

What Art and Science Want:
Disciplines and Cultures in Contention

Andrew Stones

Extracts from a Doctoral (PhD) Thesis
(UCL, Slade School of Fine Art, 2011):

*Abstract, Table of Contents, List of figures,
Introduction and Synopsis*

Andrew Stones

What Art and Science Want:

Disciplines and Cultures in Contention

PhD Thesis (UCL, Slade School of Fine Art, written-only submission)

Abstract

Art and science cannot 'want' anything, but artists can be interested in disciplinary outcomes other than those authenticated within their own field, and scientists can want a greater sense of cultural agency than is allowed within a strictly-ruled discipline. The pursuit of such aspirations puts into contention the integrity of arts and sciences as disciplines (for knowing and making a world), and the effectiveness of their cultures in transmitting their selectivist disciplinary gains, or opening them to participation and scrutiny.

This inquiry uses Pierre Bourdieu's formulation of the social fields of art and science critically within a self-reflexive (artist's) discourse. It asks whether aspirations to extend art and science in the ways summarized above are mutually-enhancing, or part of a struggle for disciplinary dominance and the control of normative culture. The aim is a better understanding of what is at stake for an ambiguously-defined contemporary art when artists and scientists extend their interests to each other's fields – given that their aspirations ('wants') can be disciplinary or cultural, and either intrinsic or extrinsic, conventionally speaking, to their home fields.

Conventionally, art as a discipline modulates between the aesthetic and the intellectual, the wild and the rational, remaining ambiguous about its precise gains. Within the extended field of art, this ambiguity is resolved opportunistically, among mutually-dependent agents: artists, curators, academics, collectors (etc.). Explicitly science-engaged art is a special case within this art world, and, conversely, art-world conventions are rejected by some prominent art-science practitioners. Such selective authentications and disavowals raise the stakes around science-engaged art. On the one hand it seems, at best, to be merely indexical of the ongoing scientification of everything; on the other, it particularizes the idea of art as a vector of rational agency, inviting a new necessity and progressivity in art.

Table of Contents

List of Figures	7
 1.0 Introduction	
1.1 Background and Approach	10
1.2 Section Synopses	17
 2.0 <i>How Shall I Know? Where Shall I Be? - An Artist's Foreword</i>	
2.1 A Garden	37
2.2 A Period of Familiarization	41
2.3 Outside/Inside: Four Works, 1993-2004	47
2.4 A Lifetime-Limited Art Knowledge	56
 3.0 Selectivity, Authentication, Legitimation: Disciplines and Cultures in Contention	
3.1 Habitus, Selectivity and Forgetting	59
3.2 About the Academy	65
3.3 Symbolic Capital and the Capitalization of the Symbolic	69
3.4 Knowledge From and About Art: Private and Public	75
3.5 Ideal and Operational Science	82
3.6 Art and the Non-Scientific Real	90

continues

4.0	Art as a Discipline in Contention: The Science-Engaged Practices of Damien Hirst, Marc Quinn, Christine Borland	
4.1	The Key Work: Knowledge Gain, Market and Canon	98
4.2	Damien Hirst: Mixed Blessings <i>A Thousand Years</i> (1990); animal vitrines (1993-); <i>Hymn</i> (2000)	103
4.3	Marc Quinn: Truth Claim, Cultural Agency and Scientism <i>Self</i> (1991), <i>Garden</i> (2000)	113
4.4	Christine Borland: Situated Knowledge Early work (1993-); <i>From Life (Glasgow)</i> (1994); <i>Second Class Male, Second Class Female</i> (1996)	126
4.5	Negotiated Settlements: Christine Borland <i>A History of Plants [...]</i> (2002/2006); <i>Support Work (Hippocrates 1:075)</i> (2006); <i>Preserves</i> exhibition (2006-2007)	141
4.6	Negotiated Settlements: Marc Quinn <i>A Genomic Portrait: Sir John Sulston</i> (2001)	153
4.7	Negotiated Settlements: Damien Hirst Biopsy paintings; <i>Beyond Belief</i> exhibition; <i>The Incomplete Truth</i> ; birth paintings (all 2007); the <i>Beagle 2</i> Mars Lander (1999)	158

continues

5.0	Art for Science, Science for Artists	
5.1	"Science Wars"	174
5.2	Apparatus of Advancement: Joseph Wright's <i>Experiment</i>	182
5.3	Art as Science-in-Waiting (Projecting Leonardo)	191
5.4	A Demonstration: In a Waiting Room on Euston Road	203
5.5	Artists and Scientists in a Room:	209
	<i>Art, Poetry and Particle Physics</i> : a film by Ken McMullen	
 6.0	 Conclusion	 225
	 Bibliographic and other sources	 239
	 Notes	 259

Cross-references and endnote references

Throughout the following text, the numerals 1.0 - 6.0 are used to refer to thesis sections as shown in this index. Cross-references to items within the thesis are given in parenthesis as, for example: (Bourdieu, 3.4, p. 78); or (4.7, pp. 167-69); or (4.2) for a discussion diffused throughout a whole section. 'Above' and 'below' are used only to refer to items within the section in which the cross-reference is invoked.

Section 1.2 is an introduction by synopsis. Endnote references in 1.2 are given only to sources cited exclusively in 1.2. Other external sources are referenced, as normal, when they arise in the sections themselves.

List of Figures

Fig. 1.	Family photograph, c. 1966	36
Fig. 2.	Helen Chadwick - Notebook 1987-96	44
Fig. 3.	Andrew Stones <i>The Conditions</i> 1993. Installation view	47
Fig. 4.	Andrew Stones <i>The Conditions</i> 1993. Video stills	48
Fig. 5.	Andrew Stones <i>Normal Numbers</i> 1998-2008. In <i>Biomedical Scientist</i>	50
Fig. 6.	Andrew Stones <i>Tell Us Everything</i> 2003. Exhibition card	51
Fig. 7.	Andrew Stones. Notebook drawing (Arecibo from memory) 2002	52
	Colourized sketch from <i>Andrew Stones - Outside Inside</i> 2004	
Fig. 8.	Andrew Stones <i>Atlas</i> 2004. Installation view	53
Fig. 9.	Damien Hirst <i>A Thousand Years</i> 1990. Installation view	103
Fig. 10.	Emily Mayer with the cast of a cow's head for an edition of	106
	Hirst's <i>A Thousand Years</i> . Newspaper photograph 2008	
Fig. 11.	Damien Hirst <i>Mother and Child Divided</i> . Installation view	109
Fig. 12.	Damien Hirst <i>Hymn</i> 2000	112
Fig. 13.	Marc Quinn <i>Self</i> 1991	113
Fig. 14.	Marc Quinn <i>Self</i> (detail) 1991	114
Fig. 15.	Marc Quinn <i>Garden</i> 2000. Installation view	120
Fig. 16.	Marc Quinn <i>Garden</i> 2000. Installation view	120
Fig. 17.	Marc Quinn <i>Silvia Petretti - Sustiva Tenofivir, 3TC(HIV)</i> , 2005	123
	Wellcome Collection installation view	
Fig. 18.	Christine Borland <i>The Dead Teach the Living</i> 1997. Installation view	124
Fig. 19.	Christine Borland <i>The Dead Teach the Living</i> 1997. Installation details	124
Fig. 20.	Christine Borland <i>Alpha Foetal Protein Test, Cold</i> 1999	125
Fig. 21.	Christine Borland <i>Shoes with .38mm Hole</i> 1993. Installation view	127
Fig. 22.	Christine Borland <i>From Life (Glasgow)</i> 1994. Installation view	131
Fig. 23.	Christine Borland <i>From Life (Glasgow)</i> 1994. Installation view	131
Fig. 24.	Christine Borland <i>From Life (Glasgow)</i> 1994. Installation view	133
Fig. 25.	Christine Borland <i>Second Class Male, Second Class Female</i> 1996	134
	Installation view	
Fig. 26.	Christine Borland – <i>Preserves</i>	147
	Exhibition view, Fruitmarket Gallery 2007	
Fig. 27.	Hippocrates' tree on the Greek island of Kos	149
Fig. 28.	Christine Borland – <i>Preserves</i>	149
	Exhibition view, Fruitmarket Gallery 2007	
Fig. 29.	Marc Quinn <i>A Genomic Portrait: Sir John Sulston</i> 2001	153
Fig. 30.	Stephanie Schuller, scanning electron microscope image	160
Fig. 31.	Damien Hirst <P520/211 <i>Small intestine cancer, SEM_SPL.jpg</i> > 2006	160
Fig. 32.	Science Photo Library online interface	161
Fig. 33.	Damien Hirst logo	164

Fig. 34.	Damien Hirst - <i>Beyond Belief</i> . Exhibition view, White Cube Gallery 2007	165
Fig. 35.	Joseph Wright of Derby <i>An Experiment on a Bird in the Air Pump</i> 1768 (detail)	166
Fig. 36.	Daniel Deme: Damien Hirst - <i>Beyond Belief</i> Exhibition view, White Cube Gallery 2007 (birth room)	166
Fig. 37.	Damien Hirst - <i>Beyond Belief</i> Exhibition view, White Cube Gallery 2007 (birth room)	167
Fig. 38.	Damien Hirst <i>Self Portrait as Surgeon</i> 2006. Painting	170
Fig. 39.	'Target painting' calibration chart for the <i>Beagle 2</i> Mars Lander, 1999	171
Fig. 40.	Joseph Wright of Derby <i>An Experiment on a Bird in the Air Pump</i> 1768	182
Fig. 41.	The Faraday Museum, Royal Institution, London. Interior view	187
Fig. 42.	The Faraday Museum, Royal Institution, London. Interior view	187
Fig. 43.	Book cover (with Joseph Wright painting)	189
Fig. 44.	Book cover (with Joseph Wright painting)	189
Fig. 45.	Sergio Cittolin. Sketches of the CMS detector at CERN in the style of Leonardo da Vinci	193
Fig. 46.	Illustration from Paluzzi et al: <i>Brain 'Imaging' in the Renaissance</i> (Raphael: <i>Transfiguration</i>)	195
Fig. 47.	Illustration from Paluzzi et al: <i>Brain 'Imaging' in the Renaissance</i> (Michelangelo: <i>The Creation of Adam</i>)	196
Fig. 48.	Henry Gillard Glindoni <i>John Dee Performing an Experiment Before Queen Elizabeth I</i> (c.1880-1910)	203
Fig. 49.	Wellcome Trust, Gibb Building, London Waiting area with Glindoni painting. Interior view	204
Fig. 50.	Wellcome Trust, Gibb Building, London Waiting area with Glindoni painting. Interior view	204
Fig. 51.	Ken McMullen <i>Art, Poetry and Particle Physics</i> 2005 Video still (montage: Borges reading)	211
Fig. 52.	Ken McMullen <i>Art, Poetry and Particle Physics</i> 2005 Video still (montage: Borges reading)	211
Fig. 53.	Ken McMullen <i>Art, Poetry and Particle Physics</i> 2005 Video still (montage: Borges reading)	212
Fig. 54.	Ken McMullen <i>Art, Poetry and Particle Physics</i> 2005 Video still (montage: Borges reading: John Berger)	212
Fig. 55.	Ken McMullen <i>Lumen de Lumine</i> . Video still	215
Fig. 56.	Ken McMullen <i>Lumen de Lumine</i> . Video still	215
Fig. 57.	Ken McMullen <i>Lumen de Lumine</i> . Video still	217
Fig. 58.	Michael Maier <i>Atalanta Fugiens</i> 1617. Emblem no. 42	217
Fig. 59.	Ken McMullen <i>Art, Poetry and Particle Physics</i> 2005 Video still (John March-Russell)	222
Fig. 60.	Ken McMullen <i>Art, Poetry and Particle Physics</i> 2005 Video still (John March-Russell)	222

