (ELIOT apud DOLIN, 2005, p. 190), Eliot goes on to say that it is:

[...] an endeavour to see what our thought and emotion may be capable of—what stores of motive, actual or hinted as possible, give promise of a better after which we may strive—what gains from past revelations and discipline we must strive to keep hold of as something more sure than shifting theory. I become more and more timid—with less daring to adopt any formula which does not get itself clothed for me in some human figure and individual experience, and perhaps that is a sign that if I help others to see at all it must be through that medium of art. (ELIOT apud DOLIN, 2005, p. 190)

‘Thought’ and ‘emotion’, put by Eliot one after another (or, better still, side by side), reflect the complex belief system of her literary method: objective observation would allow one’s to gain grounded knowledge about the world, but those convictions should also be informed by feelings so one could identify any kind of untruthfulness that could arise by one’s personal perception. Her writings are ‘simply a set of experiments in life’, and such terminological choice sets a clearly scientific approach to fiction; but equally important is her mention of a ‘formula’ (i.e. method) that should be ‘clothed [...] in some human figure and individual experience’, for it also sets a humanistic perspective to it. In that sense, her convictions are informed by both the sciences and the humanities—her literary method the direct result of the encounter of both—and that is why she says that ‘if [she is to] help others to see at all it must be through that medium of art’, i.e. her role as a novelist is to *teach* people to *see* the world as it should be seen, allowing them to then create their own convictions but based on a foundation of truth. That per se explains much of Eliot’s behaviour in fiction, including her interruptions of action through the third-person narrator to directly instruct the reader how to approach and understand a scene.



#### 4 FINAL CONSIDERATIONS

Having understood how George Eliot's moral-intellectual convictions led her to adopt the scientific method as the basis of her literary one, I must now, in accordance with Meyer's call for Literature and Science studies to help illuminate 'how the sciences and humanities inform one another', move on to the final part of this essay: the considerations on Eliot's contribution to the relationship between the humanities and the sciences, i.e. the implications of her scientific-literary method not only to her works but to the wider discourse of the two cultures. To do that I must now consider questions of reader reception, and I will do so by using a very specific event of her career which started with the way she decided to open *Daniel Deronda* (1876):

Was she beautiful or not beautiful? and what was the secret of form or expression which gave the dynamic quality to her glance? Was the good or the evil genius dominant in those beams? Probably the evil; else why was the effect that of unrest rather than of undisturbed charm? Why was the wish to look again felt as coercion and not as a longing in which the whole being consents? (ELIOT, 1876, pp. 3-4)

Which may seem, for a modern reader, as a perfectly normal opening paragraph of a story, but the same could not be said by the contemporary readers of the book. The 'issue' here is Eliot's use of the phrase 'dynamic quality' to describe the eyes of the character of Gwendolen Harleth, for the word 'dynamic' was in the nineteenth century still very much linked to its origins in physics, and therefore had a very strong scientific connotation. As it is evident, that did not stop Eliot of 'appropriating' the word to suit her descriptive needs, but in doing so, she shocked her readers.

The most interesting reaction to the 'dynamic incident', to call it that way, is certainly the one of Henry James. The American-British author was so bothered with Eliot's use of 'dynamic' to describe someone's eyes (coupled with his general disappointment with the direction that Eliot had taken *Daniel Deronda* into) that he published his critical *Daniel Deronda: A Conversation* (1876, henceforth *Conversation*) almost immediately after the publication of the last volume of her novel. *Conversation* is an unusual review of *Daniel Deronda*: it is written as fictional short story in which three characters discuss the book, with each providing either praise, criticism or a middle ground for the work. One character, Constantius, proposes that there are 'two very distinct elements in George Eliot: a

spontaneous one and an artificial one’, of which another, Theodora, replies with ‘You mean that she is too scientific?’ (JAMES, 1894, p. 82). The conversation follows this way:

*Pulcheria.* She talks too much about the “dynamic quality” of people’s eyes. When she uses such a phrase as that in the first sentence in her book she is not a great literary genius, because she shows a want of tact. There can’t be a worse limitation.

*Constantius.* The “dynamic quality” of Gwendolen’s glance has made the tour of the world.

*Theodora.* It shows a very low level of culture on the world’s part to be agitated by a term perfectly familiar to all decently-educated people. (JAMES, 1894, pp. 82-83)

Constantius goes on to make some considerations upon Eliot’s literary method, on which he concludes that ‘[i]nstead of feeling life itself, it is “views” upon life that she tries to feel’ (JAMES, 1894, p. 84). James is clearly suggesting that Eliot’s scientism was not effective or useful, but it is interesting to consider that his mention of Eliot trying to feel ‘views upon life’ reveals an understanding, even if rudimentary in nature, of her moral-artistic convictions and how they informed her fiction. Most importantly, James’ criticism suggests that Eliot had incorporated science in her discourse in such a way that she had become unaware of its implications in a literary work (‘she shows a want of tact’), but it is difficult to think that she was not aware of the implications—or the impact—that putting ‘dynamic’ in the opening sentence of *Daniel Deronda* would have on her language and on her readers.

The shock view—to name the third view of the rise of literary realism that way—holds that realism is an innovative endeavour on the sense that it has to change over time because what is felt as real also changes; C. Levine (2012, p. 88) summarises the view as ‘an attempt to startle audiences with the shock of the real’, and quotes Roman Jakobson (apud LEVINE, 2012, pp. 87-88) when he argues that innovation can be seen ‘when searching for a word which will revitalize an object, we pick a farfetched word, unusual at least in its given application, a word which is forced into service’. It can be argued, then, that the shock view applies to Eliot when we consider Jakobson’s definition of innovation by language, for ‘dynamic’ fulfilled all that for her: it was unusual in its application, and, given the reaction of Eliot’s contemporaries to it, far-fetched, definitely forced into service. As such, the dynamic incident can be considered as a very *realist* endeavour.

However, what the dynamic incident must lead us to consider is that by using ‘dynamic’ outside of its physics discourse, Eliot helped to ‘humanise’ the word (on the sense of bringing it to the discourse of the humanities), popularising it by expanding its original

meaning to cover much more than the forces and motions of objects. ‘Language must be left to grow in precision, completeness, and unity, as minds grow in clearness, comprehensiveness, and sympathy’, Eliot once claimed (1883, p. 165), and knowing how her literary method was so informed by her convictions, it is not outlandish to propose that Eliot may have ‘appropriated’ ‘dynamic’ from the sciences to the humanities not only because she had knowledge on both or because she wanted to shock her readers, but because she wanted to approximate those discourses. Even though the discourse of the humanities and the sciences was still understood as one during Eliot’s time, it was also evident that they were separating. If Eliot accepted science as a way to achieving truth (as seen in the epistemological view), then it would naturally be extremely negative for her for it to separate from literature, or otherwise her novels would never be able to achieve her moral-epistemological goals.

That brings me to the conclusion of this essay. Throughout history, George Eliot has been seen under many lights: as a religious dissenter, as a notable translator, as a prolific editor, as a masterful essayist and novelist, as a searcher of truth... Yet we who live in a time of two cultures, in which the discourse of the humanities and the sciences are still so visibly separated, should also look back and consider George Eliot under the light of a dialogist of the two cultures; as someone who, in a time of crucial division of those discourses, worked to keep them together. She did that by using her fiction to help people see the world as she believed it had to be seen, i.e. by teaching her readers a belief system that united both cultures, and by directly appropriating the language of one discourse to enrich the other. In that sense, George Eliot can be designated yet another title: as the one reapproacher of the two cultures, and what a relevant title that one is almost a century and a half after her death.

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