UNIVERSITY OF CALIFORNIA,
IRVINE

Methods in Religion-and-Science

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Philosophy

by

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Dissertation Committee:
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2024

TABLE OF CONTENTS

LIST OF FIGURES

ACKNOWLEDGMENTS

Some seven years ago, I enrolled in an STS seminar on science and pseudo-science. It was led by Kerry McKenzie. I arrived to the first day of class late, having missed the bus due to falling for a scam call and having to run some mile and a half to campus. Bursting into the room, red with embarrassment (and some exhaustion), I found that I had missed the usual introductions and so was asked to share my research interests. Luckily I had a ready reply: I was mostly interested in quantum ontology. After my breathless ten-second answer Kerry asked, "And don't you also have interests in science and religion?" Such had never occurred to me! But bewildered, nervous, and very much feeling the pressure of being both the only undergrad and the only late student in the room, I quickly agreed.

Looking back, I can't help but be impressed by the parallels between this one encounter and my journey through graduate school—and by my blindness. If when I had started my grad school journey someone had told me that I would write a dissertation on religion-and-science, I would not have believed them. As a first-year grad student, I knew exactly what I knew in that seminar: I was interested in quantum ontology and that's what I would write about. Or if not that exactly, then something at least in the realm of philosophy of physics! Never could I have imagined pivoting to religion-and-science.

But here we are. This dissertation, of course, does not concern quantum ontology; it concerns religion-and-science. I won't detail the twists and turns of my research trajectory here, but I must acknowledge that the shift was not due entirely to me—there were many who guided and supported me along the way.

Perhaps chief among those was Jeremy Heis who, when confronted by a rather grumpy third-year agreed to supervise a dissertation on a topic with which neither he nor I had much familiarity. Despite that, Jeremy was, as with seemingly any topic, a veritable treasure trove of useful suggestions and deep insights. I am especially thankful for his kindness and support throughout an incredibly (and yes, I use that term specifically!) difficult time in his life.

I also want to thank the other members of my committee—Lauren Ross, Pen Maddy, and Renee Raphael. These brilliant women opened innumerable opportunities for me and provided much-needed advice and guidance.

Producing this dissertation, of course, took more than academic guidance. I would not have made it through my time at UC Irvine without the supportive community I found among the Philosophy and LPS grad students. I want to especially acknowledge my cohort: Jason Chen, Margaret Farrell, David Freeborn, Nathan Gabriel, Saira Khan, David Mwakima, and Jingyi Wu. These seven philosophers were the strongest bond which kept me in grad school—and helped me through it. Many others gave me strength (and sometimes food) along the way including Elliot Chen, Matthew Coates, Jessica Gonzalez, Kevin Kadowaki, Rebecca Korf, Charles Leitz, Curtis Mason, Helen Meskhidze, Chris Mitsch, Stella Moon, Jeffery Schatz, Ellen Shi, Nick Smith, and Evan Sommers.

Joshua Norton was especially instrumental in turning my vague interests in religion-and-science into something more. Sorry for sneaking into your office without knocking.

Others I also want to thank include Seth Hart for randomly popping into my life and being a wonderfully kind human being to an atheist like me; Stefano Bigliardi for discovering my appreciation of goats and opening door after door for me in the realm of new religious movement studies; Brianne Donaldson for her encouragement and kind counsel; Mike Fortun and Mei Zhan for helping me see that I should have been an anthropologist; and Brian Frastaci and Robert Butchko for finding me and finding the time to read with me—our little reading group has significantly shaped this dissertation. Special thanks go to Kerry McKenzie; she has had a much greater impact on me than I suspect she knows.

And of course none of anything I have done would have been possible without the love and support of Mom, Dad, Andy, Ali, Leo, and Jaehyun. Thank you for always being there.

This work has not been supported by any external funding nor is it written with any religious or non-religious intent.

Portions of Chapter 1 of this dissertation are an adaptation of the material as it appears in "The aims of typologies and a typology of methods" (2023) in *Zygon: Journal of Religion and Science*, used with permission from Wiley Periodicals LLC (CC BY-NC 4.0).

Portions of Chapter 2 of this dissertation are an adaptation of the material as it appears in "On the method of conceptual analysis in religion-and-science" (2024) in *Zygon: Journal of Religion and Science*, used with permission from the Open Library of Humanities (CC BY-NC 4.0).

And although Brian Frastaci very generously provided copy-editing for the entire dissertation, I cannot deflect blame for any errors and mistakes onto him; all are due to my own failings.

VITA

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ABSTRACT OF THE DISSERTATION

Methods in Religion-and-Science

By

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Doctor of Philosophy in Philosophy

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Professor Jeremy Heis, Chair

This dissertation analyzes the ways in which scholars talk about the relation between religion and science. In the late 1980s, the physicist and theologian Ian Barbour proposed that we approach this massive scholarship through the lens of a fourfold typology: scholars tend to conceive of the religion-science relationship (RSR) as one of Conflict, Independence, Dialogue, or Integration. This model, though acknowledged as problematic, still dominates the field of religion-and-science—an interdisciplinary field with hundreds of specialists drawn from philosophy, history, and the natural and social sciences. Extant work which analyzes the discipline as a whole either extends or slightly modifies Barbour's four original categories. In my dissertation, I propose an entirely new way of approaching the religion-and-science literature, by focusing on the methods that scholars employ to reach their conclusions about the RSR rather than focusing on the conclusions themselves. Doing so, I argue, will help to resolve the current widespread feeling that scholars are talking past one another and also help public readerships of the literature clarify what is actually going on in the literature by highlighting the modes of reasoning being used.

I identify four main methods that scholars tend to use when characterizing the RSR: conceptual analysis, (historical) case studies, deconstruction, and fieldwork. Conceptual analysis focuses on the definitions of 'religion' and 'science,' and seeks to derive their relation logi-

cally from those definitions. The method of case studies instead proceeds by first surveying a variety of of historical encounters between religion and science and then arguing, via induction, for some general characterization of the RSR. Deconstruction, on the other hand, emphasizes the contingency of the concepts "religion" and "science", either historically or cross-culturally, and explains the emergence of the current RSR on the basis of that contingency. Finally, scholars employing fieldwork extract their characterization of the RSR from empirical data gathered from scientists and religious folk themselves. Although these different methods often draw from particular disciplinary backgrounds, they can be—and are—used by scholars in any discipline.

