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Introduction
Fact and Fiction: Literary and Scientific Cultures in Germany and Britain – Thoughts on a Contentious Relationship

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The title of this volume alludes to the paradigm of “The Two Cultures,” which became popular through Charles Percy Snow’s Rede lectures delivered in 1959. In these lectures, Snow lamented the divide of the two knowledge-producing systems of the humanities and the sciences. Despite the reference to Snow, however, it is not the volume’s aim to represent and solidify an antagonistic formulation of the relationship between scientific and literary cultures. Rather, the articles assembled here investigate Snow’s division between science and the humanities as a historically conditioned and complex phenomenon. When the title refers to literary and scientific cultures, it is with the acknowledgment of this historical complexity and, at the same time, with the recognition that the terminological pair of “literature and science” has become a practical reference for an area of study that is still in its development.

Towards a Field?

Since Snow’s lamentation about the split between scientific and literary worlds and – even more – about the unwillingness of the participants of these cultures to engage with each other’s fields of knowledge, much work has been undertaken in disciplines such as the history of science and literary studies with the goal to develop a clearer picture of the relationship between science and literature and of its historical development. Indeed, there was much excitement two decades ago about the establishment of a new field under the heading of Literature and Science. In their 1989 publication, Christie and Shuttleworth expressed the hope that this field would become comparable to research areas such as Gender Studies or Postcolonial Theory. Similarly, Bruce and Purdy, in their volume Literature and
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Science (1994), announced the emergence of an “exciting new field” under the name “Literary and Science Studies.” However, despite initial excitement and optimism, little has materialized in the last decades in terms of an institutional anchoring of such a field. There are few programs in North America that have found promising ways to bring together under one roof scholars trained in distinct disciplines (York University is an example) or to unite them in the context of a scholarly association (the Society for Literature, Science, and the Arts, SLSA, is an exception). These attempts at institutionalizing have remained far and few between.

The hesitations and delays in establishing and institutionalizing the field are connected to the realization that it is difficult to formulate a stringent set of questions which this area of study might address. Even before formulating such questions, we would need to ask: how are the terms defined within the field’s name? When we say “literature” and “science,” do we mean a specific historical and disciplinary constellation which became possible once scientific and literary methodologies were defined as separate from each other? Or do we assume a much more generous definition of the terms – running the risk that the title’s distinction, if not the opposition that it claims, becomes void? These questions are difficult to answer.

Notwithstanding the difficulties, there is a rich body of work that has tried to address questions such as these. Gillian Beer in particular has been instrumental in establishing and conceptualizing a field of research that focuses on the relationship between literature and science. In “Translation or Transformation,” Beer considers the question of whether the distinction between the disciplines is justified at all. To discuss the relationship between the disciplines, Beer employs the terms “translation” and “transformation.” She dismisses what she calls “translation” as inadequate, because it assumes a primacy of one field which is then translated into another. Instead of delineating clearly defined boundaries between disciplines, Beer highlights the unstable nature of the relationship between literature and science. She stresses “interchange rather than origins and transformation rather than translation” and notes that “neither literature nor science is an entity, and what constitutes literature or science is a matter for agreement in a particular historical period or place.” Instead of assuming a hierarchy or split between disciplines, Beer turns her attention to the shared language of literary and scientific texts. Using the Victorian period as a case study, she examines how in texts of scientists such as Charles Darwin (1809–82) and Charles Lyell (1797–1875) narrative models and myths are reused in order to tell the story of evolution.
Following the lead of literary scholars such as Beer and theoreticians such as Michel Foucault, significant work has been done in recent years in the history of science to shift the attention from individual discoveries and experiments to the discursive, textual production of these moments. This “linguistic turn” is perhaps most clearly marked in James Secord’s Halifax keynote address, in which he proposes that historians of science should approach “science as a form of communication.” Suggestions such as Secord’s have helped to raise the status of textual expertise within the history of science, where this new attention to language has proved extremely productive. One recent exploration of this work is the excellent *Focus* section of the leading history of science journal *ISIS* on the topic “History of Science and Literature and Science” (September 2010). Colin Milburn observes there that historians have become more aware of what he calls “literary technologies” in the sciences, but he notes that the contribution of science fiction “and even literature as such” to the sciences has not been adequately studied yet. In the same *ISIS* issue, Henry S. Turner encourages readers to learn from literary scholarship and to consider “form” as a category for the study of the history of science. Laura Dassow Walls’s contribution stresses the “rootedness of all texts in lived experience” and suggests that “both literary and scientific texts may be approached as performances that weave together discursive and material elements.” Two observations regarding the *ISIS* issue stand out in connection to the subject of our volume: first, the focus on the interrelatedness of literature and science and, second, the conviction that literary tools help historians of science to understand better their objects of study. Consequently, James Bono states in the issue’s introduction that the essays assembled in this *ISIS* edition demonstrate “that history of science and literature and science are, in fact, interdependent fields” and that the field of “literature and science shares with the history of science a concern to understand the making of science.”

The focus on language and on shared discourses has proved to be a fruitful path towards an understanding of how scientific innovation takes place and how scientific paradigms emerge. However, it has also made it difficult to pay attention to specific disciplinary questions and to the specific contribution of literary cultures to knowledge. Although numerous studies have shown by now that the emergence of knowledge cannot be confined within disciplinary boundaries, it is also a fact that disciplines remain a shaping structure of knowledge production and academic life. As Katherine Hayles has noted, disciplinary formation is so strong that we often don’t even notice any longer the disciplinary “lenses” that we wear.
“They are crafted through long years of apprenticeship as we absorb, often unconsciously, attitudes and ways of speaking that determine not only the answers we accept, but the questions we ask and the rhetoric we use to ask them.”\textsuperscript{13} It seems likely that the challenges in establishing an interdisciplinary field of Literature and Science Studies have not only to do with a yet to be formulated set of questions, but also with the fact that institutionalized disciplines remain today the place whence interdisciplinary inquiries are launched. Even more, disciplinary training, as Donald T. Campbell argues, is a necessary precondition for research as we understand it today.\textsuperscript{14} Accepting disciplinary division, Campbell suggests a “Fish-Scale Model of Omniscience” that promises access to truth by means of partially intersecting expert knowledge. This volume is rooted in disciplinary traditions, but it is also indebted to the historical sensibility that scholars such as Beer bring to the disciplines’ definition and development. The aim here is less a search for omniscience than an exploration of the historical condition and relation of disciplines and methods whose continued existence (and necessity) the volume acknowledges. By examining individual cases of disciplinary relations, \textit{Fact and Fiction} does not promise to formulate a binding and abstract definition of Literature and Science Studies. It pursues a more confined but hopefully no less productive agenda. Starting from the premise that the eighteenth century is shaped by a differentiation of disciplines, this volume asks how authors from the eighteenth century onwards have assessed the relationship between literary and scientific cultures. In engaging with this question, the scholars that contribute to this volume are indebted to specific disciplinary traditions and tools. However, by using these tools they aim to look beyond their disciplines.

