

Science and humanities: across two cultures and into science studies

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C.P. Snow's articulation of a two-culture divide rested on a particular view of science that has been elaborated and superseded by interdisciplinary science studies. Thus, comparisons of the 'science wars' of recent years to the Snow–Leavis controversy fail to recognize basic structural differences between the two sets of debates. In this article, I present these differences and offer some views of what has changed in the intervening years.

The history of the relationship between science and the humanities has taken a new turn in recent years. Although C.P. Snow and the two-culture debate have been the most popular expression of this relationship during the past half-century, the 'science wars' have recently brought the topic back to the fore. In Steve Fuller's review of *Higher Superstition* by Paul Gross and Norman Levitt, he observes that 'the one didactic advantage afforded by their monolithic portrayal of the natural sciences is that it licenses us to revisit the "Two Cultures" controversy that C.P. Snow sparked... How much has changed in the interval?'¹ Fuller thus evokes a comparison between the two debates that has gained wide currency in science wars literature². However, he neglects to clarify the direction of his query or to follow through with the suggestion. We are left to wonder how and why the science wars and *Higher Superstition* license us 'to revisit the "Two Cultures" controversy'. How much of *what* has changed? Fuller's comment points in two directions: back to Snow and what that controversy was about; and here to the science wars and why the two are being compared. Is this valid? And, if so, in what way?

The efforts of interdisciplinary science studies have repositioned the divide between natural science and the humanities. We can thus view 'how much has changed in the interval' in two ways. The first is theoretical, by describing science as culturally embedded and without a superior epistemological foundation. The second is methodological, by combining divergent approaches to viewing the divide. Some disciplinary efforts try to bridge two cultures, some try to blur them into one culture and some try to deny the divide, describing three cultures or

even more. An elaborated understanding of science, such as that provided in science studies scholarship, repositions and subsumes Snow's articulation. Recognizing the structural difference between the two debates casts comparisons between them in a more sceptical light. In the 1960s, with Snow and Leavis, the argument was over which side of divide was better. In the 1990s, the argument was whether or not there is a divide at all.

From hegemony to boundary

In 1959, C.P. Snow gave the Rede Lecture at Cambridge University, entitled *The Two Cultures and the Scientific Revolution*, in which he pronounced his view of a widening gulf between the intellectual cultures of science and the humanities³. Snow's purpose was twofold: to promote the idea that science should be stressed in British education because it could provide a 'better' future; and to advance the notion that communication between the Cold War powers could be facilitated best through the ideologically neutral domain of an international scientific community. Snow's conception fed the Cold War need for supremacy, because his positivist science was not just different from the humanities but better – more reliable, more likely to provide security and more trustworthy. It did not take long, however, for a spirited rebuttal to occur. In 1962, the noted English literary critic F.R. Leavis replied with exasperation to Snow's thesis, thereby establishing the basis for the two-culture debate. Leavis countered Snow's position by asserting the superiority and moral authority of the humanities and, more specifically, by highlighting the value of literature in educating the future of British society.

Snow's lecture can be seen as the culmination of decades of assertions about a cultural divide. The nascent discipline of the history of science had played a key role in noting and approaching the divide – a role that was part and parcel of the founding of the field in both the UK and the USA – well before Snow offered his perspective⁴. George Sarton had founded the History of Science Society in 1924, 12 years after founding the journal *ISIS*⁵. He

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articulated the two-culture problem in 1930. ‘The most ominous conflict of our time is the difference of opinion between...the so-called humanist, on the one side, and the scientists on the other.’⁶ The historian Tore Frängsmyr has suggested that Sarton’s inspiration for the new discipline can be traced to a continental tradition, especially that of Auguste Comte⁷. Sarton intended to provide a bridge between the sciences and humanities, combining a positivist philosophy of science with new ideas in studying the history of civilization. His intent illustrates two points: first, the tacit acknowledgement of a distinction between two different cultures of knowledge; and second, that the history of science was an early candidate that would bridge them (Figure 1).