Each of these methods faces unique issues and challenges which I discuss and further develop, proposing recommendations for those who use these methods in light of the critiques. I argue that no method is better "on the whole" than any other, for such a determination will depend essentially on the aims, goals, and values scholars and other readers may have in trying to understand the RSR. Thus, I also explain what kinds of audiences may find the different methods relevant, with an especial focus on non-academic audiences.

Throughout the dissertation, I pay especial attention to scholarship in public-facing contexts. Hence, the main sources I consider are academic, book-length tracts written by scholars with public-facing aims. The various critiques I discuss also focus on the public-facing nature of the works examined. An issue all of the current scholarship faces, which has so far gone unrecognized in the literature, revolves around the question, "Whose 'science,' whose 'religion'?" Scholars almost always focus on religion and (especially) science as practiced among elites. Standard treatments of science, for instance, draw on the large-scale theories produced by famous scientists, or examine the personal beliefs of scientists employed at prestigious research universities. Left out are the vast majority of practicing scientists which members of the public may interact with (or be), many of whom work in non-research, non-theory-oriented spaces. This leads to a sense in which prevailing accounts of the RSR work

with notions of science which fail to accurately reflect the nature of science as practiced in the world. I thus show how the religion-and-science scholarship can be improved by taking these non-research, non-theory-oriented sciences seriously—not only will it make the work more relevant to the publics scholars often wish to reach, but it will also open up new avenues of research in understanding how religion and science are related by real-world actors, not just in the minds of academics.

Overall, my dissertation provides a novel approach to the field of religion-and-science by providing a high-level, overview analysis of the methods used in the literature on the religion-science relationship.

Chapter 0

Introduction

Imagine a college freshman. She is excited to start her new life, eager to explore the various opportunities available to her. As a gen ed, she's forced to take a biology class and is immediately hooked. She wonders, "Can I be a scientist?" A shadowy doubt flickers in the back of her mind: isn't being religious and a scientist incompatible?

To our surprise, she goes to the university library where she finds, to her own surprise, a whole section of books dedicated to the relation between religion and science. The section is not only large (and many of the books voluminous), but as she inspects the books a bit more closely, the student realizes that they represent a wide array of approaches to their subject. It isn't just that some claim religion and science to be eternal enemies, others that they are life-long allies. She finds that. But perhaps more interestingly, she finds that some start by declaring science to be X, religion Y; while others declare there are no such things as religion or science. Yet others contain lists of numbers and statistics, others interviews, and still others seem like biographies. With so much variety and (sadly) so little time in the term, where should she start?

Imagine four years later, our student applies for grad school—and gets in. Elated, she starts

thinking and planning—when suddenly the thought comes: Will she thrive there? Will her religious identity pose problems for her? Will she be treated differently—poorly—because of it? And what will her coreligionists think? Will they accept her still? Back to the library she goes, wondering again which books will be useful.

Many years later, our student looks back on her life and wonders, How can I inspire other women like me to be scientists? What can I say that will help them decide and navigate for themselves the relation between religion and science? Yet again she returns to the library, to the shelves she remembers, and flips through the tomes—some old, some new—for ideas.

Other lives intertwined with our student's also run into questions about religion and its relation with science. A professor on an admissions committee might notice the student identifies somewhere in her package as an active member of a particular religious tradition and they have a slight ping of worry: Aren't religion and science incompatible? Will a student like this be able to do the work required in the lab? A potential employer may come across our student's resume: PhD in biology, publications in the relevant field, excellent letters, identifies as highly religious. Wait. Can a religious person—especially of this particular faith—do this kind of science? Like their prospective student or employee, the professor or employer may also go to the library. In front of the books on books on books, where should they start?

These cases can be multiplied ad nauseum. In each case, the protagonist's question is the same: what's the relation between religion and science? But in each case the question is asked in a slightly different way. For in each case the protagonist has a different set of values and driving concerns in asking and finding an answer to their question. As an undergrad, the student might be concerned about "fitting in"; as a grad student, she may worry about how she'll be treated; as a distinguished scientist, she may wonder about inspiring others of her faith. These values and interests may overlap—or they may not.

Regardless of their values, however, each protagonist finds themselves in front of the shelves. Facing the immense collection of work, what should they read? They cannot read everything. So where should they start? Are some of those tomes more relevant for their particular interests and concerns than others are?

In this dissertation, I aim to address these questions. I answer the final question in the affirmative: Yes, some of the books will be more relevant than others for the protagonist's particular situation. That is not to say that some books are not relevant at all—perhaps there are readers, with a different set of values and concerns, who will find them relevant. What is it that I mean by "relevant"? Relevance here does not simply mean "in line with the reader's expectations." My point is not that books which claim religion and science compatible are most relevant to religious students interested in science or that books claiming the opposite are the best fit for skeptical PIs. Indeed, this dissertation is to a large extent not concerned with the claims and conclusions of the books on the shelves. Instead, it is concerned with how the books are *structured*—with the methods the authors use to arrive at their conclusions. As a dissertation in philosophy, it is primarily concerned with the form of the *arguments* authors construct to convince their readers.

By "relevant", then, I mean "fit to purpose"—some methods of argument will be better suited to some interests and concerns than others. And this dissertation seeks to uncover what is relevant for whom. It aims to provide a guide for our protagonists as they stand before those shelves in the library.

But more than that, this dissertation also aims to provide a guide for the authors of those books shelved in the library. Many scholars who write on religion and science hope that someone like the protagonists above will pick up their book—and be convinced. Many scholars write not just for other scholars, but for the public, and they write not just to pursue and share knowledge, but to enact social change. And if that is their aim, then this dissertation aims to help them better engage with their readers. In just the same way that

it aims to help readers find the books relevant to their interests, so too does this dissertation aim to help authors find the methods relevant to addressing their readers.

0.1 Religion-and-Science, a Brief Overview

The field of what I will call religion-and-science[1] has its more-or-less official origins in the late nineteenth century. In 1878, John William Draper—president of the American Chemical Society, producer of the first lithograph of a woman and of the moon—turned amateur historian and published *A History of the Conflict Between Religion and Science.* A bit less than two decades later, in 1896, proud ex-congressman, first president of Cornell, and distinguished historian Andrew Dickson White published his *History of the Warfare of Science with Theology in Christendom.* Together, these three-named men are cited by historians to this day as the originators of what is called the Conflict Thesis.