In undertaking interdisciplinary work, the papers in this volume remind us that interdisciplinarity is in no way “more natural” than the disciplinarity that we have exercised for so many years. Interdisciplinarity is understood here as an effect of disciplinary divisions, not as their abolition. Mindful of its own historical condition, the volume testifies that if there will be a place for Literary and Science Studies, it will be as much an expression of an interest in interdisciplinarity as it will be an expression of a historical and political moment in which literature feels under pressure from the sciences. What Tim Lenoir has stated regarding disciplines – “It is at best an interested abstraction formed in the service of a disciplinary program”\textsuperscript{15} – could also be said about interdisciplinarity. Despite these difficulties and hesitations regarding an institutionalization of Literature
and Science Studies, the papers in this volume are witnesses to how productive it can be to think beyond disciplinary boundaries.

**Science and Poetry**

And yet, the distinction of the two areas of knowledge production is justified and their study legitimated not only by the current disciplinary wars, but by the fact that authors have referred to the division from the eighteenth century onwards. In an often quoted passage, the German polymath Johann Wolfgang Goethe (1749–1832) acknowledges and regrets the existence of the division: “Nowhere would anyone grant that science and poetry can be united. People forgot that science had developed from poetry and they failed to take into consideration that a swing of the pendulum might beneficently reunite the two, at a higher level and to mutual advantage.” The German term “Wissenschaft” (science) that Goethe uses in this quote encompasses a broader spectrum of meaning than its English translation into “science” would suggest. While science is often understood as “natural sciences,” the German “Wissenschaft” refers more broadly to scholarly inquiry, which includes not only “Naturwissenschaft” (natural sciences), but also “Geisteswissenschaft” (humanities) and disciplines such as “Literaturwissenschaft” (literary studies). The term “Wissenschaft” refers to a methodology rather than to a specific object of study.17 Thinking about Snow’s suggestion regarding the two cultures, David Knight has highlighted the new significance of scientific inquiry that emerges in Goethe’s times. He observes that in Romanticism “the real division was between the realm of science, governed by reason, and that of practice, or rule of thumb.” Knight’s observation brings to our attention the growing awareness for scientific methods which informs Goethe’s statement, but it also overlooks how closely scientific inquiry was shaped in Goethe’s times by the practical and the quotidian. Botany – the field of study to which Goethe refers – is a particularly relevant example. Its study around 1800 relied heavily on the contribution of individuals with no specific training or schooling. Goethe’s statement suggests that it was not only the opposition to the practical but even more the opposition to the imaginary and poetic which was crucial for the development of a modern understanding of the sciences.

While noting the split between scientific and poetic methodologies, Goethe assumes that they are genealogically linked. He is not alone in this assumption, nor is he the first to formulate it. His statement that science
has developed from poetry resonates with the work of philosopher and theologian Johann Gottfried Herder (1744–1803) from the mid-1760s – published only a few years before Goethe got in close contact with Herder and his thinking when befriending him in Strasbourg during his study years. Herder had argued that conceptual language developed from poetry and, as John Noyes formulates in this volume, that “there is something about the poetic that resides at the heart of factuality.” Much as Herder observed a historical development from poetic to conceptual language, Goethe understood the split between science and poetry not as an ontological condition, but attributed it to historical circumstances which, when changed, could reconfigure this relationship (“nach einem Umschwung von Zeiten” [after a change of times]).

Despite Goethe’s hope for a potential reconciliation of the two ways of creating knowledge, it is important to note that Goethe does not regret so much the existence of the differentiation of the methodologies as the assumption that they could not talk to each other in a meaningful way. In his contribution to this volume (“Elective Affinities / Wahlverwandtschaften: The Career of a Metaphor”), Christian Weber examines the ways in which poetic language and scientific inquiry relate to each other in Goethe’s work. He demonstrates that in Goethe’s texts the imaginative potential of poetic language can both surpass the empirical exploration of the world and fall short in grasping its reality. In order to be successful it is necessary according to Weber’s reading of Goethe that imagination constantly “renegotiates the abstract symbolic meaning of words with the more concrete images of natural things.”

Goethe discusses the relationship between science and poetry in the context of his poem on plant morphology and the hesitation of his publisher as well as his audience to accept it as a valid contribution to botany. He attributes this hesitation to his readers’ expectation that a writer known to them as an author of literary pieces will, and should, stay within the limits of his expertise. For expertise, Goethe uses the German terms “Feld” (field) and “Fach” (subject). Both terms refer to a defined space, a field of research (Feld) or a subject area (Fach). Parallel to the methodological split between scientific and poetic approaches, there is then also a disciplinary context in which Goethe’s statement has to be read. His lamentation regarding the unwillingness of his audiences to see the complementarity of poetic and scientific approaches can be read as witness to the increasing disciplinary differentiation, in which the natural sciences become defined as fundamentally different from, or even the opposite of, literature.
While it is certainly true that Snow’s paradigm of the two cultures needs to be understood as an expression of his own historical moment, Goethe’s engagement with his readers’ reaction to his scientific work demonstrates that it is no less true that the long eighteenth century knew already of potential tensions between scientific and literary accounts of the world. The unity that Goethe envisions does not negate the existence of disciplinary differentiation; rather, it considers disciplines as complementary forces which need to cooperate in the attempt to understand the world in which we live. David Knight’s statement that “around 1800 ‘science’ was not opposed to ‘arts’; there was nothing like the ‘Two Cultures’ of C.P. Snow’s famous essay” seems, therefore, overstated. Goethe’s plea for an overcoming of the gap is not an expression of his ignorance of the differences, but a proof of the experience of their existence.

**Certain and Probable**

There have been a number of attempts to understand the prehistory of the split between the arts and the sciences. In one of these accounts the Enlightenment provided decisive foundations for later disciplinary divisions. Enlightenment physicists who believed in the potential of their mathematical tools to access reality are pitted against philosophers who continued to search for epistemological clarity. Margaret Osler observes that “whereas the physicists believed themselves to be approaching the position of Laplace’s omniscient intelligence, the philosophers came to abandon the hope that scientific methods can lead to certainty or even penetrate the veil of appearances.” Osler concludes: “Where the physicists sought a science known with certainty, the philosophers saw at best the possibility of probable knowledge.”

The appeal of probabilistic thinking went across whatever divide might have existed between philosophical and mathematical approaches to reality. While Laplace (1749–1827) formulated the belief in the obtainability of omniscience, he was at the same time deeply involved in contributing to the mathematical theory of probability. Laplace’s example is significant because it illustrates that even if we can observe disciplinary splits, individuals engage simultaneously with a number of different methodologies. We have to be careful not to confuse the divide between approaches to knowledge with the divide between individuals. These individuals often lived “in a variety of conflicted epistemologies.”

