

Seismic: Surveying the Modernist Period¹

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Preamble

The bulk of the essays collected in this special issue of the *JLS* present selected papers read at the conference “Literature and Science in Europe, 1890-1950” that was hosted by the MDRN research lab at the University of Leuven in February 2022.² With the aim of exploring changes in the relation between science and European literature in the modernist period (roughly, the decades between 1890 and 1950), the conference took to literature and science in a broad sense — with science including all forms of officially sanctioned or institutionalized scholarship (thus, also within the humanities), and literature signaling not only a small number of canonized high modernist European authors but all types of creative writing in the period, popular fiction included. Of special interest to participants was whether (and if so, how) the rapid changes to the sciences led to corresponding alterations to (the reflection on) the epistemic status of European literature within the larger economy of knowledge production in the period. This was a key question because the conference figured within the framework of a larger research project, *Literary Knowledge, 1890-1950: Modernisms and the Sciences in Europe*. This project, graciously supported by Excellence Funding from the University of Leuven Research Council from 2018 until 2023 and conducted by a team of eleven³ in conjunction with two expert advisory boards,⁴ investigated how literature from various, mainly, Western European regions and countries (including Britain, France, Belgium, Germany, the Netherlands, Italy and Russia) during the modernist period had defined its own epistemic function in light of the massive expansion of (fundamental) scientific knowledge production. This comparative project covered a broad spectrum of types of writing as well a wide variety of (composite and nascent) scientific disciplines in the period — including archaeology, genetics, astronomy, and cosmology. While more scholarly publications to come out of this project are on their way (albeit not all in English), we are pleased to be able to present a portion of our work here. The essays collected here provide only partial answers to some key questions that have been of concern to us in the past five years.

Beans

Let me begin with a note on ignorance and beans. The year is 1934, the place is Paris. We are a fly on the wall in the home of André Breton, self-acclaimed leader of Surrealism. Breton has two visitors: Roger Caillois, a young student at the *École normale supérieure* who at this point is close to the Surrealist group but will soon break away from it, and Jacques Lacan, a thirty-something psychiatrist who has finished his PhD just a few years earlier. Together, these men are confronted with a basket filled with *haricots mexicains*, so-called jumping beans that have been left by a previous visitor and the sight of which is new to all three. Indeed, at this point rare in Western Europe, the seeds from a Latin-American shrub house the living larvae of a Mexican moth. The exotic beans, as they seem to wiggle and shake independently in the basket, mesmerize the three ignorant men, who each respond in their own way to the conundrum. As they collectively try to dispel the magic of the beans, they soon find themselves arguing over the relationship between literature and science. Lacan goes first; he urges his fellow bystanders not even to touch the beans and to dispose of them

instantly, "since the at least apparent irrationality of the phenomenon is enough to make us suspicious of our ordinary system of reference" (Breton 844).⁵ Proposing to leave the beans' wondrous mystery intact, Lacan seems to imply that ignorance in the face of mystery is bliss; it incites the imagination, unlocks desire. Breton agrees, partly, and puts forth that they at least temporarily respect the enigma so that they can momentarily contemplate whatever imaginative possibility the beans invite. What might be the (super)natural cause of this miraculous phenomenon? A magic spell? A soul captured inside? The saliva of a delirious nocturnal animal? Callois, the last to voice his opinion, has no such patience. He wants to cut the beans open immediately and see what is inside. A row follows. Breton lashes out in a tantrum. How can Caillois even suggest to destroy *le merveilleux*, this mystery rich of poetry? Caillois is adamant. He shouts that the marvelous no longer belongs to poetry but to science, and that if literature does not embrace science and its open-ended, experimental method, literature will lose its function. In a later tract (Caillois, "Pour une orthodoxie"), Caillois will draw explicitly on Gaston Bachelard's *Le nouvel esprit scientifique* [*The New Scientific Spirit*] (1934) to claim that any literature or philosophy that does not pay heed to new developments within science is at best ridiculous. Already in a letter sent to Breton shortly after their encounter with the jumping beans, Caillois stated that contemporary science "is at present an adventure in the dark: somewhat like children raised in boxes, who are amazed to discover ferns [... T]here is nothing left of the old intuitions, and any philosophy [or any Surrealism] that cannot fit together with this new science of the *why not* is absurd" (Caillois, "Lettre" 36).⁶ And Lacan? Well, as Breton and Caillois wage on, Lacan quietly backs away and walks out.

