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ORIGINAL ARTICLE

Prospects and pitfalls of science-engaged theology

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Abstract

This article discusses the prospects and pitfalls of science-engaged theology (SET) – a new and growing movement in the science and religion discourse. The guiding question of this enquiry is why, when, and how theology should engage with the sciences. After introducing what I call the 'source account' of SET that has emerged in recent discussion, I show that this basic account often comes with additional commitments: the 'no methodology' and 'locality and specificity' theses, both of which address the 'how' question, and the 'entanglement' thesis, which addresses the 'when' question. I argue that accepting any of them as an essential feature makes SET methodologically flawed. To provide alternative answers, I then propose to interpret the sources of theology in terms of the so-called *loci theologici*. Recognizing the sciences specifically among the *loci theologici alieni* also helps to counter the view that SET may spell the end of the discipline of science and religion. The aim is, therefore, to show that the source account of SET, if taken in a minimal sense, is a valuable contribution to the science and religion discourse, without replacing it, whereas SET, if coupled with these additional assumptions, would and has considerably muddied the waters.

Keywords: science-engaged theology; science and religion; science and theology; *loci theologici*

There is a new player in town. Despite assertions to the contrary,[1] it looks as though science-engaged theology (SET) is on the verge of becoming a new movement in science and religion, if not a school of thought or even a discipline. Mark Harris, newly appointed Andreas Idreos Professor of Science and Religion at Oxford, remarked recently that '"science-engaged theology" ... has risen to prominence with astonishing rapidity' (2024a, 15). Andrew Davison, formerly Starbridge Professor of Theology and Natural Sciences at Cambridge, now Regius Professor at Oxford, seems to agree when he notes 'the rise of SET to prominence ..., in only five years, from a topic of conversation among a few people over an evening drink to being the occasion for the main theology and science drinks and food reception at the [American Academy of Religion/Society of Biblical Literature] Meeting' (2022c, 1). And one of its forerunners, Joanna Leidenhag (2024a, 404), reports: 'By 2024, I estimate that hundreds of scholars and priests have been involved in these [SET] grants and, as a result, have reshaped their work and practice to more explicitly and consciously engage with scientific literature and methods and/or collaborate with working scientists.' In light of this apparent success, SET is at times even claimed to be a substitute for, and a successor to, the whole discipline of Science and Religion (S&R) (Leidenhag 2024a), or Theology and Science (T&S), as the discipline is also commonly labelled.[2]

In this article, I wish to discuss the prospects and pitfalls of SET. The guiding question of this enquiry is whether, when, and how theology should engage with the sciences. As I will show in section 1, much of the recent debate has been influenced by a proposal developed by John Perry and his coworkers. As part of this conversation, a basic account and definition of SET is emerging, or so I shall argue. But there are different interpretations of this basic account and definition. As I will show in section 2, the interpretation advanced by Perry and his coworkers displays not only strengths but also notable pitfalls, connected to their account of the sources of theology. In section 3, I shall therefore present an alternative proposal that builds on but also goes beyond their original proposal, based on an alternative account of the sources of theology. Section 4 finally addresses the question of how SET relates to the broader discipline of S&R.

The aim of this article is twofold. First, to offer a basic definition of what I call the source account of SET as a common starting point. Second, to distinguish different interpretations of SET thus conceived. While they fundamentally agree on why theology should engage with the sciences, they provide different answers to the question of when and how theology should engage with the sciences. The main thesis is that the influential interpretation offered by Perry and his coworkers, despite its strengths, risks making SET methodologically flawed, whereas if viewed differently, SET could be considered relatively uncontroversial.

What is science-engaged theology?

The concept of SET originated recently, in 2017, as a 'strategic priority' of the John Templeton Foundation (Leidenhag 2024a, 403). The objective was 'to advance efforts by theologians to substantively engage with the sciences in their research and inquiry about the divine and other spiritual realities' (cited in Leidenhag 2024a, 403). The concept of SET was subsequently given content by Perry and his coworkers in two Templeton-funded projects (Grant ID 59023 and 61508).[3] The term first appeared in print in an essay written together with Sarah Lane Ritchie (Perry and Lane Ritchie 2018), and was further developed and refined in works published together with Leidenhag (Perry and Leidenhag 2021, 2023, 2024), who have since gone on to elaborate and defend the position (Leidenhag 2024a, 2024b, 2025; Leidenhag and Göcke 2023).

Defining science-engaged theology

In their Cambridge Element, *Science-Engaged Theology*, Perry and Leidenhag (2023, 2) introduce SET 'to remind theologians that science ought to count among the sources of Christian theology'. The sources of theology they have in mind are primarily the so-called Wesleyan Quadrilateral (Perry and Leidenhag 2023, 50). According to this Methodist teaching, there are four sources of theology: (1) Scripture, (2) tradition, (3) experience, and (4) reason. Accordingly, theological statements need to be 'revealed in Scripture, illumined by tradition, vivified in personal and corporate experience, and confirmed by reason' (The Book of Discipline 2016, 103).

What, then, makes theology 'science-engaged'? Here is a suggestion:

> (SET_1) Theology is science-engaged if and only if science is, and is used as, an epistemic source of theology.

The source in question here is an epistemic source – and perhaps we can even specify the epistemic source as a source of theological knowledge, as I have suggested elsewhere

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(Kopf 2024, 2).[4] In any case, if science is an epistemic source of theology but is not used as such – if the source is not tapped into, as it were – it will not qualify as SET, nor will it count as SET if science is made use of but is not in fact a source of theology. Both are therefore necessary requirements: that science *is* an epistemic source of theology, and that it *is used as* an epistemic source of theology. I shall call this the 'source account' of SET.

Leidenhag (2024b, 5) considers (SET_1) to be one among five interpretations of SET. The reason for this claim is that Harris (2024a, 16–22) has pointed out a development in the way in which Perry and his coworkers have conceived of SET. In their initial publication, Perry and Lane Ritchie (2018, 1087–1088) speak of SET as analogous to (1) a *Swiss Army Knife*, which contains multiple well-defined tools for different problems, suggesting that SET comes into play whenever theological problems need multiple tools, including specific scientific tools. In their second publication, Perry and Leidenhag (2021, 247) introduce SET as (2) solving *theological puzzles*, by which they mean 'narrowly-focused theological questions that are already entangled with scientific theories and findings', suggesting that SET identifies such entangled questions which, again, require multiple tools to solve the theological puzzles, including specific scientific tools. In their Cambridge Element, Perry and Leidenhag (2023, 1, my emphasis) view SET as (3) 'a *reminder* to theologians that the local tools and products of the sciences ought to be sources for theological reasoning'.

In light of this, Harris (2024a, 22) concludes that there is an evolution of the SET movement in which

> the first [stage] suggests that SET uses the sciences as *tools*, the second sees the sciences as *sources* for the solution of specific theological problems, and the third subordinates the first two to the researcher's *mental attitude*: SET is now a reminder/disposition/mindset of the researcher as she uses the sciences as specific sources/tools for her theological work.

In view of this three-stage model, it might seem that the question of the sources of theology is only of transitory importance and non-essential to the SET movement. In other words, the source account of SET was proposed and advocated by Perry and his coworkers only in stage two.

Despite the outlined differences, however, there is a consistent and continued focus on 'sources' of theology, except in their earliest publication, where Perry and Lane Ritchie (2018, 1085) talk about Scripture, tradition, experience, and reason as 'principles of verification' instead – a terminology they later drop. Perry and Leidenhag (2021, 248) speak already of the sciences as 'a *source* for theology alongside Scripture, tradition, reason and experience', in line with the terminology used in their Cambridge Element and later writings.[5] What is more, even though they admittedly do not speak of sources in their first publication, the context is also and consistently the Wesleyan Quadrilateral, as the quotations above show. Therefore, (SET_1) appears to be an accurate rendering of SET, as envisioned by Perry and his coworkers. Put differently, the source account of SET is not just a transitory suggestion, as might appear from Harris's model of the evolution of SET, but the permanent core of SET as conceived by Perry, Lane Ritchie, and Leidenhag.

Five definitions of science-engaged theology?