The split between those approaches to knowledge that were based on the assumption of certainty and those approaches that continued to
explore epistemological questions anticipates later formulations of disciplinary divisions. It is important to note, however, that in this Enlightenment articulation of the division the uniting principle is rationality: both approaches assume that truth finding needs to be conducted by rational means. In contrast to later thinkers, these philosophers neither rely on faith nor do they want to employ Poesie – as Goethe would later suggest – in order to come closer to the truth or in order to sketch probable scenarios.

Probabilistic thinking became a powerful tool that was used well beyond its Enlightenment origins to elaborate on the likeliness of events of which the particular occurrence could not be known with certainty. Tina Young Choi’s contribution to this volume (“Probabilistic Knowledge in the Works of James Clerk Maxwell and George Eliot”) attests to the fact that nineteenth-century scientists such as Maxwell (1831–79) and writers such as Eliot (1819–80) took recourse to probabilistic thinking in order to elaborate where certainty was missing. By the late nineteenth century, however, how certainty about reality was defined had changed significantly compared to the Enlightenment understanding. As Choi shows, by the time Maxwell published his thoughts on molecules and thermodynamic laws in his 1873 *Nature* article, such certainty had become defined as that which can be accessed by the senses.32 While the physicists’ optimistic belief in “Laplace’s omniscient intelligence”33 relied unapologetically on mathematical approaches to reality, Maxwell felt it necessary to admit to his readers that “no one has ever seen or handled a single molecule” and that they “cannot be subjected to direct experiment.”34

A second decisive change had occurred around 1800: once certainty had become defined by the empirical and experimental, the imaginary became its opposite. Maxwell found it justified and necessary to “extrapolate from limited data by engaging the ‘constructive imagination.’”35 In a way that might have pleased Goethe, Maxwell connected to Lord Tennyson’s (1809–92) poetic imagination of the atom in his 1868 poem “Lucretius” in order to overcome factual limitations. Maxwell’s text witnesses two important phenomena. First, it highlights the options that probabilistic thinking offered in moments of missing certainty, now defined as empirical truth. And, second, it witnesses the closeness that Maxwell saw between probabilistic and poetic-imaginative thinking when certainty became defined via the empirical. Once philosophers had highlighted the epistemological limits of knowledge, probabilistic thinking became one way to deal with them. However, once the criteria for scientific certainty had become defined by the empirical and experimental, there was also a second alternative opened, the imaginary.
Introduction

Many scholars have noted that the study of Romanticism played a crucial role in the understanding of how disciplines emerged and became institutionalized. In *Romanticism and the Sciences* (1990), Cunningham and Jardin suggest reading Romanticism as a counter-movement to the Enlightenment and its mechanical and dividing tendency. With this assessment they confirm the core of Hans Eichner’s argument in “The Rise of Modern Science and the Genesis of Romanticism” (1982). Building on work by René Wellek and Morse Peckham, Eichner, in an essay that is impressive in both its comprehensiveness and clarity, argues that Romanticism can be understood as “a desperate rearguard action against the spirit and the implications of modern science.” Eichner ultimately reads the split between humanities and natural sciences as a split between physics and ethics and locates its beginning at that point when the sciences, starting with Galileo, did not engage any longer with the question of final causes. In the new mathematical and mechanical world the space for God, transcendental hope, and the possibility of free will had shrunk if not altogether vanished. According to Eichner, Romanticism tried to overcome the shortcomings of mechanical philosophy by rejecting the material existence of the world and by positing instead a cosmos that is a product of the mind. In order to attain truth Romantic thinkers “relied on the irrational faculties of the mind – unmediated insight, ‘enthusiasm,’ ‘intellectual intuition,’ and the imagination.” Eichner goes one step further yet by assigning a specific genre to this approach to truth finding: poetry becomes the place where imagination reigns and it is considered “the supreme tool of cognition.”

Assuming a split between imagination and empirical science, it seems difficult in this approach to account for the decisive contributions that Romantic scientists have made in fields indebted to empiricism such as medicine and physics. Eichner concedes such advances, but he reads them as the result of a compromise. Romantic scientists obtained their scientific discoveries not as a result of their speculative methodologies, but because they had interiorized the empirical paradigm long before they encountered the thought of Romantic philosophers such as Schelling. Eichner’s insights are decisive, but his strict division between the empirical and the imaginary makes it difficult to acknowledge the genuine contributions of Romanticism to modern sciences except as a compromise between different methodologies.

The relationship of Romantic thinkers to the heritage of Enlightenment might be more complex. In connecting to what Eichner calls “empirical
paradigms” of the Enlightenment, Romantic thinkers fundamentally transformed them. In her contribution here (“Constructing the Faktum in the Enlightenment and Early German Romanticism”), Jocelyn Holland zeroes in on the status of the “fact” in Romantic thought. Holland traces the term through a rich etymological and conceptual history which exposes its temporal quality. She demonstrates how Romantic writers such as Novalis and Friedrich Schlegel (1772–1829) became interested in exploring this temporal quality of the fact “by connecting it to an open-ended process which, ideally, would facilitate the emergence of new facts.” For these Romantic thinkers the fact is not defined as a verifiable observation but as “potential conveyer of intellectual activity.” For Schlegel, as Holland observes, even aesthetic statements can become a fact. Such close readings of how Romantic thinkers engaged with the heritage of the Enlightenment shed new light on the Romantic contribution to the sciences. Contrary to the assumption that Romantic scientists retained empiricist methodologies because they were trained in them and compromised when they used them, Holland’s article demonstrates that Romantic authors embraced facts by fundamentally redefining them. This redefinition made it possible to think beyond the split between natural sciences and aesthetics because both were understood as products and origins of intellectual activity. If Romanticism has been read as a poetic reaction against mechanical philosophy, Holland’s paper challenges the division between the mechanic and poetic, since the mechanical itself becomes a productive tool which cannot be distinguished in its epistemological status from aesthetics. Romantic thinkers dissolved disciplinary boundaries not because they could not accept that they rely on different objects and methodologies of studies, but because they saw similar epistemological questions at work in both areas.

If the beginning of the nineteenth century experienced an unprecedented interest in the accumulation of empirical data obtained by means of experiment, the “facts” collected also gained a new status as both epistemologically uncertain and rich. In this context, aesthetics was not providing the meaning that the mechanical data collection could not provide: rather, both fact and aesthetic object rely on the subject who reads and posits the data. In her chapter on the invention of homeopathy, Alice Kuzniar shows the extent to which the work of the physician Samuel Hahnemann (1755–1843) was shaped by an uncertainty regarding the status of the fact. While his research efforts are devoted to the collection of huge data sets, there is no attempt to find general rules or approach the large numbers statistically. This lack of interest in generalization is not the
result of a capitulation, but expression of the conviction that facts cannot be distinguished from the act of reading. The data that Hahnemann collects becomes intrinsically tied to individual engagements with it. Drawing connections between Hahnemann’s and Novalis’s (1772–1801) work, Kuzniar observes that both experimental research and literature of the time searched for affinity and analogy between unique and disparate facts. Despite the reliance on the fact, this search was, as Kuzniar demonstrates, “conducted intuitively and idiosyncratically” and, therefore, relied heavily on an act of reading. While Goethe strove for an objectivity which was still guaranteed by the object itself, thinkers such as Hahnemann and Novalis put a greater stress on the perceiving entity of the subject which can only guarantee the sense-making process.