The Cambridge History of Science Committee of 1936 helped to start the most enduring British version of a history of science program by gathering together scientists and humanists with the intent, like Sarton, of providing a bridge between the two. Joseph Needham and Walter Pagel, as scientists, led the committee, and Herbert Butterfield and A. Rupert Hall brought input from the history department. Later, in 1949, Butterfield broadcast a series of lectures titled *A Bridge Between the Arts and Sciences*⁸. It was apparent to these intellectuals that there were two sides to academia. The original goal of the Committee was that bringing together members from both sides – both cultures – might create a closer understanding of one another. Interestingly, Snow was at Cambridge at the time (in the 1930s) and was fully aware of the Committee and its function⁹. The influence of the intellectuals there and the prevailing philosophy of the time led him to advance the logical positivist view of science in 1959. In doing so, he maintained the positioning of science as an epistemology that sat at the peak of a hierarchical knowledge pyramid, a view that empowered his argument for scientific supremacy.

And so it was, 40 years ago, with the superiority of science being gauged from a foundational level. However, in the intervening years, studies of science have investigated this claim more closely and come to view it in a different light. Today, we might still rely on science as our best means to understand the world, but this assessment can no longer be based on tacit epistemic authority. Evidence of this can be found even in the introduction to reprints of *The Two Cultures* (at least since 1993), in which Stefan Collini observes that we now view science as ‘merely one set of cultural activities among others, as much an expression of a society’s orientation to the world as its art or religion, and equally inseparable from fundamental issues of politics and morality.’¹⁰ The historian of technology Leo Marx also sums up this change in our view of science.

In place of old faith in the possibility of arriving at one truth, many of our most insightful thinkers are tuned to an all-inclusive historicism, acutely sensitive to the...historical and societal basis for all thought and practice. This tendency, with its pronounced bias in favor of contextualist modes of thinking, may help to narrow, if not close, the gulf between two cultures.¹¹



Figure 1 Frontispiece from *A New Universal History of Arts and Sciences* (1759) (Ref. 24).

The ‘old faith’ that he refers to was held by Snow. What Marx points to is a change in disciplinary exegesis. What we had in the 1950s (and was developed for Snow in the 1930s) was a hegemonic concept of science. What we have today – the enterprise of science as portrayed in science studies literature – is a concept of boundary definition, ‘one set of cultural activities among others’, to use Collini’s description. The way to understand what lies beneath the observations of similarity between the science wars skirmish and the decades-old two-culture debate – the why and the how, so to speak – is to recognize the change in our scholarship about science that has occurred over the past 40 years. The question becomes, what have we done to approach the so-called divide?

Crossing, denying and blurring

As I mentioned, the history of science offered one approach to viewing the divide. However, this pre-dates Snow and should be seen as a vanguard discipline that bolsters other science studies efforts of recent years. Thomas Kuhn certainly had something to do with the move beyond bridging the gap that allowed science studies, and the history of science, to reposition the divide that it was originally trying to bridge. As the harbinger of the constructivist movement, Kuhn frustrates the relationship between science and the humanities¹². When

The Structure of Scientific Revolutions is interpreted and appropriated – by the sociology of science, for example – and normal science and scientific revolutions are recognized as community-based activities, Kuhn speaks to the social character of science¹³.

This social definition of science indicates that, as a discipline, science has the same foundational basis as other forms of knowledge-seeking endeavours. If this is the case then the humanities exist on a common level with science and a bridge from one epistemological level to the other is no longer necessary. This is not to say that the achievements of science are the same as those of the humanities, nor even that all scholars agree with such a description of science as social. What I mean to say is only that the sociology of science, as a component of science studies, has developed a picture of science as social, and such a picture does not recognize two distinct and opposing intellectual cultures.

