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Our Common Cosmos: Towards a New Natural Philosophy

Tom McLeish FRS, Professor of Natural Philosophy in the Department of Physics, University of York, York, UK, YO30 6AS

Abstract

The academic aspects of the tangled and largely misunderstood relationship between theology and science are themselves complicated further by the disciplinary fragmentation that has marked universities for the last two centuries. The apparently superficial change in usage from ‘natural philosophy’ to ‘science’ in the early nineteenth century has disguised, yet signifies linguistic, metaphysical and theological moves whose consequences for academic fragmentation have surfaced since. In this paper we examine these through the lens of a departure from the notion of ‘wisdom’, as a complementary good to ‘knowledge’. We trace a possible re-constitution of a contemporary natural philosophy and its consequences for recognition of a common narrative of creativity in scholarship and beyond, a renewed philosophy of interdisciplinarity, a transformed relation of science and theology, and a route to re-establishing a more democratic participation in the scientific process.

Keywords: natural philosophy, interdisciplinary, wisdom, universities, science and theology,

1. Introduction

The last century has increasingly revisited, in one form or other, the ‘Two Cultures’ paradigm of the academic world [Snow 1959]. The bitter confrontation of scientist C. P. Snow (in his Reith lecture and subsequent book *The Two Cultures*) and literary scholar F.R. Leavis produced unmistakable echoes in the ‘Science Wars’ of the 1990s [Latour 2004]. In addition to the noisy and oppositional debates around the questions of cultural relativism, empiricism and scientific realism that the post-modern version of this cultural conflict prioritises, the tensions that they reflect have also generated more practical concerns in the shaping of academia. Over the same period, the narratives around national funding strategies, have, for example, valorised science over the arts and humanities in its dominant research and educational priorities [Rörsch 2014]. Over the same period, proponents of the arts and

humanities have understandably perceived the need to mount explicit defences of them. Peter Carey, for example, in *What Good are the Arts?*, writes [Carey 2006]:

Literature does not make you a better person, though it may help you to criticize what you are. But it enlarges your mind, and it gives you thoughts, words and rhythms that will last you for a life.

Carey, in an earlier chapter in his personal survey of the arts, levels criticisms at the visual ‘high’ arts, especially in terms of their societal framing as, for the most part, received rather than actively engaged-in. There seems to be, even within the humanities themselves, further fragmentation resulting in a degree of academic squabbling over disciplinary priority. In similar vein, Helen Small’s *The Value of the Humanities* develops a list of functional attributes of the study of the humanities, none of which attempts to engage with the sciences, but rather seeks to counter-balance them. It is not my purpose here to evaluate her categorisation, but note the significance of her final summary, referring to Bernard Williams, where she relates public value to private affect [Small 2013]:

... we will find ourselves in trouble, as a society, if the ways in which we express and encourage important values drift too far from our private sentiments and intuitions about values.

These two examples also represent echoes of the Two Cultures debate. But that debacle was itself by no means the first confrontational articulation of a divergence between the humanities and the sciences, for Snow and Leavis drew heavily on an earlier debate between Matthew Arnold and T.H. Huxley [White 2005], which has bequeathed a moniker to the framing of a discussion from which it has proven hard to break free.

Beyond the questions of epistemology and value, there are other less frequently discussed consequences of disciplinary division. A pertinent example can be found in the increasingly circumscribed range of endeavours that support a discussion of creativity. Paradoxically, in an age that, if media-chatter about ‘creatives’ is to be trusted, increasingly values aptitude for ‘creativity’, the same late modern period has witnessed a distancing of concepts of creativity, and of the creative link from affect to concept, from those of science itself. From an early-romantic visionary stance, William Wordsworth [1802] could hope that:

The remotest discoveries of the Chemist, the Botanist, or Mineralogist, will be as proper objects of the Poet’s art as any upon which it can be employed, if the time should ever come when these things shall be familiar to us, and the relations under which they are contemplated by the followers of these respective sciences shall be manifestly and palpably material to us as enjoying and suffering beings. If

the time should ever come when what is now called science, thus familiarized to men, shall be ready to put on, as it were, a form of flesh and blood, the Poet will lend his divine spirit to aid the transfiguration, and will welcome the Being thus produced, as a dear and genuine inmate of the household of man

Later in the century, the French realist writer Émile Zola [1964] could write of artistic imagination being ‘replaced’ by scientific method:

it is experimental reasoning, which combats one by one the hypotheses of the idealists, and which replaces purely imaginary novels by novels of observation and experiment.