This anecdote, well-rehearsed in the study of Surrealism, is in many ways exemplary of the relationship between European literature and science in the modernist period, that is, roughly, the timespan from the late 19th century up until the early 1950s. First of all, it is telling because it unfolds in the co-presence of writers and scholars or scientists, their respective reactions and dispositions putting literature and science not in a relationship of opposition but in one of mutual dependence. Indeed, second, the altercation uncovers how writing in the modernist period – whether it wanted to or not – had to consciously relate to science somehow, either by fully embracing its potential (the position of Caillois), by shoving it temporarily aside (as Breton would have had it), or by ignoring it completely (as Lacan proposed). Third and finally, the row over the jumping beans also evinces that different understandings of what counted as science were at play in the modernist period. After all, had the Surrealists not borrowed the format of the popular natural science magazine *La Nature* for their founding periodical *La Révolution surréaliste* already a decade earlier (Ades 189), and had the movement, at least in Paris, not always presented itself as a creative science rather than a bourgeois or philistine literary or artistic movement? What was Roger Caillois going on about then? Much has been written in response to this question (see Parkinson for a selective survey) and it is safe to say that the alternative, Nietzschean-inspired sociology Caillois, Michel Leiris and Georges Bataille would go on to develop in the columns of the later journal *Acéphale* has few secrets left in store (Hollier, Galletti). Yet, to the present purpose, it is not so much the particulars of this Surrealist case that are of interest. What is significant is that a negotiation of what counted as science, and of how literature was to relate to it, was characteristic of almost all writing in Europe during the modernist period. Why was the issue of science such a vexed and inescapable one in this period in Europe? And why, almost a century later, is it worth revisiting this interesting phase in the history of literature and science?

Literature(s)

It could be argued that the complicated relationship between literature and science was less due to science than to literature itself. Indeed, both the literary field and the aesthetics of writing go through massive changes in the modernist period, which culminate in a situation in which literature at once becomes accessible to almost everyone and enjoys the highest possible cultural esteem as an art form. There were a number of changes that led to this situation, many of which, needless to say, follow on from shifts earlier on in the 19th century. There is, to begin with, what is perhaps best called the industrialization of literature. If already in the nineteenth century the rotary press and the widely used wood pulp paper had led to a much faster and cheaper production of books, magazines and newspapers, then legal and educational reforms facilitated the democratization of education by 1900. This resulted in massively rising literacy rates, albeit at different speeds in Europe: in Italy, for instance, around 1900 about 50% of citizens was still illiterate; in Belgium this was ca 20%, in France, ca 16%, in the UK, less than 10% (Roser and Ortiz-Ospina). Due to the birth of a mass readership and a fast-growing market of popular literature, writing in the modernist period accordingly comes to target an ever more diversified audience. On the back of this, poetry, among other forms of creative writing, becomes a mass phenomenon. Consider the production of poetry in Germany; there, each day during the first month of the First World War, 50,000 lines of poetry on the war alone were published (Marsland 2). While this figure gives clear evidence of nationalist sentiments, it above all uncovers poetry's wide circulation and popularity. Literary magazine culture across Europe in the period, similarly, indicates literature's unprecedented popularity. Around 1900 in Paris alone, nearly 200 *petites revues* were in circulation, thus excluding the equally substantial number of more commercial, established or glossy magazines (Brooker, Bru, Thacker, Weikop 20). Massively produced now, magazines came to push different forms and genres of fiction towards audiences of different ages, genders, classes and races. As the literary market begins to diversify, perhaps most clearly in the anglophone world, where markers of class are never far away, pretty soon there is also talk of different strata or registers in literary production. There is the so-called lowbrow genre fiction (mostly short stories or serialized novels): romance, detective and crime fiction, erotica, science fiction, western, horror and fantasy and adventure stories which can fall back on a whole spectrum of magazines sometimes devoted exclusively to fiction of a single genre. While the French and Germans have no equivalent term for what the English in the period come to call middlebrow literature, European literature also sees the establishment of book clubs (in France, the book club takes flight only after the Second World War), of para-academic lecture circuits on great books, cheap paperback series of classics and more. Such initiatives come to cater to a broader audience as well, one that wishes to engage in self-development by acquainting itself more thoroughly with the cultural and literary canon (Jaillant, *Modernism*; Jaillant, *Cheap Modernism*; Holmes and Letourneux; Sanders, Van Boven, Verstraeten). These and other such changes in print culture led to an exponential growth of literary production, to literature bulging at its seams; for the first time in human history literature, at least within Europe, becomes available to almost all (and not the few). Never before has so much literature, in such diverse forms and types, been accessible to so many.