**Subjective and Objective**

For a short time, then, in Romanticism, the subject-object distinction was virtually dissolved. However, in the history of disciplinary differentiation a new definition of the opposition between “objective” and “subjective,” which also emerges around 1800, marks a crucial point. As Lorraine Daston and Peter Galison show, from the fourteenth century, when this opposition was introduced by scholastic philosophers such as Duns Scotus (c. 1266–1308) and William of Ockham (c. 1287–1347), until the nineteenth century, objective denoted objects “as they are presented to consciousness,” while subjective denoted the objects themselves. Daston and Galison credit Immanuel Kant (1724–1804) with redefining the terms. But, as they point out, even Kant’s “objective validity” was not directly linked to external objects. Instead, it referred to the “forms of sensibility” – time, space, causality – which for Kant make experience possible. Kant’s introduction of subjective as an approximate equivalent for “merely empirical sensations” shares with the later usage a pejorative connotation. Daston and Galison observe further that in the first third of the nineteenth century, dictionaries in Germany, Britain, and France started to explain the terms “objective” and “subjective” similarly to today’s usage: as fact and fiction. Objective is from now on defined as referring to external objects, while subjective is connected to feelings and thoughts inside a person. It is this new definition of subjective and objective that starts to be associated with certain disciplines. While natural scientists increasingly strove to exclude subjectivity from their work, subject-based approaches to the world gained value in literary cultures. Daston and Galison observe: “In notable contrast to earlier views held from the Renaissance through
the Enlightenment about the close analogies between artistic and scientific work, the public personas of artist and scientist polarized during this period. Artists were exhorted to express, even flaunt, their subjectivity, at the same time that scientists were admonished to restrain theirs.\textsuperscript{50}

While one can witness some resistance to this differentiation, particularly in those countries in which Romantic epistemology had a significant influence, such as Germany,\textsuperscript{51} the subject-object division increasingly became equated with the division between science and the humanities. At the same time, one can also observe decisive attempts to dissolve the distinction within a positivistic paradigm, namely, by reinterpreting a number of disciplines, like history, as natural sciences.\textsuperscript{52} Tobias Wilke’s contribution in this volume examines how empirical approaches in the late nineteenth century kindled a paradigmatic shift in the understanding of aesthetics, which started to engage in empirical methodologies to establish the psychological phenomena behind aesthetic experiences.

Under the pressure of the dominating natural sciences, new attempts were made to define what the unique contribution of the humanities could possibly be. Wilhelm Dilthey’s (1833–1911) texts from the late nineteenth century can be interpreted as an expression of this “crisis” of the humanities. Dilthey’s immensely influential work moves along a similar axis as that of Daston and Galison. Dilthey defines the kind of research undertaken in the natural sciences as geared towards finding universal laws, while the research undertaken in the humanities is shaped by a historicist perspective and is interested in individual approaches to the world. In his work, the sciences are defined as explaining the factual world, while the humanities are given the task of understanding the world from the centre of the hermeneutic circle, the subject.\textsuperscript{53}

In light of empirical methodologies emerging in the sciences, literature more than any other discipline became the space for subjectivity and imagination. Faced with disciplinary fragmentation, it also became that discipline in which meta-disciplinary discussion could be held. This is an interesting development, because it somehow defines literature both as the place where the non-factual resides and as that place where a higher factuality is searched for. While imagination remains epistemologically suspect, it is at the same time privileged as the place where a truth might be found.

**Disciplines and Institutions**

Although Daston and Galison can locate the differentiation of the terms “subjective” and “objective” along disciplinary lines in the first third of
the nineteenth century, disciplinary differentiation was far from being completed. Even when disciplines have been institutionalized, they are, as Hayles has pointed out, “far from being monolithic,” and we can observe intricate links between disciplines well into the twentieth century and beyond. How complex the picture of the emergence of disciplines remains even, or, rather precisely when paying close attention to historical conditions is pointed out by Gowan Dawson and Bernard Lightman. Focusing on the developments in Great Britain, they observe that for the British Royal Literary Fund in the early nineteenth century science was considered one of literature’s branches. At the same time, the term literature “was also being used, by members of the very same charitable organization, in a newer, much narrower sense to signify merely imaginative or fictional writing.” Dawson and Lightman highlight that different notions of literature existed simultaneously in the early nineteenth century. Much as Daston and Galison, they note that the understanding of literature as “imaginative fictional writing” was the one that became defining for the later nineteenth century. Parallel to a new understanding of literature as fiction, science came to be defined in Britain as natural science. Dawson and Lightman locate the emergence of this more restrictive understanding of the word “science,” which focuses on “experimental method and the investigation of the natural world,” with the formation of the British Association for the Advancement of Science in 1831. Fulford, Lee, and Kitson assume a slower solidification, but they also place disciplinary differentiation in nineteenth-century institutional history. They locate the professionalization of disciplines in the later nineteenth century and observe: “There were institutional parameters, and bodies concerned with enforcing them, ensuring that intellectuals could, in practice, define what was, and was not, acceptable as a proper scientific discourse. The sanction of the Royal Society and the Royal College of Physicians was important, and both these bodies preferred work that followed inductive method and used an empiricist and realistic style.”

In their introduction to *Nature Transfigured: Science and Literature, 1700–1900* (1989), Christie and Shuttleworth observe that the split between science and literature is often based not on different underlying methodologies but on the tendency to understand disciplines as products of different human faculties. They state that while we tend to align rationality with the natural sciences, we align literature with emotional faculties. Departing from this quasi-anthropological paradigm, Christie and Shuttleworth suggest tracing the split between scientific and literary cultures neither to epistemologies nor to human faculties but to institutional decisions in
the seventeenth and eighteenth centuries. By doing so, they open the inquiry into the relationship between the two areas of knowledge production to questions regarding specific local and national cultures. Instead of a uniform historical – or even natural – development towards ever greater disciplinary stratification, they describe the dependency of disciplinary differentiation on specific geographical, political, and national conditions. For example, they note the great difference between the institutionalization of disciplines in France and Britain, thereby offering readers a new framework to understand the division between French and British scientific cultures. To follow Christie and Shuttleworth’s approach, the greater openness of British scientific cultures to popular occupations and representations in fields such as botany and physics can be traced back to the less pronounced institutional divisions between disciplines in Britain compared to France.