Finally, at the turn of the 21st century, the holder of Oxford University’s chair for the public understanding of science could write [Dawkins 2006]:

I don't want to decry human feelings. But let's be clear, in any particular conversation, what we are talking about: feelings, or truth. Both may be important, but they are not the same thing

The distancing of the aesthetic, the emotional and the creative modes of human expression within discussion of science is a quieter, but at least as significant a change as the louder debates around disciplinary cultural value. Perhaps one reason for a lack of realisation that such a pervasive shift in the social and human framing of science has occurred since the early 19th century, is that the history of thought, and its disciplinary conventions within an educational context, has not been as deeply explored as it might. The slow divorce of the perception of science from both affective and creative energies has contributed to the equally strong redefinitional shift in the territories of ‘science and religion’ [Harrison 2015].’ The medieval centuries, so foundational to modernism, yet without the stark divisions of humanities and sciences to which modernism had become so strongly wed, present themselves as potential sources for more fruitful reconciliation [McLeish 2016], but there are much later disciplinary decisions that shape the detachment of science from the humanities more generally.

2. The Move from Natural Philosophy to ‘Science’

William Whewell coined, around 1834, the term ‘scientist’, which gathered currency first in America and then Britain throughout the century. Although Faraday and Maxwell both refused the new term, insisting on the older ‘natural philosopher’, the final adoption of

'scientist' was complete by the end of the century. Momentously, the discoveries and theories of geology (Lyell's gradualist and ancient formation of geological strata) and of biology (Darwin's evolution by natural selection) were transforming utterly the understood relationships the human race in the time and space of our world, and with the other species on earth. Paradoxically, in the face of Wordsworth's vision, the well-known poet-scientist partnership of Coleridge and Davy [Holmes 2008] and the lucid scientific prose-development of Alexander von Humboldt [Walls 2009], the period of romanticism swept in a fragmentation of disciplines and a further distancing of 'the inhuman otherness of matter' [Steiner 1989] unprecedented in thought. In the English-speaking world, the crack between the linguistic continents of 'science' and humanities widened with respect to its cognates *Wissenschaft*, *scienza*, and *sciences* in German, Italian and French, which continued to refer to the broad sweep of academic 'knowledge'. The loss of 'natural philosophy' as an active term for those who pursued science is arguably more than a superficial change in nomenclature, but signifies these, and deeper cultural shifts in late modernism. In the following we pursue three avenues that suggest where these underlying shifts might find their loci.

2.(a) Linguistics and Etymology

The change in nomenclature - 'natural philosophy' becomes 'science', and their cognates *mutatis mutandis* - carries with it many etymological undercurrents of meaning. A Greek declaration of 'love of wisdom of natural things' (*philo - Sophia*) is slowly replaced by a Latinate claim to knowledge (*scio*) (Wordsworth's far more critical appraisal of science than in the *Lyrical Ballads*, 'we murder to dissect' uses the term 'science' where Keats and Poe retained 'philosophy').

The language-worlds change. The more contemplative scholarship that Greek provenance suggests, together with its allusions to wisdom, rather than knowledge, and to love, rather than to control, is replaced by the Latin of the conquering power of mid and late antiquity. Latent in Francis Bacon's narrative of a mastery of nature, with its own invasive and even violent language, the term 'science' has a resonance with domination, albeit through knowledge rather than explicit violence, that had been implied from the early 16th century. Knowledge commands an alternative and less-commented aspect - that of a game. No less a loss of wisdom, the superficially playful interpretation of the 'knowledge game' is infantilising in Bacon [1887]:

The glory of God is to conceal a thing, but the glory of the king is to find it out; as if, according to the innocent play of children, the Divine Majesty took delight to hide his works, to the end to have them found out; and as if kings could not obtain a greater honour than to be God's playfellows in that game, considering the great commandment of wits and means, whereby nothing needeth to be hidden from them.