In part as a result of this enormous literary production, a number of further changes occur. The rampant growth of literature increasingly also calls for specialist

attention and critique. Gradually, beginning in eastern Europe (Mrugalski, Schahadat and Wutsdorff), this leads to literary studies gaining autonomy within the European university, as the discipline comes to loosen itself from the clutches of philology and rhetoric. The gargantuan growth of literature also gives rise to a financially viable segment in the literary marketplace, where a small contingent of authors are given the space to explore the potential of literature at greater length and to embark on experiments the ends of which are not always clear at the outset. This segment is of course made up of the now canonized, so-called high modernist and avant-garde writers mostly associated with the modernist period. Sometimes in disregard of popular taste – at times with a keen eye on developments in popular culture – these writers are able to distinguish themselves from the gross of literary production. Often taking up the role of public intellectuals, if not of cultural celebrities, the words and voices of many of these writers come to enjoy unprecedented high esteem (Jaffe, De Beun, Winock). These writers voice their opinion on everything and their interdiscursive literary output comes to interlock with all possible aspects of culture. Hence, as the producers of a highly esteemed and popular art form, these writers could reasonably also be expected to comment on developments within science.

Adding to this expectation is the fact that these high modernists and avant-gardists extend into the modernist period various, at times age-old, epistemic functions attached to literature. Especially the claim that literature, as an autonomous zone or nexus in cultural communication, would be able to produce a type of knowledge of its own, one that differs from all other types of writing, is often encountered in the archive of modernist and avant-garde writing. From F.T. Marinetti's frequent and grandiloquent pronouncements that Italian Futurism – at the outer edges of given knowledge – was about to enter uncharted cognitive terrain, to the far more modestly pronounced epistemic functions in the poetics of Louis Ferdinand Céline, Alfred Döblin, Gottfried Benn or Robert Musil, time and again we encounter the idea that literature knows the world in a way that is singular and unique to it alone (Veivo et al.). On what this literary knowledge, or singular way of knowing, boiled down to precisely, however, no clear consensus emerged in the modernist period – except perhaps on the fact that literature, as a self-reflexive medium or art form, knew above all itself and the linguistic material it manipulated.

This lack of consensus in part can be explained by the fact that high modernists and avant-gardists as well as more popular writers also extend into the modernist period still various other, at times ancient, epistemic functions attached to literature. These previously amassed, mostly heteronomist, epistemic functions ranged from literature being the means of moral and ethical *Bildung* (aesthetic education) or the place to study the human or the social, to literature being the reservoir of national consciousness or the site of linguistic standards (Hörisch, Köppe, Borghards et al., Danneberg and Vollhardt). It was precisely these older and more lasting functions which in part also endowed certain writers with such weight and authority during the modernist period. Indeed, as William Marx has reminded us in his thought-provoking study *L'Adieu à la littérature [Farewell to Literature]* (2005); it is these older epistemic functions, and the concurrent esteem literature had come to enjoy through them, which modernist and avant-garde writers drive on and exploit, but also try to bend and renew, if not destroy, as they see through the modern idea that literature might also be a source of hitherto undefined or undisclosed knowledge (Marx). Given the wide variety of aesthetics of writing put forth in the modernist period, as conventional depictions of modernist literature have long argued (Weinstein), what marks this period perhaps above all is a search for what literature knows, for what its function, or functions, might be within a

larger modern economy of knowledge production. This orchestrated undertaking, the contours of which are still being developed, inevitably also required that authors in the period turned to science and determined if and how literature approximated, differed from or countered the knowledge produced in science.

In sum, simply by looking at the state literature found itself in during the modernist period, it makes perfect sense that Breton and Caillois, in the presence of Lacan, would have been arguing about literature and science. Everything considered, it must have come as natural to them to do so; their overdetermined context in part conditioned them to act as such.

Science(s)

The vexed relationship between literature and science in the modernist period cannot be accounted for only by looking at literature. Just as crucial to grasp the complicated marriage between literature and science is the state science found itself in during the period. In hindsight, it is manifestly clear that the epistemic crisis in literature alluded to above was to a large extent incited by changes in the domain of science, delimited not just to the physical sciences, engineering, life sciences and medicine, but also including the social sciences and humanities; in short, all types of officially sanctioned scholarship and research. The late 19th and the early 20th centuries are often said to have marked a veritable scientific revolution. If it falls outside the scope of this introduction to cover the full complexity of this revolution, it is key at least to recall some basic shifts that occur in the modernist period and which have been investigated in depth by a range of scholars (Morrisson; Thiher, *Fiction Rivals Science*; Thiher, *Fiction Refracts Science*; Ross; Peppis).