1.0

Introduction

1.1

Introduction: Background and Approach

What do arts and sciences want, and how might the pursuit of it put their disciplines and cultures into contention? These questions are inferred in the title of my inquiry. I ask them in Britain, on the cusp of the twentieth and twenty-first centuries, where art and science seem at the very least to want attention, legitimacy, and continuance. I intend to suggest, too, that art and science can want something of each other, and that this is bound to entail difficulty around questions of intellectual authority and normative (general, public) culture.

How is my impression – that this 'art' and 'science' might 'want' things – formed? I do not assume that art and science are singular entities with agency, like a human being, nor that they concentrate their powers in single monolithic institutions. I take it that, by means of the cultures which they produce and are every day intermeshed with, the many arts and sciences crowd into public discursive space, *as though* proposing and wanting things in and of society; for instance, by demonstrating their gains, courting legitimatization, seeking resources.

In the background to my inquiry is the Snow-Leavis controversy, which played out in Britain and the United States from the time of C. P. Snow's 1959 Rede Lecture *The Two Cultures and the Scientific Revolution* in Cambridge, to the mid-1960s.¹ Because the name of Snow-Leavis still hangs over the discussion of artistic and scientific disciplines and public culture, it is useful to indicate aspects of the affair I find salient to an inquiry about science-engaged contemporary art in my own time.²

Snow's 'Two Cultures' texts, especially his lecture, are mostly unconcerned with artistic practice.³ The lecture is a call for a utilitarian and socialistic programme to apply western science and engineering to fundamental human needs, especially in post-war Africa and India. Snow claims that a mindset associated with individualistic modernism in literature is an obstacle to this kind of socio-scientific progress.⁴ His argument is passionately made, but not supported by much evidence, and his critics have found it easy to characterize his position as (in Roger Kimball's phrase) 'naïvely meliorist'.⁵ Following Collini's comparison of earlier and later versions of Snow's lecture text, it appears that in 1959 Snow could also be operating on a more parochial and opportunistic level, rebranding the project of the British political left with a scientific contemporariness.⁶ His tone and language, at least, were taken up by the British Labour Party. Harold Wilson's well-known 1963 Labour Party Conference speech states that 'in all our plans for the future, we are redefining and we are re-stating our socialism in terms

of the scientific revolution'.⁷ Following Wilson's narrow election victory, Snow was made second-in-command in the new Ministry of Technology, and received a life peerage.

Snow's premise about the 'dangerous non-communication'⁸ between arts and sciences is weakened by his not referring to many relevant artistic examples available at the time (Bauhaus, for example), and his representing the power of scientific knowledges as overwhelmingly beneficent. His lecture text is nevertheless interesting for drawing on Snow's own, very particularized involvement in the disciplines and cultures of art (literature) and science (chemistry, physics and war science). Further, his rhetorical stance recalls his literary hero H. G. Wells,⁹ and incorporates a disdain for a kind of person and a social grouping Snow associates with Britain's 'traditional culture' (his term), and with social and political power in Britain. I take Snow's discourse as the script for a performance of personal disposition mixed up with scientistic, progressivist rhetoric; and a writ against scientifically ignorant or ill-informed government. As much as any overarching idea in his lecture, it is Snow's performed persona – the urbane, clubbable everyman, of inferred intellectual sophistication – which provokes his best-known detractor, literary critic F. R. Leavis.

Cambridge-based Leavis was widely reprimanded for his highly personalized 1962 response to Snow, in *Two Cultures? The Significance of C. P. Snow*, also given as a lecture at the University of Cambridge.¹⁰ The published text reveals him to be preoccupied with Snow's vaunted public status, and affronted, even, on the basis that Snow is a traitor to the ethos of the University both men have attended.¹¹ Leavis tries to make a case for the necessity of the kind of literature threatened by the new order of which Snow is 'a portent'. He argues for his preferred literary canon (with special attention to D. H. Lawrence¹²), and ends, advocating 'creative work on the contemporary-intellectual-cultural frontier' and proposing his Cambridge as 'a centre of consciousness (and conscience) for our civilization'.¹³

Leavis introduces the idea of a 'publicity-created culture' to explain how Snow's reputation is created and maintained. In the Prefatory Note to his published text Leavis turns Snow's charge of élitism around, presenting the publicity-created culture as the cultural manifestation of an ascendant liberal-left establishment, with nodes of power in the BBC, the British Council, liberal-left journals and the Sunday papers.¹⁴ This points to a much darker idea of disciplines and cultures than that presented by Snow. Specifics aside, the suggestion that the emerging and supposedly liberatory cultures of the 1960s are in fact a new, but programmatically-produced normative culture seems prescient, and is interesting in relation to the interplay of contemporary art and science, both in and as culture.

The first part of Snow's lecture title *The Two Cultures [...]* is still held up emblematically: both by those complaining of 'the marginalisation of science',¹⁵ and by rhetoricians of science going as far as to suggest, in the words of John Brockman, that 'what traditionally has been called "science" has today become "public culture."' ¹⁶ The phrase 'the two cultures' is also invoked by advocates of formalized art-science practice,

to axiomatize the obstacles in the way of the interdisciplinarity to which they aspire.¹⁷ The second part of Snow's title [...] *and the Scientific Revolution*, with its echoes of Marxian thinking, is often ignored when Snow is cited emblematically.

Obviously, a scientific revolution of a kind has proceeded, but not necessarily in accordance with the moral and ideological imperatives Snow attributed to science and scientists. The knowledge gains of science in general are today routinely and widely assimilated to the point of seeming banal, whilst the practice of science has become increasingly specialized, commercialized and militarized. Snow's biculturalism is no longer axiomatic of societies like Britain's, especially outside academic or professional realms. Today, cultures are manifold.¹⁸ Individuals, including artists and scientists, can partake of multiple cultures; in addition, that is, to any selectivist culture which might define them professionally, or that emerges simply from the coming together of the like-minded, as with Snow's 'two cultures'.

Brian Massumi has proposed a latter-day cultural domain as a 'field of power' agitated by 'irritations' (events or acts taking place in the world) amplified by the news media.¹⁹ Like an extended nervous system, these media 'transduce singularity', but do not transmit content. To this elegant, if abstract model I would add the more practical element of agents in many fields who can create, or stage, just the kind of singularity to which the networked news media are sensitized; agents who have access to the nerve-endings (so to speak) of those media. According to Leavis's bitterest remarks, Snow is just such an agent. His equivalent today can swiftly fill the public discursive space available for, say, contemporary art or science, via 'singularities' tailored for the kind of amplification Massumi proposes; events made to create effects in public discursive space. There is no need, here, to cite examples. One need only compare a selection of major news carriers in a given week to see how a limited number of events, from exhibitions to science announcements, are amplified again and again, as though differentiated by some natural order of importance. They may or may not be important, but it is surely clear that here is a publicity-created culture in action; a culture brought to a semblance of life via the willed and targeted acts of agents who stimulate an almost-autonomic network. Offering a kind of cultural action-at-a-distance, the system is bound to be attractive to some in the most autonomous (and, thus, potentially isolated) artistic and scientific fields. We can hope that as they seek to create effects in public discursive space their agents are motivated by a drive to share and democratize art and knowledge. Following Massumi, I suggest that the likelihood of 'content' being transmitted is dependent on the strength of such motivations.

It does seem that the more democratic and discursive the cultural realm becomes, the more it is characterized by a superfluity of fragmented information and rhetoric. It can be viewed as a realm of competing self-interest, or a public-relations free-for-all in which any given player, from individual practitioner to arts foundation or science institute, must make their bid for attention, legitimacy and resources. Today, we

experience an almost industrial throughput of micro-discourses, before which the Snow-Leavis debate stands like the craft-product of a prefiguring cottage industry. Questions of which field is doing necessary and progressive work, whose work is vouchsafed by tradition, who is obeying the imperative of the *Zeitgeist* (and whether this matters), have all become related to securing a platform in public discursive space.

In 2009 one of Britain's largest contemporary art institutions, Tate Modern, hosted a day-long symposium as part of a series of events marking the 50-year anniversary of Snow's Lecture.²⁰ Given the venue and the title of the event – *Art and Science Now: The Two Cultures in Question* – it might seem surprising that no artist, theorist, curator or critic concerned with contemporary art appeared on any of the symposium panels.²¹ This impression of disinterest invites comment.

Even if the bi-culturality proposed by Snow is based on anecdotal observations, and does not show convincingly that non-scientific culture is either traditionalist or reactionary; and even if Snow's formulation is even less representative of artistic and intellectual life today than it was in 1959, there is a still-relevant point to be pursued about the power of cultural élites; or élitist cultures. The following remark from one of the main voices informing my inquiry, Pierre Bourdieu,²² might speak to the silence of contemporary art on the occasion of the Tate symposium:

The dominant are drawn towards silence, discretion and secrecy, and their orthodox discourse, which is only ever wrung from them by the need to rectify the heresies of the newcomers, is never more than the explicit affirmation of self-evident principles which go without saying and would go better unsaid.²³

Some of the intricate ways in which this passage might pertain to the world of contemporary art are pursued in part 3.0 of this thesis. Given what I have said so far, I will note here that Bourdieu's remarks could also describe the preconditions for the Snow-Leavis argument. Leavis demonstrates just how difficult it is to publicly legitimate an artistic practice from within the social field which self-interestedly authenticates it. Difficulties with the legitimating arguments around literature are opened to scrutiny when Leavis, provoked by Snow, breaks the 'silence of the dominant'. No representative of contemporary art was so provoked at the Tate symposium.

