

“STRANGERS AND BROTHERS”: REVISITING THE QUESTION ON THE TWO CULTURES

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ABSTRACT

We discuss the relationship between art and science. The need to build bridges between the artistic culture and scientific culture is pointed out. They grew apart in spite of the regular contact between them which have always led to mutual enrichment. We compare the claims of Charles Snow and Jacob Bronowski in the fifties with those of the Portuguese António Lobo Vilela, an intellectual banned by the “Estado Novo” very attentive to scientific culture who wrote a book entitled “Science and Poetry”. Bearing in mind the history of this debate, we propose the deepening of these bridges in order to materialize the union of artistic culture and scientific culture.

KEYWORDS

Art; culture; poetry; communication; language

On 7 May 1959 the English physicist and chemist, novelist, politician and public intellectual Charles Percy Snow (1905-1980), better known by the abbreviated name C.P. Snow, delivered a famous lecture at the University of Cambridge as part of the *Rede Lectures* (which started in 1706) entitled “The Two Cultures”, which became justifiably famous. The book with the same title, which contains the text of the lecture, has been published, reprinted, translated and criticized all over the world (Snow 1963).

In Portugal the first edition of the book was issued by Publicações Dom Quixote in 1965 (Snow 1965). It was one of the first books published by that company, directed by Snu Abecassis, as it came out in August of that year and Dom Quixote had only opened business four months before. In 1996, another edition, with translation of Miguel Serras Pereira, was published by Presença (Snow 1996). I transcribe here the spirited defence made by Snow of his main argument, centred on the limitations of so-called ‘traditional culture’. The quote is a bit lengthy, but worth setting down here because it encapsulates the crux of the controversy triggered by the lecture.

They are impoverished too — perhaps more seriously, because they are vainer about it. They still like to pretend that the traditional culture is the whole of ‘culture’, as though the natural order didn’t exist. As though the exploration of the natural order was of no interest either in its own value or its consequences. As though the scientific edifice of the physical world was not, in its intellectual depth, complexity and articulation, the most beautiful and

wonderful collective work of the mind of man. Yet most non-scientists have no conception of that edifice at all. Even if they want to have it, they can't. It is rather as though, over an immense range of intellectual experience, a whole group was tone-deaf. Except that this tone-deafness doesn't come by nature, but by training, or rather the absence of training. (Snow, 1963, p. 14)

Then comes the famous invective against men of letters with regard to the second law of thermodynamics, or law of entropy (or rather law of the non-decrease of entropy in isolated systems, the entropy being a physical quantity expressing the disorder of a macroscopic system), comparing that statement to one of the masterpieces of William Shakespeare:

As with the tone-deaf, they don't know what they miss. They give a pitying chuckle at the news of scientists who have never read a major work of English literature. They dismiss them as ignorant specialists. Yet their own ignorance and their own specialisation is just as startling. A good many times I have been present at gatherings of people who, by the standards of the traditional culture, are thought highly educated and who have with considerable gusto been expressing their incredulity at the illiteracy of scientists. Once or twice I have been provoked and have asked the company how many of them could describe the Second Law of Thermodynamics. The response was cold: it was also negative. Yet I was asking something which is about the scientific equivalent of *Have you read a work of Shakespeare's?* I now believe that if I had asked an even simpler question — such as, What do you mean by mass, or acceleration, which is the scientific equivalent of saying, *Can you read?* — not more than one in ten of the highly educated would have felt that I was speaking the same language. So the great edifice of modern physics goes up, and the majority of the cleverest people in the western world have about as much insight into it as their neolithic ancestors would have had. (Snow, 1963, pp. 14-15)

As the issue was pertinent and his style had the liveliness required to bring it to reader's attention, it was no surprise that rivers of ink flowed in response. In a text published four years later, included "The Two Cultures and a Second Look", C.P. Snow backpedalled in relation to his previous position with an emphasis on the separation of the two cultures, and spoke of the possibility of their mutual reconciliation in what may be called a "third culture". By analysing the controversy caused by his 1959 article, he noted, however, that he was not alone and was not even the first to say what he had said. Other writers before him had highlighted the issue of valuing science in the context of human culture (the adjective "human" is not redundant as some authors speak of culture in the animal world, e.g., Mosterín, 2009). In particular, he referred several times to one his contemporaries, the Polish-British mathematician of Jewish origin, Jacob Bronowski (1908-1974), who, like Snow, made a career in the British civil service and, also like him,