The latent metaphysical shift is released in the early 19th century through a change in language, that both expresses the dynamic of a loss of wisdom and participates in it.

2.(b) Metaphysics and Affect

The first metaphysical consequence of the shift from natural philosophy to science is, paradoxically, the loss of metaphysics itself from scientific discourse. As Nicholas Maxwell has urged [Maxwell 2012], the divorce of philosophy from science isn't really possible - all science requires a metaphysical framework of assumptions of domain and methodology. If not explicitly acknowledged then the current set of assumptions become implicit and invisible, but not inoperative.

To take one example that has enjoyed an interesting resurgence recently, a generation ago the tacit assumption that science was built upon a necessary and strong ontological reductionism was near-ubiquitous. The 'in principle' determinism of the structure and behaviour of large-scale assemblies of complex matter from the complete causal set of microscopic degrees of freedom, and the resultant 'causal completeness of physics' (CCP) has been claimed as necessary for the function of scientific method itself [Humphries 2016]. One consequence of the strong reductionist assumption has been the generation of the fraught and problematic debate within the 'theory of mind' [Lowe 2010]. A more recent discussion, however, itself emerging from a renewed collaboration between physicists and philosophers, has reappraised the necessity of reduction in all causal variables to an empirical one. Much simpler systems than mind, operating in both classical and quantum domains, possess structures that present candidates for a 'strong emergence', including sets of long-range variables inherently non-reducible to atomistic (or smaller-scale) variables, yet determining of the future evolution of the systems [McLeish, Pexton and Lancaster 2019].

However, the etymological shift from natural philosophy to science does more than demote metaphysics. Maxwell's thesis that the recovery of a 'natural philosophy' for today amounts purely to a reconnection of the scientific disciplines with philosophy itself surely falls short of its full implications. There is more than the recovery of metaphysics to be discovered in a deeper excavation of the history of a natural philosophy. The 'love' within *philosophia* might remind us that the contemplative practice of earlier ages had not made a second artificial

divide as we late moderns have: that between cognition and affect. A sustained 'natural philosophy' would not have supported the loss of a conscious role for the affective in the practice of science, addressing the move traced in the previous section from Wordsworth to Zola and Dawkins. Philosophy does more than erect a meta-logical canopy over the practice of science, it releases a fuller engagement of the human mind, including the emotional faculties, within it. David Hume articulates this best of the early - moderns [Hume 2007 p.35]:

The difference between fiction and belief lies in some sentiment or feeling, which is annexed to the latter, not to the former, and which depends not on the will, nor can be commanded at pleasure. It must be excited by nature, like all other sentiments; and must arise from the particular situation, in which the mind is placed at any particular juncture

In his earlier *Treatise on Human Understanding*, Hume is even stronger on a deception of enlightenment rationality - that the emotions play no part in the philosophical search for truth:

By reason we mean affections ...; but such as operate more calmly, and cause no disorder in the temper: Which tranquility leads us into a mistake concerning them, and causes us to regard them as conclusions only of our intellectual faculties."

The essential and explicit role of the affective as well as, and in partnership with, the cognitive faculties, is one that marked discourse and writing in natural philosophy before its restriction to 'science' [McLeish 2019]

2.(c) Theological and Philosophical Perspectives from Medieval to Modern

The 13th. century English polymath Robert Grosseteste prefaces the body of his published work on natural philosophy and scientific topics with a remarkable treatise on the seven liberal arts. Written probably in the period 1200-1215, it begins with the summary of high medieval philosophy of education. The deliberate discussion of the integrated nature and purpose of the disciplines in that age might, in the fragmented academic world of our own, offer a helpful reflection on the late modern issues that follow from a loss of 'natural philosophy' [Grosseteste 2019 (1215)]. Grosseteste begins:

Now, there are seven arts that purge human works of error and lead them to perfection. These are the only parts of philosophy that are given the name 'art', because it is their effect alone to lead human operations towards perfection through correction. The works within our capacity consist either

in the mind's sight, or in the desire of the same, or in bodily movements, or in the dispositions of these same movements. Sight first looks; then it verifies what has been looked at or cognised, and when the fitting or harmful things have been verified within the mind or within sight, desire covets to embrace the fitting, or retreats into itself to shun the harmful.