Is contemporary art weak in the face of challenges to the insularity of its field? Is the 'two cultures' problematic long settled within the art world? Does art's settlement with subjectivism mean that the power to speak in the presence of objectivized knowledges has been ceded? Perhaps it is widely believed that contemporary art already encompasses enough of everything for it always to be indexical of what is important in society and culture in general; that art acts as a kind of aggregator of what matters. Artists and others concerned with art certainly appear open to a wide range of ideas.

However, this appetite for new ways of knowing and being in the world is also related to the co-option of knowledge, instrumentality, or representations emerging from other fields as a sign of the contemporariness that new art must demonstrate. Artists can be surprisingly confident about purloining signs (of the new, of the selectively known) from other disciplines, construing them as meaningful in and of themselves, and using them to bolster the truth claims of art. Further, such incorporations can be allowed to count towards the acquisition of what Bourdieu calls 'symbolic capital' in the field of art (3.3, and throughout this thesis). However, were the extrinsic in art to answer back (so to speak) this could provoke a critique of art's authenticatory protocols from within, in terms no longer controlled within.²⁴

The sciences, of course, are hardly free of inconsistencies and difficulties when it comes to legitimacy in society. The benefits of much scientific work are arguable, but terms required for informed debate about this are hard to assimilate, and, all along, the sciences are extremely needy of resources and public assent. However, in good times and bad (economically-speaking) agents of the sciences seem continually to enter public discursive space, seeking to alter the complexion of normative culture. The Tate symposium was dominated by such agents.

When art seems disinvested in the challenges thrown up by the most radical, insistent and totalizing views of humanity and society, then closer scrutiny is invited of claims that it does something as worthy of interest and resources as the sciences. The art world's inner coherence is well-served by the self-justifying economism of an art market; mutualities connecting academies and other institutions; and the dedication and belief of many agents. Drawing on this inscrutably-interconnected social field, art's wider legitimacy, like the integrity of a cellular underground organisation, seems impervious to both systematic critique and overwhelming attack. However, this very self-sufficiency exacerbates the danger that art in general is easily marginalized as the tokenistic instrument of a small social grouping – an élite – and that attempts to rationalize its claims will appear conceitedly self-justifying.²⁵ To wider society this may not matter much, because the grouping, especially around contemporary art, is small and politically ineffectual, and, in any case, offers entertaining diversions.

Stepping back, initially, from the highly contested realm of presentation, representation and reception sketched out above, I begin my inquiry (in 2.0) with the idea that disciplines (including the multiplicity of arts and sciences) are related to differently-nuanced affinities, and are, in effect, formalized, selectivist ways of knowing and being in the world. I propose that, as the relationship between a given discipline and wider society becomes more complex, its culture is called upon as a mediating construct, and becomes arrayed between disciplinary insiders (artists and scientists, for example) and outsiders; between selectivist knowledges and common knowledge. In this formulation, cultures are the projections of selectivist disciplines in the social world. They become the repository and the stage for proxies and representations; and, to these, the expectations and

aspirations of disciplinary insiders and outsiders, intended and unintended, can become attached. The extension of a discipline into a cultural realm, via proxies and discursive outgrowths, opens the way for challenges which are, strictly-speaking, extra-disciplinary, meaning that things can be put into play which, in the disciplinary realm, are normally sacrosanct, or ruled. The discipline, in other words, can be put into contention. This, I argue, is an unavoidable consequence of a discipline becoming acculturated, or socialized. When disciplinary insiders try to counter this effect, say, in the name of recapitulating their disciplinary rule, or reasserting the autonomy of their disciplinary field, the cultural projections of their discipline are put into contention.

There is uncertainty, today, not only about what is to be gained from selectivist disciplines, but where to look for those gains: to the core practices or knowledges, or their mediating cultures. The purpose of my inquiry is not to compare the disciplines of contemporary art with any, or all, of the sciences, in terms of where someone might find the most trusted, comprehensive or reliable way of knowing and being in the world (although that question is bound to arise). Rather, it is to focus on instances where the cultural manifestations of sciences and contemporary art contest the same ground in the social world, or interweave across it, and thus put their respective disciplines into contention. The works, events and practices I scrutinize show a coming together of seemingly contrary pursuits, such as knowledge production and intellectual diversion, truth-telling and rhetoric. They show how the disciplines and cultures of some arts and some sciences can be put into contention in different ways: opportunistically, carelessly, or programmatically, and how the coexistence of differently selective arts and sciences in society makes this more likely. An overall picture can, I suggest, only be inferred instance-by-instance, perhaps as a trend, or a turn this way or that.

Of course, the appearance that arts or sciences 'want' anything is likely to be indexical of what the agents dedicated to those fields want. As an artist, I am one such agent. It is from a particularly involved and interested position that I propose that some agents of selectivist disciplines want to be more like the agents of other disciplines, and especially that an engagement with the scientific might, for an artist, promise a connection with ways of knowing and being in the world given up at the threshold of becoming an artist. This means that, within the bounds of my inquiry, I claim the power to name and critique what it is I think I am asked to be when I am an artist. I may, too, acknowledge an almost impossible desire for that more objectivist, unambiguous position which I have not been obliged to adopt with the discipline of making art, nor within the artistic culture most familiar to me. Such an objectivist position is 'almost impossible' for me, now, because my disciplinary background is that of an artist of twenty-five years standing.

As an artist whose own past work could be situated within the very problematic I claim to be investigating, I was initially unsure of the degree to which I should become my own research object. I did not want to be drawn into producing an authenticatory text

about my own art practice, which I had interrupted, anyway, in order to undertake this inquiry. Additionally, my experience of the art world is particularized, and were my own artworks to be my research objects, then I might be tempted to ignore vital, influential dimension of the art market, of which I have little personal experience. Whilst I want to be appropriately objectivist, I am bound also to question what this might mean, firstly for an artist undertaking this kind of inquiry, secondly for artists more generally, in a social world where scientific ways of knowing, being and making are assertively present. If I resolve this dilemma by completely disavowing the licence to subjectivize granted to the artist, aiming for an objectivizing method, then I might lose touch with my own knowledge of the problem at hand. What I need to do, it seems, is lay claim to that personal knowledge, whilst interrogating it more rigorously than before, especially at the threshold where knowledge shades into belief, beyond which are the ideas so cherished as to be resistant to interrogation.

Bourdieu finds himself in a similar reflexive loop as he attempts to formulate a scientifically-viable sociology of the social fields of science (including his own social science). The following, from *Science of Science and Reflexivity*, is from a segment on the problem of self-reflexivity:

Experience linked to one's social past can and must be mobilized in research, on condition that it has previously been submitted to a rigorous critical examination. The relation to the past which remains present and active in the form of the habitus has to be socioanalysed [...this...] allows one to understand the game instead of undergoing it or suffering from it, and even, up to a point, to 'learn lessons' from it – for example, by taking advantage of the revelations which may be brought to each of us by the self-interested lucidity of competitors or by bringing to consciousness the social foundations of intellectual affinities.²⁶

In the terms used here, my inquiry is part research, and part 'critical examination [of] experience linked to [my] social past'. I want to carry the spirit of the above statement forward throughout this inquiry, with an important qualification which I will apply in all my interpolations of Bourdieu's work. I will keep open the possibility that 'affinities' may be expressed in individual agency, prior to, outside, or despite 'social foundations'. This is a way of guarding against an overly systematizing or totalizing view in which art practices are wholly governed by what Bourdieu elsewhere calls 'objective relations' in the social field of art,²⁷ a model in which the agency of the artist might be lost at a very early stage.

1.2

Introduction: Section Synopses

Part **2.0 How Shall I Know? Where Shall I Be? - An Artist's Foreword** is my response to Bourdieu's imperative to socioanalyse the 'relation to the past [...] active in the form of the habitus'. Even though it follows this extended Introduction, it is 'an artist's foreword' because, whilst my work here is an inquiry, it is also the extended, interrogated, position statement of a particular artist, made at a particular time. It is the discourse of an artist testing whether or not their ambivalence about art, especially around a desire for an engagement with disciplinary others, is reflected in more widely-distributed practices, actions and events.

I start, in section **2.1 A Garden**, with a family photograph, showing two boys engaged in an activity between play and work. I speculate about what is at stake, especially for the older of the two boys (my younger self) at the time when the photograph was taken. With hindsight I find in this image something paradigmatic of the disciplines and cultures through which the boys will later become social adults. In **2.2 A Period of Familiarization** I refer to some of the key influences on my thinking and sensibility as a student (Lévi-Strauss, Barthes, Berger), and how these encouraged me to form an idea of art practice as a way of consciously knowing and rationally being in the world. I discuss the complexion of the British art world into which I moved in the 1980s, on leaving art school, with special reference to the work of artist Helen Chadwick; and then the selective remembering of Chadwick, and the disenchantment of Jeff Nuttall and Julian Stallabrass with the Young British Artists (YBAs) of the 1990s.

2.3 Outside/Inside: Four Works, 1993-2004 is a retrospective look at four of my own exhibited works, and a discussion of a coming-to-consciousness of questions in my own practice which answer to the ambivalent position adopted in this inquiry. I give a detailed account of the concerns behind *The Conditions* (video/audio and mixed media, 1993). This is followed by a briefer treatment of *Normal Numbers* (site-specific sequenced neon, 1997) *Tell Us Everything* (site-specific audio installation 2003) and *Atlas* (video/audio installation, 2004). I frame all these works, retrospectively, in terms of the disciplines and cultures they may have put into contention; whether or not these effects were noticed by me, or by others within the sectors of the art world which facilitated my work.

In **2.4** I propose the notion of **A Lifetime-Limited Art Knowledge**. This is a delimited ideal to carry forward into my analysis of how art as a discipline for inquiry – or a knowledge project – is valorized or put into contention in the art world, and, later, through engagements with scientific fields.