achieved a prominent position in public life through his intellectual discourse. Bronowski, perhaps even to a greater extent than Snow, was one of the rare polymaths of modern times: he was a science historian (he is the author of "The Western Intellectual Tradition", co-written with Bruce Mazlish, published in Portuguese by Edições 70, 2002), a science populariser (he is the author of the acclaimed television series "The Ascent of Man", broadcast by the BBC and subsequently issued in book form, 1973; there is a Brazilian translation entitled "A Escalada do Homem"), poet, playwright and literary critic. In fact, Bronowski published three articles in 1959 in the *Universities Quarterly* associated with three lectures he had given at Massachusetts Institute of Technology in Boston, USA, on 16 February, 5 and 19 March 1953. They were combined to make the essay "Science and Human Values" (1956), published in Portuguese by Dom Quixote in 1972 under the title "Ciência e Valores Humanos" (1956), with a new translation in 1992, as part of the volume "A Responsabilidade do Cientista e outros escritos" ("The Responsibility of the Scientist and other writings") (1992), with introduction, organisation, notes and translation by A.M. Nunes dos Santos, C. Aurette and J. L. Câmara Leme, of the School of Science and Technology, Universidade Nova de Lisboa.

Bronowski illustrated his *leitmotiv* - the unity of culture - not with the work of the bard of Stratford-upon-Avon, as Snow had done, but with a definition by the English Romantic poet and critic Samuel Taylor Coleridge, who in 1814, in his book "On the Principles of Genial Criticism Concerning the Fine Arts" (1971), wrote: "The most general definition of beauty, therefore, is - that I may fulfil my threat of plaguing my readers with hard words - Multeity in Unity". Bronowski, taking Coleridge's concept, said:

When Coleridge tried to define beauty, he returned always to one deep thought: beauty, he said, is 'unity in variety'. Science is nothing else than the search to discover unity in the wild variety of nature - or more exactly, in the variety of our experience. Poetry, painting, the arts are the same search, in Coleridge's phrase, for unity in variety. Each in its own way looks for likenesses under the variety of human experience. What is a poetic image but the seizing and the exploration of a hidden likeness, in holding together two parts of a comparison which are to give more depth each to the other?.

(Bronowski, 1956, p. 27)

While Snow, in his polemical article, valued science which, in his view, was insufficiently appreciated by the public in comparison with art, Bronowski, in the same vein, drew attention to the essential unity between science and art: for him there were not two cultures, but only one. The contempt for science in some circles had, after all, no justification, and was merely the result of tradition and prejudice, perhaps perpetuated by a stagnant education system. Later, in the same essay Bronowski wrote in defence of the deep cultural unity he uncovered between science and art:

The discoveries of science, the works of art are explorations - more, are explosions, of a hidden likeness. The discoverer or the artist presents in them

two aspects of nature and fuses them into one. This is the act of creation, in which an original thought is born, and it is the same act in original science or original art. (Bronowski, 1956, pp. 30-31)

It is interesting that, in the post-Snow era, the mathematician Bronowski found it appropriate to make an apology for poetry rather than an apology for science. In an interview he gave to George Derfer, an American academic specialist in philosophy of religion, published in *The American Scholar* (1974) and republished, in Portuguese translation, in the volume edited by Nunes dos Santos and others in the chapter *The Science, the poetry and 'human specificity'*, Bronowski (1992) thus responds to one of the questions:

Poetry is a wonderful theme that we should consider whenever we talk about scientific ideas, because it reminds us that one can communicate a truth of undoubted intellectual value without the need to be complemented by any system of equations. (Bronowski, 1992, p. 187)

The difference between science and art would therefore be more one of language than of content. While the language of science was mathematical (as has been known since the Italian physicist Galileo Galilei wrote in "Il Saggiatori ("The Assayer") that "[the Book of Nature] is written in the language of mathematics and its characters are triangles, circles and other geometrical figures" (1623, p. 238 of the English translation) poetry is expressed through words in a more visual language than mathematics, but yet not without rules.

But if science and art collude in their attempt to grasp the unity of the world, and are only separated by the use of different languages, one seemingly more intelligible by primarily addressing the emotions, could there be some parallels regarding their methodology? In the same interview, Bronowski argued that both poetry and science depend on the human capacity to imagine, that is, "of our ability to retain images in the mind, to identify these images with constituent elements of reality, and reorganize these elements into imaginary situations." And he added, so that there remained no doubts about the conclusion that he wanted to convey: "All of our intellectual activities depend on this *projection* both in science and poetry" (n/p).