Germany and Britain

Christie and Shuttleworth’s work points to the necessity of looking at national developments in order to understand the relationship between literature and science and its historical origins. The authors have formulated first insights into the French and the British contexts and conditions of the emergence of disciplines. Without being able to provide a comprehensive picture – nor having the ambition to do so – *Fact and Fiction* offers an opportunity to compare and contrast German and British disciplinary developments.

Germany and Britain offer a rich field for such studies because of the significance of their scientific cultures for furthering disciplinary developments and their crucial role in shaping modern sciences. In the history of the sciences, as David Knight has pointed out, precisely those countries in which Romantic natural science was strongest turn out to have had decisive impact on the development of modern science culture. Knight observes: “The theory of the conservation of energy and evolutionary theory in the mid-nineteenth century developed in Germany and Britain, where romantic natural science had been strongest, and not in France.” Knight goes so far as to claim that “this was a factor in the relative decline of French science in the course of the nineteenth century.”

Regarding the comparison of German and British traditions of scientific inquiry, two statements have been made traditionally. Knight mentions the first one, namely, the indebtedness of British scientists to empirical methodologies compared to the continued devotion of German scientists
to metaphysics. The second one is – as Christie and Shuttleworth note – the greater openness of British scientific cultures to popular occupations and representations. Ann Shteir’s contribution to this volume, “‘She comes! – the GODDESS!’ Narrating Nature in Erasmus Darwin’s *The Botanic Garden*,” bears witness to the willingness of British authors to engage with a wider public. As Shteir shows, Erasmus Darwin (1731–1802) uses literary imagination and mythology to make scientific knowledge accessible to the layperson. In discussing Darwin’s *The Botanic Garden*, Shteir not only pays attention to Darwin’s use of poetic language for the purpose of making scientific context accessible to larger audiences, she also examines the role of poetic language in making sense of the scientific data. Shteir argues that by drawing on mythology, Darwin is able to project a holistic understanding of nature, which would not be possible by the presentation of botanical nomenclature alone. Here, we observe a thinker who is indebted to an Enlightenment epistemology of empirical observation, while at the same time acknowledging that the data alone can provide neither meaning nor the ability to communicate knowledge. For both activities, Erasmus Darwin relies on literary cultures.

It might seem that Darwin’s attempts to popularization confirm the long-standing conviction that attributes greater openness regarding larger audiences to British scientists. However, singling out British scientists as more open to popularizing their science risks overlooking the extent to which communication and cross-fertilization between British and Continental scientific communities were vivid and ongoing. Erasmus Darwin drew significantly on the work of Swiss polymath Albrecht von Haller (1708–77) and Darwin’s own poem *Loves of the Plants* was highly influential in Germany in general and for Goethe in particular. As Shteir points out, while Goethe might have dismissed Darwin’s “pile-up of textual features,” he nevertheless acknowledged Darwin’s influence. Goethe’s own botanical poem *Metamorphose der Pflanzen* (Metamorphosis of Plants) is driven by a very similar pedagogic-didactic impetus.

While German intellectuals around 1800 might have made attempts to distinguish their work from any form of trivialization – as Goethe did when he rejected Darwin’s poem as a “fashionable” piece of writing in a letter to his friend Friedrich Schiller – their texts nevertheless took shape in similar paradigms as those of their British counterparts. It is indeed interesting that Goethe and Schiller sketched pieces such as *Über den Dilettantismus* (On Dilettantism) in which they erected barriers against the work of women and other less educated groups, while Goethe himself was deeply involved in dilettantish attempts at painting and, as some would
argue to his dismay, botany and optics. In fact, Goethe and Schiller might have been aware of the discrepancy between their theoretical attempts and their writing practice: the *Dilettantismus* sketch was never published during their lifetimes. Goethe’s remark on Darwin’s poem and the sketch on dilettantism suggest that there is an attempt in German intellectual circles around 1800 to distinguish “high” from “low” forms of literary and scientific engagement which has no equivalent in British circles. However, as Shteir’s article makes visible, ultimately German and British writers, scientists, and “dilettantes” in the late eighteenth and early nineteenth century engaged in surprisingly similar forms of scientific and poetic explorations.

In light of the close interaction between empirical and imaginary, scientific and popular cultures that we can observe in both German and British science communities, this volume encourages us to reconsider the conviction that British cultures were more indebted to empirical work and to popularization than their German counterparts. As in the case of the openness of British culture to popular forms of learning which were rejected by Goethe and Schiller, the attention to the work of authors such as Erasmus Darwin, Hahnemann, and Novalis highlights the fact that such preferences might have been more declaration and rhetoric than actual practice. Knight suggests as much, when he adds that the British were indebted to empirical work “at least in public.” Why these public declarations were felt to be necessary needs further examination from the perspective of fields such as the sociology of science and the history of science.

Attention to the relationship between literature and science also sheds new light on one of the most influential theories of modernity that emerged in the twentieth century, Niklas Luhmann’s systems theory. In Luhmann’s model, modernity is marked by a differentiation of value spheres, such as art, religion, or love. Each of these spheres is ultimately a self-referential system with no access to (and interest in) the questions asked or the knowledge produced in other systems. Daniel Fulda and Thomas Prüfer have noted that Luhmann’s model seems too schematic in light of the permeability of forms of knowledge and the fundamental significance of convergence for autonomous disciplines. The contributors to this volume observe both interdependence between knowledge fields and the conviction of the authors of the time that such distinct knowledge fields exist.

The Volume’s Organization

*Fact and Fiction* is organized into five parts, with each of the parts devoted to one activity that relates literary and scientific cultures in Germany and
Britain. In the first, “Reading: Electricity, Medicine,” Holland and Kuzniar investigate the fragility of the “fact” in literary and scientific texts from the Enlightenment to Romanticism. Discussing examples and language taken from the fields of electricity and medicine, both authors point out that in the cases they study the fact is not considered something empirically given, but rather produced in an act of reading. Holland opens the section with the fundamental question of how the fact is defined in texts around 1800. She traces the eighteenth-century history of the term “fact” and observes that at the end of the century the term did not yet encompass notions like “objectively known” or “scientifically proven,” with which we associate it today. Instead, for Romantic authors the “‘primal’ factum is in essence the one which we are ourselves, posited in the original activity of the subject.” Focusing on this temporal and processual quality, authors like Novalis and Schlegel begin to see the fact as a conveyor of intellectual productivity. Drawing on vocabulary and concepts used in contemporary research on electricity, Romantic authors redefine the fact as “conductor” (Leiter), an instrument for the facilitation and creation of new facts. If the difficulty to establish facts haunts scientific endeavours around 1800, Romantic authors explore the epistemological potential of such uncertainty in their literary and philosophical texts. Perhaps ironically, these explorations become possible precisely because of new conceptual frameworks which the sciences provide.