Part **3.0 Selectivity, Authentication, Legitimation: Disciplines and Cultures in Contention** is in five sections. Here I develop an analytical framework used throughout my inquiry, drawing on a close cross-reading of texts by Pierre Bourdieu: *The Field of Cultural Production* (collected essays); *The Peculiar History of Scientific Reason*, and *Science of Science and Reflexivity*. I explore similarities and differences in Bourdieu's social fields of arts and sciences, by interrogating his formulations of *habitus*, *illusio* and *symbolic capital*. I do this with contemporary and art modern physical sciences in mind, each as both discipline and culture, paying particular attention to the artist's settlement within the art world.

Bourdieu's *autonomous social fields* are distinct from the wider *social world* or *social realm*, where all social fields overlap, all people (*subjects, agents*) intermix, and the outcomes of different disciplines are exposed to scrutiny. I alternate Bourdieu's term *autonomous social field* with my own *selectivist social field*. My modification is meant to emphasize that the field in question is one whose core practices are held up as extraordinary, as opposed to being generalist, or concerned with common knowledge. I mean that these core practices have formal and autonomous disciplinary status, or (again within the conceit of my overall title) 'want' or aspire to it.

The *illusio* of an artistic or scientific field incorporates the promise of a life in which affinities for knowing and being in the world in a selective way are accommodated and rewarded, but only within limits set down. Illusio, in this view, connects the autonomy of social fields with disciplinary selectivism. It functions a little like a constitution, constraining modes of inquiry and production in relation to selectivist ideals or protocols of authentication. All this lends a particular edge to what is at stake when an artist or scientist undertakes an action that takes them outside their own field. Risks and potential gains are disciplinary, socio-cultural, and personal.

Regarding extra-, cross-, trans-, or interdisciplinary actions, my aim is to develop terms of critical evaluation which acknowledge the co-dependency of selectivist disciplines, their social fields, and their cultures, without treating any of these entities, or their descriptors, as synonymous. I am concerned with what is at stake for an ambiguously-defined contemporary art when artists and scientists extend their interests to each other's fields; and this, as stated, can be either disciplinary, social or cultural. For example, whilst "interdisciplinarity" might suggest artists producing scientific outcomes, or scientists making art, some supposedly interdisciplinary actions seem more like cross-cultural play, or demonstrations of cross-cultural entente (where the 'cultures' are those related to different disciplines). I want to be able to situate science-engaged art in a way which acknowledges how the outcomes of art or science are authenticated in their home fields, and legitimated in the social world. To do this I need to distinguish between the effects of a disciplinary rule, the imperatives exerting influence within a selectivist social field, and the information, preferences and allegiances borne in a culture.

Given these aims, I could begin in 3.0 with a discussion of the foundational settlements which make arts and sciences what they are today. However, I combine the

logic of a reflective practitioner with a reading of Bourdieu: I first consider the individual in the subjective realm, then the settlements and forces they might encounter within selectivist social fields. After this, I attempt a formulation of how contemporary art and science seem to be situated in relation to each other, in terms of their appeals to different ideals, and selectivities of practice. In other words, the exegesis of 3.0 repeats that of 2.0, but my methods are more objectivist, and the targets of the discourse no longer particularized around my own art practice.

In **3.1 Habitus, Selectivity and Forgetting** I consider the possible effects of what Bourdieu calls *habitus*: 'aspects of a person's disposition resulting from the internalization of behaviours relating to social structures' (I paraphrase). Individuals might, it seems, be drawn to a selectivist social field through similarities of primary habitus (to do with social position and early upbringing) as well as an affinity with the modes of knowing and being which also define the field. The process of developing secondary habitus (via education and training) is coeval with what Bourdieu calls a *metanoia* (change of mind). This, in turn, is associated with ceding to the *illusio* of a selectivist social field, to the extent that an individual cannot disavow the settlement which guarantees their place in that field.

I suggest that an artist assimilates a *metanoic illusio* which operates like a licence, allowing them to remain in a world maximally in play, whilst limiting them to the production of symbolic, or tacitly-held knowledges. Modes of practice at the heart of many artistic fields – especially that of contemporary art – are subjectivized, and difficult to formalize according to a disciplinary rule. If the main producers in a field cannot know their place in relation to a disciplinary rule, they may, in order to advance a career, have to become more directly involved with contesting positions in a social field. I discuss some of the uses of habitus in these struggles, for instance in signalling both insider and outsider status, both of which might be invoked opportunistically in the art world.

By entering art school students have already attested to art's power of affect over themselves as subjects. As the typical entry-point to the art world, in the Britain which concerns me, the art school is also where the artist-to-be encounters a credo and an *illusio* like those introduced in 3.1. Modes of practice at art school presuppose that if work is made and presented according to an inferred settlement, it has a chance of being carried into the social world by the art world: for example, by private individuals, markets and institutions which seem to guarantee art its legitimacy in society. However, such assurances can only be given informally. All that is guaranteed for the artist-to-be, however completely they cede to the metanoic *illusio* of the art world, is participation in a competition where all art is evaluated according to the fluctuating interests of many differently-situated agents. The academy is partly concerned with preparing the artist for this competition, but is also a site of contention around the idea of art practice as a form of knowledge production.

I begin **3.2 About the Academy** by referring to the curatorial branding of the 53rd Venice Biennale *Making Worlds* (2009), in the context of a conflicted art world, where positions of power have to do with authenticating artworks more or less strongly as knowledge objects or market objects. I then briefly set out some changes in British art schools which have heightened the question of knowledge production in art practice. I suggest that artists in the academy, pursuing studio practices designated as research, stir up some pre-existing ambiguities, bringing them home, especially, to the domain of the individual practitioner.

To make matters more interesting, there are moves to transform the strongly intellectual practices of reflecting on the primary products of artistic fields into a more prospective theory/practice discipline. Irit Rogoff, for instance, aspires to escape the strictures of cultural theory and 'write with' art practice. The re-situated historian or theorist is then freed from a conventional role in an intellectual culture of art, as mediator of symbolic knowledge locked up in artworks, and allowed to produce knowledge outcomes every bit as ambiguous as those of art. Whether this is a gain, or an irony, is unclear. Clémentine Deliss has an interesting contribution to make here, her notion of 'initiate knowledge' usefully augmenting my own 'lifetime-limited art knowledge' (2.4).

I closely follow Bourdieu as I try to get to grips with the question of knowledge in an art world where ideas are organized mainly with reference to positions in a social field (rather than ideals informing knowledge production), and are, as a matter of course, personalized and even personified (rather than collegially-objectivized and formularized as in a scientific field). In **3.3 Symbolic Capital and the Capitalization of the Symbolic** I seek an understanding of Bourdieu's notion of symbolic capital that might apply, in particular, to the way rewards are sought in different sectors of the art world, where various aspects of artworks and practices appeal to differently interested agents. Bourdieu states that: "'symbolic capital" is to be understood as economic or political capital that is "credit" which, under certain conditions, and always in the long run, guarantees economic profits'.

It is clear that this capital can pertain to different kinds of opportunity. With contemporary art, symbolic capital might be bankable in the public or academic art world; or in the private, more openly economic art world; and perhaps, if certain questions are not asked, in both. I find that I must complexify Bourdieu's notion of the disavowal of economism in the art world. I propose that what is disavowed, by whom, and in what circumstances, depends on the sector in which a given agent seeks to acquire symbolic capital; or to capitalize, or bank, some of the capital they have already acquired.

Driven home here is the artist's agreement to commit work of mainly symbolic value, to be capitalized, in different ways, only via selected relationships (Bourdieu says 'objective relations') in the social field of art. Putting art practice in the place of a core discipline, I discuss the creation and maintenance of an intellectual culture of art, in which opportunities are created for strongly intellectual agents to mediate the tacit knowledge

gains of the artist. If consensibility and utility in art are more ambiguous than in conventionalized science, this intellectual activity around art can help to strengthen the impression that they are at least present. This, in turn, is useful (in a secondary sense) for art's legitimization in the social world.

Although full of critique and contestation, the intellectual culture of art today is somewhat limiting to the intellectual freedom of those who create it, since it is, in effect, an affirmative culture for art. Many of its contributors, however, have strong connections with other fields, where their intellectual projects are authenticated independently of the art world. For such agents little risk is entailed in playing a temporary role in an intellectual culture of art. It is with these intricacies in mind that I briefly discuss Maja and Reuben Fowkes' commentary on the co-option of philosophy within major art events.

In **3.4 Knowledge From and About Art: Private and Public** I explore the acquisition of symbolic capital and its capitalization across the boundary separating the private and public sectors of an extended art world. I ask who represents whom on either side of this divide, and propose that artists and art mediate *back and forth* between a liberal realm of knowledges and a capitalistic realm of monetary risks and trades.

I discuss the 2008 bequest to the British state of Anthony d'Offay's art collection, an act which both benefits a private collector financially and affirms the importance of his judgements relating to the canon of twentieth-century art. I contrast this with Charles Saatchi's attempt to execute a similar manoeuvre, in this case falling foul of the Ethics Code of the Museums Association. I discuss the role of the itinerant curator in the public art space, via the example of the 2009 Tate Triennial, curated by Nicolas Bourriaud. The symbolic capital acquired by collector and curator in these settings is of a kind which might (with varying success) be capitalized in the economic art world, in the academic realm of knowledges of and about art, and in the realm of state institutions and the canon. I consider the movement of curators from public to private sector, and the implied shift from managing art in a knowledge field, to bringing products to market.

In Britain (art) museums have traditionally been (or have become) publicly funded institutions which must demonstrate art's consensibility, if not its utility and legitimacy, before a widely differentiated, tax-paying public. Such legitimacy, established between museum and public, can still be used in the private realm to both leverage the monetary value of art works, and bolster the symbolic capital of collectors donating or selling to museums. In practice, different types of authentication (academic, economic, historical) are unevenly mixed, and discussion of this mix is muted, perhaps because it can reveal and problematize the most privileged mutualities of the art world.

(I write this in 2010-11, a period characterized by cuts to many public services in Britain, in turn prompting argument around the public funding of the arts.²⁸ From the ambivalent responses provoked by some of these efforts, it seems that the terms required for a discussion of the uneven settlement between private and public art worlds are underdeveloped, making it difficult to convincingly connect contemporary art with the

public good; especially in comparison with the sciences, and where higher education is concerned).