According to the Conflict Thesis, religion and science are in irreconcilable tension with one another, at odds in a zero-sum game of control for cultural influence. Both Draper and White arrived at their conclusions by combing through the history of science and dragging to the surface literally hundreds of encounters between religion and science—sometimes in the form of encounters between religious folks and scientists[2], or scientists and religious institutions, or theologians and scientific theories—which they interpreted as showcasing that tension. As Draper put it, "the history of Science is not a mere record of isolated discoveries; it is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditionary faith and human interests on the

[1] To my knowledge, no other scholar terms the discipline "religion-and-science." More often one encounters it as "science and religion"—in that order and without the hyphens. I use the hyphen both to reduce grammatical ambiguity (i.e. to differentiate between references to a field of study and a pair of human activities) and to reinforce the idea that the field does not on the one hand treat of religion and on the other treat of science, but rather treats them together. And I choose to use the order religion-and-science because as an atheist with a personal history of significant misgivings about religion, I find it useful to give it prior place as a reminder that it is something to be taken seriously. And besides, R comes before S.

[2] Or people whom Draper and White *label* as religious and/or scientists.

other" (Draper 1874, Preface).

The Conflict Thesis structured not only the emergence of history of science as a discipline (Ungureanu 2019, 249–256), but also the in-some-ways companion discipline of religion-and-science, as scholars argued for and against the works of Draper and White. And even to this day, scholars take themselves to be responding to these two long-dead Americans, and whoever works in religion-and-science works in the shadows of their (by modern standard) admittedly rather shoddy historical work and controversial conclusions. Indeed, few scholars of religion-and-science today embrace the Conflict Thesis propounded by Draper and White, despite its continued prevalence in public discourse.[3] Instead, the discipline has shifted, if not to the opposite conclusion—that religion and science are eminently compatible—then to a certainly more positive view of how religion and science interact which allows for there to be non-conflict-laden relations.

Representative of this trend is Ian Barbour (1923–2013), whose foundational 1966 *Issues in Science and Religion*—foundational because this text can be seen as birthing the contemporary discipline of religion-and-science. Barbour was one of the first—and certainly the most widely read—to systematically discuss the ways in which religion and science could be related, beyond simple platitudes towards conflict or harmony. Barbour himself, trained as a physicist and writing as a theologian, was an advocate of a more positive characterization of the RSR—religion and science could and *should* be in fruitful dialogue, mutually informing and advancing each other. Barbour's work heralded a flurry of other, increasingly nuanced work unpacking the ways in which religion and science had interacted both historically and into the present. Within the past three or so decades, it has become increasingly common to see endorsement of something called the Complexity Thesis as a kind of alternative to the

[3]Or at least such is often said. I am not aware, however, of any systematic study of the religion-and-science literature or its contributors showing that the Conflict Thesis (or modern revisions of it) is indeed a minority position. There have, however, been studies of public views on the matter. In the US, for instance, a Pew study found that a majority of people think that "science often is in conflict with religion"—though a slightly larger majority of people do not think that science conflicts with *their own* religious beliefs (Funk 2015).

Conflict Thesis. The general idea is that relations between religion and science are complex: they go beyond simple labels of conflict or harmony or independence.

But the discipline of religion-and-science today is far more than just a motley assortment of responses to the Conflict Thesis. As may have been suspected from the histories of Draper and White themselves, historians and scientists—and scientists-turned-historians—are major contributors to the field. But they are joined by philosophers, sociologists, anthropologists, religious studies scholars, theologians, cognitive scientists, rhetoricians, media scholars, and many others. Twenty-first-century religion-and-science has dedicated journals (*Zygon: Journal of Religion and Science* and *Theology and Science*), multiple major annual conferences, and hundreds of specialized researchers. Beyond the specialized researchers, many non-academics also contribute to the general body of religion-and-science work—they sometimes attend (and even present at) the conferences (e.g. the annual conference of the Institute on Religion in an Age of Science, organized by *Zygon*) and regularly publish books and other media on the topic.

The topics explored under the rubric of religion-and-science are manifold. Some seek general characterizations of "the" religion–science relationship (RSR)—where "religion" and "science" are general, universal categories. Others try to sketch more specific relations between particular sciences and particular religions. Some get even more specific, focusing on particular scientific theories (especially quantum mechanics and evolution) or particular theological positions (like divine action). Some of the literature is apologetic in nature—in defense of religion in general or of some religion in particular or of non-religion; some is not. Some focuses on the past, some on the present—and some even looks to the future.

Historically, much of the literature was produced in the West—in Western Europe and the US. And this circumstance has had the usual consequences. As is often lamented (see e.g., Kim 2015), reading work in religion-and-science can often feel like reading work in Christianity-and-science, even if the author purports to analyze the RSR in general. Likewise,

the figures who appear in the literature—as historical figures or as interlocutors—are more often than not drawn from the Western tradition: Kepler, Newton, Darwin, Einstein. In some ways, the overly Christian/Western-centric focus is the result of linguistic selection bias. There is, and has been, for instance, a thriving body of Islam-and-science literature which is widely consumed in the Arabic world. But while some of this has been translated into English, much of it remains inaccessible to the largely English-speaking and English-publishing discipline. By another line of thought, the over-representation of Christianity is in fact a non-issue, for the whole idea of some relation between religion and science was really possible only in the Christian context—for the ideas of religion and of science only emerged organically in such contexts, and had to be *invented* in others (see e.g. Josephson 2012 and Harrison 2015 for this way of thinking).

Regardless of what we think about the place of Christianity in religion-and-science, more recent years have witnessed more and more religious traditions entering the literature. Brooke and Numbers' edited volume, *Science and Religion Around the World* (2011), for instance, represents a push towards globalizing the field. And increasingly work is being published which explores religion-and-science in Asia (see e.g. Keul 2015).

The reasons behind the extensive engagement with religion-and-science also derive a wide variety of places. On the apologetic side, the Dali Lama provides generous funding for cognitive scientists to research meditation. The Templeton Foundation, one of the most well-endowed sources for academic funding pours millions each year into projects in physics, biology, and theology which might in some way be sympathetic to its Evangelical roots.[4] But there are also more secular motives: historians might be interested in religion simply for the sake of telling better histories of science; sociologists may be interested in how the political tensions built around religion and science might be eased.

[4]I myself have received funding from the Templeton Foundation in the form of a teaching prize won through the Science Engaged Theology (SET) Foundations grant. The money was used to support the teaching of a new course on religion and philosophy of science which did not directly impact my research.