Building on Harris's three-stage model, Leidenhag (2024b, 3–7) claims that by now five main metaphors have been proposed to define SET, suggesting that (SET_1) falls into option (iii):

(i) SET as a Swiss Army Knife
(ii) SET as solving theological puzzles

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(iii) SET as using science as a source for theology
(iv) SET as a mindset/mental attitude/disposition/reminder
(v) SET as a discipline

Harris's stages (1) and (2) correspond to Leidenhag's metaphors (i) and (ii), respectively. Leidenhag adds (iii) as a separate option, which Harris connected with (2), in keeping with the fact that the source terminology has, as pointed out above, been consistently used by Perry and his coworkers – and continues to be used especially by Leidenhag herself (Leidenhag 2024a, 2025). Harris's stage (3) is (iv), which Leidenhag contrasts with Harris's conclusion that SET seems to turn into a discipline for a few, rather than a mindset for many, if not all, theologians.[6]

Leidenhag (2024b, 3–7) now advances two claims: first, that metaphors (i) to (iii) are complementary. She reasons that while (ii) the puzzle metaphor emphasizes that the questions raised need to be local and specific, (i) the Swizz Army Knife metaphor shows that the answers must be found in an interdisciplinary manner. Speaking of (iii) sources of theology, she explains, is in turn meant to emphasize that the questions themselves are theological in nature. By contrast, she acknowledges that (iv) and (v) are in tension with each other, but argues that Perry and his coworkers have made increasingly clear that what they have in mind is (iv) and not (v): SET is meant as a task for all theologians asking relevant questions, and not simply for a few specialized ones – although it might for practical reasons require a few to specialize to help others in doing SET. In short, SET is a mindset, not a discipline. The second claim is that these five metaphors are 'definitions' of SET.[7] But a metaphor is not a definition. A metaphor cannot 'define' SET. At best, it serves to illustrate SET.

I take it that a better way of approaching the matter is as follows: (i) and (ii) are prominent metaphors proposed to illustrate the nature of SET. Although not being metaphors, (iv) and (v) are helpful to distinguish approaches to SET that would highlight that SET is relevant for theology in general or that it is only a specialized subdiscipline. By contrast, (iii) contains the actual definition of SET – at least of what I called the source account of SET. For this reason, I do not agree that (SET_1) should be grouped among five 'definitional metaphors' of SET – metaphors cannot be used as a definition – but is rather at least one way, and I would argue a broadly acceptable way, of defining SET. At least it is an accurate rendering of the influential source account of SET.

Now it might be objected that the suggested definition is too narrow, if we consider engaging with *philosophy of* science to be sufficient in some cases to count as SET. At least some science-engaged theologians would allow for such a philosophical mediation between theology and science.[8] The corresponding view of SET could be rendered as follows:

(SET_2) Theology is science-engaged if science is, and is, mediated by philosophy of science, used as, an epistemic source of theology.

Here, theology's engagement with the sciences would be indirect. Theology would engage directly with philosophy of science in order to indirectly tap into the source of science, so to speak. Although this engagement is thus mediated, the source of theology would have to be science itself. On the one hand, such a suggestion might look at first sight like a form of philosophy-engaged theology rather than science-engaged theology. On the other hand, engaging with some scientific insights might call for philosophical interpretation. In other words, theology might engage with the sciences in a mediated form: through the mediation of philosophy. Immediate SET would then be characterized by (SET_1), mediate SET could perhaps be characterized by (SET_2). To count as SET, however, (SET_2) would need to allow for the source still to be science in some relevant sense, even though mediated by philosophy of science. To allow for such mediated engagement with the sciences, we could stipulate the following basic definition:

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(SET_{1*}) Theology is science-engaged if and only if science is, and is (immediately or mediately) used as, an epistemic source of theology.

What emerges from the publications of Perry and his coworkers is then a general account of SET – the source account of SET – that can be variously illustrated. And (SET_{1*}) can be regarded as a general definition of SET thus conceived. In the following, I will focus on this source account, to address the central question of why, when, and how theology should engage with the sciences. I will do so in reverse order: how, when, and why. If SET is to be successful, it must provide a compelling answer to all of these questions. While there is some agreement on the why question, there is considerable disagreement on the when and how questions. In this context, I will identify three prospects and two pitfalls of SET.

Pitfalls of science-engaged theology

As we have seen so far, ostensibly, the concept of SET is meant to motivate theologians to interact with the sciences, to take science seriously and into consideration when doing theology, wherever appropriate. But there is arguably more to the introduction of the concept of SET into the S&R debate than meets the eye at first sight. There are further commitments that frequently come with the slogan of SET, at least as commonly conceived. I will now discuss them in some detail, to argue that if these commitments are considered an essential part of SET, they make SET methodologically flawed.

There are three additional theses that are often considered essential features of SET. The first and second theses address the question of how theology should engage with the sciences, while the third thesis addresses the question of when theology should engage with the sciences:

No methodology thesis (NM): SET must set aside questions of methodology, at least initially; if needed, a methodology can be developed *ad hoc* along the way.

Locality and specificity thesis (LS): SET must stay local and specific.

Entanglement thesis (E): SET is appropriate precisely in entanglement cases.[9]

Considering any of these theses as essential to SET is the first of two pitfalls I shall discuss.

The no methodology thesis

The no methodology thesis (NM) states that SET must set aside questions of methodology, at least initially; if needed, a methodology can be developed *ad hoc* along the way. In their initial publication, Perry and Lane Ritchie (2018, 1086) set up the very project of SET thus: 'But what would happen if we set aside methodology, just for a minute, and start with some particular claim that is at home in one or another specific subdiscipline, and then work out, as needed, points of methodology on an *ad hoc* basis. This would be Science-Engaged Theology.' And Davison (2022c, 2) confirms: 'a desire to demote matters of methodology to second place is perhaps the definitive hallmark of this approach'. Thesis (NM) includes two proposals: first, to set aside methodology and start engaging with the sciences without any explicit methodology, and second, to provide a methodology *ad hoc* if needed. But setting aside methodology in any explicit manner means adopting a methodology implicitly. For, arguably, one cannot do theology – or any other scientific discipline, for that matter – be it science-engaged or otherwise without any methodology altogether. And it

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seems preferable to acknowledge openly one's methodological commitments, especially in an interdisciplinary dialogue, rather than to assume a methodology implicitly without any reflection. What is more, if one acknowledges the general need for methodology, at least at some point, as even the *ad hoc* approach does, then it seems more reasonable to establish one's methodology in a reflected, coherent, and consistent manner, fit for purpose, and not simply *ad hoc* – which is not to say that some of the methodology cannot potentially be developed or adjusted along the way.

What Perry and Lane Ritchie presumably meant by (NM) is to suggest that we do not need to work out the general, abstract relation between 'science' and 'religion', or 'science' and 'theology', before we can engage in meaningful particular work on specific questions. The S&R discourse, Perry and Lane Ritchie (2018, 1089) claimed, would finally make progress if we 'temporally set aside questions of methodology and see where we get'. Their 'professed exhaustion with discussions of methodology' (Leidenhag 2024b, 21), however, has not been taken lightly in the debate. Carmody Grey (2021), Peter Harrison (2021), and Harris (2024a) – to name just a few – have all protested against thesis (NM), emphasizing that methodology and broader metaphysical questions cannot possibly be sidestepped, not even temporarily.

In reply to this criticism, Leidenhag favours a two-fold strategy. On the one hand, she claims that at least a 'granular view of methodological reflection has always been a part of science-engaged theology' (Leidenhag 2024b, 22). In other words, what needs to be set aside is not a fine-grained *ad hoc* methodology but a general and grand methodology. On the other hand, while acknowledging that the general and grand methodology of at least the particular sciences may affect the fine-grained outcomes of these disciplines, she suggests that a theology of science could remedy this drawback. Leidenhag's refined no methodology thesis could be stated as follows:

> *No methodology thesis (NM*)*: SET must set aside questions of *grand* methodology, at least initially; a *granular* methodology, *by contrast*, can be developed *ad hoc* along the way, *when needed*.

As the discussion below will show, however, methodology matters for SET, including the question of whether science is a source of theology, and especially how it can be used as such. This requires more than a granular methodology. Methodology matters, then, specifically for the interdisciplinary work SET is supposed to do, not least because we have to be clear on how we can use and appropriate scientific findings in theology. Methodology also matters for the interpretation of scientific findings – everything else would be a naïve engagement with the sciences. It goes without saying that every discipline, including the various sciences and theology, needs and operates with a specific methodology. And the methodology will affect its findings. When dealing with these findings, reflecting on the way these findings were obtained matters, not only in a granular but also in a grand manner. Methodology seems to be particularly relevant for a theology that aspires to be a systematically coherent and consistent reflection on the whole of reality. For these reasons, even setting aside 'only' a grand methodology but retaining a granular methodology will not work. Therefore, (NM) should neither be accepted nor built into the definition of SET. Nor does (NM*) seem much more promising, not least because the grand methodology will affect the specific questions asked as well as the findings, in both the sciences and theology. What is more, a granular methodology should ideally flow from, but be at least consistent with, the grand methodology. So, methodology cannot be sidestepped, not even temporarily – neither granular nor grand methodology. And it is at least an open question how a future theology of science is supposed to remedy all of this. Perhaps something like the following would be a more nuanced way of putting the matter:

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'No' methodology thesis (NM**): Not every particular engagement of theology with specific sciences on a local level requires a full-fledged grand methodology specifying the general relation of theology-as-such and science-as-such.

Be that as it may, the refined methodology thesis (NM**) would in fact not be a 'no methodology' thesis and would by no means imply a sidestepping of methodological issues in SET.