Several surprising and strange notions surface simultaneously for a modern reader of this dense passage, as in the entire treatise that follows.

First, the arts (which here *include* the sciences of course), for Grosseteste, do not primarily support vocation or equip for employment, but constitute personal *virtues* that underpin them. Their moral relationships to ‘the good’ on the one hand, and ‘the harmful’ on the other, illustrate this unfamiliar framing. The surprise for modern sensibility increases when it becomes clear that the treatise’s ethical development and orientation spends relatively little time on the lettered arts of the trivium (grammar, logic and rhetoric); rather its bulk is devoted to the mathematical arts of the quadrivium (arithmetic, geometry, astronomy and music), especially the last two.

Second, the consequence of a proper grasp and deployment of the arts is not so much the application of knowledge, as a holistic ordering of the human in operation and behaviour. Furthermore, the process is not one of mind-directed activity, but derives from a vision of interconnection of ‘sight’, ‘desire’ and ‘bodily movement’ or as we might articulate it, from ‘thought’ to ‘action’.

Third, it is the interplay and dynamic of these three functions that achieves the fruitful rather than the harmful. The pursuit of disciplines is a moral and ethical activity, but also an explicitly practical one. For Grosseteste personally, the context this work enjoys within his corpus is highly significant. Though dating of his treatises is notoriously difficult, in this case there is strong support for the conclusion that this survey of the liberal arts acts as a preface to his significant body of work on natural philosophy. That this contains a wealth of highly novel and imaginative proposals on the qualities and behaviour of light and colour [Dinkova-Bruun *et al.* (2013)], sound and matter points to the aspect creative fruitfulness inherent to his definition of ‘the good’ in respect of learning.

Fourth, the spectrum of disciplines is highly integrated in any account of praxis. The subsequent treatise details the ways in which virtuous human beings adopt the learning of geometry as much as logic, of astronomy as much as rhetoric, to order their worlds fruitfully. The way in which the liberal arts work out within this scheme is alluded to and anticipated in the introductory passage above in an account of what we might now refer to as a psychological process. ‘Sight at first looks ...’ is the introduction of an account of experience. This ‘sight’ is

not necessarily visual – here the Latin *aspectus* is invoked in its fully metaphorical sense of mental sight or vision. Similarly ‘desire’ is the complementary *affectus* elicited by the mind’s cognition, but necessary to drive both further thought and subsequent action. We talk loosely today of acting from our ‘head’ or our ‘heart’, as if these were exclusive modes of motivation. But for a medieval thinker, the emotions and rationality were intrinsically intertwined. In many ways we are less subtle now, needing rather nuanced definitions of these two Latin terms:

Affectus comprises the will, desire, or divine speculation. It has a greater projection onto the emotional than does *aspectus*, and less onto the cognitive or rational. It is the immediate motivator of motion or action. It responds more to the internal than the external, but can be directed by *aspectus*.

Aspectus is intellectual apprehension. It has a greater projection onto the cognitive and rational, and less onto what we would term the ‘emotional’ today. It acts on *affectus*, rather than acted on by it. It possesses a sense of inner perception, gently invoking the visual ‘aspect’ of cognition.

The two notions map approximately onto our language of cognition and emotion, but these are only the dominant components of their content. There is a palpable admixture of the affective in ‘*aspectus*’, as much of the rationally executed in the ‘*affectus*’. If nothing else, this should warn us that any apparently clear distinction between the emotional and cognitive today is the result of as much cultural circumstance as it is psychological structure. David Hume’s observations and warnings echoed deeply reflective medieval antecedents.