Kuzniar, in the second chapter of this part, starts her investigation with a focus on Hahnemann’s medical writings, to discover that these writings share important features with literary theories which emerge simultaneously in early Romanticism. Kuzniar demonstrates that the discovery of similarities between symptoms which forms the basis of Hahnemann’s homeopathic theory of healing (the Law of Similars: “like cures like”) is only possible in a moment of nonsensical intuition. While Hahnemann’s infinite listing and cataloguing of symptoms follows an eighteenth-century methodology of taxonomical observation, his law of similars follows the principle of the absurd, which aligns it closely with Romantic notions of the chaotic and fragmentary. Rejecting any attempt of systematization or generalization, Hahnemann’s theory of medicine does not allow for the establishment of a stable set of symptom–remedy relations. Instead, it relies on individual and idiosyncratic acts of reading symptoms and establishing similarities between them, thereby connecting it strongly to the productive acts of reading propagated in Romantic literature and philosophy, which Holland negotiates in the first chapter of this section.

What both chapters witness in the late eighteenth century is a heightened
awareness of the instability, or even absence, of “reality” and a growing acknowledgment that our perception of the world is a process which produces the fact that it studies. Here fiction does not differ from fact: the distinction has become obsolete.

While Holland and Kuzniar discover the instability of the fact in Romantic thought, in the next part, “Imagining: Botany, Chemistry, Thermodynamics,” Shteir, Christian Weber, and Choi explore the place of imagination vis-à-vis empirical studies in the production of knowledge. Shteir investigates the many ways in which physician and poet Erasmus Darwin employs imagination in order to both arrive at a more comprehensive understanding of nature and to mediate this understanding to new audiences, in particular women. Shteir points to the tensions in Darwin’s expository poem *The Botanic Garden* between, on one side, taxonomy built on empirical observation and differentiation and, on the other, Darwin’s multiple use of analogies, which establish “the vastness of relations within nature.” In his poem, Darwin goes beyond mimetic presentation of the Linnaean nomenclature and empirical classification and by combining prose and poetry, Shteir argues, leaves Enlightenment taxonomy behind to propagate what Pierre Hadot in *The Veil of Isis* has called an “Orphic” idea of nature.

By discussing *The Botanic Garden* as a generic hybrid, which mixes poetry and prose, scientific information and mythology in the tradition of Albrecht von Haller’s “Die Alpen” (The Alps), Shteir joins Kuzniar and Michael House (see part 3) in highlighting the extent to which epistemological questions have an impact on genre. The epistemological aporia finds its generic expression in Ernst Platner’s (1744–1818) aphoristic writing style and in Hahnemann’s practice of simply jotting down symptoms which do not add up to a given set of sicknesses, but require – much like Romantic fragments – individual acts of reading to become meaningful. Erasmus Darwin’s *Botanic Garden* is shaped by a similar tension between an (Enlightenment) taxonomic understanding of nature and a (Romantic) search for analogies, which Kuzniar observes also in Hahnemann’s homeopathy.

Shteir observes that for Erasmus Darwin “imagination underlies science as much as poetry, and is as important for him as information.” In the opening lines of the poem, Darwin declares the goal “to inlist Imagination under the banner of Science.” The quote suggests that imagination is for Darwin both resource and tool in the production of knowledge. However, it also alludes, it seems, to the fact that imagination has a dangerous potential which threatens to get out of control and thereby endanger the
scientific inquiry. It is this last aspect which is taken up by the second chapter in this part, in which Christian Weber discusses the relationship between empiricism and imagination in Goethe’s work.

Weber opens his chapter with the observation that although we have come to understand literature and science as two mutually exclusive fields – one thriving on subjectivity and imagination, the other shunning them – they ultimately depend on each other. While literature receives inspiration from the sciences, each scientific inquiry will experience at some point the limits of factual analysis and will, at this point, be forced to leave the area which can be approached by the senses and use imagination and figurative language to newly conceptualize the problem at hand. Weber takes the term *Elective Affinities* as a case study for this figurative use of language. He traces it from its origin in eighteenth-century chemistry to its use in Goethe’s novel of the same title. Weber demonstrates not only how poetics supplies the sciences with metaphors for their inquiries, but how the novel itself becomes a virtual experiment. It has the potential to take on a meta-discursive function, stimulating and assessing the formative potential of metaphors and scientific models.

Much as in Goethe’s *Elective Affinities*, in Eliot’s *Daniel Deronda*, which is the focus of Choi’s contribution, science is less the novel’s topic than its informing model. Choi explores how Eliot draws on probability theory used in nineteenth-century thermodynamics to articulate the characters’ speculations on what lies beyond empirical observation. When the characters in *Daniel Deronda* speculate about the feelings and actions of other people, they can articulate general observations and probable outcomes, but they fail to predict actions and decisions of the individual. Where Eliot shows how much the scientific model that she employs fails to predict the individual case, she closely follows probability theory, which, as Eliot’s contemporary Maxwell laments in the context of thermodynamics, can predict behaviour of all, but not the behaviour of individual, particles. Both Goethe and Eliot describe the necessity of imagination in the moment of the failure of empirical observation and both transfer scientific models into literature. However, while Goethe considers this transfer from science to literature, and ultimately life, problematic because the model cannot grasp the far more complex reality for which it is taken, Eliot embraces the scientific model at hand precisely because it does not offer a conclusive reading of reality, but expresses an epistemological aporia.

Eliot and Goethe grapple with the question of what happens, as Maxwell had put it, when the scientific inquiry turns to “things invisible and imperceptible by our senses.” The urgency of this question was never
clearer than at the point in history when the sciences started to define themselves as a field of inquiry based on the method of empirical study and experiment, and in opposition to subjective imagination. The third part in this volume, entitled “Sensing: Anthropology, Psychology, Aesthetics,” connects to the previous in that it asks how to account for something which is not easily graspable by logical deduction: feelings, in both their sensory and psychological interpretation. At the centre of this part, which presents papers by Noyes, House, and Wilke, stands the question of how to account for feelings in a science of the human and how to distinguish “true” from “false” or merely “simulated” (fictitious) feelings within a field of inquiry which, methodologically, is increasingly committed to the factual. Opening this part, Noyes traces Herder’s philosophical project from Kant’s lectures on metaphysics via Alexander Gottlieb Baumgarten’s (1714–62) and Johann Georg Hamann’s (1730–88) aesthetics to the advent of anthropology as a science. Noyes describes the extent to which Herder’s anthropological turn is indebted to Kant, with whom he shares the conviction that “Being is a concept that cannot be further analyzed.” Against the backdrop of the crisis of rationalism and in the wake of the empiricism which Locke and Hume had promoted, Herder’s aim is to establish a philosophy that accounts for both rational and sensory capacities of the human being.