In sections 3.1 to 3.4 (synopsized above) I indirectly press the question of knowledge production by the artist, and the scope of the artist's rational agency under the influence of the *credo* and *illutio* of the art world. In engaging with scientific fields, the artists discussed in my inquiry invoke knowledges produced under a different kind of settlement, influenced by a differently nuanced *credo* and *illutio* (to which they have not ceded). To an artist, the knowledge-producing and social aspects of scientific fields might seem to be more discrete than is the case in the art world. I believe this may be a reasonably true impression. However, because it is also a state of affairs which may be strongly desired by an artist seeking a different (scientific) order of truth claim, it demands scrutiny. It is important, I think, to distinguish the different ways in which the sciences ply their effects: to distinguish material agency from other powers of affect (emotional, rhetorical), and the knowledge outcomes of science from the cultural proxies and ciphers of information-entertainment (infotainment) also produced. This is not primarily in order to critique the claims of science, but to better evaluate whether or not an artist's practice is strengthened via a particular kind of engagement with science.

I now consider some enduring ideals and expectations associated with art and science broadly, with a view to their possible fate when the disciplinary outcomes of differently-selective fields enter the social world. Throughout, I try to remain alert to the fact that both arts and sciences are simultaneously sets of practices; producers of knowledge about the world at large (knowledge emergent in practice); and producers of historical or informational knowledge of and about their own activities.

3.5 Ideal and Operational Science is where I establish my own position regarding objectivism in science. I refer to Freud, Ziman, Snow, Medawar, Galison, and others, developing a view of scientific inquiry as an *ideally objectivist* project which has, of necessity, become a *collegially-objectivizing* one. Bourdieu identifies a number of social field effects which ensure a scientist's dedication to their field. Protocols emerge which address the problem of subjectivity in the production of knowledges of a reality deemed "external" even though it includes the scientist as object and subject. Whatever the viability of particular scientific truth-claims today, there is also a sense that scientific inquiry must take place in a 'scholarly city' which is 'simultaneously open and public [...] as well as closed and selective' (Bourdieu). This answers to the sciences' need to maintain social legitimacy, whilst guarding a disciplinary ideal and enjoying autonomy for their selectivist fields. I argue that an "open and public scholarly city" has limited operational scope if scientific outcomes are only exposed to scrutiny once practical applications and processes of productivization are well-advanced.

Bourdieu's objection to Woolgar and Latour's 'semiological' critique of laboratory practices shows his agreement with the notion that scientific inquiry is indeed grounded in

a viable settlement around the production of a reliable knowledge of external reality. For Bourdieu (following Bachelard), scientific instruments are not tools of 'creation' or 'inscription' but the instrumentalization of already formalized and formularized knowledge. I join this argument with Peter Galison's account of how judgement evolves along with instrumentalization in science. I suggest that there is a difference between 'banal facticity' (my phrase) and the kind of information about the world likely to be of interest to a human subject in society, and that this is reflected in the ways in which data are represented when the outcomes of scientific inquiry are demonstrated.

In the course of his rebuttal of the semiological critique of science Bourdieu infers that, within the arts and humanities, 'radicality effects' and 'the skilful use of ambiguous concepts' can stand in for knowledge gain. This, for me, is a useful a formulation which answers to the ambiguousness of artworks as knowledge objects. I find Bourdieu's notion of art practice as a discipline less definite than his sense of the scientific inquiry found at the heart of a scientific field. For him, art, especially, seems only to emerge as a formalized discipline via the power of 'objective relations' in social fields; artworks being outcomes suited to a conventionalizing and strongly economic art world, and the tokens of an affirmative culture around it. Such an art world is, in effect, the autonomous social field of a discipline whose unmodified outcomes (artworks) can be directly monetized, perhaps with help from an intellectual culture of art. This analysis finds the goals of art practice aligned more strongly with a market and a hierarchical canon than with knowledge production.

In **3.6 Art and the Non-Scientific Real** I seek an understanding of how an artist's knowledge project is bound to differ from a scientific one. I begin by briefly discussing Amelia Jones's perspective on Kant, Derrida, and subjectivism in art. Discourses around aesthetics have, I suggest, to contend with a progressive lessening of the scope for philosophy and art to produce sensible knowledges of the real. This is inherited with a separation of disciplines beginning in the Renaissance, continues through the Enlightenment, and is ongoing. The instrumental effectiveness of the sciences reinforces the effects referred to here.

Whilst the historical facts here may not be disputed, the effects for art are not always factored into discourses around its primary practices. I proceed via Jacques Rancière, for whom an 'aesthetic regime', separates art from 'the life of the community'. However, I find Rancière's definition of the aesthetic too reflexive, given that the authentication of art (indexical of the problems considered proper to it) is today essayed from many positions in a diffuse field. The term "art" is even used by radical practitioners, according to James Elkins, merely as a descriptor for whatever is not the politics, science, or field of activity they wish to critique. To be an artist in this sense means adopting a critical position outside various (non-artistic) disciplinary fields, whilst not to ceding, either, to any particular settlement with the art world.

Rancière's 'aesthetic regime' of art recalls Bourdieu's notion of selectivist sciences becoming estranged from 'ordinary modes of thought and language', with the increasing autonomy of their social fields (discussed in 3.1). For science, such autonomy might ensure an optimally-objective position, shielding knowledge production from social interference; whereas for art a similar autonomy seemingly ensures highly subjectivized outcomes. Implicitly, the question of consensibility undergoes multiple iterations here: we can ask how and if scientific outcomes which are sensible among scientists can become sensible further afield; and whether art should aim for consensibility in its primary outcomes – its artworks – or accept the necessity for an intellectual culture of art to mediate art outside its subjective realms of production.

If the aesthetic regime collapses, as suggested by Rancière, this may encourage a reconsideration of art practice as a knowledge project, and a renegotiation of the artist's role. I do not propose that this is happening in the guise of a historic movement; but ad hoc, in instances of practice. The instances which concern me are due partly to the overlapping of all kinds of selectivism in the cultural realm: where artists encounter many ways of investigating and representing the real which do not originate in the field of art, and where they also find many proxies of cutting-edge science which are attractive as signs of extreme contemporariness. Art's loss of 'ordinary connections' (with society) also accounts for a process by which art itself becomes intricately known within a conventionalizing art world. An art whose disciplinary limits are set here can be put into contention whenever artists seek to know the world via extrinsic means: in unconventional art, or actions which no influential agent authenticates as art. Artists' engagements with the sciences test, in a particularized way, the rule that any extension of *what can be known of the world via art practice* has to reach a settlement with selectivist ways of *knowing about art* associated with positions available in the art world.

Given the different uses made of the idea of the aesthetic, from philosophical to art-critical – and notwithstanding my interest in some of them – I propose in 3.6 to use the terms *aesthetic* and *intellectual* quite straightforwardly with reference to different modalities of art. This is so that I can contrast the reception of artistic and scientific outcomes in the social world, in relation to powers of affect perceived as *aesthetic* when they mainly 'play on the senses' and *intellectual* when they appeal to 'intellect or understanding' (OED). My inquiry asks what happens to the artist as a rational agent when knowledge is defined, post-scientifically, as highly intellectual; and what happens to the artwork as a vector of intellection when art is defined as strongly or primarily aesthetic. My exploration of the ramifications of this question in section 3.6 is a precursor to my discussion of artists' practices in 4.0; and I revisit it from the perspective of culturally-ambitious sciences in 5.0.

Here is a good place to clarify my use of two terms. I use *scientificify* to refer to the process of bringing elements of physical reality, such as the body, or the cosmos, under the rule of a science; in other words, the redefinition of the real within collegially-

objectivized scientific knowledges. Anything transformed in this way, becoming incorporated into a formalized and formularized scientific knowledge, I take to have acquired *scientificity*. I use the term *scientize* to refer to the process by which a mode of practice, a behaviour or a culture (for example), acquires something of the character of a science, for instance by bearing the signs of a scientific knowledge or process whilst, in many cases, not contributing to scientific knowledge. Something transformed in this way becomes more *scientistic*. I will refer, for example, to a scientified nature, or world (as opposed to an intuited or mythic one); and to a scientized or scientistic culture (as opposed to an artistic or religious one). An idea, artwork or art practice can be scientistic without demonstrating true scientificity: as when an agent of an artistic field adopts the stance of a scientist, imitates or performs the methods of a science. Conversely, a science whose true scientificity is hard to demonstrate to disciplinary outsiders can still, via its proxies or signs, have a scientizing effect on cultures, and on socially-shared perceptions of the real.

In 4.0 Art as a Discipline in Contention: The Science-Engaged Practices of Damien Hirst, Marc Quinn, Christine Borland I explore in detail three artists' engagements with the sciences. Their approaches vary, suggesting, by turns: a critique of the scientification of the real; games with tradition and convention in art; the use of proxies of science in provocative or tokenistic ways; and a search for new disciplinary purpose in art. All three artists have used techniques such as freezing, tissue preservation, or chemical treatments, along with apparatus, technical expertise and methods associated with scientific research, each bearing a link with an ideal of scientific objectivization. Sometimes the truth-value of scientific elements is taken as a given, but in all cases scientificity is resituated within a subjectivist practice, in relation to qualifying, non-scientific (often art-historical) knowledges. I look at how the scientific – a source or sign of explicitness of intellection and meaning – is treated in the discussion and mediation of some selected works, carrying forward ideas derived from my reading of Bourdieu and others.

In 4.1 The Key Work: Knowledge Gain, Market and Canon I develop my concern with the ambiguousness of art as a means of knowledge production, concentrating on artists' relationships with galleries and agents helping them to advance a career, and on the presentation and reception of particular works. I draw on Brian O'Doherty's *Inside the White Cube* essays, especially his notion of 'slotting', an effect of a conventionalizing art world by which artists become 'time-bound to the moment of their greatest contribution'. This is indicative of a regime of production comprised of key and follow-on works. The regime is well-known, but it is important for me to acknowledge its effect in thinking about art practice as a knowledge project.

Via O'Doherty I make some comparisons between a view of progress in science: Kuhn's well-known 'paradigm shifts', interspersed with 'normal' practice; and the uneven way in which both individual art practices and art in general progress over time.

O'Doherty refers to one-off 'gesture' works which herald, for an artist or for art in general, what could be paradigm-shifting 'projects'. If the 'projects' fail to materialize, a high tolerance of forgetting in the art world allows similar 'gestures', suggestive of radicality or progressivity, to be repeated. 'Gestures' also serve an economic purpose. As key works, they are presented as instances of both stylistic breakthrough and special empirical gain; sources of symbolic capital which can be used to leverage the value of serially-produced follow-on works (whether or not the artist continues with the knowledge-project heralded, by inference, with the key work). Here, the opportunistic collapsing together of art work as knowledge object and market object becomes likely.