The remarkable claim of Grosseteste and Hume alike is for a centrality of passion in the acquisition of scientific knowledge itself, not purely in the aesthetic enjoyment of its fruits. Yet it is a truth, if a suppressed one, that all scientists know. Furthermore, it presents an important diversity within affect: as well as the violent passions of joy and grief, there are the quieter ones that may even, for their persistent nature, be mistaken for the rational (*aspectus*). A salient example would be the ‘aesthetic emotion’ – the appreciation of beauty, which threads its way through the testimonies of both artistic and scientific creation, both as motivation and response. Keeping alert to such quieter emotions is important in gathering personal evidence on the creative phase of science, but doing so is to swim against the tide of current scientific narrative. If Hume was able to report, and even to analyse, the emotional thread of natural philosophy without controversy, it was because science was as honest about its passions in the eighteenth century as it was in the thirteenth.

A further function of emotional affect emerges when its entanglement with the cognitive is set within the context of creativity. That affect and cognition support a mutual collaboration

in the search for innovation, the creative solution, the imagining of the new was the contention of French mathematician and mathematical physicist Henri Poincaré [Poincaré 1915]. Faced with the universal experience in which the mathematician's conscious mind is suddenly presented with a clear perception of a pathway to the solution of a mathematical problem, he realises that the non-conscious mind has been at work during periods of apparent respite from conscious labour upon it. He also calculates that a purely unguided, mechanical function of checking possibilities is not a candidate for the way this subconscious process works: there are simply too many possible avenues within the space of candidate proofs for each to be checked exhaustively:

What is the cause then, among the thousand products of our unconscious activity, some are called to pass the threshold, while others remain below? Is it a simple chance which confers this privilege? Evidently not; among all the stimuli of our senses, for example, only the most intense \times our attention, unless it has been drawn to them by other causes. More generally the privileged unconscious phenomena, those susceptible of becoming conscious, are those which, directly or indirectly, affect most profoundly our emotional sensibility.

Poincaré concludes that there are hidden aesthetic and affective functions that guide the non-conscious mind towards sub-spaces of fruitful ideas. He might have been developing a direct application by example from the medieval analysis of mental sight and affect.

The theological tradition which provides the context of the balance between affect and cognition, and especially its moral framing, is that of *wisdom*. Here is another theological resonance 'natural philosophy' that is largely missed in contemporary discourse. Yet not entirely so - Mathematician Ennio De Giorgi spoke at a 1996 congress of philosophers, scientists and theologians gathered to reflect on the theme of wonder in the natural sciences, of another ancient wisdom-book [Bowden 2009]:

A reminder of the oldest roots of wisdom might seem out of place as an answer to the problems posed by the developments of science and modern technology, but I believe that if we want, if not to resolve such problems, at least to take a correct approach to them, we must put them in a very broad perspective which embraces the most concrete and lowliest realities as well as the highest and most abstract ones. It seems to me that this perspective is that of the book of Proverbs, which speaks at length of the most common human conditions and finally of the life of the smallest and most common animals, and in which Wisdom herself says of herself that she was with the Lord at the beginning, before the creation of the world, which delighted in this creation and loves to stand with the sons of men (cf. Prov 8:22-31)

The passage Di Giorgi quotes is a delightful description of ‘Wisdom’ (*Sophia* in Greek, *hokhma* in Hebrew) as a little girl playing within the early epochs of the created world, as its order emerges in the form of land and sea, the depths and the heavens. The poem describes a wisdom that blends a deep contemplation of the natural world with a practical engagement. In a fascinating development that describes the experience of multiple perspectives in scientific and artistic negotiation of subject and object, Di Giorgi brings left- and right-hemisphere perspectives into focus when he describes the consequence of wisdom in science [Bowden 2009]:

The humility and commitment to daily work must be combined with an attitude of respect and attention to every branch of knowledge since in life everyone succeeds in informing themselves only on a limited number of subjects, but can and must love all of wisdom in the broadest sense of the word.