In the same vein, and as perhaps the most influential facet of the progression from Snow to today (hinted at in the views of Collini and Marx), is the idea of local knowledge and boundary definition. Clifford Geertz has called the social sciences the third culture, which Snow forgot, and maintained that all of our knowledge is local, that ‘most effective academic communities are not that much larger than most peasant villages and just about as ingrown.’¹⁴ Thus, social sciences (e.g. sociology and anthropology) deny the need for a bridge and open up the way to contextualizing science. Joseph Rouse, the philosopher of science and promoter of cultural studies of scientific knowledge, says much the same from within science studies. He believes that scientific knowledge ‘is an achievement always rooted in local know-how’¹⁵ and that cultural studies of scientific knowledge ‘display a constant traffic across the boundaries that allegedly divide scientific communities from the rest of culture.’¹⁶ To make the connections here more explicit, we should recognize that a key feature of Kuhn’s analysis was showing that the important values of scientific practice are local. When the social sciences, generally, or the sociology of science, specifically, claim third-culture status, they deny the validity of the two-culture construct.

In addition to the views of sociology, the increase in studies of scientific rhetoric, discourse and inscription that came about in the decades after Kuhn offer another answer to our question of what we have done to approach the divide. Studies of rhetoric work across the divide, concentrating on the study of writing. ‘Literature and science’, now a bona fide subfield of science studies, generally reduces the number of cultures from two to one, because it sees both forms of knowledge as derived from one common culture¹⁷. The approaches to studying literature and science therefore implicitly reposition a two-culture split. For the sake of brevity, I cannot elaborate the full ramifications of this approach here but, to put it simply, the efforts of ‘literature and science’ blur the divide.

Intellectual cultures are innumerable when the demarcation between them is no longer simply a negation; that is, for example, when the humanities are not just the opposite of the sciences. We see a repositioning of Snow’s two-culture divide with the development of interdisciplinary science studies programs and methodologies: the history of science (crossing), the sociology of science (denying) and literature and science (blurring) can all view science as a culturally specific activity that does not have an epistemologically superior foundation. None of this is to say that science is not successful, nor that science cannot provide us with answers. What these views of science claim is that elevating science above other forms of knowledge is untenable on a foundational level.

Not quite a sequel

We are now back to where we started, having considered some ways in which the academy has approached the supposed separation of science and the humanities. The new concern is whether or not the science wars are the contemporary version of the two-culture split¹⁸ (Figure 2). Many scholars have made the comparison and the prevailing opinion is that, yes, the two are inextricably linked^{2,19}. However, before we make this association of similarities, we have to realize the important differences. Given the influence of science studies on the two-culture divide, as shown above, it seems to be curious, and somehow misplaced, to allow the science wars to be considered a modern two-culture debate.

The science wars began in 1994, more or less, with the publication of *Higher Superstition*²⁰. The arguments began as an attack by science defenders on social constructivists of the ‘academic left’²¹. This science wars debate has been constructed in much the same way as the Snow–Leavis debate, at least from a practical standpoint. That is, both debates highlight practical differences between science and humanities, using these distinctions to further the argument that there is a theoretical difference.

From the science defender’s point of view, the skirmish is based on the notion that science is a distinct and superior way of knowing that is being attacked by outsiders and nonscientists. The science defenders use the inside–outside cultural divide as a rhetorical strategy to defend their positions and to reassert their credibility, thereby retaining scientific authority and power²². Given this strategy, we should not be surprised that the language of the science wars is similar to that used by Snow and Leavis, so that, in *Higher Superstition*, the ‘scientists’ and the ‘academic left’ are described using verbiage similar to the two-culture debate. The ‘academic left’, as Gross and Levitt have it, is turgid, full of perverse theories, ideological and reliant upon metaphor, whereas science is objective, reliable and self-correcting, resting on sound methodology (Ref. 20, p. 354). Just as the two-culture thesis was rebuked by Leavis, who did

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not grant science the same position of authority and moral guidance that Snow wanted for it, science studies scholarship has been rebuked by Gross, Levitt and the science defenders, who do not grant that science is not a superior, objective and privileged enterprise.