In fact, imagination is the ultimate weapon both of science and art (Fiolhais, 2008). The Swiss-American German-born physicist Albert Einstein, when asked by a journalist in 1929 to choose, between knowledge or imagination, the most reliable, replied without hesitation: "Imagination is more important than knowledge. Knowledge is limited. But imagination embraces the entire world" (Calaprice, 2011, p. 12).

A friend of Einstein recalled later a similar phrase he had heard from him: "When I examine myself and my methods of thought, I come to the conclusion that the gift of fantasy has meant more to me than my talent for absorbing knowledge itself" (Calaprice, 2011, p. 26).

In this context, I would like to introduce a Portuguese author less known, the mathematician and geographical engineer António Lobo Vilela (1902-1966), and one of his

work, "Ciência e Poesia" (Vilela, 1955, 2012), about the relationship between science and art. It might be thought that the positions first of Bronowski and later Snow in defence of the unity of human culture in the 1950s found little echo in the paltry cultural milieu of Portugal in the New State (*Estado Novo*) regime, dominated by António de Oliveira Salazar. In fact, these works only appeared much later in Portuguese, via Dom Quixote, and first-hand knowledge of this subject was limited to the very few people who were able to follow the cultural discussion that took place abroad in post-war Europe. But, interestingly enough, Lobo Vilela, a mathematician like Bronowski and opponent to *Estado Novo* (Vilela, 1999), in a lecture given at the Museum of João de Deus in Lisbon on 22 June 1955, just two years after the Bronowski lecture and four years before Snow's *Rede Lecture*, emphasized the proximity between science and poetry, without quoting Bronowski. The book containing the lecture text, also entitled "Ciência e Poesia" (Vilela, 1955; 2012), published by Portugália in the same year as it was given, began with these words: "The conviction long ago took root in my mind that there are close affinities between scholars and poets, contrary to common opinion" (n/p).

On this respect the book recalled the celebrated poetries written by the poet Fernando Pessoa (1888-1935), or rather Álvaro de Campos, about the aesthetic equivalence between Newton's binomial theorem and Milo's Venus, dating from c. 1915 (Pizarro & Cardiello, 2014): "Newton's binomial is as beautiful as the Venus of Milo. / There are but few people who know this".

And, going further back in time, the author quotes the poet, writer, journalist and politician Guerra Junqueiro (1850-1923) – the preface to the second edition of his book of poetry *A Morte de D. João*, first published in 1874 :

Poetry is truth transformed into feeling. The law discovered by Newton can be explained in a physics book, and sung from a book of verse. The wise man looks at it, demonstrates it, and the poet, starting from this demonstration, draws from the facts all the moral, social and religious consequences, translating them in an emotional way. In this case, science gives us conviction, certainty; poetry gives us emotion, enthusiasm. (Junqueiro, 1887, p. 10)

Vilela then cites the poet and writer Antero de Quental (1842-1891), a Junqueiro contemporary, quoting a letter written by that author while still in Coimbra, addressed to the economist Anselmo de Andrade:

The ground on which today's *certainty* rests was formed by successive waves of ancient *intuition*. What now is science was once poetry: the sage was once a singer, the legislator a poet; and the evidence, a riddle, a brave *guess*, whose profound conclusions are amazement and perhaps despair of the strictest philosophies. And if today we bathe in the full light of reason, it was poetry, that gentle hand, which guided us through the pale twilight of ancient dreams. Ancient? No: eternal dreams! [*italics in the original*]. (Quental, 1989, p. 32)

Since Portuguese isolation was notorious in the 1950s, it is remarkable that at the same time that Bronowski and Snow brought out to cultural agenda the matter of culture unity, a Portuguese had already written on the same topic quoting other Portuguese authors (Pessoa, Junqueira and Quental, instead of Shakespeare and Coleridge). Portugal of Salazar was arid soil to make cultural dialogue to grow - Lobo Vilela was just one of several intellectuals banned by the regime, prevented from being a teacher in high school and forced to gain his live from translations and private lessons. But that soil might well have been irrigated because there were people very well informed about the major discussions and sources of the XIX century. Lobo Vilela's book found some clever readers: one of them was the great mathematician José Sebastião e Silva, who quotes Vilela in his books on the reform of Mathematics he managed to introduce into Portuguese high schools in the 1970s (Silva, 1937). Another was the physicist and science historian Luís Miguel Bernardo, who refers to him in his recent history of scientific culture in Portugal (Bernardo, 2013).