Embedded in Di Giorgi’s words, but also echoing through the longer comparative stories of creativity in picture, word and number, is also solid practical advice. Little of the radically new emerges from a narrow obsession or labour within established boundaries. There is value in broad, ‘interdisciplinary’ excursions, not only for their own sake, or for the benefit of recuperation, valuable though these are, but for the new patterns and connections that they offer for specific creative demands. Although the most distant connections require the deepest and longest incubation, even at the still-mysterious depths of the non-conscious, the long wait for their surfacing is worth the patience. For an early-modern articulation of the same vision we can turn to Newton’s contemporary, mathematician and theologian Isaac Barrow, who wrote:

He can hardly be a good scholar who is not a general one, for one part of learning doth confer light upon another’

The Book of Job has been a constant inspiration for thinkers of all traditions and in all centuries. Contemporary neo-Kantian philosopher Susan Neiman has recently even urged that Job be held alongside Plato as a foundational text for western thought [Neiman 2016]. Here Neiman sums up the tension between order and chaos in both the natural and moral worlds of Job:

As Kant would later put it, two things fill the mind with awe and wonder the more often and more steadily we look upon them: the starry heavens above me and the moral law within me. They are both awesome and wonderful, but entirely separate - the one stands for a cosmos described by the

Voice from the Whirlwind, a cosmos so vast and impersonal that it strikes down our self-conceit and makes us feel, as Job put it, that we are but dust. Yet the moral law within me, which Job so beautifully upholds in his darkest hours – he may wish he had never been born, but he never once wishes he had behaved anything less than righteously – that moral law reveals our power to step in and change a piece of the world if it seems to be gone wrong

The Book of Job, of all ancient literature, succeeds in articulating in timeless and plangent depth the difference between what human beings consider the world ought to be, and how they find it. Its response, in poetic dialogue of beautifully structured form, but of brutally honest content, has also shocked and offended many of its readers. One of its enduring puzzles is that, when God finally answers long-suffering yet righteous Job's complaints 'from the whirlwind', his Answer seems to by-pass the moral dimensions of Job's predicament, directing him instead with over 160 questions about the natural world. This extraordinary and influential text suggests that the answer to one of humanity's most severe and running moral problems is to be found in a theological natural philosophy. The encounter with aleatoric nature in this questioning and searching mode is, for Job, therapeutic. Perhaps this is the guiding narrative which brought in the great 20th century double Nobel laureate Marie Skłodowska-Curie to declare [quoted in Benard 1973 p. v]:

Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less.

A long tradition within the same worldview that encompasses the wisdom texts of Job and Proverbs is that, in some sense, humankind is created in *Imago Dei* – in the image of God – an idea whose hermeneutics have spawned an extensive literature, but which surely captures at its heart the fundamental urge and ability to create. Contemporary theologian Philip Hefner has developed a theology of 'co-creation' from this starting point, addressing the challenges of being 'citizens in the commonwealth of the natural world' [Hefner 1993]. The human ability to co-create lies, for Hefner, at the nexus of the evolving freedom of the world. The act is simultaneously constrained, or conditioned, by the past but embodies freedom to explore potential in the future. Creation assumes the moral value of choice in doing so. Hefner has a late-modern take on the disjointed relationship of humankind with the world, pointing out the dangers of a runaway technology of our own making that we are no longer able to control.

The story of a creator out of control of creation transports the discussion back once more to Job, for the hymn to wisdom and the voice from the whirlwind hold the balance of chaos and order in constant tension. The Book of Job's context of pain, and the shocking

implication from both of its great poems that humans may share in the perceptive and imaginative vision of God, hints at another aspect to *Imago Dei* – that we share not only the ability to create but also a related propensity to suffer. The pain of separation, of disjointedness with the world is the import of Job’s anguish. The immersing – one might say incarnational - experience of questioning engagement with nature that Job experiences in the whirlwind is by no means the end of his healing, but does signal its beginning.