The modernist period ushers in a thorough revision of how we understand the most basic categories, from human culture and society and all life on earth to the outer regions of the universe. In the social sciences and humanities, for example, serious doubt is cast over whether subjects actually possess any agency or individuality, as human behaviour, culture, history and society are shown to be subjected to larger or subconscious individual-determining processes. The study of human society, culture and imagination at the same time fractures and falls apart in increasingly smaller and ever more specialized disciplines. In the life sciences and medicine the relationship between all living creatures on earth is redefined as it is demonstrated that life is the result of (chance) operations that escape existing theological frames of reference — neo-Thomists, like Jacques Maritain in *Les Degrés de savoir (The Degrees of Knowing, 1932)*, arguing that there nonetheless remain types of incommunicable knowledge, encountered among others in mystical experience. Genetics tries (but only succeeds around 1950) to explain how inheritance and change in living organisms is structured and caused (Müller-Wille). The abundance of new advances in medicine irrevocably shows the power (and potential dangers) of human control over, and intervention in, physical and biological reality. As humans are proven to be capable of manipulating their biological being, debates about the modification and eventually partial extermination of the human species follow suit. Finally, in what we now call the physical sciences and engineering, the Newtonian understanding of the universe (while still being deployed in various disciplines), is also proven to be theoretically unsound (Morrisson). On a small-scale level, much smaller, much more dynamic and dividable elements than atoms are shown to exist which are in part unpredictable or undecidable and on a large-scale level the universe is shown not to be a stable, perennial and self-enclosed entity, but a galaxy among galaxies in an expanding universe that began with a Big Bang. Nothing in this universe is fixed; everything always changes, and,

presumably, at some point also ends. The still expanding field of engineering in the meantime not only introduces all sorts of new media which, as prostheses to the human body, require that people rewire their sensorial experience. The vast number of innovations, most notably in the military domain, also leads to a growing awareness of the fact that the collective impact of humans on the environment reaches far beyond anyone's individual control.

These new insights come on the back of various other changes. Disciplinary expansion is rapid: around 1850 only a limited number of officially institutionalised scientific fields exist, but by 1950 scholarly disciplines have multiplied and mushroomed to form (more or less) the present-day university. Countless new fields, previously in the hands of amateurs or loosely organised amalgamations of scholars, establish themselves, or at least try to, with some disciplines disappearing as promptly as they came and a sizeable amount of para- and pseudo-sciences forming themselves at the margins. Hand in glove with this institutionalization of science goes its increased internationalization. This process also develops slowly and unevenly across Europe, due to complicating factors. These include the heated debates waged within national university systems about the direction the modern university should be taking (such as Émile Durkheim's altercation with the Collège de France and German Humboldtians; Ringer). While the modernist period witnesses, moreover, an increased investment by European states in universities and Big Science, linguistic and cultural hurdles hamper internationalisation — as different nations each have their own ways of, and traditions for, conducting research.

These issues in turn give rise to a growing self-reflection in science and scholarship. This is manifested not only by the fact that matters of method and theory increasingly become the topic of debate, but also by the sustained attempt to write the history of science both for specific disciplines and for science as a whole, the latter leading to many well-known debates about which types of scholarship count as *Wissenschaft* and which not (Richtert, Schönert and Titzmann; Maillard and Titzmann). These histories, like those presented in this special issue, most often settle on the 17th century as a key period of beginning and in part serve as a legitimization strategy for the younger physical sciences. Further legitimization for specific scientific disciplines, as well as science in general, happens through popularisation and popular science, both of which were already strongly developed in the 19th century, but which see an exponential growth in the interwar period. Reaching out to a wider audience by authoring books or pieces in popular periodicals devoted to science, high-profile scientists like Albert Einstein after 1920, gain global popular renown while as many others remain known mainly to national audiences. Film and radio coverage as well feeds this popularity — 1922, for instance, sees the longest ever educational film on Einstein's theory of relativity by the Deutsche Lichtbild-Gesellschaft (Wazeck).