The locality and specificity thesis

The locality and specificity thesis (LS) states that SET must stay local and specific. SET 'forces theologians engaging with the sciences to stay local and specific' (Perry and Leidenhag 2023, 36). On the one hand, SET must stay specific: 'science-engaged theology must, by definition, always be specific' (Leidenhag 2024a, 402). Staying specific in this context means asking narrowly-focused theological questions. As Harris (2024a, 15) explains: 'SET is uncompromisingly theological and deals with specific and well-defined problems rather than the essentialised and grandiose claims of "science" versus "religion"'. On the other hand, SET must stay local. Staying local means here that in asking 'specific' questions, theology must engage with particular scientific disciplines in a small-scale fashion, in a highly 'localized' manner, to find concrete answers. Perry and Leidenhag (2023, 48) explain: 'When theologians engage the sciences, they cannot engage them all at once, nor even a whole sub-discipline (biology), perhaps nor even a sub-area of subdiscipline (mood disorders).' Or to use the words of Harrison (2021, 477), SET deals with 'bite-sized chunks of individual sciences'. Thus, Leidenhag (2024b, 8) concludes: 'the only way forward for theologians to engage the sciences is "to stay local and specific"'.

A focus on locality and specificity can certainly help in doing the work of SET. But the question is whether SET can afford to *stay* local and specific. I concede that as 'science-engaged' theology, SET may *start* local and specific. But I would contend that as 'theology' it cannot *stay* local and specific. Theology has a holistic task, reflecting on God and the whole of reality as it relates to, and is revealed by, God. Only part of this reality is accessible through science. Otherwise, SET would turn into scientism, to which proponents of SET vehemently object (Leidenhag 2024b, 16–19). SET may *paradigmatically* deal with specific and well-defined theological problems and seek answers by engaging with 'bite-sized chunks of individual sciences'. Such a commitment to a fine-grained activity, however, must not exclude a scientific, philosophical, and theological interpretation of these specific findings in light of this bigger picture, nor an integration of these localized and specific findings into an overall and holistic picture. SET may engage the sciences at a local level, but as part, and not at the expense, of a larger theological project. Otherwise, SET is in danger of turning into what Ignacio Silva and Gonzalo Recio (2025, 191) call a 'piecemeal' approach, 'solving particular and concrete theological puzzles without a greater theological project in mind'. Such a piecemeal approach without a theological rationale carries the risk of giving way to an eclectic bundle of particularized and atomized views that shows little coherence and consistency. In short, the methodological advice should read: 'start local and specific', not 'stay local and specific'.

Locality and specificity thesis (LS*)*: SET must* start *local and specific.*

But even turning this refined methodological advice into a necessary requirement seems too strong, as there are arguably cases of SET that we can approach differently. We should not exclude cases on methodological grounds that can, as it were, be approached top-down

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rather than bottom-up.[10] Nor should we exclude cases that address more general theological problems or need more than 'local' scientific insights in order to develop answers. Even the requirement to 'start local and specific' would then be too strong. Perhaps the following would work instead:

*Locality and specificity thesis (LS**): In doing SET, it may help to* start local and specific.

In any case, (LS) should not be considered essential to SET. We now turn from the how question, addressed in theses (NM) and (LS), to the when question.

The entanglement thesis

The entanglement thesis (E) states that SET is appropriate *precisely* in entanglement cases. Two interpretations are possible: SET is appropriate (i) *only* or (ii) *paradigmatically* in entanglement cases. Although I am not certain that Perry and his coworkers would want to commit themselves to (i), as they seem to allow for other appropriate cases as well, they appear to be committed at least to something like (ii).[11] As we noted above, they introduce SET as solving 'theological puzzles', which they define as 'narrowly-focused theological questions that are already *entangled* with scientific theories and findings' (Perry and Leidenhag 2021, 247, my emphasis). Perry and Leidenhag (2023, 57) then argue that entanglement cases can be of two kinds: (a) conjunctive entanglement, where the entanglement results from the conjunction of two or more non-entangled concepts from different disciplines; and (b) concept entanglement, where the entanglement stems from a single concept that entails a claim about another discipline, or claims about other disciplines. In the former case, the *claim* is entangled; in the latter case, the *concept* is entangled. The latter Perry and Leidenhag (2023, 13) define as follows: 'Entangled concepts are concepts that cannot be understood as either scientific or theological in meaning and origin, but only as both.' By contrast, conjunctive entanglement they define as cases of 'entanglement, where a claim requires the tools of more than one discipline to understand' (Perry and Leidenhag 2023, 57). Put differently, SET is appropriate precisely in the case of so-called entangled questions; that is, questions concerning (a) entangled claims or (b) entangled concepts. The argument is that if and to the extent to which theology deals with entangled questions, an engagement with the sciences is appropriate: 'whenever theologians make claims about … empirical realities, they should incorporate the insights of empirical investigation into their analysis' (Perry and Leidenhag 2023, 1).

Two points call for further discussion. The first concerns the distinction between (a) conjunctive and (b) concept entanglement. Although conjunctive entanglements may arise in at least some relevant cases, it is less clear under what conditions concept entanglements would occur. Perry and Leidenhag (2023, 57) explain that 'concept entanglement' means that 'the base concepts being used are entangled in multiple disciplinary conversations, even when they are (in any given moment) being used in a single discipline'. This seems to presuppose, however, that these base concepts have a univocal meaning, which is not necessarily the case. In fact, some of the examples they give for entangled concepts, such as 'matter' or 'person', seem to indicate otherwise; they do arguably not have a univocal meaning in the various disciplinary conversations in which the terms are employed.[12] At least some of these base concepts are used analogically or could even be used equivocally. If they have analogical meanings, then the entanglement cannot simply be assumed, but must be explicated; if they have equivocal meanings, then they refer to different and entirely unrelated things, so that there is no entanglement.

In addition, further complications may arise regarding the supposedly unambiguous meaning of terms used within a single scientific discipline to express scientific concepts and

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the potential dependence of their semantic content on scientific theories. First, one and the same term used at a given time in a single scientific discipline may express different scientific concepts. For example, although biologists largely agree on paradigmatic examples of species, they arguably operate with a variety of different species concepts. Consequently, the meaning of 'species' may vary depending on the species concept the term expresses. As a consequence, not only does the concept of species in traditional metaphysics or theology not easily map onto biological species, but the term 'species' may also express different species concepts that exist in biology itself. Second, and closely related, the meaning of the term expressing a scientific concept may change, or so some have argued, if the scientific theory to which it belongs changes. The question arises, for example, whether the term 'mass' means the same in Newtonian mechanics and in the special theory of relativity. Third, some have pointed out cases where even the reference of the term expressing a scientific concept changes when the scientific theory to which it belongs changes. For example, the term 'planet' in the Ptolemaic theory refers to the sun but not to the earth, whereas in the Copernican theory it refers to the earth but not to the sun. Some even went so far as to suggest that a strong dependence of the meaning or reference of scientific terms on the theories to which they belong leads to some sort of incommensurability of scientific concepts, theories, or traditions.[13] We need not go that far to see that there are probably some further questions that would have to be addressed in order to uphold the notion of concept entanglement in the sense of Perry and Leidenhag. The disputed question in philosophy of science as to whether the semantic content of scientific concepts, or the meaning (intension) of the terms expressing them, and perhaps even their reference (extension), depends at least in part on the scientific theories to which they belong, and related questions, seems to have a certain relevance here, in addition to the remarks made above. So, there is not only a question as to whether terms have the same meaning across different disciplines, but perhaps also as to whether and to what extent the meaning of central terms within a single discipline is variable and theory-dependent. Therefore, establishing concept entanglement needs more than showing a term to come up in multiple disciplinary conversations.

The second point concerns the very notion of entanglement. The concept of entanglement would seem to imply a two-way relationship or some sort of symmetry between the involved disciplines. If there are questions that are 'entangled', then there would seem to be a two-way relation: one is entangled with the other, and the latter is in turn entangled with the former. To understand entangled claims or concepts, then, theology needs other disciplines, and these other disciplines also need theology to understand these claims or concepts. But this need not be the case.[14] There could be cases, and arguably a considerable number of relevant cases, where the relationship is one-way only: to understand 'entangled' claims or concepts, theology needs other disciplines, but these other disciplines do not need theology to understand these claims or concepts. At present, it seems to be at least an open question how many cases would qualify as an entanglement, even in the sense of a conjunctive entanglement.

At least for the purpose of SET,[15] I suggest the notion of entailment is more helpful than the notion of entanglement. Entailment implies only that one discipline makes claims about, or uses concepts that have an entailment relation to, another discipline, or other disciplines. Some theological claims or concepts entail scientific claims; that is, have empirical implications. An engagement with the sciences might also be appropriate if scientific claims or concepts entail theological claims; that is, have theological implications. But in both cases, there may only be an asymmetrical one-way relation. It seems to me that such cases of entailment would suffice for SET.[16] If this broad picture about entailment is accurate, then thesis (E) is probably – depending on the interpretation – asking too much. There

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may indeed be relevant cases where there is not only an 'entailed' one-way but also 'entangled' two-way relation. But to count as paradigm cases, it would have to be shown that these are the majority of relevant cases. For this reason, (E) may turn out to be too restrictive, even if read as indicating (ii) a paradigmatic case, also due to unresolved questions surrounding the nature of entanglement. In any case, if (E) is understood to posit entailment as (i) a necessary requirement for SET, (E) is methodologically flawed: SET is appropriate not only in entanglement cases. Thus, we could reformulate (E) as follows:

> *Entailment thesis (E*)*: SET is appropriate precisely in *entailment cases, including (the more demanding)* entanglement cases.