Indeed, with all the activity, the religion-and-science literature is growing to be not only diverse but immense. This dissertation aims at making sense of some of that diversity within immensity.

It is not the first project that has done so. Ian Barbour famously outlined four "headings" under which we might classify both religion–science relations themselves and the positions of various authors and their scholarship: Conflict, Independence, Dialogue, and Integration (see e.g. I. G. Barbour 1997). This classic typology dominates the literature. Even if scholars take issue with it—as overly simplistic, as conceptually misleading, as internally confused—the language of these four headings (sometimes with the addition or substitution of "Harmony") can be found in the vast majority of both scholarly and non-scholarly work.

But while Barbour's fourfold typology may have its uses, I find it not especially illuminating of the religion-and-science literature. I thus propose a different kind of typology, one based on the methods used by scholars in their attempts to characterize the RSR. This typology is, like Barbour's, fourfold and highlights what I will call the methods of conceptual analysis, case studies, deconstruction, and fieldwork. By looking to how scholars reach their conclusions rather than just looking to the conclusions themselves, this method-oriented typology highlights the argumentative strategies at play in the literature. This can be useful both for scholars, for it can help them understand how their work relates to other scholarship and clarify how to best respond to particular authors; as well as for public non-scholarly readers of the literature, for it can help them find work which proceeds in a way that speaks to their interests in puzzling out the RSR.

While my project is not the first to try to systematize the religion-and-science literature, it is the first to engage directly with the need for such systematization and the first to propose a focus on scholars' methods rather than their conclusions. And it is the first to do so with the specific aim of understanding how to make the literature easier to navigate by members of the public.

0.2 Scope of the Project

Given the size of the religion-and-science literature, this dissertation does not purport to attempt to cover the entire discipline. Instead, I limit my analysis to particular areas of the literature and to particular kinds of sources. Specifically, this dissertation focuses on scholar-produced public-facing books whose authors aim at characterizing the RSR (or the relation between some particular religion and science) and are neither natural scientists nor theologians. Let me say a few things about these self-imposed limits and a few of their consequences.

0.2.1 The Authors

First, the authors. Although the contributions to the religion-and-science literature come from a wide range of backgrounds, I focus only on works produced by scholars from the humanities and social sciences. I choose scholar-produced works rather than works produced by non-academics in large part because my ultimate interest is in the arguments found in such works. I expect that the arguments presented in scholar-produced works will not only be clearer—and therefore make for easier exposition and careful analysis—but also more sophisticated—and therefore make for more compelling examples which highlight the virtues of the different methods. Of course this is only an expectation—scholarly work can also be dense and far less clear than works produced by academic lay folk! But given my explicit interest in *methods*, I think it is a fair expectation to have, especially since care in methodology is often a prerequisite for attaining the title of (academic) "scholar."

There is another reason, which comes from scholarly circles themselves, to focus on the academic literature. In a recent collected volume tackling the persistent public belief in the Conflict Thesis, the historian Ronald Numbers (1942–2023) complained that "four or

more decades of revisionist scholarship has not trickled down very far into popular culture, especially in North America and Western Europe" (Numbers 2019). This desire to have public impact is shared by many other scholars—and not all of whom wish to disabuse the public of the Conflict Thesis! As a scholar who is himself interested in producing work with potential public impact, I, too, want to understand how to make scholarly work more influential in the public arena. I thus focus on thus, I focus on *public-facing work* by scholars since this provides an opportunity for reflection on how to make such work more relevant and available to the publics we scholars wish to address.

But I do not draw my examples from all the possible public-facing scholarly-produced works. In particular, I limit my sources to those produced by scholars in the humanities and social sciences. Thus, although scholars such as Fritjof Capra (a physicist), Richard Dawkins (a biologist), and Christoph Schönborn (a theologian) have a relatively large public presence in the religion-and-science literature, they will not feature as my exemplars of the various methods. This is not because natural scientists and theologians do not use the methods I discuss—they certainly do! However, given their disciplinary backgrounds, I expect that work produced by philosophers, historians, and social scientists are likely to be more sophisticated in their use of the four methods, seeing as the methods have their roots in those disciplines. This, of course, like my expectation about scholar-produced work in general, is a fallible expectation. But again, I do not think it is unreasonable, especially since the philosophers, historians, and social scientists who contribute to the religion-and-science literature often make their entire scholarly careers in the discipline.[5] Furthermore, scholars in the humanities and social sciences often produce works that are at the same time public- and scholarly-facing. That is, it is normal for scholars in these disciplines to publish public-facing work which is considered part of their "normal" scholarship—a practice that is *not* normal in the natural sciences.

[5]I should also note in particular that I do not draw on the cognitive science of religion (CSR) literature, for most work in CSR does not aim to provide characterizations of the RSR—though CSR *could* do so.

0.2.2 The Medium

Secondly, I focus on books rather than articles. I do this in large part because my ultimate interest is in members of the non-scholarly public who interact with the scholar-produced literature. I assume that most such individuals will likely encounter the religion-and-science literature in book form rather than as papers published in specialized journals. Although many academic disciplines are now shifting towards papers and away from books, public readership is still a book-culture.[6] That said, I will still refer to journal articles throughout the dissertation. However, my primary examples will all be book-length manuscripts produced by academics and meant for a public audience.

How is public-facing intent determined? I have used three main criteria: 1) the presence of public-facing language in the introduction/preface, 2) the existence of reviews in popular outlets (e.g. the *New York Times*), and 3) inclusion on lists of recommended literature put out by public-oriented religious or scientific organizations (e.g. the American Academy for the Advancement of Science). In addition to these criteria, I have also included works which began their life as public lectures, e.g. the Terry Lectures given in the US and the Gifford Lectures given in Scotland. A complete list of books taken as exemplars, and justification of why they were included, can be found in Appendix A.

Beyond books and articles, however, there is a plethora of other media created by scholars of religion-and-science which are indeed consumed by the public. These might include interviews, podcasts, documentaries, blog posts, magazine articles, tweets, pamphlets, films, opinion pieces, and popular lectures. One could even argue that these other kinds of media are more likely to be consumed by public audiences than books are!