Noyes’s chapter on Herder marks an important point in the narrative to which this volume contributes, since it illustrates the enormous changes that happened in the course of the eighteenth and nineteenth centuries in the assessment of sensual experience for a scientific understanding of the world. While for philosophers like Leibniz, Wolff, and Kant sensory information was suspicious because it was considered blurred and therefore provided only imprecise information, Herder rehabilitates sensory experience as a necessary correlation to a rational approach to the world; but only the nineteenth century turns to observation and experience as the major tool of a scientific methodology, thereby redefining the empirically obtained information as the more factual and precise one, undistorted by subjective and fictitious accounts of the world. It is precisely at this point that House’s chapter continues the discussion.

Much as in Noyes’s contribution, one of the main concerns that House discerns in the authors that he discusses – in particular Salomon Maimon (1754–1800) and Karl Philipp Moritz (1756–93) – is how to conceptualize the relationship between universal and particular. However, while for Herder this terminological pair was analogue to, and defined by, the terms rational and sensory, House demonstrates that it could also be interpreted
as empirical versus fictitious. For Enlightenment thinkers, it was the rational mind that reflected and abstracted the information transmitted by the senses. Maimon, however, doubts the conviction that such a step is possible and, as a result of this hesitation, embraces fiction as a necessary part in giving meaning to the overwhelming number of facts which the human encounters constantly.

While in Platner, one of the founding fathers of anthropology as a discipline, epistemological uncertainty finds its expression in the focus on observing and expressing thoughts in an aphoristic writing style which refuses any meaningful narrative (very similar to what Kuzniar observes in Hahnemann’s work), eighteenth-century anthropologists turn to autobiographical writing and to what became known as empirical psychology. The question of fiction, however, continued to haunt the scientific ambitions behind this project. Focusing on the narrative of life-experience, which they collect in their Magazin der Erfahrungsseelenkunde (Journal of Experimental Psychology) authors like Moritz and Maimon are confronted with the question of how to distinguish between fact and imaginative reconstruction. Discussing Maimon’s contribution to the Magazin, House proposes that the production of fiction comes to be understood as a fundamental condition of human existence. Around 1800, House argues, the science of the human ultimately is a science of fiction.

Wilke takes this line of inquiry further by reconstructing the concept of “fictional feelings” that was developed in the framework of late-nineteenth-century psychological aesthetics. The article analyses the way in which the idea of fictional feelings, which assumes that emotions experienced as a result of aesthetic stimuli are merely “simulated states of consciousness,” is the signal of a fundamental shift in the understanding of aesthetics: namely, an understanding of aesthetics which does not rely on theoretical statements (e.g., specific rules or media according to which specific art forms function), but on the study of psychological “facts” which follows an empirical methodology. Like House, Wilke observes a pronounced wish to distinguish real and “fictional” emotional responses. While there are intrinsic reasons for such a distinction, Wilke shows that the insistence on separation is also driven by strategic interests: by excluding so-called quasi-emotions from the field of psychology, psychological aesthetics hopes to establish itself as a discrete discipline. While anthropology around 1800 strives – as House demonstrates – to include a number of disciplines in order to arrive at a science of the human, psychological aesthetics insists on the limitation of the field for the sake of disciplinary clarity and survival.
The essays in the fourth part, “Relating: Biology,” delve into how genealogy is negotiated in light of an increasing biologization of kinship relations. While Stefani Engelstein observes that in Gotthold Ephraim Lessing’s (1729–81) Nathan the Wise cultural ways of establishing kinship trump biological factors, Daniel Newman explores the ways in which new and as of yet unacknowledged scientific theories inform narrative and character in E.M. Forster’s (1879–1970) novel The Longest Journey. Literature serves here as an experimental space in which authors ask what consequences scientific theories might have for our self-understanding.

Engelstein revisits Lessing’s Nathan the Wise in order to study its contribution to the eighteenth-century debate on human diversity. Lessing’s Nathan played a significant role in redefining religious studies as an anthropological discipline by removing religion “from the Enlightenment quest for grounded truths.” However, it is important to note that eighteenth-century interpretations of anthropology – much like the one that House describes – include both biological and cultural inquiries which are considered intrinsically intertwined. If Lessing opens up a space for accepting the importance of kinship and blood relation for human self-understanding, he points out at the same time that “inherited traits must enter a history of activity and relationships to shape their expression as deeds and to acquire meaning.”

Newman’s contribution is similarly devoted to questions of heredity and biological genealogy. However, while in Lessing’s Nathan biological inheritance acquires meaning only through a process of culturization, Newman argues that in Forster’s The Longest Journey new models of hereditary transmission provide the main character with a new narrative to his life. Here atomistic heredity, first described by Gregor Mendel (1822–84) and then rediscovered by the Dutch botanist and geneticist Hugo de Vries (1848–1935) and the German botanist Carel Correns (1864–1933), allows the novelist Forster to use and, at the same time, to question the narrative logic of genetic determinism. Forster’s novel is informed by most recent scientific models. However, it does not only illustrate these models, but also helps to propel a scientific theory at a time when this theory is not yet fully acknowledged in the scholarly community. Like Goethe’s Elective Affinities, Forster’s novel becomes a virtual experiment in which the author anticipates and asks for the significance of specific scientific models for individual lives and human interaction.

In the fifth and last part of this volume, “Displaying: Scientific Collections,” Peter McIsaac and Dana Weber examine the relationship between fact and fiction in collections of medical specimens and of ethnographic
mannequins. McIsaac opens this part by studying the function of collections of medical specimens in recent literary productions by Durs Grünbein (1962–) and Thomas Hettche (1964–). In McIsaac’s chapter, fictional medical museums are shown to “represent indispensable ways of probing the place of science and science knowledge in our existence as biological beings at the turn of the third millennium.”

McIsaac’s article witnesses both a new awareness for the interconnectedness of fact and fiction and an awareness that the conceptualization of their relationship is not independent of specific historical moments and particular media.

The volume is closed by Dana Weber with an article on ethnographic mannequins and exotic performers in early-twentieth- and twenty-first-century exhibition culture. In her article, Weber demonstrates that the boundaries between scientific display and popular spectacle, between events in which exotic performers were featured and the presentation of ethnographic mannequins in ethnological and anthropological museums which followed scientific and pedagogical goals, were not always clearly defined. She argues that the mannequin’s problematic epistemological status and its uncanny effect are determined by its paradoxical position between the scientific, factual information for which it is conceptualized and the imaginative flights that it invites. Drawing on theories of the uncanny by Jentsch and Freud, Weber investigates “the relationship between scientific facts and the fictions emerging in their contemplation.” Paradoxically, the effect that the ethnographic mannequin exerts on the viewer is uncannier when the mannequin is rendered in more realistic a manner. Weber reads the mannequin against the backdrop of the “uncanny valley,” a concept introduced by Masahiro Mori in the context of robotics and later employed in studies of three-dimensional computer-generated digital animation (3D CGI) in order to articulate the insight that excessive realism leads to disturbed reactions in the viewers and users of life-like animations. Discussing the ethnographic mannequin and its relationship to contemporary adventure literature, Weber comes to the surprising and strong conclusion that “by giving some leeway to imagination, an inaccurate human representation in fact allows for a quicker and more exact ontological ascription.”