An important conclusion to be drawn from this again, admittedly, oversimplifying survey is that the term science in the modernist period was unstable; the actual tenor or meaning of what counted as science was in fact a matter of continuous debate and negotiation throughout the modernist period. Indeed, science's process of becoming, its constant flux in the search for new ways of understanding human culture, life and the universe, is fundamental to an understanding of science in the modernist period, because our current ordering of the sciences as we have just presented them for the most part was still forming itself and thus post-dates the period. That on various occasions there was profound confusion over what counted as science, and what (if anything), defined it, is evidenced by a large variety of elements. To begin with, there was the question that would puzzle Thomas Kuhn as well, namely, "Is

science one or are there many?" This question was central, among others, to attempts at unifying the sciences in the modernist period, to think them all together, however utopian that goal might have proven. Indeed, ideals of the scientific organisation of a united world will eventually come to inform the establishment, at the close of the modernist period, of new international agencies such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Health Organization (WHO) (Kamminga and Somsen). Before these mammoth agencies see the light of day, the modernist period also witnesses the rise of what is now called information engineering (Boyd Rayward; see also Stevens). So much scientific knowledge was being produced in the period, that issues of storage, access and distribution come to the forefront as well. Paul Otlet's Mundaneum, with its universal card-based system and microfilm, along with Otto Neurath's attempts at setting forth a new pictorial language of isotypes, are just two examples of this new information engineering. Closely tied to these initiatives was the issue of what was to be done with all this knowledge; at what outcome it was to be aimed? This issue would come to take centre-stage in the newly established sociology of knowledge, which studies the distribution and uses of knowledge, scientific or other. Founder Karl Mannheim demonstrated that knowledge was never a free-floating entity, but always socially rooted, motivated and subject to power-relations. Socially constructed knowledge, and its possession, proves a means of power.

Perhaps of greatest significance in this period is the rise of historical epistemology, where the already mentioned Gaston Bachelard and Ludwik Fleck – in opposition to the logical positivism of the Vienna Circle – begin to study the ways in which contemporary natural scientists arrive at what they call facts in the laboratory, in other words, how knowledge comes about in specific contexts (Fleck; see also Canguilhem, Knorr-Cetina, Latour and Woolgar, Lenoir). Noting the crucial role of social and cultural factors playing into science and observing the high degrees of indeterminacy and uncertainty that mark the human-non-human interaction in science, Bachelard comes to characterize the physical sciences in the modernist period as moving forward without knowing where they are heading and leaving all possibilities enthusiastically open at the frontiers of knowledge (Bachelard). The questions that guide the modernist scientist are no longer why or how, but *pourquoi pas*, why not try this too? Bachelard's colleague Alexander Koyré arrives at remarkably similar conclusions about the scientific revolution of the 17th century (Koyré), while Koyré's successor, Alexandre Kojève – a nephew of Wassily Kandinsky – would continue in his footsteps and increasingly come to question where science ends and the act of imagination begins (Kojève). That, indeed, may in the end be one of the most striking features of the conception of science in the modernist period: whether in the work of these historical epistemologists, in George Collingwood's *Speculum Mentis or The Map of Knowledge* (1924) (see also Weder), in the very popular philosophy set forth in Hans Vaihinger's *Die Philosophie des Als Ob [The Philosophy of the As If]* (1911), or in the work of many others still, time and again an attempt is made from within the sciences to differentiate the creative act of literature from the scholarly work of the scientist, and to stipulate that the knowledge of science perhaps approximates but never coincides with that of literature.

In short, that Caillois, while quoting Bachelard, would have found himself arguing with Breton about the relationship between science and literature – in the presence of what will become one of the most creative psychoanalysts of the 20th century – makes perfect sense. In this formative phase of the sciences (traditionally defined), it was common for scientists too to draw parallels with writing and to revisit

the close bond literature and science had always held – and still holds. It is indeed well-known that during the fin de siècle and up and until the First World War, many scientists – with the exception of physicists and mathematicians – routinely received both a humanistic and a scientific education. Scientists of all kinds in most parts of Europe thus got acquainted with Greco-Roman culture and literature as well as with various national canons, and learned to express themselves in a language and discourse that was available also to their generally well-educated peers (Micale). This is not the place to rehearse what was read by which scientist in the modernist period, but it is abundantly clear from historical evidence that this also included the more popular forms of writing touched upon earlier (Canaday, Bru, Huemer and Steuer). On all fronts and levels, in short, literature spilled into science and vice versa, with science shaping literature as much as literature shaped science.