However, the sheer amount of such literature would have exploded the scope of the project

[6] It is not entirely clear if this is the direction religion-and-science is heading, perhaps in large part because even specialized work in the discipline is often of interest to public audiences which crave books.

beyond reason. I have thus limited myself to books—and then only those written in the twenty-first century (especially since these are the books contemporary publics are more likely to encounter) and not by natural scientists or theologians. In future work, I plan to explore other media and the ways they enable and constrain scholars to present particular characterizations of the RSR.

Finally, due to my own linguistic limits, my sources are drawn almost exclusively from English-language publications (although in some cases, e.g. Gingras 2017, the works are translated).

0.2.3 What this Dissertation is Not

This dissertation is both quite abstract and at the same time aims to be practical. As such, it is likely useful to clarify not only what the dissertation is—as discussed in the previous subsections—but also what it is *not*.

In the first place, this dissertation is not an attempt to characterize the RSR. Instead, it analyzes the ways in which others have tried to characterize the RSR. As such, I do not advocate any positive thesis about the RSR. Further, I have tried my best to remain neutral with respect to other scholars' conclusions about the RSR. My focus, after all, is not on authors' *conclusions* about the RSR, but on their *methods*.

That said, however, this dissertation is also not an attempt to determine the "best" method for characterizing the RSR. Rather than advocating for a particular method, I offer a systematic analysis of the different methods which dominate the scholarly literature aiming to characterize the RSR. Ultimately, I think the different methods are useful for different purposes and may be more or less relevant to particular readers—both scholarly and not—based on their particular interests in the RSR.

In this vein, my dissertation does not employ the methods it discusses. This is for the almost trivial reason that the methods I discuss are specifically geared at characterizing the RSR. In some sense I make use of conceptual analysis: I unpack the conceptions of religion and science scholars use, identify the kinds of limitations they impose, and suggest ways those concepts could be altered or expanded. But this is conceptual analysis of a different kind, one might say at a different level, from "conceptual analysis" as featured in the religion-and-science literature. There, as we will see in much more detail in Chapter 2, conceptual analysis focuses on the definitions of religion and science, and the logical relation between those two definitions. Insofar as I employ something which we might call "conceptual analysis," it is *not* centered around definitions and their logical relations.

This dissertation does, however, make use of philosophical methods, perhaps more so than methods from any other discipline. After all, this is a dissertation "submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy in *Philosophy*"! The tools I employ revolve around conceptual clarity and ends-means analysis. I use philosophical tools to isolate the particular argumentative structures employed in the scholarship I analyze and to determine if those argument forms are actually sufficient for drawing the conclusions scholars wish to draw.

Thus, one might say that this dissertation falls, rather than into the discipline of religion-and-science itself, into the discipline of philosophy of religion-and-science. For just as a philosopher of physics may study the arguments and concepts employed by physicists without themselves contributing to the experimental process of physics, so too do I analyze the methods of scholars embedded in religion-and-science without making a claim as to the nature of the RSR. However, just as a philosopher of physics' insight may be helpful in clarifying the scope of a physical theory or in identifying new areas of research, so too do I think my own work in philosophy of religion-and-science may be useful to those who do wish to characterize the RSR—and to their readers.

0.3 Overview of the Project

As said above, this dissertation aims to bring some order to the vast religion-and-science literature. By focusing on the methods public-facing scholars use in trying to characterize the RSR, I provide a way of systematizing the literature which will be useful for not only scholarly readerships but also—and especially—non-scholarly ones.

In Chapter 1, I discuss the typologies currently in use in the religion-and-science literature. I first propose a distinction between conclusion- and concept-oriented *types* of typologies and then offer a further distinction between how typologies are used in the literature, either as first-order classifications of the logically possible ways religion and science may be related or as second-order classifications of scholars/their scholarship. With these distinctions on the table, I proceed to a discussion of the aims scholars might have in proposing a typology. Finally, I propose my own fourfold method-oriented typology and show how it achieves the various aims discussed. In particular, I argue that thinking through the religion-and-science literature with a methodological lens can help scholars identify places where various authors talk past one another and better understand why some works receive more public uptake than others. Further, and perhaps more importantly, this kind of typology can help both scholars and non-scholars assess how relevant a certain work might be for a particular reader—it allows us to determine how fit-for-purpose a given work is for a reader with a particular set of values, concerns, and interests in the RSR. The following chapters then unpack the methods—conceptual analysis, case studies, deconstruction, and fieldwork—in more detail, offering critiques, recommendations for improvement, and a discussion of what publics might find the method most relevant.

Chapter 2 focuses on conceptual analysis, roughly the method which proceeds by first defining "religion" and "science" before deriving the RSR logically from those definitions. This method has faced heavy criticism for encouraging monolithic and overly essentialist ways of

thinking about religion and science. However, I argue that such criticisms, where they are in fact well founded, can be avoided as long as authors take care to properly delimit the temporal (and sometimes geo-cultural) scope of their claims about the RSR.

In Chapter 3, I turn to the method of case studies. This method comes in two "flavours": one focused directly on accurately describing the RSR, the other aimed more at facilitating identity formation. The former employs a kind of enumerative induction: an array of historical episodes of encounter between religion and science are brought together to act as a basis for an induction to a general characterization of the RSR. On the other hand, the latter flavour of case studies simply showcases particular encounters to highlight ways readers might conceive themselves as fitting into—or potentially altering—a larger narrative about the RSR. It is important to distinguish between these two flavours because objections to one may not apply to the other. For example, one of the major critiques of real-world implementations of the method of case studies—that they fall prey to cherry-picking and often fail to have sufficiently representative inductive bases—apply only to the inductive-descriptive flavour. Further, different public audiences may find one of these uses of case studies more appealing than others. I thus address both how scholars might revise their practices to address objections to their use of historical case studies and point to who might find case studies-based scholarship useful.

Chapter 4 discusses another historical method: what I have termed the method of deconstruction. Deconstruction proceeds by tracing the contingent processes by which our concepts of religion and science have emerged, usually by appeal to particular historical or cultural trajectories. A particular characterization of the RSR is then generated based on an analysis of those historical and/or cultural forces. This method is conceptually more complex than the others—and for this reason is perhaps the least successful in appealing to public audiences. That said, however, I argue that there are in fact some publics—for instance policymakers—who may benefit from deconstructive work. In this chapter, I also explore an

interesting tension between the method of case studies and the method of deconstruction which has hitherto been ignored.