Although there are similarities between the two debates, a strict association is incomplete without understanding their differences. When we understand this, we see that it is the theoretical underpinning of the debates that differ, with the similarities residing only on a practical level. The most prominent difference between the two debates is this: Snow and Leavis argued from opposite sides of one position, of which domain of knowledge was better suited to guide the future of society. However, the science warriors argue two different positions. The science defenders argue for the acknowledgement of the divide, claiming that science studies scholarship can have nothing to say about 'hard' sciences. The science studies argue that their research has redefined the enterprise of science such that a divide between science and humanities has no epistemological basis. Thus, the Snow–Leavis controversy was based on which side of the divide had more credibility, whereas the science-wars debate reduces to whether or not there is a two-culture divide. This realization makes the science wars into an anomaly that is attempting to maintain scientific hegemony amidst prevailing boundary definitions. Also, although science defenders assume that their opponents are postmodernists, empowered by a society adjusting to a post-Cold-War political scene, the validity of making distinctions is even more questionable today with the science wars than it was with Snow in the early Cold War era²³.

The best claim to knowledge

The debate initiated by Snow's thesis and responded to most pointedly by F.R. Leavis was based on the existence of foundational differences between science and humanities. The broader issues then, as now, were what validity a distinction between forms of knowledge had and which domain had the best claim to knowledge. Snow's articulation rested on a particular view of science that has been superseded by recent science studies scholarship. The enterprise of studying science has changed the concept of Snow's intellectual divide by re-evaluating what science is and how it works, and by reconsidering the very assumption that there are two sorts of intellectual enquiry.

The core issues for Snow and Leavis were those of credibility, education and epistemological authority. The science wars of the 1990s reintroduced concerns over those same issues and thus evoked comparisons to the earlier controversy. The two debates did share practical similarities, such as isolating science from other domains of knowledge and decrying the encroachment of a competitive intellectual culture. Snow saw a divide between the progressive promise of science and the retrospection of the humanities, whereas Leavis questioned this perspective, reversing the hierarchy. However, scholars on one side of the science wars argue



Behave the Title of the Battle.

Figure 2 Frontispiece from Jonathan Swift's *Battle of the Books* (Ref. 25).

for a divide between science and those who study science (i.e. science critics, like art critics). On the other side, the science studies scholars attempt to reposition the divide by bridging it (as the early history of science did), blurring it (as we might consider the field of literature and science to do) or outright denying it (as sociologists do). Thus, the contemporary debate has been based on whether or not a divide, as Snow articulated it, exists.

I see science studies as subsuming the divide, or at least having the opportunity to do so, instead of being positioned across it. The two cultures make sense as a rhetorical strategy and from the point of view of recognizable practices. As a theoretical and epistemological distinction, however, the divide cannot hold up under a revised (science studies) notion of science.