I begin **4.2 Damien Hirst: Mixed Blessings** with a detailed look at the installation *A Thousand Years* (1990). This key work, with its mixing up of references to different art movements, gives art insiders a chance to exercise their 'sensible mode of being specific to artistic products' (Rancière), whilst hinting that something purposive is going on in the moment of encounter which has nothing, particularly, to do with art. The installation's potential power as a thoroughgoing experimental work is, I argue, neither fully realized nor carefully guarded, either by the artist, or his commercial partners. It is, instead, opportunistically exploited, and compromised to facilitate an editioning process. The piece is exemplary of Hirst's ability to combine apparent empirical gain, stylistic breakthrough and commercial gain in one instance of practice, and in the context of his career is instrumental in his acquiring the special autonomy of a self-authenticator.

Some of Hirst's early works with anatomized – or butchered – animal bodies reveal much about the ethical separation of human and non-human animal, especially as reinforced via the twin routes of post-Enlightenment science and industrialized farming. I explore these ideas via a consideration of government legislation around animal experiments, and other artists' works seeking to dwell on the moment of an animal's death. Whilst the ideas are interesting in themselves, my aim here is also to show what might be lost to both Hirst and his viewers as a result of overpowering commercial authentication and isolation from certain kinds of discourse.

Hirst, I finally argue, does value moments of special gain typically associated with the making of a key work, even as he shows in many other ways that he also enjoys his power as an arch-manipulator of art world protocols.

In **4.3 Mark Quinn: Truth Claim, Cultural Agency and Scientism** I begin by locating Quinn's practice between a credo of vaunted subjectivity which valorizes the artist's agency, and a scientification of nature according to which individual human agency is played down. My first example is *Self* (1991), a self-portrait head cast in the artist's refrigerated blood, intended to be remade every ten years (thus, incidentally, offering an interesting response to the key and follow-on regime of production expected in the conventionalizing art world (4.1)). This is the first widely-known piece in which Quinn uses bodily or medical substances such as human DNA, blood, or pharmaceuticals.

I interrogate an early text on Quinn, produced by art critic Sarah Kent for the Saatchi Collection; which acquired the first iteration of *Self*. She alludes to Quinn's challenge to the idea of authenticity in art, and an aura about *Self* which seems by turns scientific and religious. It emerges that critics and historians are able to weave a discourse around Quinn's challenge to the traditional discipline of portrait sculpture, allowing him to 're-enter periodically the atmosphere of critical reception' (according to Rod Mengham). Meanwhile, the scientific contemporariness of his work is built up in information circulating in a cultural realm. Here I do not mean a random or chance circulation, but a necessary one, entailing the programmatic use of a publicity-created culture responsive to the prompts of knowing, powerful agents like Quinn, Kent, Saatchi and, later, White Cube Gallery.

Quinn goes on to engage with a range of scientific knowledges, usually of a kind already circulating one way or another as culture. I discuss Mengham's account of *Garden* (2000), and suggest that Quinn invites uneven evaluations from agents more used to art-historical categories than scientific knowledges. Such difficulties might be elided when the discourse produced is affirmatory, and circulated mainly inside an art-world where there is less interest in a cross-disciplinary problematic, or correctly-represented science, than in maintaining the autonomy of contemporary art and its social field.

Uneven relations like those between public art institutions and private markets discussed in 3.4 are briefly demonstrated in a cross-disciplinary form here. Quinn and his private partners leverage the symbolic value of commercially-traded art through a suggested association with publicly-shared, instrumentalized science; but Quinn's works offer few disciplinary gains to the scientific fields to which they refer. Leaving aside discourses to do with traditional art forms – which might be "disciplinary" in an art-historical sense – Quinn's work produces its strongest effects in a cultural realm; and it is as a cultural rather than a disciplinary agent that he is later able to return something to the sciences, especially via his involvement with the Wellcome Trust (4.6).

In **4.4 Christine Borland: Situated Knowledge** I acknowledge that this artist's work reflects her strong affinity for scientific inquiry, classification and taxonomization. However, this is not to say that there are no precedents for this in the art world, nor that Borland's work cannot serve quite conventional purposes there. One of those purposes is to be an exemplar of a kind of serious or radical practice valorized in opposition to the most populist YBA art of the 1990s, by agents such as Patricia Bickers, Charles Esche, and Julian Stallabrass. I discuss Borland's work in the light of the retrospective exhibition *Preserves* (Fruitmarket Gallery, Edinburgh 2006-7), citing a variety of curatorial and critical voices including Esche, Hilty, Lind, Richardson; and Borland herself, who is an articulate mediator of her own work.

In contrast to some of the work of Hirst and Quinn, Borland's early works do not to flatter scientific disciplines by inflating the power of science as culture. They are more like

acts of institutional critique, with the institutionalized knowledges of medical and forensic science as their target. I discuss *From Life (Glasgow)* (1994) and *Second Class Male, Second Class Female* (1996). In each of these, Borland highlights the specimenizing of human subjects in the treatment of osteological remains within anatomy and forensics. Each work demonstrates an act of restitution for a lost subject whose anonymous skeletal remains become objectified for use in scientific study.

Borland's strategy invokes the necessities of selectivist knowledge projects, subjecthood and individual sovereignty, social legitimacy, institutional power, history and tradition. I find that she, like Quinn, relies on the durability of some traditional categories of art, even as she interrogates the ethical settlements behind the production of scientific knowledges. In her early career Borland acquires strong authentication within the public-sector art world, and symbolic capital by association with the academic and institutional domains of medicine she also critiques in her work. In order to better situate this complex practice in terms of disciplinary and cultural action, I turn to Donna Haraway's 1988 essay *Situated Knowledges*.

Haraway's text begins with a recapitulation of feminist critiques of science, but she argues towards an acceptance of the need for 'a no-nonsense commitment to faithful accounts of the "real" world'. Although the particulars of her argument differ, she echoes Bourdieu's scepticism about adopting a semiological approach to aspects of science which are definitively outside the scope of semiology. Haraway then argues for licence to adopt 'partial perspectives' on scientific knowledge, to counter the 'totalizing' tendency of modern sciences, with their increased cultural agency and relations with commercial and even military partners.

Putting the artist's practice in the place of Haraway's subject, and her (feminist) 'special interest group', I ask: with what degree of subjectivization does scientific objectivity – which Borland is interested in, and which helps her escape 'the traps of art' (Esche) – become a free-for-all of subjectivities? Borland's work, it seems to me, is pushing at the limits of being radically outside both conventional art and science.

In 4.5 to 4.7 I return to each of the artists discussed so far, to look at the scientific aspect of their works as their careers advance, each entailing increased involvement with a conventionalizing art world. In **4.5 Negotiated Settlements: Christine Borland** I analyse more closely the situatedness of Borland's practice. I find that it is within reach of three areas of interest: scientific knowledges and modes of inquiry; art-world conventions and knowledges of and about art; and social radicality. I now contrast the apparent ambivalence of this position – with its promise of interdisciplinarity and multivalent outcomes – with the gains available to Borland if she remains an artist. I relate some of the details in the staging of the exhibition *Preserves* to my discourse in part 3.0, showing how Borland's work slips in and out of categories which appeal to differently interested agents in public and private sectors of the art world. The work can thus be regarded, by turns, as more or less disciplinary, more or less cultural; as part of a knowledge

project, but also yielding outcomes that serve conventional purposes in an economic art world.

I draw comparisons with Hirst and Quinn, regarding the transition between art practice (research) and art object. I argue that, even with Borland, this entails a dynamic intellectuality becoming represented in a relatively static, but strongly aesthetic form. I select Borland's *The History of Plants According to Women, Children and Students* (2002/2006) for detailed discussion. This, I suggest, derives its authenticity from the artist's foregoing reputation for offering a radical 'partial perspective' (Haraway) on medical knowledges. This is a reputation maintained via an intellectual culture around her practice, and bolstered in public-realm settings like the Fruitmarket Gallery, although the work might also be eminently suited to the requirements of an art market.

The last part of my discussion of Borland's work concerns *Support Work (Hippocrates 1:075)* (2006), a scaled-down simulacrum of the frame supporting "Hippocrates' tree" on the Greek island of Kos. I note that the original iconic structure may have a little to do with the disciplines of medical science, but has much to do with a related culture. I propose that Borland's copy is an attempt to create something which looks like a new key work, and that it and other pieces signal a shift in the manner of her engagement with the sciences: away from the disciplinary (methods and processes), and towards the cultural (narratives, proxy-objects and histories). This may reduce Borland's chances of being critical or radical with the playing out of scientific knowledge in society.

In 4.6 Negotiated Settlements: Marc Quinn I concentrate on the distinction between interdisciplinarity and what I call cross-cultural entente. By the latter, I mean the expression of cordiality between artistic and scientific agents who remain faithful to the illusion of their own disciplinary fields, whilst enjoying (to various ends) a temporary intermingling of (artistic and scientific) social fields or cultures. With Quinn's *A Genomic Portrait: Sir John Sulston* (2001), I find this kind of action formalized around a specific project, and presented in the public realm in a way that might be taken to represent interdisciplinarity; but which resolves the disciplinary ambiguousness of art around simplified scientific content, pointing towards the emergence of artistic cultures of science.

I focus on the press release crafted for the launch of Quinn's *Portrait* of the well-known geneticist, and especially on the tangle of artistic and scientific terms used to describe the artwork by agents of the different disciplines and cultures involved with the commission: Quinn, Sulston, and representatives of the Wellcome Trust and the National Portrait Gallery. Commissioned by this group, the work is probably bound to be affirmatory of art and science in general, and genetics in particular. I focus on what I find to be a poor trade between resolving the ambiguousness of art around a supposedly scientified realism, and ceding the opportunity to address the impact of the knowledges and instrumentalities of genetics in society.

Finally, I argue, the *Genomic Portrait* facilitates a demonstration that there is no trouble between powerful, and exemplary protagonists, who, whilst they pursue differently selective disciplines, and partake of different cultures, all seek legitimacy in the same social world: an example of cross-cultural entente among agents who each have influence over normative culture.