Finally, Chapter 5 unpacks what I call the method of fieldwork. "Fieldwork" encompasses a range of methods with origins in the social sciences, the most frequently encountered of which are ethnography, interviews, and surveys. This group of methods aims to derive a characterization of the RSR empirically by extracting the RSR directly from the voices of the people studied—typically religious folk and scientists. Because the method takes seriously the views and practices of the folks studied, it must overcome several more-or-less standard challenges facing the measurement of attitudes or beliefs in general and religiosity in particular. As the only method which relies so heavily on self-reporting, it must also deal with objections regarding the relevancy of those reports: what if those studied are simply wrong about the RSR? These challenges, if not entirely defeasible, can at least be defused, and I offer suggestions as to how scholars may deal with them and still produce work that is relevant to a range of audiences both scholarly and public.

Throughout the dissertation, a common objection I will develop centers around the questions "Whose religion?" and "Whose science?" As will be argued in the context of each method, scholars have generally failed to pay proper attention to these questions in light of their public-facing goals. The upshot is that scholarly work almost always focuses on elite forms of religion and science, which are not representative of the kinds of religion and science public readers are likely to encounter in their day-to-day lives. This is especially the case when it comes to science: university-bound theoretical physics and evolutionary biology dominate discussions of science in the scholarly literature. But such fields form only a tiny sliver of actually practiced science which members of the public are likely to interact with. I thus encourage scholars, regardless of the method they use to characterize the RSR, to open their investigations to more forms of science which their public readership may encounter, like the biology practiced at genome sequencing companies, the chemistry in pesticide factories,

and the geology featured in the oil industry. Incorporating these other forms of science into scholars' general analyses will not only improve their scholarship in general by ensuring an actually representative discussion of the S part of the RSR, but also improve the relevancy of their work to the publics they wish to address.

The chapters have been arranged in order of my own initial familiarity with the method addressed. However, the chapters are largely self-contained and can be read in any order, although I do suggest that Chapter 3 (on the method of case studies) be read before Chapter 4 (on deconstruction).

Ultimately, my dissertation makes two main contributions to scholars of religion-and-science. First, it offers recommendations for improving the general scholarly quality of their work, i.e. how they can make their cases stronger and their arguments more well founded. Second, it offers further recommendations for how they can increase the relevancy of their public-facing work to the audiences they seek to reach. Inversely, my dissertation also provides a rough guide for publics facing the library shelves: Chapters 2–5 each end with a discussion of what publics will find the method useful.

Ultimately, I do not think that any method is better than another. Each simply provides different ways of exploring the RSR. But for particular readers with particular interests and particular reasons for being interested in the RSR, some methods may be more relevant than others. Scholars, however, should continue to employ each method—and perhaps explore and create new ones.

Chapter 1

A Typology of Methods

Consider our freshman biology major facing the library shelves. As she gazes up at the books, she wonders how to start, how to find something relevant to her concerns. There are the flashy titles, the gold-embossed spines. But of course she understands that such features are of no real use to her. The books are organized, as they should, by the Dewey Decimal System. But unfortunately that is not especially useful for our student's current quest.

But could the books be organized in some way that *would* be useful for the student?

Perhaps one could organize by subtopic. But of course that presents challenges—how does one divvy up the subtopics? Should it be by particular religion? Particular science? Geographic location? Perhaps instead one could sort the books by their conclusions—how they ultimately characterize the RSR.

In this chapter, I propose an alternative way of organizing the books which I think our student—and many others interested in the RSR—would find useful. I propose that we sort by the methods the authors use to characterize the RSR.

For almost thirty years, participants in the field of religion-and-science have widely employed Ian Barbour's fourfold typology of ways of relating religion and science. It structures textbooks used in introductory courses to the subject (e.g. A. E. McGrath 2020), organizes scholarly dialogues (e.g. Copan and Reese 2021), and even shapes the way scholars discuss non-Western religions (e.g. Aukland 2015). The terms Conflict, Independence (or sometimes Separation), Dialogue, and Integration (or sometimes Harmony) thoroughly permeate the discourse.

But despite its wide presence, many scholars complain of Barbour's typology. It is too restrictive and ought to be expanded (e.g. Stenmark 2010); it relies on overly rigid notions of "religion" and "science" (Shin 2016); it doesn't capture the richness of individuals' particular ways of relating religion and science (G. Cantor and Kenny 2001). Surprisingly, despite all these issues—some of are considered quite major—scholars seem quite happy to make use of the fourfold typology. I take Alister McGraths' comment (versions of which are found in many of his works) at the start of his popular religion-and-science textbook to be representative: "despite its limitations, the framework set out by Barbour remains helpful as a means of approaching the field of science and religion studies" (A. E. McGrath 2020).

Some scholars have proposed alternative typologies: John Haught (1995), Willem Drees (1999), Mikael Stenmark (2004, 2014), and Shoaib Ahmed Malik (2021, 2022) for example expand upon Barbour's typology. But none of these have truly caught on—perhaps they are too complex for a typology.[1] And in a sense they are all doing the same kind of thing: they carve out the space of logically possible/plausible ways or dimensions in which religion and science could be related and then categorize various scholars (and non-) into those niches. They are all based on classifying the proposed relationships between religion and science.

On the other hand, there is a conspicuous lack of discussion about typologies, their use(s),

[1]Indeed, one of the criticisms of Barbour's typology is that it is too simplistic—but in a sense that is the whole point of a typology: to simplify the complex (a point noted by Barbour himself (I. Barbour 2002, 348))!

and their aims in religion-and-science in general. In this paper, I aim to fill this gap. Further, I sketch a different *kind* of typology from those "relationship-based" ones currently on offer. This typology is based on the *methods* that scholars employ in coming to their conclusions about the religion-and-science relationship (RSR) rather than on the particular form of relation the scholars endorse. It centers, then, not on the relationship itself but on the *relating* done by scholars. In particular, I focus on methods often associated with (but by no means limited to the disciplines of) philosophy, history, and the social sciences: the use of conceptual analysis, case studies, (cultural and historical) deconstruction, and (quite broadly) fieldwork.

I'll start (§1) by reviewing several major typologies currently on offer by grouping them as conclusion-oriented and concept-oriented. I then (§2) examine two major ways in which typologies are actually used (and critiqued) in the discipline: as first-order categorizations of how religion and science could themselves be related and as second-order taxonomies of scholars and/or their contributions to the literature. In §3, I consider what aims/goals we might want a typology to achieve, reviewing those offered by Barbour and proposing three of my own. I then (§4) propose and unpack a typology of methods, different in kind from the concept-oriented typologies, and argue that this kind of typology retains all the virtues of a concept-oriented typology—and some. I conclude (§5) with a summary.