Epistemic(s)

It is at this crucial junction in the history of science and literature that the essays collected in this special issue of the *JLS* hold up. In so doing, these essays seek to add to an already sizeable body of work. While a full bibliographic account of modernist literature and science studies falls outside the scope of the introductory notes here, it is worth noting that this field of study until recently has tended to focus on a fixed set of sciences, as well as on a limited number of canonized authors and forms of writing from the modernist period. Modernist and avant-garde studies, for obvious reasons, have tended to favour new developments in the scientific landscape of the period. These include the exploding sciences of mind, ethnography, anthropology and sexology, as well as developments in the physical sciences (from relativity theory to quantum mechanics). It is only in the last two decades or so that a wider palette of sciences have been dealt with in the study of European literatures from the late 19th and early 20th centuries. In the process, it has not only become obvious that to many writers older, pre-modernist forms of science were at least as significant in their creative practice, but also what a veritable treasure trove the modernist period offers to those engaged in the study of literature and science.

Important in the English context was the debate waged between Thomas Huxley and Matthew Arnold in the 1880s and the contention unleashed by C.P. Snow's so-called two-cultures debate in the 1950s. These led to the three-cultures argument advanced by Talcott Parsons and Wolf Lepenies which argued for the inclusion of sociology (Parsons 40, Lepenies) as well as the one-culture argument for consilience proposed by Edward O. Wilson, foundational for the ecological humanities today (Wilson). These make the importance of the modernist period to a present-day understanding of literature, science and their interrelation self-evident. If, likewise, the larger contours of the modernist period as sketched above are no secret, there nonetheless remains the general question of literature's epistemic status and functions, both during and after the modernist period.

This is by no means to say that no attempts have been made to arrive at general conclusions about the fate of literature's epistemic status or functions in the modernist period. Michel Pierssens, for example, has demonstrated that what continued to make literature such a powerful source of knowledge throughout the modernist period alongside science was that it increasingly came to point at the polyphonous and cacophonous nature of the totality of knowledge production. Whereas science tried to order the world in countless manners, literary texts constantly reminded science of its foundational disorder, bordering on conceptual breakdown, but then went on to make alternative orders of its own (Pierssens). This *épistémocritique*, which echoes the more

recent work of Isabelle Stengers (Stengers, "Science Fiction"; see also Stengers, *Penser*), also ties in with the scholarly work on modernist literature (by mostly German-speaking critics) inspired by interdiscourse theory. Oversimplifying, this theory stipulates that literature in modernity increasingly becomes the one nexus left in cultural communication that is capable of bringing together otherwise disconnected, specialized discourses and knowledge-cultures operative in functionally differentiated societies and to interrelate these in fictional and symbolic ensembles that lay bare their interconnections as well as insurmountable rifts (Link, *Elementäre Literature*; Link, "Diskursanalyse"). As information and knowledge in literature is always also textualised, subjected to a *mise-en-texte* (Angenot), or *domained* and inscribed within a literary discourse (Merrill Squier), the articulated ensemble of scientific knowledge that writing in the modernist period sets forth is at times startling indeed. For in dialogue with science, authors in the modernist period not only called to life their own possible scientific disciplines — from the famous pataphysics introduced by Alfred Jarry in *Gestes et opinions du docteur Faustroll pataphysicien : Roman néo-scientifique suivi de Spéculations* [Exploits and Opinions of Dr. Faustroll, Pataphysician] (written in 1898, but published posthumously in 1911), that is the science of imaginary solutions to unresolvable metaphysical questions (such as how big is the surface of God?), to Robert Musil's advancement of a science of the *Nicht-ratioïd* that was to explore what (if any) moral and ethical agency was left to the individual (Musil 1029). We also find others simultaneously trying to develop (popular) fiction into a distinct pedagogic project.⁷ For some literature in the modernist period comes to take the form of a (quasi-)scientific machine for thought experiments (Swirski; Birke, Butter and Köppe). For others it is transformed into a mode of engaging – in the spirit of Ernst Mach – in imaginative scientific experimentation (Moser; Gamper; Bies and Gamper). For others again it becomes a means to solve highly technical aporia in specialized discourses (Bru 87-134), or if not, to recall Michel Foucault's frequent visits to the archive of modernist and avant-garde writing, a medium to transgress, through linguistic experiment, the limits of the knowable at the edges of the modern episteme (Foucault). The question, in sum, is perhaps less what epistemic functions writing endowed itself with in the face of the modernist scientific revolution; rather, it is what epistemic it did not take on.