It seems, however, that even showing that an alleged entailment (or entanglement) is in fact not an entailment (or entanglement) after all would qualify as SET. Consider, for example, the claim that the doctrine of original sin entails monogenism. Here a theological claim is said to entail a scientific claim. But what if the scientific claim is invalidated? Then we would either have to reject the doctrine of original sin thus conceived, as indicated by conclusion (3), or revisit the entailment claim, namely, premise (1) – assuming, for the sake of the argument, that (2) is sufficiently established on scientific grounds.

(1) If the doctrine of original sin holds, then monogenism holds.
(2) Monogenism does not hold.
(3) Therefore, the doctrine of original sin does not hold.

This argument could lead to a revisiting and reformulation of the doctrine of original sin. But it could also give reason to deliberate the entailment relation: is it a real or only an alleged entailment? That is, someone might argue, having studied both the theological doctrine of original sin and the science of the human origin, that original sin is compatible with both monogenism and polygenism. If this is true, then, even if it was initially assumed, there is no real entailment. By an engagement with the sciences, a supposedly entailed (or entangled) claim or concept would be shown to be only an alleged but not a real entailment (or entanglement) – be it that theology is thought to entail (or be entangled with) scientific claims or science (with) theological claims. At least concerning some topics, I would argue, it may take a considerable, if not deep, engagement with the sciences to determine whether a supposed entailment (or entanglement) is an actual entailment (or entanglement). Hence, I would argue that showing that a supposed entailment of a claim or concept does not hold, as well as the disentanglement of supposedly entangled claims or concepts, would count as SET. If this is so, then even (E*) would have to allow for more cases:

> *Entailment thesis (E**)*: SET is appropriate precisely in *real or alleged* entailment cases, including (the more demanding) entanglement cases.

But even this suggestion, one might object, appears to be too strong if we assume that scientific insights can concretize theological doctrine, as I will propose below. It could be that theology gains from the sciences by enabling it to spell out the details of certain theological doctrines, including the ones concerning God's creation or history. By consequence, the modes of engagement would be manifold, including cases where science merely supplies further details, without theological claims necessarily entailing scientific claims, or *vice versa*. Due to the above-mentioned unresolved difficulties, I suggest refraining from making thesis (E) an essential feature and part of the definition of SET, especially if entanglement is taken as a necessary condition of SET. Perhaps (E) could be replaced by (E*) or (E**), but even these broader requirements could turn out to be too restrictive, especially if we read

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them as a necessary requirement instead of paradigm cases. To avoid these difficulties, we could instead stipulate something along the following lines:

> *Entailment thesis (E***)*: SET is appropriate *at least* in real or alleged entailment cases, including (the more demanding) entanglement cases.

A first pitfall would therefore be to include theses (NM), (LS), or (E) in the definition of SET, or to regard them as essential parts of SET. None of these theses should be accepted. If the analysis is correct, then the how and when question must not be answered in terms of theses (NM), (LS), and (E). An alternative answer is needed.

Prospects of science-engaged theology

An alternative answer is possible, based on the same account of SET and building on the previous discussion. Should theology engage with the sciences; that is, should science count as an epistemic source of theology? And if so, when and how should it tap into that source? In answering the first and revisiting the second question, I will, at least initially, focus on the T&S discourse, rather than the S&R discourse, to which I will return in the final section. The discussion of SET, to state the obvious, is potentially relevant for those religions that have developed what could count as a 'theology'. More specifically, I will concentrate on Christian theology, as SET has originated in, and remains today mostly focussed on, Christian theology – although it could potentially be relevant for other theologies as well.[17] Thus I proceed to the first two of three prospects of SET.

The source account and its interpretations

On the source account of SET, the answer to the why question appears straightforward: theology should engage with the sciences because the sciences are among the epistemic sources of theology. But there are different views of what a source of theology is, how many there are, and why science is to be counted among the sources of theology.

A first proposal advanced by Perry and Leidenhag, as previously mentioned, is to interpret the sources of theology by means of the Wesleyan Quadrilateral. There are four sources of theology: (1) Scripture, (2) tradition, (3) experience, and (4) reason, and none of them is science. Rather than adding science as an additional source of theology, or identifying it with any of the listed ones, Perry and Leidenhag (2023, 50) dismiss the question of where science fits among the sources of theology as ill-formed. Doing so, they argue, would wrongly assume that sources of theology are 'discrete pots of information', that they are 'natural kinds'. For Perry and Leidenhag, there is no objective way of identifying the sources of theology. Consequently, Perry and Leidenhag (2023, 51) explain, 'our preferred answer to the question of where science fits among the sources is to say that sometimes it is helpful to view the sciences as an extension of one particular source, sometimes as implicated in all four Wesleyan sources, and sometimes as something a bit different from any'.

Thus, Perry and Leidenhag posit that science *is* a source of theology, without specifying what source it is. As such, they feel the need to motivate the *use* of the posited source. Perry and Leidenhag (2023, 49) argue that theologians ought to make use of science as a source of theology because doing so increases epistemic virtues such as coherence and consistency, but most of all empirical accountability. Empirically accountable theology, they claim, is '*better theology* … because the authors write in such a way that they can be held accountable' (Perry and Leidenhag 2023, 55). But theology can be held empirically accountable only for empirical claims, or claims that have empirical implications. Empirical accountability then means that when making empirical claims, theology is to be held accountable

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for these claims; that is, the relevant empirical facts need to be checked, and erroneous claims revised, in order to 'prune wrong or idolatrous ideas' (Perry and Leidenhag 2023, 54). To increase the virtue of empirical accountability, theology needs to engage with the sciences. On their view, then, theology should engage with the sciences because SET maximizes empirical accountability. This is why, on their view, science is needed in addition to the other sources of theology to increase the disciplinary, epistemic virtues of theology.

By contrast, I would like to suggest understanding the statement that theology should engage with the sciences because the sciences are among the epistemic sources of theology in terms of the *loci theologici*: theology should engage with the sciences because the sciences are among the theological places. There is a long tradition of considering different theological sources that has been formative for at least Western, and especially Catholic, theology: the so-called *loci theologici*.[18] What is important for the present purpose is not so much the original list proposed by Melchor Cano, but rather his distinction between proper and foreign theological places. Both are places where theological arguments can be discovered, or sources from which theological arguments can be derived. Whereas the proper theological places (*loci theologici proprii*) are places specific to theology, foreign theological places (*loci theologici alieni*) are places that theology shares with other disciplines. There are, then, sources of theology unique to theology, and other sources that theology shares with other disciplines. The former are theology's primary sources, the latter secondary sources; even though both are sources of theology, the proper are more central than the foreign theological places.

Now if, following Peter Hünermann (2003a, 207–51; 2003b) and in accordance with at least the argument I will present below, we include the sciences among the sources of theology, they must be a *foreign* theological place – a source of theology shared with other disciplines. Thus, we can specify:

> (SET_3) Theology is science-engaged if science is, and is (immediately or mediately) used as, a *locus theologicus alienus*, that is, an epistemic source of theology shared with other disciplines.[19]

The distinction between proper and foreign theological places is, I would argue, highly relevant for the contemporary debate. If the distinction is not made, it looks like specifying science as a source of theology somehow subsumes the sciences under theology, thus challenging their autonomy and independence. Making science a source of theology, it is objected, leads to an 'incorporation' or 'integration' of science into theology (Harris 2024a, 18). Leidenhag (2024b, 5) seems to agree with this objection, stating that 'theology provides the larger context within which empirical investigations are conducted'. Questioning the independence and autonomy of the sciences would result, however, only from placing science among the proper theological places, which is a nonstarter. Hence, SET, according to (SET_{1*}), especially if interpreted in the sense of (SET_3), does by no means imply, as Leidenhag (2024a, 402) claims, that, as a consequence of science being a source of theology, 'science-engaged theology sees all knowledge-seeking practices as in some sense already (proto-)theological'. If we qualify science as a foreign theological place, this claim is a *non sequitur*. What follows from (SET_{1*}), especially if interested in the sense of (SET_3), is only that other sources of knowledge are theologically relevant. Put differently, SET does not render other disciplines, including science, part of the discipline of theology, but maintains that other disciplines are relevant for the conduct of theology.