In **4.7 Negotiated Settlements: Damien Hirst** I explore, first of all, Hirst's use of science as a guarantor of a 'traumatic reality' (I borrow from Hal Foster, on Warhol). I contrast this with the nostalgic, schoolboy view of scientific facticity demonstrated in Hirst's use of the signs and proxies of medical sciences. I discuss in detail the "biopsy paintings" exhibited in the highly-publicized exhibition *Beyond Belief* (White Cube Gallery, London 2007). Following the lead of *New Scientist* magazine, I interrogate Hirst's attempt to infer authorship of representations bearing scientific truth-claims; including his elision, no doubt by contractual agreement, of the names of the original makers of the microscope images used. Whilst the intellectual property or moral rights issue is perhaps minor, more interesting is the attempt to wrest new legitimacy via opportunistic invocations of symbolic capital, and a blatant conversion of shared knowledge objects into privately capitalized artworks. There is a high-handedness here, exemplified in Hirst's taking for himself the company name "Science".

Prompted by the incidental similarity between a press image of Hirst's exhibition *Beyond Belief* and Joseph Wright's 1768 painting *An Experiment on a Bird in the Air Pump* I contrast Hirst and Wright in terms of artistic products which simultaneously demonstrate the power of scientific truth claim and social situatedness. I compare Wright's now iconified painting with Hirst's exhibition as a whole; the latter with its equivocation between the power of scientific knowledges, religious belief, and strongly aesthetic art. The exhibition presents scenes of scientified nature, medicalized childbirth, scientific culture, and the financial alchemy of the private art-world. In each case, Hirst seeks to demonstrate his own agency.

As a coda to my discussion of artists' science-engaged practice, and a bridge into part 5.0, I briefly discuss Hirst's contribution to the *Beagle 2* Mars Lander. This, I suggest, is a case of Hirst allowing one of his trademark styles to be used to glamorize a science project; at the behest of a project leader, Colin Pillinger, who has a keen eye for new or ready-made elements for an artistic culture of science.

In part **5.0 Art for Science, Science for Artists** I consider attempts to enter various cultural 'spaces of play' (Bourdieu) from strongly pro-science positions. If it is necessary for any selectivist field to counter the isolating effects of autonomy, or to bolster the legitimacy of its practices in the social world, then cultures created programmatically might seem most likely to promise this whilst minimizing opportunities for outsiders to question the credo, illusio or privileges of the field.

I raise the issue of artistic cultures of science which seem to be dependent on defining art as a predominantly aesthetic (intellectually non-assertive) practice. Inherent here is the tacit acceptance of a disciplinary devaluation: that art is, relatively speaking, a weak or unreliable way of knowing external reality. I have already suggested that some kinds of art, and some of the products and actions of an intellectual culture of art, resist this devaluation. Now I explore the likelihood of aesthetic modalities once particular to art being repurposed within cultures of science, the creation of artistic cultures of science, and the likelihood that normative culture is becoming more scientific.

In **5.1 "Science Wars"** I explore some disputations about philosophy, cultural theory and science which took place in the 1990s. Like the Snow-Leavis controversy of the early 1960s, these so-called "science wars" particularize the issue of finding a platform in public discursive space in terms of selectivist disciplines and their cultures. I begin, though, with Francis Bacon's seventeenth-century warning about trying to 'entangle [public] assent' or 'tickle [...] the populace' with emerging scientific ideas. Bacon apparently predicts that the socially-autonomous scientist faces special difficulties when they become a representative of science in the public realm; as many are, a few hundred years later.

I discuss the stance adopted by the founder of the Edge Foundation, John Brockman, and his reworking of Snow's 'third culture' in the name of a science which 'has today become "public culture"'. This is a formulation which holds Snow up only emblematically, forgetting his moralism, his political affiliations and the fact that Snow's 'literati' – like, I suggest, Brockman's 'digerati' – were an élite whose privileges Snow found problematic.

I explore the premise, and some of the inconsistencies around Gross, Levitt, Sokal and Bricmont's quarrel with postmodern philosophers and their alleged 'abuse' of scientific terms and ideas. These arguments were given force via Sokal's publication of a deliberately non-scientific paper in the humanities journal *Social Text* in 1996. Here I revisit the question of what passes for knowledge gain in the humanities. However, with input from Feyerabend, I also suggest that the knowledge projects of science are put into contention if rhetoricians of science adopt an acquisitive approach to the cultural realm, whilst constraining debate, and nullifying the contribution of any rationalist who is not conventionally scientific in approach. If the issue for modern science is merely its continuance within its present, fairly autonomous fields, then a scientific culture is merely a public-relations buffer-zone in which to 'entangle assent' and 'tickle the populace'.

In **5.2 to 5.4** I consider pre-modern artists whose personas are readily iconified, and whose work is most easily taken to be different from contemporary art: perhaps being consonant with what biologist Michael Yudkin, commenting in 1962 on the Snow-Leavis controversy, calls 'the trophy of the traditional culture'. I argue that key to distinguishing

between art as a token in such a pre-legitimized culture, and art as a way of knowing and being in the world, is the keeping open of a place for the artist's rational agency.

5.2 Apparatus of Advancement: Joseph Wright's *Experiment* explores the possible mixed motivations of Joseph Wright in making his scientific history paintings in the eighteenth century. For Wright, in his own time, an espousal of emerging science is a statement about social aspiration, situatedness, and power. Informed by Stephen Daniels's suggestions about Wright's position, I turn to the modern uses Wright's strongly-iconified 1768 painting *An Experiment on a Bird in the Air Pump*. I argue that this is widely used today in a traditional culture which not only guards the canons and bodies of knowledge of art, but also the narratives of science, suggestive of a cultural legitimacy shared by both arts and sciences.

Wright's painting bears within it a mixture of disciplinary and cultural elements, and can be a starting point for thinking about the comparative disciplinary power and cultural resonance of scientific instrumentality. Daniels shows that the apparatus of scientific inquiry can also be the identificatory paraphernalia of social groups who advocate science. Comparing Wright's air pump with objects on display in the Faraday Museum I suggest that similar mixed attributions are in play, similarly changing in emphasis over time. As their disciplinary necessity lessens, certain apparatus and some features of science can become tokens in a traditional culture of science, lending an aura of historicity and permanence to disciplines which are, in fact, endlessly changing, and endlessly disturbing the human settlement with the world at large.

In **5.3 Art as Science-in-Waiting (Projecting Leonardo)** I continue my line of thinking from 5.2, first by discussing three examples of the casual incorporation of pre-modern art in the rhetoric or cultural side-projects of scientists. I begin with scientist Colin Blakemore's references to Shakespeare, Rembrandt, and Wagner when announcing a major stage-completion of the potentially controversial human genome project. The announcement is a tiny event, amplified via a publicity created culture, and entails Blakemore associating a disciplinary outcome in a highly selectivist science with a notion of iconified works in a traditional culture; the latter representing something to which scientific fields should aspire. I speculate on the degree to which this expresses a desire to put certain aspects of science beyond question. Perhaps, however, these associations are meant to operate in reverse: the explicatory power of science being so self-evidently comprehensive that it must supersede other forms of totalization; for instance, those associated with the oeuvre of a thoroughly legitimized artist.

I introduce the multivalent figure of Leonardo da Vinci via latter-day physicist Sergio Cittolin, who makes drawings in the style of Leonardo. Whilst Cittolin playfully takes advantage of the iconification of Leonardo as master draughtsman, he also introduces a question of naivety around artistic representations of the real. For the physicist, I argue, the real that is his serious concern is that which is revealed in the data produced by the massive and complex apparatus at CERN, where he is based. It is

Leonardo's aesthetics which mainly interest Cittolin. Although Leonardo's drawings are obviously connected with his reputation as a proto-scientific knowledge seeker, this empiricism is downplayed, in a trivial sense, by Cittolin's projection of him.

In a similarly critical vein, I analyse a paper published by a group of neuroscientists (Alessandro Paluzzi and co-authors) who extend a retrospective claim over examples of Renaissance art, and in doing so categorize its now highly-contestable intellectual aspect as a kind of science-in-waiting. I argue that it is not necessary to reposition these artists as producers of a secret culture of assent around early science in order to acknowledge the influence of anatomy on their works, as the paper claims. Alternative conclusions can be drawn from the same evidence.

Finally, I return to Leonardo, discussing in more detail the uses of different projections of man and work. I comment on Robert Hughes's use of Leonardo as a way of distinguishing by default the art he wishes to disavow (Warhol, Hirst). Hughes projects Leonardo as a painter, and as the guarantor of a traditional artistic culture which Hughes himself authenticates, in doing so becoming authentic himself to a particular notion of art. For the *Leonardo* journal of science-art interdisciplinarity, on the other hand, a projection of Leonardo as both empiricist and aesthete serves as a sign that the interdisciplinarity represented by the journal has a grounding in deep history. I argue, on the contrary, that Leonardo da Vinci marks the point at which a mixture of objectivization and subjectivization in the one practice becomes less tenable, as can be seen if we compare his modes of practice (deduced from the objects left behind) to contemporary art and latter-day science. Leonardo, in fact, personifies as a realm of contestation the domain I have sought to define through instances of contemporary art practice and acts of cross-field engagement.

In **5.4 A Demonstration: In a Waiting Room on Euston Road** I discuss the siting of a painting (c. 1880-1910) by Glindoni in the foyer of the headquarters of the Wellcome Trust; an institutional advocate of life- and medical sciences, which is also proactive in the creation of what might be called an artistic culture of science. The work by Glindoni is generically-similar to Wright's *Experiment*, showing the Elizabethan natural philosopher Doctor John Dee demonstrating a beguilingly dramatic chemical reaction before the assembled court of Queen Elizabeth I. I speculate about the resonance of this scene – of coincident disciplinary and political power – for the Wellcome Trust.

Via a discussion of the Trust's programmes with artists I consider the 'spaces of play' associated with an aesthetic or artistic culture of science. I ask whether or not artists can extend their disciplinary activity by entering these spaces, or if agents of the sciences merely seek to adapt aesthetic forms which artists have already made familiar in the social world. Is there a place for a strongly intellectual art in an artistic culture of science?

Even if the sciences are securely founded as disciplines within their own selectivist fields, their continuance may still be threatened by wild or unruly (un-ruled) evaluations of their outcomes in the social world. Of course, what might be regarded as

misunderstandings from one point of view, are 'partial perspectives' (Haraway) from another. I finally consider the possibility that the Wellcome Trust has, in effect, collected and thus managed a large number of such unruly responses to science.