Roland Barthes counts among the 20th century literary theorists to have kept a keen eye on the development of literature's epistemic role in Western modernity. Looking back on recent developments in literature shortly after the modernist period, Barthes observed the following:

At the present moment "literature" can no more coincide with the function of *mathesis*, because of three reasons: 1. Today the world is planetary. It's a profuse world, what we know about it we know immediately, but we are bombarded by partial and directed information. As awareness of the world is no longer filtered, this world would hardly enter a literary *mathesis*. 2. The world is too surprising, its power to surprise is so excessive that it escapes the codes of common knowledge. [...] Literature, as *mathesis*, was the closing of a homogenous knowledge. 3. Science is plural: there is no longer a single science, but various sciences, and the old 19th century dream has collapsed (Barthes, *Le Grain* 225).⁸

Whereas writing in the 19th century could still rival or, rather, complement, science, Barthes upheld, through the study of the totality of society in the novel for example, no such role could still be endowed to literature in the mid-20th century. After all, at the

end of the modernist period, after intense fragmentation, specialization and a lot of turf wars, it was decided that the humanities and social sciences would be the ones producing knowledge about human cultures and societies, that the life sciences and medicine would focus on all biological life forms on earth, and that the physical sciences and engineering would see to the vast domain of technology but also cover all other things in the cosmos. In short, all possible objects of knowledge, all epistemic things (Rheinberger), had been claimed by science (broadly defined) at the end of the period — leaving little, if nothing, left for literature to know. This did not empty the epistemic role of literature completely, Barthes claimed a few years later in his inaugural *Leçon* at the Collège de France: for while literature from here on no longer could put forth an object of knowledge of its own – except literature itself – it remained a source of wisdom because it *knew of knowledge*, that is it looked over the shoulder of subjects and scientists engaged in acts of knowing (Barthes, *Leçon*). As Jacques Rancière has gone on to argue, this leaves literature also in a powerful position to unearth the multiple *poétiques de savoir* created by science, as it discursively names and claims epistemic authority over subjects and objects and at times violently excludes others from engaging in knowledge production (Rancière) – the *Poétologie des Wissens* [Poetology of Knowledge] developed by Joseph Vogl and projected back on pre-modernist literature and scientific culture being developed on similar assumptions (Vogl). Leaving aside whether Barthes' assessment of the condition of mid-20th century literature's epistemic status was correct, it does contrast sharply with the panoply of epistemic functions we witness literature taking up during the previous modernist period. This only adds to the idea that what happened during the highly unstable modernist period – which was also marked by an almost uninterrupted string of upheaval, war and revolution on the European continent that constantly upset the institutional boundaries of both literature and science – presents an equally unstable and open-ended dialogue between the fields of literature and science in which literature came to maximally explore and exploit its epistemic potential.

As this special issue demonstrates, notably in the contributions by Kenneth Hirschkop on literary theorist Mikhail Bakhtin, Anke Gilleir on Marxist theorist and trained biologist Rosa Luxemburg, and Stefan Willer on Nietzsche and Freud, literature's potential epistemic value was also reflected on broadly by all sorts of scientists and scholars, literary or other. This variegated reflection on what and how literature knew, found its correlate in similar estimations about the epistemic role of science, as a number of further contributions in this issue show. Taking us up to the far North of the European continent, to Iceland, Benedikt Hjartarson's article for instance delves into the messy and contested zone in between so-called esoteric parasciences and the natural sciences during the period, arguing that it was perhaps first and foremost in popular literature that the divide between both was constantly negotiated, and undermined. In a similar vein, Michael H. Whitworth addresses the complicated interrelation between high modernist writing and philosophy on the one hand and quantum physics on the other. Who was first, the writer or the scientist, in developing the uncertainty principle so crucial to quantum physics, Whitworth asks? And, more poignantly, how do we heuristically determine this? As illustrated by the contributions of Hugues Marchal and Thomas Klinkert, which in a way book-end this issue, the creative work of writers themselves can of course also be read as gauging the contours of the massive changes that take place in the field of science during the modernist period. Klinkert's essay shows that to *nouveau romancier* Nathalie Sarraute, writing at the close of this period, science had somehow acquired a more stable tenor. In turn, Marchal evinces how the French tradition of *poésie scientifique*, so lively in the 19th

century, almost eclipsed during the modernist period, perhaps in part because the boundaries between science and poetry became so fuzzy and so much was going on in science that even to the poetically inclined science-buff, it just became too much. Finally, turning our gaze toward Fascist Italy, Bart Van den Bossche reminds us of the fact that many advances in science during the period occurred on the back of a bloody process of colonization, the tellability (Baroni) of which more often than not was also obscured by writers. Thus exploring only a number of key facets of the literature-science complex in the modernist period, this comparative special issue of the *JLS* presents itself both as a renewed invitation to add further work and as a suggestion to develop that work not only in a comparative fashion, but also along an at once simple and yet so terribly complex set of questions, namely what and how does literature know? For if we want to demonstrate that literature is a particular medium of knowledge, an epistemological apparatus in its own right, as media epistemologists would call it nowadays (Albera and Tortajada), then its relationship to the knowledge set forth by science, especially during the modernist period, warrants further attention. Indeed, the particularities of the modernist moment might well go some way in helping us gauge the more general epistemic range of modern and contemporary literature as such.