Above, I argued that to count as SET, science must *be* a source of theology and be *used* as such. If the sciences are introduced as a distinct source of theology, then the why question can be answered with reference to this epistemic source of theology. If the sciences

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are a place, although not specific to theology, where nonetheless theological arguments can be discovered, or a source, in common with other disciplines, from which theological arguments can be derived, then theology will profit from the sciences. For example, science may support a given theological conclusion by providing relevant premises, or it may help to interpret theological statements and derive correct conclusions from given premises, which may be adjudicated. In these and other ways, science can help theology in appropriate cases to develop sound arguments. The question, then, is not so much why make use of an epistemic source in appropriate cases, but rather why the sciences are an epistemic source of theology, and what the appropriate cases are.

By outlining these two models of the sources of theology, I do not mean to suggest that theses (NM), (LS), and (E) are a necessary implication of the Wesleyan Quadrilateral. Nor does the rejection of the criticized theses necessarily require an interpretation of the sources of theology in terms of an updated version of Cano's *loci theologici*. What I wanted to show is that, on the source account of SET, much depends on the interpretation of the sources of theology in question. And although I do not defend the *loci theologici* model here, but only present it as a potential alternative, some of the advantages of the *loci theologici* approach will become apparent as we proceed to discuss the prospects of SET.

Why should theology engage with the sciences?

A first prosect of SET is that it may help, or at least provide an occasion, to address the question of *why* theology should engage with the sciences. The why question hinges, as just pointed out, on the much-debated topic of the sources of theology, which in turn is embedded in the question of the nature and scope of theology in general, and specifically the relation and relevance of the sciences to theology thus understood. Admittedly, there is no single, commonly accepted approach to, and understanding of, Christian theology across the various theological traditions and denominations. Consequently, there is probably no single argument as to why the sciences need to be considered an epistemic source of theology and hence why theology should engage with the sciences. Rather, it is to be expected that different understandings of theology call for different arguments.

In reply to the question of why the sciences ought to count as an epistemic source of theology, different responses have been given. Some would refer to the metaphor of the Book of Nature, which is often contrasted with the Book of Scripture – both are, it is argued, given to us to read, interpret, and gain knowledge about God (Harris 2024b). Others would allude to the role of the whole of creation in coming to understand God. For example, Leidenhag (2024b, 1) writes: 'Science-engaged theology affirms the idea that the study of God (theology) must include the study of God's creation, as conducted by the natural and human sciences.' Karl Rahner (2005, 306) expressed a similar view: 'If as a theologian I inquire not about an abstract concept of God, … then absolutely nothing of what God has revealed as Creator of the world, as Lord of history, should be uninteresting to me.' Davison has attempted an answer in more Thomistic terms. He writes:

> If the task of theology is to consider *everything*, albeit under the aspect of its relation to God, then attention to the natural sciences will inevitably be part of theology's task, since the sciences offer a perspective on the nature of reality – on that about which we want to think theologically – for which nothing else can stand-in. (Davison 2022a, 19)

Traditionally, all of reality was considered a potential subject of theology, as its material object. The formal object of theology, the aspect under which potentially everything could be considered, was *sub ratione Dei* – that is, insofar as it is related to God. God is

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the primary 'object', or subject, of theology and everything else, insofar as it is related to God, its secondary object. To differentiate (revealed) theology from philosophy, which also reflects on how created things are related to God, one would then traditionally have added that philosophy advances by natural reason, but theology is based on divine revelation (which exceeds natural reason). Elsewhere, I presented the following argument for SET, in line with definition (SET_{1*}):

(1) The subject matter of theology is not limited materially but only formally, including God and everything insofar as it relates to, and is revealed by, God.
(2) The sciences cover materially part of the subject matter of theology, although under a different formality.
(3) Understanding the subject matter of theology under a different formality provides a source for theology.
(4) Therefore, to the extent that the sciences cover, and provide an understanding of, the same subject matter as theology materially, but under a different formality, the sciences provide a source for theology.
(5) If the sciences provide a source for theology, then theology should engage with them.
(6) Therefore, theology should engage with the sciences to the extent that they cover, and provide an understanding of, the same subject matter materially, but under a different formality. (Kopf 2024, 7)

The argument is based on the assumption that the subject matter of theology is not only God but also all of created reality insofar as it is related to, and is revealed by, God. The clause 'is revealed by God' is meant to clarify that theology, in contrast to philosophy (and other disciplines), is based on divine revelation. Such an understanding of theology implies that part of the subject matter of theology overlaps with the subject matter of the sciences materially, but not formally – the method of investigating the overlapping subject is notably different. The decisive point for SET is that at least some of the content of the sciences, despite their difference in methodology, is relevant to theology: science is a source for theology because it helps to concretize theological doctrine. Hünermann (2003a, 275, my translation) expresses the point well when he argues that the sciences, among other disciplines, are essential for theology and the act of, and reflection on, faith, to the extent that the reality described in these points of reference gives additional, concrete content to doctrinal statements: 'Only by including the reality of science and philosophy, society and culture, religions and history with their respective truths does faith prove itself in its *infallibilitas* as a *participatio* in God as first truth.'[20] And as such, science should be viewed as a source of theology – an epistemic source of theology shared with other disciplines. On this view, science is also a critical corrective for theology. If the sciences are employed to help concretize the content of doctrinal statements, then science becomes a critical corrective in the sense that points of inconsistency, incoherence, or simply a lack of applicability to experience more generally become apparent, allowing for the necessary adjustments.

On the source account, then, theology should, in specific cases, engage with the sciences because the sciences are an epistemic source of theology, and different reasons have been offered for why science should be considered a source of theology. If theology should, in appropriate cases, engage with the sciences because the sciences are an epistemic source of theology, the question arises as to when and how such an engagement is appropriate.

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When and how should theology engage with the sciences?

A second prospect of SET is that it may contribute to clarifying both *when* and *how* theology should and can engage with the sciences. We have seen that Perry and his coworkers have answered the how question in terms of theses (NM) and (LS), and the when question in terms of thesis (E). But we have also seen that these answers are problematic, for the reasons given above. In building on the previous discussion but also moving beyond these restrictive and questionable theses, it might as a first step help to take recourse to the relationship between faith and reason. If one holds that (a) faith and reason cannot contradict each other, and that (b) faith and reason complement, or mutually enrich, each other, then the task of SET will be both to (a) avoid contradictions and (b) seek complementation, or mutual enrichment, between theology and science – if, of course, theology is based on faith, and reason can be taken to include, or rather extend to, the sciences. Traditionally, the relationship of faith and reason was important to spell out the relation of theology and philosophy. But the sciences have historically developed from philosophy into distinct disciplines – and both are related to, and forms of the exercise of, human reason. What prior to the so-called Scientific Revolution would have been considered philosophy (or history) of nature, are now considered independent and separate disciplines. To reflect this change, Hünermann (2003a, 2003b, 207–51) has updated the list of theological places, now including among the foreign places not only philosophy and history, but also the sciences, as well as culture, society, and religions – rather than natural reason, philosophy, and history, as in Cano's original list. Be that as it may, the point is that the sciences are arguably also an exercise of human reason – acknowledging that reason itself is a complex phenomenon. Consequently, theology will have to engage with the sciences (a) *whenever* its consistency with the sciences is in question. This could be because theology faces a challenge arising from the sciences or because one wants to explore or actively show theology's coherence and consistency with the sciences. Theology will also engage with the sciences (b) *whenever* it seeks complementation, or mutual enrichment, either in form of the sciences complementing theology or theology complementing the sciences, or both. As John Paul II (1988) notes in a much-quoted statement, this mutual service could include, for example, a mutual purification along the following lines: 'Science can purify religion from error and superstition; religion can purify science from idolatry and false absolutes.'

There is another way of putting the suggested answer to the *when* question. We have established that according to (SET_{1*}) and (SET_3), theology should engage with the sciences because they are a source of theology, namely, a foreign theological place, that is, a source of theology shared with other disciplines. Above, I suggested that an engagement with the sciences is appropriate *at least* in real or alleged entailment cases, including potential real or alleged entanglement cases. Here we may add cases of concretization of theological doctrine, filling in, as it were, the details by recourse to the best of our scientific knowledge. Take for example the theological claim that God is the Lord of history. If I know nothing of history, the claim is somewhat empty. Likewise, if we state that God is the Creator of the world, but I know very little about the actual world, then the theological statement is shallow. These statements can be filled with content, however, by recourse to what we know about history and the world by means of other disciplines. Doing so will not only show harmony and complementarity between theology and these disciplines but also potential points of tension or conflict. For example, if one assumes the world to be less than 6,000 years but then, filling out the scientific details, learns that the world is billions of years old, an apparent conflict arises that needs to be resolved by reconsidering the theological or scientific side. Or, conversely, in understanding and filling in the details of an evolutionary view, one may see that it harmonizes well with a theological outlook – that it appears theologically fitting. Therefore, the appropriate cases of SET are arguably not

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even limited to real or alleged entailment cases. Rather, SET may be appropriate also in cases where specific theological and scientific statements are merely suggestive of each other; where they dovetail well, but, say, less with alternative views; in cases where there is no strong empirical or theological implication but only a weaker fittingness. For example, given a scientific assumption, a certain theological assumption might appear fitting, or *vice versa*. Although consistency and coherence are important, the connectedness between theological and scientific assumptions appears to be not merely based on entailments, let alone potential entanglements.