My final section before concluding is **5.5. Artists and Scientists in a Room: *Art, Poetry and Particle Physics: a film by Ken McMullen***. This is a detailed analysis of the 2005 film in the title, centred on what can be made of the positions of its main protagonists: a group of artists and scientists, mainly seen together in different combinations, in similar rooms at CERN. They discuss the relative merits of arts and sciences in general, and particle physics in particular; in terms of their history and philosophical groundings, their utility, social legitimacy, and power of affect. I identify a potential difficulty whereby interesting disciplinary differences between the main protagonists in the film might be masked by their social similarity, and the need to produce a certain kind of outcome: a characteristic of the cross-cultural entente I identify elsewhere (especially in 4.6).

I begin with an account of the film's opening montage, which gradually reveals John Berger reading Jorge Luis Borges's poem *Happiness* to an unseen audience. This may or may not include the two physicists taking part in the film: Michael Doser and John March-Russell. The poem offers symbolic gains which might be posited as a challenge to the presumed objectivism of the physicists. However, other aspects of Borges' writing (which Berger, elsewhere, downplays) could offer the possibility for a more deeply interdisciplinary dialogue. I identify a bias towards discussing the disciplinary positions of the scientists, and questioning them about the effects of their work and their ethics, whilst not interrogating art's more ambiguously-defined disciplinary purposes and powers of affect.

I argue that the film's representation of art practice as a kind of material thinking emergent in physical processes aligns art with somewhat outdated, artisanal notion of science, underplaying the fact that science today, and especially physics, is rendered exceptional because of a strong reliance on mathematical abstraction and complex instrumentation. Attempts to engage with or represent this kind of science via allegory or metaphor seem likely to exclude the intricacies of science as discipline, being more suited to a consideration of science as culture. Via its carefully modulated exegesis, McMullen's film nevertheless offers insights into the power of affect physics has over its practitioners. What emerges here is a sense of scientists whose experience of the real is of a world as in play as it might seem to be from the point of view of any avowedly subjective artist. However, the physicists also possess disciplinary tools with which to extract, from this world, knowledge gains of a more objective kind. The contrast between the field of affect which seems to hold the scientists in thrall, and the realm of material effects in which their very selectivist practice is legitimated, is the subject of the last part of this final section of my inquiry.

Notes

Notes: 1.1 Introduction: Background and Approach

¹ C. P. Snow, Stefan Collini, *The Two Cultures*

(Cambridge: Cambridge University Press, 1993). Includes:

Stefan Collini, 'Introduction', pp. vii-lxiii.

C. P. Snow, 'The Two Cultures', pp. 1-51 (Given as 'The Two Cultures and the Scientific Revolution' for the Rede Lecture, Cambridge 1959).

C. P. Snow, 'The Two Cultures: A Second Look' (1963), pp. 53-100.

Further references to texts in this edition given as '**Collini Two Cultures**' '**Snow Two Cultures**' and '**Snow TC: Second Look**'.

² Snow-Leavis, recently re-examined from a historical perspective:

Guy Ortolano, *The Two Cultures Controversy: Science, Literature and Cultural Politics in Postwar Britain* (Cambridge: Cambridge University Press, 2009).

³ Snow *TC: Second Look*. This later text contains more argument about the kinds of literature Snow admires. Although Leavis is not mentioned by name, it is fairly clear that parts of the *Second Look* are written in response to Leavis's attack on Snow's literary standing, including the 'poverty of [his] canons' (Leavis *Two Cultures* [notes. below] (p. 41)).

⁴ Snow *Two Cultures* (pp. 1-15; esp. pp. 7-8).

⁵ Roger Kimball, "'The Two Cultures' Today", *The New Criterion* Vol. 12, No. 6, February 1994. Kimball states: 'In the end, Snow is a naïve meliorist. For him, a society's material standard of living provides the ultimate, really the only, criterion of "the good life"; science is the means of raising the standard of living, ergo science is the arbiter of value'. Like Collini, Kimball draws equivalences between Snow-Leavis and a prefiguring nineteenth-century debate between T. H. Huxley and Matthew Arnold.

⁶ C. P. Snow, 'The Two Cultures', *New Statesman*, 6 October 1956.

In this text, preceding the 1959 lecture, Snow is even more concerned with 'the "moral health" of scientists as a group over "literary intellectuals"' than in the version delivered as the 1959 Rede Lecture. Collini *Two Cultures* (p. xxvi).

⁷ Andreas Whittam Smith, 'The White Heat of a Successful Party Conference', *Independent*, 30 September 1996.

Also:

John Cole, 'Labour Enlists Science to Fight Poverty At Home and Abroad', *Guardian*, 2 October 1963.

⁸ Snow *TC: Second Look* (p. 98). The danger, states Snow, is in not addressing the need for decision makers to be well-informed scientifically; a precursor of later arguments for what, quite ironically, has become known as 'scientific literacy'.

⁹ F. R. Leavis, 'Babbitt Buys the World', *Scrutiny*, 1 (1932).

C. P. Snow, 'H. G. Wells and Ourselves', *The Cambridge Review*, 56 (19 Oct. and 30 Nov. 1934).

These two pieces attest to earlier disagreements between Snow and Leavis about Wells: Collini *Two Cultures* (pp. xxiii-xxv).

¹⁰ **F. R. Leavis, *Two Cultures? The Significance of C. P. Snow: Being the Richmond Lecture, 1962* By F. R. Leavis; With an *Essay on Sir Charles Snow's Rede Lecture* By Michael Yudkin** (London: Chatto & Windus, 1962.). (first publ. as 'Two Cultures? The significance of C. P. Snow' *Spectator*, 9 March 1962).

Further references to this edition given as '**Leavis *Two Cultures***' and '**Yudkin *Two Cultures***'

¹¹ 'This sage [Snow] is after all a Cambridge man'. Leavis *Two Cultures*, p.35.

¹² Leavis *Two Cultures* (esp. pp. 48-49).

¹³ Leavis *Two Cultures* (p. 50).

¹⁴ Leavis *Two Cultures* (pp. 19-21).

¹⁵ Martin Kettle, 'Two Cultures Still', *Guardian*, Saturday, 2 February 2002.

Kettle recapitulates Snow's 1959 complaint about lack of science training in individuals holding high government office.

¹⁶ **John Brockman, 'The Third Culture', *Edge.org*, 1991**

<http://www.edge.org/about_edge.html> [accessed 27 December 2010].

Further references to this online source given as '**Brockman *Edge***'

¹⁷ 'The Leonardo Story', <<http://www.leonardo.info/isast/leostory.html>> [accessed 21 March 2011]. Snow's lecture is cited in this brief account of the motivational background to the interdisciplinary *Leonardo* journal.

¹⁸ Commenting on latter-day academic disciplines (undistinguished from their cultural manifestations) Collini suggests that rather than 'two cultures' today's disciplinary mix is more like a 'continuous spectrum'. Collini *Two Cultures* (pp. liv-lv).

¹⁹ Brian Massumi, 'Ready to Anticipate: Pre-Emptive Perception and the Power of the Image', Paper, *Neuroaesthetics*, Conference: Goldsmiths University, London, 20 - 21st May 2005,

<<http://www.artbrain.org/ready-to-anticipate-pre-emptive-perception-and-the-power-of-the-image/>> [accessed 28 January 2010]. Also: author's audio recording and notes.

²⁰ *Art and Science Now: The Two Cultures in Question*, Symposium in collaboration with the London Consortium, the Science Museum, Birkbeck, University of London and the Wellcome Trust: Birkbeck, Dana Centre, Tate Modern, London, 22-24 January 2009, author's audio recordings and notes.

²¹ *Art and Science Now*, Tate Modern 24 January 2009. Speakers (with generic professional description): Gillian Beer (professor, historian of science), Ben Goldacre (writer, broadcaster, medical doctor), Anthony Grayling (professor of philosophy, writer),

Colin McCabe (professor of English, film, humanities; writer), Jonathan Miller (neurologist, writer, television presenter, photographer, curator, theatre and opera director), Patrick Wright (writer, historian, broadcaster, curator, film-maker), Marcus de Sautoy (professor of mathematics, writer), Alan Sokal (professor of physics, writer).

²² I refer throughout my inquiry to several essays reprinted in **Pierre Bourdieu, Randal Johnson, *The Field of Cultural Production: Essays on Art and Literature*** (Cambridge: Polity Press, 1993). These are:

'The Field of Cultural Production, or: The Economic World Reversed', pp. 29-73 (orig. publ. 1983);

'The Production of Belief: Contribution to an Economy of Symbolic Goods', pp. 74-111 (orig. publ. 1977; 1980);

'The Market of Symbolic Goods', pp. 112-41 (orig. publ. 1971; 1985);

'The Historical Genesis of a Pure Aesthetic', pp. 254-66 (orig. publ. 1987).

Further references are given as '**Bourdieu *Field of Cultural Production***' with page numbers for the 1993 edition.

²³ Bourdieu *Field of Cultural Production* (p. 83).

²⁴ 'were the extrinsic in art to answer back (so to speak) this could provoke a critique of art's authenticatory protocols from within': When, at the Tate symposium, the arts are represented by a figure like Jonathan Miller, who is not regarded as a contemporary artist, there is no danger that his dyspeptic remarks about latter-day art will be taken as a sign of crisis in the field represented by Tate Modern.

²⁵ Nick Cohen, 'Why the Tate's Posing Curator is So Passé',

Observer, 1 March 2009, p. 32. Opinion column criticizing Nicolas Bourriaud's curatorship of 'Altermodern', Tate Triennial 2009.

²⁶ **Pierre Bourdieu, *Science of Science and Reflexivity*** (Chicago: University of Chicago Press, 2004), p. 113. (first publ. 2001). Further references to this edition given as '**Bourdieu *Science of Science***'.

²⁷ Bourdieu *Field of Cultural Production* (p. 78).

²⁸ 'I Value the Arts', <<http://www.ivaluethearts.org.uk/>> [accessed 8 January 2010]: National campaign petition: approx. 19,000 signatures after approx. 4 months online.

'Save the Arts UK', <<http://savethearts-uk.blogspot.com/>> [accessed 8 January 2010]: National campaign petition: approx. 63,000 signatures after approx. 4 months online.

Also:

Bob and Roberta Smith, 'Arts cuts are like ripping up the Magna Carta', *Guardian.co.uk*, 4 January 2011

<<http://www.guardian.co.uk/commentisfree/2011/jan/04/arts-cuts-devaluation-britain>>

[accessed 8 January 2011]: national newspaper blog; over 350 comments, mainly hostile, after 4 days online.