References and notes

- 1 Fuller, S. (1995) A tale of two cultures and other higher superstitions. In *History of the Human Sciences* 8, 115–125, on p. 117. Gross, P. and Levitt, N. (1994) *Higher Superstition: The Academic Left and its Quarrels with Science*, John Hopkins University Press.
- 2 de Laet, M. (1997) STS: an insider's perspective. *21st C* 2.3; Franklin, S. (1996) Making transparencies: seeing through the science wars. In *Science Wars* (Ross, A., ed.), pp. 151–167, Duke University Press; Fuller, S. (1995) A tale of two cultures and other higher superstitions. In *History of the Human Sciences* 8, 115–125, on p. 117; Fuller, S. (1996) Does science put and end to history, or history to science? Or, why being pro-science is harder than you think. In *Science Wars* (Ross, A., ed.), pp. 29–60, Duke University Press; Koertge, N. (1998) *A House Built on Sand*, Oxford University Press; Latour, B. (1999) *Pandora's Hope*, Harvard University Press
- 3 The thesis was first given in Snow, C.P. (1956) The two cultures. *New Statesman* 413. It was revised when he delivered it as a lecture, three years later.
- 4 The discipline has its own fascinating history but one that I will not describe beyond the few details that follow. For a fuller elaboration, see Laudan, R. (1993) Histories of the sciences and their uses: a review to 1913. *History Sci.* 31, 1–34; Rossiter, M., ed. (1999) Catching up with the vision: a supplement to ISIS. *ISIS* 90, 2; and the entire *BJHS*, March 1997
- 5 Sarton, G. (1924) Preface to Volume VI. *ISIS* 6, 4
- 6 Sarton, G. (1931) 1962 *The History of Science and the New Humanism*, p. 54, Indiana University Press
- 7 Frängsmyr, T. (1999) History of science as history of civilization: George Sarton's program. Presentation at the 1999 *History of Science Society Meeting*, 5 Nov 1999. Thanks are due to Ann LaBerge for discussion of this talk.
- 8 I thank Anna-Katherine Mayer for this reference. Mayer, A-K. (2000) Setting up a discipline: conflicting agendas of the Cambridge History of Science Committee, 1936–1950. *Studies History Philos. Sci.* 31, 665–689. Also, see Butterfield, H. (1948) A bridge between the arts and sciences. *The Listener* 15 July, 94–95.
- 9 See Mayer (2000)
- 10 Collini, S. (1993) Introduction. In *The Two Cultures*, p. li, Cambridge University Press
- 11 Marx, L. (1994) The environment and the 'two cultures' divide. In *Science, Technology, and the Environment* (Fleming, J. and Gemery H., eds), pp. 3–21, University of Akron Press
- 12 Kuhn, T. (1996) *The Structure of Scientific Revolutions* (3rd edn), University of Chicago Press
- 13 One note is not enough in this case but, for a start, see the work of David Bloor, Barry Barnes and the Strong Programme; for example, Barnes, B. *et al.* (1996) *Scientific Knowledge*, University of Chicago Press
- 14 Geertz, C. (1983) *Local Knowledge*, Basic Books
- 15 Rouse, J. (1987) *Knowledge and Power*, p. 119, Cornell University Press
- 16 Rouse, J. (1993) What are cultural studies of scientific knowledge? *Configurations* 1, 1–22, on p. 12
- 17 Consider the following titles, all of which speak to this positioning. Levine, G. (1987) *One Culture: Essays in Science and Literature*, University of Wisconsin Press; Peterfreund, S., ed. (1990) *Literature and Science: Theory and Practice*, Northeastern University Press; Slade, J. (1991) *Beyond Two Cultures: Science, Technology, and Literature*, Iowa State University Press.
- 18 What I mean by 'the science wars' is a set of debates between some science 'defenders' and the science studiers. On a basic level, some science defenders argue against the de-privileging of science by science studies scholars and the science studiers argue in return that they are not against science but simply trying to understand better how science 'actually' works. (This summary is itself problematical, which perhaps indicates the ease of falling into a debate such as this.)
- 19 Rorty, R. (2000) Being that can be understood is language: Richard Rorty on H-G. Gadamer, *London Rev. Books*, 16 March
- 20 See Gieryn, T. (1999) *Cultural Boundaries of Science*, pp. 336–362, University of Chicago Press, for a discussion of the history of the science wars through 1998.
- 21 I follow Gieryn's labelling by referring to one side of the wars as 'science defenders' ('those who see science as under attack') and the other as 'science studiers' ('those who examine science as a historical, sociological, and cultural phenomenon') (Ref. 20, p. 342). The lines are hardly drawn neatly: trained 'scientists' are not only allied to one side, nor 'humanists' to the other.
- 22 In an indictment of the work of Gross and Levitt, Richard Lewontin uses the term 'authority' 11 times in the first two pages of his review of *Higher Superstition*. Lewontin, R. (1995) À la recherche du temps perdu. *Configurations* 3.2, 257–265
- 23 Collini, S. (1993) Introduction. In *The Two Cultures*, p. xlvii, Cambridge University Press. This makes the wonderful prophesy of science wars to come (written c. 1993), observing that many practising scientists continue implicitly to endorse the assumption that methodologically scientific inquiries 'give us "real" knowledge...and occasionally a self-appointed spokesman for science will articulate it in its most arrogantly imperial form.'
- 24 (1759) *A New Universal History of Arts and Sciences*, London
- 25 Swift, J. (1704) *Battle of the Books*