So, when is it appropriate to engage the sciences? According to the understanding proposed above, it is appropriate to engage with the sciences *at least* (1) when theological claims or concepts have real or alleged empirical implications, or scientific claims or concepts have real or alleged theological implications – be it that (a) theological claims or concepts entail, or merely appear to entail, scientific claims or concepts, or *vice versa*, in one-way relation, or perhaps even (b) that theological claims or concepts are somehow entangled, or merely appear to be entangled, with scientific claims or concepts in a reciprocal relation. But an engagement would also appear appropriate in cases (2) where the content of theological doctrine can be ornamented and amplified by scientific details, even before a link between theological and scientific statements may support or put into question the theological (or scientific) statement. And it is hard to predict and specify the exact ways in which connections between theological doctrines and scientific theories, between theological statements and scientific findings, may emerge. Yet, once these respective statements are brought into relation, the various cases can show areas of apparent conflict, to be resolved by reconsidering the results of theology or the sciences, but also areas of complementarity and (mutual) enrichment.

The crux of the matter is, of course, *how* to achieve such an engagement of theology with the sciences, which is a hard and daunting task. How might such an engagement take shape? Without going into further detail, I would at least like to distinguish between modes, levels, and depths of the science-engagement. As Silva and Recio (2025, 188–91) have shown, it is to be expected that there are a variety of modes of engagement as well as different levels of engagement. The *modes* of engagement may vary considerably, from shaping and informing the theological questions asked to various forms of shaping and informing the theological answers given. For example, the scientific dimension of the monogenism versus polygenism debate may shape the way the doctrine of original sin is approached, or how the theological question of original sin is raised, but it may also inform the theological answer given – for example, in form of a polygenetic revision of the classical doctrine of original sin. Both basic modes of engagement – that theology engage with the sciences (a) by letting the very questions it asks be informed, at least partly, by the sciences, and (b) by letting the answers be informed by the sciences – are, in principle, legitimate forms of engagement. The former mode may include reformulations of the traditional questions asked; the latter mode may vary from mere fact-checking and the avoidance of a contradiction between theology and science to concretizations or even development and reformulations of traditional doctrinal answers. As evidence of this complexity, Silva and Recio (2025, 189) use historical examples to draw attention specifically to cases in which an answer to a theological problem: is informed by, and at least partially drawn from, a scientific statement; is supported by a scientific statement, where the answer itself is initially drawn from other sources of theology; is comparatively related to a scientific statement (for example, by drawing analogies), aiming at a deepened understanding of at least one, if not both or all, of the relata; or involves further philosophical reflections about the nature, scope, and justification of the scientific statements under discussion. In many of those cases, it may help to start local and specific, without being restricted to locality and specificity. The *levels* of engagement can

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therefore range from local, to mid-sized, to grand levels. And all of these levels are legitimate levels of engagement. But methodology cannot be sidestepped, as argued above. And finally, the *depths* of the engagement at any level and mode of engagement can vary from a rather superficial to substantial engagements, as needed and fitting for the task at hand.

A further pitfall and prospect

Having discussed the questions of why, when, and how theology should engage with the sciences, I will finally turn to the question of how SET relates to the discipline of S&R. In doing so, I will add another pitfall and prospect to the discussion.

The replacement thesis

The second pitfall I will address is the idea that SET could somehow replace, and be a successor to, the entire discipline of S&R or T&S. In one of her most recent publications, Leidenhag (2024a, 408) argues that SET should be viewed not so much as a 'monastic order' within the church but rather as a 'reformation' of that church – as a substitution of that church by another, reformed church. The traditional church – the field of S&R – should be left behind because of 'deeply entrenched mistakes' – namely, the idea that 'we can easily identify what we mean by "science", "religion" and "theology"'. Leidenhag (2024a, 402) thus concludes that the development of SET will, in all likeliness, 'spell the end of [the discipline of] science-and-religion'.

Here is the rub with the replacement thesis. SET, in the sense discussed above, is immanent to, and arguably a form of, theology, and as such cannot be a substitute for the whole discipline of T&S, let alone S&R – a discipline that is much broader and richer. As I understand it, the discipline of S&R has been a melting pot of different disciplines, methodological approaches, and perspectives that are united to what appears to be a single field of studies by their shared interest in matters pertaining to science and religion. Appropriating the octopus analogy of Niels Henrik Gregersen (2014), Harris (2024a, 26–27) describes the nature and status quo of S&R thus:

> The arms of the octopus stand for the many disciplines and sub-disciplines within the science-and-religion field including ... SET. (There must be many more than eight arms.) The head of the octopus – which obviously holds the arms together and organises them – represents the trans-disciplinary concerns of the science-and-religion field, along with its self-reflective activity on its aims and objectives, or, in other words, everything that allows the field to maintain its sense of self and coherent identity.

The main disciplines (which Harris states are more than eight) include at least history (particularly history of science, history of religion, but also what is now considered history of science and religion), philosophy (particularly philosophy of science and philosophy of religion), the study of religion, or religious studies, theology, and the various sciences.

If this broad picture is roughly accurate, then SET cannot stand in for the whole discipline of S&R. SET is a theology-centred approach. What about the other disciplines?

Let us start with the sciences first. SET may help to clarify the relation of the sciences to (Christian) theology. But precisely because SET relates the sciences to theology – namely, as a source of theology – it leaves unresolved the involvement of other disciplines of the S&R discourse, including history and philosophy. Moreover, if the distinction between entailment and entanglement is valid, it might not even affect the relation of theology to the sciences.

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Some would see *theology-engaged science* as a counterpart specifying this relation. But it is by no means clear that either theologians or scientists could possibly be happy with such a specification: even though science may be a source of theology, it is highly doubtful that theology is a source of science. Science (in the modern sense) cannot be based on revelation; science may indeed profit from an engagement with philosophy or history (of science), but not in the same way from (revealed) theology. But even if one were to disagree about this point, SET would arguably still qualify the relation between theology and the sciences one-way. Otherwise, no complementation would be needed. Thus, SET appears as part of a bigger picture.

Others have suggested *theology of science* – analogous to the disciplines of philosophy of science, history of science, and so on – as a helpful way forward. This suggestion raises the question of what presuppositions and commitments of science cannot possibly be shown by the history and philosophy of science? Admittedly, various philosophical presuppositions and commitments are built into scientific theorizing, and historically, even theological assumptions were used in the 'sciences'. But the philosophical presuppositions and commitments are elaborated in the philosophy of science, and the historical as well as the theological presuppositions and commitments are shown in the history of science. The question, then, is what genuinely theological presuppositions and commitments are today part of science, of the very way in which scientists do their job *qua* scientists, that are not subject to the history and philosophy of science? In any case, theology of science also does not specify as such the relation of theology to philosophy, history, and other relevant disciplines.

Turning to history and philosophy, then, precisely because the reappraisal of the history has been so successful and thorough in the field of S&R, it is important to keep alive this dimension of the interdisciplinary discourse. History has been an essential part of S&R and should continue to be so. But by its very specification, SET relates the sciences to theology, thereby setting aside other disciplines traditionally part of S&R. SET has had little to say about the historical disciplines and cannot possibly take over their vital task.

What is more, advancing the claim that SET will replace the S&R discourse is peculiar, considering that the background of SET is deeply connected with the history of science and religion that is an integral part of the very S&R discourse that SET is supposed to end. To understand the replacement thesis – and Leidenhag's accusation that the field of S&R is plagued by 'deeply entrenched mistakes' – it is helpful to highlight a certain 'anti-essentialist turn' in the S&R debate. The very concept of SET has its roots in Harrison's (2015, 2022) influential *historical* thesis that the central terms of the debate – namely, 'science', or 'theology,' and 'religion' – are not analogous to natural kinds. If their meaning has substantially changed, however, and the terms are now in danger of concealing the different activities associated with and denoted by them, this makes absolute claims about the relation of science and religion, or theology and science, historically dubious. To avoid typologies of the relation of science and religion committing this fallacy, then, SET is proposed as a way forward. Instead of asking about the absolute relation of 'science *and* religion', or 'theology *and* science', the task for S&R scholars, at least the theologians among them, is said to be to *engage* with specific sciences.

Although this proposal may indeed change the focus of the specific work done, the concept of '*science*-engaged *theology*' still relates *science* to *theology* – namely, I argued, as a source for theology – thus positing and presupposing that there are methodologically distinct disciplines or well-defined entities – 'theology' and 'science', or rather, as proponents of SET would not cease to emphasize, 'the sciences' – one engaging the other(s). It does so especially in a localized form, relating local scientific explanations to specific theological explanations. But if science(s) and theology are an essential part of the project of SET, then

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even '*science*-engaged *theology*' can be essentialized, just as '*science* and *theology*' – or '*theology* of *science*', for that matter – can be essentialized: even in 'science-engaged theology', 'science' and 'theology' could be understood as analogous to natural kinds. But they need not be essentialized. The various labels and approaches do not as such commit one to an essentialist or an anti-essentialist position. Other grounds, including history and philosophy, are needed to decide the question.