1.1 Types of Typologies

Many alternatives to Barbour's fourfold typology have been proposed. However, scholars have not adequately theorized typologizing in religion-and-science: as far as I am aware, there has been no 1) synthetic discussion of the different kinds of typologies nor—perhaps more surprisingly—2) much discussion of what exactly typologies are meant to be useful for. In this section, I focus on the first of these, identifying two major kinds of typologies

currently used in the literature: conclusion-oriented and concept-oriented. When assessing the RSR, conclusion-oriented typologies start with religion and science as monolithic entities, directly asking about their relationship. Concept-oriented typologies, on the other hand, nuance the relationship and start with the question, "What aspects of religion and science are we relating"? Despite their differences, both kinds of typologies are relationship-based; that is, they are based on the particular configurations of the relationship between religion and science. (This distinction will be of more importance later in §4, when I propose an alternative type of typology.)

In what follows, I lay out the two major kinds of typologies, citing Barbour and Haught as exemplars of conclusion-oriented typologies and Drees, Stenmark, and Malik as exemplars of concept-oriented typologies.

1.1.1 Conclusion-Oriented Typologies

The most commonly cited typology, that of Ian Barbour, is a conclusion-oriented typology. Perhaps most famously enunciated in *Religion and Science* (I. G. Barbour 1997), Barbour's typology is constituted by four possible religion-science relations: Conflict, Independence, Dialogue, or Integration.[2] These four views are typically glossed in something like the following manner: Conflict means religion and science are opposed, and only one is legitimate; Independence means they deal with entirely different phenomena/aspects of human life; Dialogue means they pursue similar questions or have similar methodologies; Integration means they can be assimilated for a single purpose (see e.g. Shin 2016 for a similar characterization).

Barbour himself, however, does not provide such straightforward characterizations of his "ways of relating." In fact, aside from Independence, the other three ways are actually called

[2]As pointed out by Berg 2004, in earlier work Barbour actually referred to a fivefold typology borrowed from H. Richard Niebuhr's (1892–1971) *Christ and Culture* (1951). In this system, which focused on the *ethical* relationship between religion and science, religion could be against, under, above, separate from, or transformative of science.

"headings" under which rather different views of the relationship are categorized. Thus Barbour recognizes two kinds or modes of Conflict: scientific materialism (science wins the opposition) and biblical literalism (religion[3] wins). Likewise, "Dialogue is a diverse group of views," including that religion and science engage in a back-and-forth over each others' explanatory limits, that they share in each others' methods, and what Barbour terms "Nature-centered Spirituality": responses "to nature in personal and experiential ways" (I. G. Barbour 1997, 95). What unites these three views together and separates them from Integration is that they "[start] from general characteristics of science or of nature rather than from particular scientific theories." In taking the latter course, one can arrive at three different versions of Integration: natural theology (theological doctrines inferred from nature), theology of nature (scientific theories shape theological doctrines), or systematic synthesis ("both science and religion contribute to the development of an inclusive metaphysics" (ibid., 98)).[4] In total, then, Barbour provides *nine* ways of relating religion and science—though these can be grouped under four headings.

Haught 1995 also offers a fourfold typology. As with Barbour, his system includes Conflict and Separation (re-labeled "Contrast," perhaps so that all headings in the typology begin with C). But the other two categories differ because "I do not find a sufficiently crisp logical distinction between his third and fourth types, 'dialogue' and 'integration'" (Haught 1995, 9 fn. 1). In their place, Haught provides "Contact" (science and religion have implications for one another and thus ought to adapt as either changes) and "Confirmation" ("religion supports and nourishes the entire scientific enterprise" (ibid., 9)). It seems to me that there is a bit of an asymmetry hidden in Confirmation: Haught understands it only as religion (qua theology) supporting science; "[s]uch an approach does not look for or expect in return any scientific endorsement of religion" (ibid., 22). It seems, though, that there is nothing

[3]Or "theology"; Barbour often slips between these two, a frustrating move not uncommon in the literature (see e.g. White 1896, Haught 1995). One also sometimes finds authors conflating theology with religious studies—e.g. Zehnder 2011.

[4]I should note that in my summaries of these views I have generalized from Barbour's focus on Christianity, which would otherwise limit the categories to e.g. theistic religions.

in principle ruling out such a return or expectation, and there are clear cases where such a return *is* thought to exist—for instance those who take scientific confirmation of particular claims in the Qur'an to reinforce the truth of Islam (a tradition known as *i'jaz 'ilmi*) and those who believe Buddhism to be "true" because of its consonance with modern evolutionary psychology (Wright 2017).

I should also note that in addition to the four C's, Haught discusses a fifth C, Conflation (see e.g. pp. 13-14, 17), although he does not include this among his main "headings." Conflation collapses religion and science into one another, as we might see in those who claim Buddhism to be a form of science (see, again, Wright 2017; see also Winter 2015 on *Kōfuku no kagaku* and Hubbard 1950/2007 on Scientology) or in those who embrace Science (with a capital S) as their religion (e.g. the Religious Naturalists (Goodenough 1998)). Why Haught holds to a fourfold typology and only implicitly recognizes Conflation is not clear.

In any case, what is common to both Barbour and Haught's typologies is their orientation towards the *general relationship* between religion and science: the two relata are in Conflict or are in Contact or what have you. When applied to particular scholars, the typology focuses exclusively on their general conclusion. In a sense, the character of this kind of typology is holistic: religion and science are related *in total* or *all at once* in one way or another.

1.1.2 Concept-Oriented Typologies

In contrast to these conclusion-oriented typologies are concept-oriented ones. These focus on particular aspects of religion and science and how those particular aspects are related. Thus, when approaching the question, "What is the RSR?" through a concept-oriented typology, one must first ask: "What concepts, 'religion' and 'science,' are we talking about?" One might say that concept-oriented typologies are more fine-grained than conclusion-oriented

ones, though, again, they have different starting points.[5]

Drees offers a nine-fold typology in this vein. He begins by canvasing three kinds of "challenges to religion" that have historically been generated by science: those related to new bits of knowledge (like the age of the earth); ones concerning epistemology, or how we understand knowledge (as in the transition from a purely deductive model of science to an inductively inflected one); and finally ones regarding "our appreciation of the world" (e.g. the emergence of the possibility of a meaningless world) (Drees 1996, 39–41). This trio of challenges is accompanied by three ways of understanding the nature of religion: cognitive (akin to systematic theology), experiential (à la Schleiermacher), and as traditions (which Drees associates with "languages and forms of life") (ibid., 42–3). By crossing the challenges and conceptions, we obtain a nine-member matrix of "areas of discussion in science-and-religion." Scholars who engage in a particular area of discussion will thus tend to focus on a particular kind of challenge posed by science to a particular conception of religion—though authors can, of course, engage in multiple areas of discussion at once.