Dana Weber’s contribution makes visible once again what renders the papers in this volume particularly fascinating, namely, the fact that they combine detailed analysis of one particular point in time with larger issues surrounding the question of the relationship between fact and fiction, thereby informing our current debate on the relationship between humanities and the sciences. The book aims to gain scholarly knowledge
of disciplinary constellations in particular historical moments, but also intends to open new views and debates on questions which have far-reaching consequences for the academic landscape and society in general.

NOTES

1 Snow, Two Cultures.
2 In their introduction to Victorian Science and Literature (2011), Dawson and Lightman concede that although terminological clarity is missing, the term literature and science has become a useful reference. Referring to nineteenth-century Britain, they state: “While there is certainly nothing inevitable or timeless about the distinction between science and literature, and it is essential to resist postulating general patterns that are in fact contingent cultural formations particular only to certain historical moments or specific interest groups, it needs to be acknowledged that the disputed critical shorthand ‘science and literature’ remains no less useful than the newer ‘science as literature’ in recapturing the intricate situation of nineteenth-century Britain” (“General Introduction” x).
4 Bruce and Purdy, eds, Literature and Science, front-matter.
5 Beer, “Translation or Transformation?” in Beer, Open Fields 173.
6 Beer, Darwin’s Plots.
8 Secord, “Knowledge in Transit” 655. Another strong current has been the turn to the metaphorical language of sciences. See Bono, “Why Metaphor?” 215–34.
9 Milburn, “Modifiable Futures” 560.
11 Bono, “Making Knowledge” 555.
12 In his contribution to the ISIS Focus section, Turner concentrates on how attention to form could be productive for the history of science. However, he also provides a sketch of some ways in which scientific understandings of form shaped the work of early modern playwrights, an inquiry that he has developed in greater detail in The English Renaissance Stage (2006). Turner, “Lessons from Literature” 581.
15 Lenoir, “The Discipline of Nature” 94.

17 Regarding the development of knowledge fields into scientific disciplines see Stefani Engelstein’s contribution on the science of religion in this volume, chapter 9. See also Fulda and Prüfer, “Das Wissen der Moderne.”

18 Knight, “Romanticism and the Sciences” 14.

19 Ann Shteir has demonstrated that women particularly contributed significantly to the study of plants around 1800. See Shteir, Cultivating Women, Cultivating Science. See also the recent project under the leadership of Sally Shuttleworth on citizen involvement in nineteenth-century science in Britain (“Constructing Scientific Communities: Citizen Science in the 19th and 21st Centuries,” http://conscicom.org/).

20 See chapter 6, p. 155.

21 See chapter 4, p. 102.


23 See the entry “fach” in the Deutsches Wörterbuch of the brothers Grimm, where it is defined as a spatial term and – deduced from there – as a subject area. The Wörterbuch connects this subject area closely with professional occupation: “fach ... das einem überwiesene, von ihm betriebene geschäft” (fach ... the profession that one has been assigned to, that one engages in). Jacob and Wilhelm Grimm, Deutsches Wörterbuch 1221.


25 Knight, “Romanticism” 14.

26 In another account, this prehistory is located already in alchemic thought. William R. Newman argues that “alchemy provided a uniquely powerful focus for discussing the boundary between art and nature,” and thereby anticipated today’s split between arts and sciences. Newman, Promethean Ambitions 8.


28 Ibid. 3.

29 Ibid. 10.

30 Ibid. 21–2.


32 See Daston and Galison, Objectivity.

33 Osler, “Certainty” 3.
26 Christine Lehleiter

34 Quoted in Choi, chapter 5, p. 130.
35 Quoted ibid., 144.
36 Fulford, Lee, and Kitson come to a slightly different result. While they also understand Romanticism as a counter-movement to the sciences, they see this movement less as an engagement with mechanical tendencies than with the colonial enterprise. Their “study shows how literary Romanticism arose partly in response to science’s appropriation of explorers’ encounters with foreign people and places” (Fulford, Lee, and J. Kitson, eds, Literature, Science and Exploration in the Romantic Era, front-matter).
38 Ibid. 11.
39 Ibid. 12.
40 Ibid. 14.
41 Ibid. 17.
42 Ibid. 18.
43 Ibid. 24.
44 Ibid.
45 See chapter 2, 39 and 43.
46 Chapter 2, p. 61.
47 Daston and Galison, Objectivity 29.
48 Ibid. 30.
49 Ibid. 31.
50 Ibid. 37.
51 According to Daston, such resistance to differentiation can be observed in Germany. Cf. Daston, “Die Kultur der wissenschaftlichen Objektivität” 15–16.
53 Dilthey, Introduction to the Human Sciences.
54 Hayles, “Deciphering” 31.
55 Dawson and Lightman, Victorian Science viii.
56 Fulford, Lee, and Kitson locate the differentiation of fictional from factual writing in the middle of the nineteenth century and associate it with De Quincey. They write: “It was not customary formally to divide fictional from factual writing until De Quincey in 1848 made fiction a defining characteristic of the ‘literature of power’ and claimed it was distinct from the ‘literature of knowledge’” (Fulford, Lee, and Kitson, Bodies of Knowledge 4).
57 Dawson and Lightman, Victorian Science ix.
58 Fulford, Lee, and Kitson, Bodies of Knowledge 2.
60 Ibid. 2.
61 Ibid. 2 and 9.
62 Knight, “Romanticism” 22.
63 Knight observes that “men of science in Germany were aware of their use of
and need for metaphysics, while in Britain empiricism prevailed.” Ibid. 19.
64 Christie and Shuttleworth, Nature Transfigured 2 and 9.
65 Chapter 3, p. 79.
66 Ibid.
years later, when contemplating his own attempts in botanical studies, Goethe
conceded that dilettantti could make decisive contributions to the sciences: “und
was sind nicht überhaupt schon die Wissenschaften teilnehmenden Liebhabern,
und unbefangenen Gastfreunden schuldig geworden!” (“And to how many
other interested amateurs and uninhibited dilettantes is science indebted?”).
68 Knight, “Romanticism” 19.
69 Cf. Luhmann, Art as a Social System; Luhmann, A Systems Theory of Reli-
gion; Luhmann, Love as Passion.
70 Fulda and Prüfer, “Das Wissen der Moderne” 5.
71 Chapter 3, p. 77.
72 Cf. Daston and Galison, Objectivity.
73 Chapter 9, p. 224.
74 Ibid., p. 232.
75 Chapter 11, p. 276.
76 Chapter 12, p. 305.

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