Therefore, the proposal of SET arguably does not *by itself* prevent what Leidenhag takes to be the deeply entrenched mistake of S&R – nor can it even by itself raise the issue. To put it in the words of Leidenhag, if the mistake is to assume that 'we can easily identify what we mean by "science", "religion" and "theology"', at least transhistorically, this would mean not only that we cannot easily identify the relation of science and religion, or theology and science, but also that we cannot easily identify what SET is, at least transhistorically. Hence, if we cannot speak about 'science and theology' across history, then we could also not speak about 'science-engaged theology' across history. But one could assume otherwise and thus commit the same mistake – assuming, of course, that it is a mistake. The question, however, of whether or not the basic terms are analogous to natural kinds needs to be determined and solved on other grounds, including historical analysis, which is not part of SET.[21]

And turning to philosophy, like in the case of history, SET has had little to say about philosophy, and it is hard to see how SET could possibly take over this task – unless one deems the role of philosophy replaceable. What is left unspecified by all the above-mentioned proposals is the explicit role of philosophy in the S&R discourse, thus perpetuating the underrepresentation of philosophy that has at times plagued the debate.

Therefore, SET cannot possibly replace S&R. If it were to end the S&R discourse as we know it, something essential would be lost, including the vital historical and philosophical dimensions of the debate. If SET has value, it does so as a theological discipline. As such, SET should be seen as part of, and a contribution to, the bigger field of studies of T&S or S&R.

Science-engaged theology as a contribution to the science and religion discourse

A further benefit of the approach in terms of the *loci theologici* is that it guards against disregarding the relative unity of the foreign theological places, thus helping us to see the place and role of SET within the wider debate. Doing so also holds the promise to make progress in the field of T&S or S&R more generally. The way forward, in my view, is not for SET to replace the field of S&R, but by considering SET as a *theological* contribution to the interdisciplinary field that emphasizes the connectedness of theology not only with the sciences in all their variety but also with the foreign theological places more generally, including philosophy and history – and potentially also other fields listed above, such as the study of religions, society, or culture. Such a move should be seen as an integral part of, and be embedded in, the T&S or S&R discourse.

SET is a form of *x*-engaged theology, where *x* denotes the source that theology taps into, or the place where, or source from which, theological arguments can be discovered or derived. A theology that uses science as a source of theology can then be called SET, just as a theology that uses Scripture as a source of theology could be called Scripture-engaged theology – the difference being that the former would tap into a foreign theological place, while the latter would tap into a proper theological place.

The interpretation of these sources in terms of the *loci theologici* may serve as a reminder, on the one hand, that although science is among the sources of theology, it is, as a foreign theological place, not among the primary sources of theology. SET should thus be embedded in, and seen as a part of, a form of theology based on other theological sources, especially the proper theological places. Analysing SET in terms of the *loci theologici* thus helps to show that even though science is and should be recognized among the sources of theology, it is

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not among the first and most important theological sources. Science is embedded in a web of theological sources, and at least all the proper theological places would come first in hierarchy. In other words, science can never be the sole or even main source of theological theorizing. And history can also remind us that including the sciences in theological modelling can cut both ways. Much of the 'science' of the past – be it science in the modern sense, or what was back then considered philosophy (or history) of nature – is dated. What was back then considered support for a theological position may now, if the connection was too tight, be seen as weakening or distorting it. For this reason, Silva and Recio (2025, 191) emphasize the importance of embedding appropriated scientific findings properly: an engagement with the sciences specifically on the local level should be part of, and integrated into, a larger theological project that is rooted in, and tapping into, sources other than the sciences, namely, particularly the proper theological places unique to theology.

SET interpreted in terms of the *loci theologici* is a reminder, on the other hand, to see SET connected with all the other foreign theological places, including philosophy and history. To do SET properly, it must be in line not only with theology in general, but also with philosophy-engaged and history-engaged theology. History and philosophy – to name just two foreign places – form a relative unity as foreign theological places. As pointed out above, in the S&R discourse, history has featured prominently, while philosophy perhaps less so, at least in certain theological traditions. But both are important and vital dialogue partners for theology as well as the sciences. Considering the role philosophy and history can play in the engagement with the sciences might help to sharpen the focus of SET. The concept of foreign theological places may therefore help to refocus the current debate, by indicating the importance not only of the sciences, but also of history and philosophy, and all other disciplines to be counted among the foreign theological places. Thus interpreted, SET serves as a reminder to take into consideration the foreign theological places, including science, philosophy, and history, not only in isolation but also in their entirety. Whether the label 'SET' proves helpful in this endeavour, the future will tell.

Conclusion

In this article, I have discussed the source account of SET, offering both a basic definition and an argument in support of it. I have highlighted some prospects of SET, thus understood, but also indicated considerable potential pitfalls that will become acute if the no methodology thesis, the locality and specificity thesis, and the entailment thesis, which we should dispense with, are made an essential part of SET. Making these additional theses, as well as the replacement thesis, a part of SET would and has considerably muddied the waters. Without these additions, however, and with some modifications, SET is arguably a valuable contribution to the T&S debate, but in no way a substitute for the discipline of S&R.

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Notes

1. In their monograph on SET, Perry and Leidenhag (2023, 8) insist: 'Rather than a school or method, science-engaged theology is a mindset which any theologian of any camp or tradition could (and we think should) adopt.' Likewise, Leidenhag (2024b, 1) insists that 'science-engaged theology does not seek to become institutionalized into a new area of study or special interest group. Nor does science-engaged theology claim to be a school of thought localized to the pre-existing community of science-and-religion scholars.'
2. Although the labels are often used interchangeably, I will generally use the label 'S&R' to refer to the whole discipline, and 'T&S' when focussing on theology. In one sense, I take the term 'T&S' to be more accurate, as both science and theology could, in very broad terms, be described as a (theoretical but also practical) reflection on, or

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study of, nature and religion, respectively. Religion, by contrast, as commonly understood, has far more practical implications. Religion could be practiced, at least in principle, although probably not in practice, without much theological reflection. For this very reason, however, 'S&R' appears to be the broader term, as religion, and the study of religion, is arguably broader than theology. To bring 'science' and 'religion' to the same reflective level, as is the case with 'science' and 'theology', the discipline could be renamed 'science and the study of religion' or something similar, but that would be an uncommon and impractical label.

3. For more details on the origin of the SET movement, see Davison (2022c).

4. Based on Perry and Leidenhag's work, and assuming that the epistemic source of theology in question is a source of theological *knowledge*, I have suggested the following basic definition of SET: 'Theology is science-engaged if and only if science is, and is used as, a source of theological knowledge' (Kopf 2024, 2). Although Perry and Leidenhag (2023, 51) agree that the sources of theology are 'sources of knowledge', in the present context I will instead speak more generally of (epistemic) sources of theology in order to emphasize the basic source account of SET. To be clear, Leidenhag (2024b) responds to my previous rendering of SET, not to (SET_1) as specified in the main text. But the difference is not relevant for the following analysis.

5. Perry and Leidenhag (2023) variously state that in SET, the sciences, or 'the local tools and products of the sciences', ought to be (used as), count as, or are (among the), 'sources for theological reasoning' (1), 'resource[s] for theological reflection' (1), 'theological source[s]' (2), 'sources of Christian theology' (2), 'source[s] in theology' (4), 'source[s] for theology' (6), 'sources of theology' (7), 'source[s] for theological research' (15), 'source[s] for theological insight' (35), or 'sources of theological reflection' (63). Up to her most recent publications, Leidenhag continues to speak of sources: 'Science-engaged theology sees other disciplines – their practices, discoveries and methods of discovery – as sources for theological reflection' (Leidenhag 2024a, 402). 'Put another way, science-engaged theology is about using the natural and psychological sciences (but not only these) as a source for theological reflection and practice' (Leidenhag 2024a, 404).

6. Harris (2024a, 22) remarks: 'While Perry and co-workers never appear to acknowledge this evolution in their publications, nevertheless there is a clear movement discernible, from an objective to a subjective understanding of SET, and away from any sense in which SET might entail firm methodological principles. I suggest, therefore, that what Perry and co-workers have moved towards, in fact, is a construal of SET *as a discipline*, by which I mean a community of like-minded scholars.'