Surprisingly, the theological lens through which the reflective thinkers of the 12th and 13th centuries looked on the questions of human predicament, creativity and purpose, projects those insights forward into our own age, resonating with searching philosophies of affect, while at the same time drawing on much older traditions of wisdom. It is no coincidence that ‘wisdom’ appears explicitly in the older names for science – ‘natural philosophy’ declares its love of wisdom, as we have noted, so that even secular thinking in universities today may legitimately draw on the reception of wisdom-tradition and the reflection on human teleology that a theological framing supplies.

3. Conclusions: A Natural Philosophy for Today’s Universities

I have urged in this paper a broader interpretation than, for example Maxwell [2012] of a renewed conception of natural philosophy within a contemporary academia and its public context. Within its own long history of thought and contemplation, drawing on tributaries from the ancient world, and from medieval thought, it offers much more than a philosophical framing and underpinning of science. Even this brief investigation has also been able to identify other implicit themes: a renewed account of creativity, an appreciation of the involvement of the human totality of affect and cognition in discovery and scholarship, an account of purpose, and an approach to the interdisciplinary unity of knowledge that retains an appreciation of disciplinary distinctness and power while providing narrative and methodological resources to erode the current barriers between them.

David Lowenthal [2019] has (posthumously) warned against a naïve quest for the ‘unity of knowledge’. He reminds us that thinkers from Gambattista Vico to Isaiah Berlin have claimed an incommensurability between the inner world of intention and value, and the outer cosmos of discernible physical law. Yet both the ancient wisdom of *The Book of Job*, and the modern insights into the multiple mutual couplings and connections between the human and the material declare this boundary to be more porous than this modern tradition claims. Physics indicates that the screen between observer and observed is an illusory one. Geography and

Earth Sciences provides us with the new realisation that the ancient wisdom that human behaviour has natural consequences, for good or for ill, applies. Neuroscience embeds our very thoughts, emotions and intentions into the matrix of the material, yet in the same stroke allows the attribution of emergent intentionality to matter.

Historian Michael Sadlier (and Lowenthal) suggest that ‘story has become the master metaphor for understanding everything ..., and thus for uniting the two cultures, the arts and the sciences’ [quoted in Lowenthal 2019, p. 195]. The blurring narratives of the sciences of matter, earth and mind are themselves examples of scientific stories that require humanistic framing to cohere. But perhaps the most fundamental shared narrative of all is the repeated story of the creative process itself, which threads through all scientific and artistic endeavour [McLeish 2019]. Telling each other our stories of vision for what might be but is not yet, whether this is the scientific understanding of a new field of nature or a work of art, searching for it within the debilitating constraints of our own misconceptions, ignorance and inabilities, conceiving of a new and fruitful approach, the long labour to its realisation – this is one of the great narrative plots of human experience. A natural philosophical approach to the sciences would recognise, rehearse and affirm the narrative experiences of research. As all narratives, it would value and vindicate the role of affective faculties alongside the cognitive in creation.

The high valency of the natural philosophy I have discussed would allow it to endow the sciences with resources that complete and connect across a much more united disciplinary landscape of academia. In addition to its natural narrative awareness, its theological and philosophical priors permit the richer discussion of teleology than an isolated faculty of science is able to do. This may draw on theological material, and I have claimed that even a through-going secular framework would legitimately do so. But it is equally possible to cast discussion of purpose in an anthropological setting [McLeish 2016]. Alister McGrath has recently proposed an alternative approach that takes the model of a developed interdisciplinary discourse between science and theology as a pattern of a ‘meta-rationality’ of multiple ‘territories’ of epistemology that yet supports a world of ‘ontological unity’ [McGrath 2019]. Tellingly, McGrath suspects that we will need to drop some of the assumptions of Enlightenment rationality to do so. As we have seen, it is precisely the concurrent early modern divisions of knowledge and wisdom, of cognition and affect, of the inner human and external material worlds – the sleight of hand that replaced these palpable dualities with enlightenment dualism – that need to be reconnected before a natural philosophy may flourish. But when it does it will embody the re-attachment of knowledge to both wisdom and love that its name signifies.

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Tom McLeish

University of York

orcid.org/0000-0002-2025-0299