Notes

1. This introduction was first delivered as the opening address at the conference noted by the author in his opening paragraph. This revised version of that address as a result retains the openness of the spoken word and the provocations that were intended to prompt the conference's discussions (note by the *JLS* editors).

2. For more information about the MDRN research lab, visit: <http://www.mdrn.be/>.

3. Supervisors were Sascha Bru, Elke D'Hoker, Anke Gilleir, David Martens and Bart van den Bossche. PhD students were Fatima Borrmann, Leanne Rae Darnbrough, Adele Guyton, Robrecht De Boodt, Abigael van Alst and Chiara Zampieri.

4. There was an advisory board of experts in modernist literature that included Paola Govoni (University of Bologna), Hugues Marchal (University of Basel), the late and dearly missed Laura Marcus (University of Oxford), William Marx (Collège de France), Tyrus Miller (University of California, Irvine), Mark S. Morrisson (Penn State University), Michel Pierssens (Université de Montréal), Morag Shiach (Queen Mary University of London), and Stefan Willer (Humboldt University). At the University of Leuven itself we also amassed a board of historians and philosophers of science as well as experts in the sciences we studied from up close. This second board included Andreas De Block, Hilde Heynen, Jeroen Poblome, Geert Van Calster, Hilde Van Esch, Geert Vanpaemel, Hans Van Winckel and Kaat Wils. We are grateful to all of them for their advice and continuous support.

5. "Lacan [était] pour qu'on s'en dispensât à tout jamais, puisqu'il n'en serait pas moins avéré que l'irrationalité au moins apparente du phénomène avait suffi à nous faire prendre en suspicion notre système de références ordinaires."; unless stated otherwise, all translations are by Sascha Bru.

6. "[C]'est l'aventure dans le noir : la découverte éblouie des fougères par des enfants élevés dans des cubes [... I] subsiste rien des anciennes intuitions et toute philosophie qui ne compose pas avec cette nouvelle science du *pourquoi pas* est ridicule." (The italicized *pourquoi pas/why not* is a quote from Bachelard's *Le nouvel esprit scientifique*.) The English translation is quoted from Roger Caillois, "Letter to André Breton", in *The Edge of Surrealism: A Roger Caillois Reader*, ed. Claudine Frank, trans. Frank and Camille Naish, Duke UP, 2003, pp. 84-86, 85.

7. See, among others, the special issue on "Modernism and/as Pedagogy" of *Modernist Cultures*, 14, 3, 2019. For popular literature: Aleksandra Boss and Martin Klepper, "What Nancy Knew, What Carol Knew: Mass Literature and Knowledge", *What Literature Knows*, edited by. Antje Kley & Kai Merten. Lang, 2018.

8. "A l'heure actuelle la 'littérature,' le texte, ne peuvent plus coïncider avec la fonction de *mathésis* [...]: 1. Le monde est planétaire, aujourd'hui. C'est un monde profus, ce que l'on sait du monde, on le sait tout de suite, mais on est bombardé d'informations parcellaires, dirigées. La connaissance du monde n'étant plus filtrée, ce monde aurait beaucoup de mal à entrer dans une *mathésis littéraire*. 2. Le monde est trop surprenant, son pouvoir de surprise est si excessif qu'il échappe aux codes du savoir populaire. . . . L'excès, la surprise rendent impossible l'expression littéraire. La littérature, comme *mathésis*, était la clôture d'un savoir homogène. 3. Il est banal de dire que le savoir a un rapport avec la science, mais aujourd'hui, la science est plurielle: il n'y a pas une science mais des sciences et le vieux rêve du XIXe s'est effondré. En effet, les frontières entre les sciences sont impossibles à maintenir." (Leyla Peronne-Moises, "Leçon: Testament and Prophecy." *Yale Journal of Criticism*, 14, 2, 2001, pp. 463-68, p. 464.)

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