7. Leidenhag (2024b) variously speaks of 'five main metaphors … used … to give a clear definition to science-engaged theology' (3); 'metaphor[s] for defining science-engaged theology' (4); 'metaphor[s] with which they define science-engaged theology' (4); 'definitional metaphors' (5). Leidenhag (2024b, 6) then goes on to suggest that the five metaphors 'give further definition to science-engaged theology', which, she claims, can be generally defined as 'theology which engages the work of natural and human scientists'. Whatever exactly is meant by 'giving further definition to' SET here, her general suggestion will not do as a definition of SET. The suggested definition is tautological, as Leidenhag seems to acknowledge herself. Her suggestion boils down to: science-engaged theology is theology that engages with science. The question, then, is what is meant by 'engaging' here? What sort of engagement? Presumably not all conceivable sorts of engagement – such as, for example, simply reading scientific works (without further taking them into consideration) – would qualify as SET.

8. Consider, for example, the Templeton-funded SET project 'Building Foundations in Science-Engaged Theology: Insights from Philosophy of Science' dedicated to the philosophy of science (Grant ID 61582). Davison (2022b, 241) speaks of the possibility 'to approach science through philosophy of science'.

9. My formulation of thesis (E) is admittedly ambiguous. Saying that entanglement is a necessary condition for SET would probably overstate the case. Perry and Leidenhag (2023, 63) present entanglements as 'starting points', which they supplement with another thesis: *Empirical accountability thesis* (EA): SET must be empirically accountable. Addressing the how question, Perry and Leidenhag (2023, 54–57) view SET as an invitation to theology to be 'risky', by making empirical claims, and ideally specifying their success criteria, for which it is then held accountable. Because, as we shall see below, empirical accountability is regarded as an epistemic virtue of theology, SET must be empirically accountable: whenever empirical claims are made, the relevant empirical facts need to be checked. Are the empirical claims that SET makes, and ought to make, correct? Perry and Leidenhag conceive of SET as a form of theology that is attentive to, and increases, cases where it makes claims about empirical reality. 'Pruning theological ideas with empirical accountability' (Perry and Leidenhag 2023, 57) is here the objective. At one point, Perry and Leidenhag (2024, 290) state that 'entanglement is about maximizing accountability'. The question of how to interpret thesis (E) depends on the relation of entanglement and empirical accountability. If (EA) is parasitic on (E) in the sense that theology maximizes empirical accountability either by making entangled claims or by expanding on entangled concepts, then being 'risky' may provide an additional answer to the how question, but is no alternative strategy to entanglement as far as the when question is concerned. But perhaps thesis (EA) should instead be interpreted as referring to, or at least including, the kind of one-way relation that I will discuss

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below: theological claims entail, but are not entangled with, empirical claims. If this is so, then (E) cannot be formulated as: SET is appropriate *only* in entanglement cases. Rather, entanglements would be paradigm cases of SET: SET is appropriate *paradigmatically* in entanglement cases. Below I shall argue that thesis (E) is methodologically flawed in the first rendering, but also appears too strong in the second rendering.

10. For example, in the Divine Action Project, various specific theological questions about the possibility of divine action in the world were asked in conversation with local scientific theories, especially theories in quantum physics and chaos theory. But there was arguably too little conversation about the notion of causation operative in these different disciplinary discourses. If the fine-grained analysis is not informed by a reflection on the general assumptions and commitments of each discipline, and their methodological relationship, then the fine-grained analysis can go astray. But if, as SET proponents rightly criticize, we only speak about the general relationship of disciplines such as theology and science without analyzing and learning from specific and localized cases, then the methodology remains abstract and sterile. Therefore, top-down and bottom-up approaches should inform each other. Which approach is preferrable in a given case will depend, at least in part, on the subject. Sometimes it will be better to start from general principles and apply them to specific cases, in other instances to start from specific cases and derive more general principles.

11. See footnote 9.

12. Elsewhere, I gave the following example to make the point: 'To stick with their example, the question of why and in what way understanding the concept of matter in theology or metaphysics, where it commonly signifies potency, requires the tools of, say, physics, where the same notion basically refers to stuff, needs elaboration. Or why exactly does understanding the notion of person in, say, Trinitarian theology require the tools of, says, psychology? But not only do these analogical cases need further clarification, but potential equivocal cases would also have to be excluded. For example, although the notion of bat is used in different disciplinary conversations – for example, in sports and biology – it is unreasonable to assume that the concept of bat in biology is relevant in understanding the notion of bat in sports; the tools of biology are irrelevant here because the notion of bat is used equivocally. In short, the fact that a term is used in multiple disciplinary discourses is not enough to establish [a concept] entanglement; the meaning of the employed term matters' (Kopf 2024, 17 fn. 10).

13. The question of the semantic content of scientific concepts, or the meaning of the terms expressing them, arises especially in connection with the incommensurability vs commensurability debate in philosophy of science. According to Cheon and Machery (2014, 507–508), the main options are as follows. The semantic content of scientific concepts (a) 'stands in a bijective relation with the class of inferences whose premises or conclusions involve that concept (what we will call "concept use")', (b) 'supervene[s] on their use', or (c) is 'entirely independent of their use'. They then argue that the controversial incommensurability thesis follows only in the case of (a), but not in the cases of (b) and (c). Or, alternatively, one could 'grant that the semantic content of scientific concepts changes when scientific theories change while insisting that commensurability and progress simply require stable reference despite conceptual change' (Cheon and Machery 2014, 524 fn. 2). The incommensurability thesis states, roughly speaking, that 'when scientists are committed to different scientific theories ..., they mean different things or have different concepts despite using the same terminology' (Cheon and Machery 2014, 507). For example, despite the fact that 'mass' and 'space' are central terms in both classical mechanics and relativity theory, they would mean different things, or express different concepts. And these views appear to be incompatible, as Oberheim and Hoyningen-Huene (2024, sect. 3) elaborate: 'Either objects have an absolute mass and move in space that is inert, or objects have a rest mass and a relative mass and move in space that can bend and stretch.' For a discussion of different versions of incommensurability, see Oberheim and Hoyningen-Huene (2024). I thank Ignacio Silva for referring me to this debate.

14. As I noted elsewhere, as a counterexample, 'primary analogates do not depend on secondary analogates the way secondary analogates depend on primary analogates. To understand that medicine is "healthy" one needs to understand what a "healthy" living organism is, in reference to which medicine is called "healthy", but to understand what a "healthy" living organism is, one need not necessarily understand what "healthy" medicine is. The relation here is asymmetrical. Medicine is called "healthy" in relation to, and as a cause of, the health of a living organism. In such cases, one discipline may need another discipline to understand a given concept, but the latter does not need the former to understand that concept in its own discipline' (Kopf 2024, 16–17 fn. 10). If (E) is interpreted in the strong sense, as entanglement being a necessary requirement for SET, then showing that there is at least one relevant case that is not entangled suffices to reject thesis (E). In the weaker sense, taking entanglement not as a necessary requirement but the paradigm case, the question would be whether these cases are actually paradigm cases. As noted in footnote 9, I primarily object to the strong sense, but would also welcome a further clarification of the notion of entanglement before positing it as paradigm cases of SET.

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15. The concept of entanglement is at times used to connect 'science-engaged theology' and 'theology-engaged science'. For that particular purpose, entailment might be too little. But as I will mention below, I do not approve of theology-engaged science, and so entanglement need not play this function.
16. As noted in footnote 9, perhaps this is what Perry and Leidenhag have in mind with what I called their (EA) thesis.
17. That said, other faith traditions have also joined the conversation. Malik (2023) reports about Islamic SET and Tirosh-Samuelson (2023) about Jewish SET. Notwithstanding these developments, the main work to date has focussed on Christian theology.
18. For a more detailed discussion of the *loci theologici* in the context of SET, see Kopf (2024).
19. To allow for other possible interpretations of 'sources of theology', I formulate (SET_3) in terms of sufficient (if) but not necessary and sufficient conditions (if and only if): at least positing science as a *locus theologicus alienus* satisfies the conditions set out in (SET_{1*}). In Kopf (2024), I tried to show that this proposal is broadly consistent with Perry and Leidenhag's vision of SET.
20. 'Nur durch die Einbeziehung der Realität von Wissenschaft und Philosophie, Gesellschaft und Kultur, Religionen und Geschichte mit ihren jeweiligen Wahrheiten erweist sich Glauben in seiner *infallibilitas* als *participatio* an Gott als erster Wahrheit.'
21. If one were to reply that SET is meant to specify the relation of science to theology only in the here and now, not transhistorically, then I would reply that, in principle, the same could be assumed for 'theology and science' – which is not to say that scholars have done so in the past. The difference between 'and' and 'engaged' in 'science *and* theology' and 'science-*engaged* theology' does not change the fact that both relate two entities – namely, science and theology. If the fallacy is to assume that 'science' and 'theology' are analogous to natural kinds and that we cannot speak about their relation transhistorically, then this applies to both 'science-engaged theology' and 'theology and science'. And if the fallacy is that we cannot 'easily identify' what science and theology are here and now – which, by the way, would be a much more radical thesis that I did not want to ascribe to Leidenhag above, although she could be read in this way too – then it also applies to both cases. Although in the latter case it would be difficult both to identify what SET is and to practise it if we did not know what theology and science are here and now. I thank Ignacio Silva for raising this objection.

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