So how did the topic of the unity of culture develop in the world and in Portugal? In the 1980s and 1990s, we should emphasize Carl Sagan's television series *Cosmos* (2009) and the book accompanied that, a worthy successor of Bronowski's *Ascent of Man*, at a time when a wave of science coverage swept through the media. Scientific discourse became fashionable. In addition to the peerless Sagan, others names emerged, including major science writers such as the physicists Roger Penrose and Murray Gell-Mann (one British and the other American), the biologists Richard Dawkins and Stephen Jay Gould (*ditto*) and the American psychologist Steven Pinker. In 1991 a book called *Third Culture: Beyond the Scientific Revolution* (1991) was published by the American literary agent John Brockman, who had created the digital magazine *Edge*. In this book and following the arguments of C.P. Snow in his revisiting of *The Two Cultures*, Brockman spoke about a "third culture", in which he intended to reunite scientific and literary cultures. But for Brockman, in these new science dominated times, there was no doubt about the primacy of scientific culture: the new intellectuals were scientists, particularly those with the greatest capacity to disseminate science to the general public. Brockman's book gave voice to a whole plethora of other disseminators including the above mentioned names.

The history of ideas is constructed by ebbs and flows. It is well known that the post-modern approaches which conventionally entered the world of philosophy in 1979 with "The Postmodern Condition: A Report on Knowledge" (2003) by the French philosopher Lyotard turned out to relativize science's plan to explain the world. Lyotard, whose original intention was to discuss the influence of technology in the modern world, criticised the construction of the underlying metanarrative of the Enlightenment, given preference instead to a diversity of small narratives, such as those provided by literary language. While the language of mathematics is universal, with the aim of eliminating ambiguity, the language of poetry was nourished by polysemy. Then the famous Sokal case (Sokal & Bricmont, 1999), occurred in 1996: the American physicist and mathematician Alan Sokal managed to publish a hoax article sprinkled with scientific jargon in *Social Text* (1996), a renowned social sciences journal which was a voice for postmodernism. The

reviewers and editors had thought that the social sciences would gain particular legitimacy with the use of the esoteric language of hard sciences. Although the discourse containing scientific jargon sounded poetic, it was entirely empty of sense and admirers of the poetic sound were simply praising an absurd from the scientific viewpoint. The discussion that followed the publication of Sokal's text, in which hints of mistrust and resentment emerged, did not help the unity of the sciences, the strengthening of links between the improperly called "hard" and "soft" sciences and did not help to build bridges between science and the arts. The American biologist Gould, in his essay "The Hedgehog, the Fox, and the Magister's Pox" (2003) pointed out that scientists were not involved in the so-called 'science war' since most of them were simply unaware of its existence. The dialogue continues today, not without well-known difficulties. Wilson, another American biologist, speaks of "consilience" (1999), a large meeting place between various branches of science, including the human and social sciences, which would be an omega point in the pursuit of knowledge.

In Portugal some attempts at rapprochement between science and poetry are visible in the recent publication of two anthologies of poems on a scientific theme, one more ostentatious organized by Graça Moura and Bochicchio, "Newton's Binomial and the Venus de Milo. Poetry and Science in Portuguese Literature" (2011) (the title alluding to the poem by Álvaro de Campos), and the other more modest, organized by Malhó, "O Bosão do João" (2014). In visual and performing arts, in line with global trends, several attempts at reconciliation between the "two cultures" have also occurred in Portugal with recognized success.

In conclusion, I would like to express my agreement with Bronowski, going beyond what I have written about science and art (1994, 2007, 2008, 2013, 2015). In my opinion to talk of two or even three cultures is to complicate an already complex issue. I do not think that we need to abandon neither the artistic nor the scientific cultures, which grew separately but with frequent contacts leading to mutual enrichment, in order to assume a third one. What we have to do is to find bridges between the two, so that it becomes increasingly clear that they are only one.

The Austrian physicist Erwin Schroedinger pointed out in lectures given in London in 1948 and Dublin in 1950, included in the book "Nature and the Greeks and Science and Humanism" (1999), that sciences are intended to satisfy the human need for self-knowledge, as are the arts do. For him, the ultimate concern of man was and always will be "who are we?" (Schroedinger, 1999), mirrored in the inscription on Delphi Temple: "Know yourself." Man of arts and man of science are one and the same. There is only one culture, human culture, which has several sides, these two and others, such as, for instance, the religious. The idea that science is outside culture seems to me not only false but also pernicious: science – the human capacity to respond using a defined method to questions raised by Nature - is one of the greatest achievements of the human spirit.

Perhaps the best title for an approach of the two cultures would be that of a series of novels by C.P. Snow: "Strangers and Brothers" (1940). The literary and scientific culture may be strangers to each another, but they are irrefutably brothers.

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