	Character of religion		
Challenge	1. Cognitive	2. Experience	3. Tradition
1a. New knowledge	1a. Content: i. Conflict ii. Separation iii. Partial adaptation iv. Integration	2a. Opportunities for experiential religion? Religious experience and the brain.	3a. Religious traditions as products of evolution.
b. New views of knowledge	1b. Philosophy of science and opportunities for theology.	2b. Philosophical defences of religious experiences as data	3b. Criticism and development of religions as 'language games'.
c. Appreciation of the world	1c. A new covenant between humans and the Universe?	2c. Ambivalence of the world and implications for the concept of God	3c. Religions as local traditions without universal claim?

Figure 1.1: Drees' 3x3 classification of "Areas of Discussion," adapted for space. Notice how Barbour's categories are contained within Drees' matrix. Adapted from Drees 1996, 45.

[5]In a sense, concept-oriented typologies are also conclusion-oriented: ultimately they are used to discuss conclusions about the RSR, even if they are more specific conclusions than what is permitted in Barbour-like typologies. The important distinction between these typologies is their starting point: do they go immediately to the relationship itself or begin by clarifying the particular conceptions under examination.

As Drees points out, most conclusion-oriented typologies are focused on "the way cognitive claims in religion (theology) and in science are related"—which is only one "column" of Drees' taxonomy (see Figure 1.1). Further, it is not just the typologists who ignore the relevance of the experiential and traditionary aspects of religion, but the scholars being classified themselves; they too tend to focus on one particular aspect of religion *despite* the fact that "debates do not stand in isolation, but require consideration of other views of religion and other views of the challenges" (ibid., 45).

So Drees' typology cross-cuts other conclusion-oriented typologies by slicing along the conceptions of religion (and of science[6]) at play. In fact, Drees claims that Barbour's typology can be found distributed within particular areas of his nine-fold typology (ibid., 45).[7] In that sense, it is more fine-grained than Barbour's and Haught's: religion and science are not related wholesale but along particular dimensions.

An even more sophisticated typology which takes this dimensional approach further is developed by Stenmark 2004 (see also Stenmark 2010). The typology begins with three basic distinctions familiar to conclusion-oriented typologists: religion and science might be entirely separate endeavors, overlap some, or be unified. But Stenmark points out that really quite distinct views are wrapped up in the overlap and unity positions: one might think that there is more or less overlap, or that science wins in the overlap (scientific expansionism), or that it loses (religious expansionism), or that science may come to totally encompass religion (the complete scientific expansionist view), or that science may instead eventually be just a subset of religion (the complete religious expansionist view) (see especially Stenmark 2004,

[6] It is not clear to me why Drees' "vertical" axis is not "Character of science" rather than "Challenge"—it seems to me as if each challenge is itself picking up on a different aspect of science (propositional, epistemic, social). Labelling the axis "Challenge" also seems to belie a latent Conflict thesis in a way that I expect Drees would like to avoid.

[7] Although I agree that Barbour's typology can be "contained" in Drees' in this way, Drees seems overly restrictive of that containment. For instance, Barbour's Conflict is supposedly only to be found in the Cognitive-New knowledge area—though it seems clear that there could be "conflict" in any of the three "challenge" rows within the Cognitive column (see, again, Figure 1). In fact, as mentioned in fn. 6, by labelling the rows "challenge," it seems like Drees is implicitly committed to the possibility of Conflict in *all* areas of his matrix.

251–259).

Further, what is separated/overlapped/unified are often not just single things, Science or Religion with capital S and capital R—these two human endeavors are, after all, not monolithic phenomena but complex social practices. To that end, Stenmark outlines a number of dimensions along which one might evaluate the RSR: the social, teleological (i.e. the goals of the practices), epistemological, and theoretical—though importantly this list is not meant to be exhaustive. Further, within each dimension are wrapped up a number of what one might call sub-dimensions (though Stenmark does not use that phrase). For instance, when thinking of the teleological dimensions of religion and science, one might think at the community level—what religious congregations or groups of scientists aim at achieving—or at the individual level—what particular religious practitioners or scientists seek. And the degrees of overlap may differ along different dimensions as well: one might be a teleological community-level separatist (or "restrictionist") but a methodological unitarian (an admittedly rather practically implausible position which is nonetheless logically possible).

In all, this highly nuanced typology allows for something on the order of 6^4 possible characterizations of the RSR. Notice that just as with Drees', Stenmark's typology cross-cuts conclusion-oriented typologies: those who might have been labeled Conflict theorists (like scientistic New Atheists and biblical literalists), might be classed as scientific or religious expansionists; or historical interactions between Religion and Science which have appeared to represent Conflict or Harmony (e.g. the Galileo Affair and the early reception of Darwin in England), might instead both be categorized as instances of, say, theoretical overlap. Again, what separates Stenmark's typology from conclusion-oriented ones is his focus on the particular conception(s) of religion and science at play.

Operating in a different cultural landscape, Malik also offers a concept-oriented typology, albeit one constrained to the relationship between Islam and human evolution rather than between religion and science more generally. Rather than focusing on different aspects of

Muslim/scientific practice, Malik zooms in on particular understandings of scripture and the theory of evolution—it is in fact explicitly unidimensional (Pear and Malik 2022, 632). Thus, Muslim perspectives on evolution are typed according to their understanding of that theory: as entailing that all animals were produced via evolution, that only non-human animals were so produced, or that at least Adam (the first human) was not generated by evolution. These groups all believe that Islam and evolution are compatible, in contrast to the "Creationists" who reject the evolutionary origins of any animals whatsoever (Malik 2021, p. 111; Pear and Malik 2022, 632).

This focus on conceptions of evolution is motivated, similar to Drees and Stenmark's focus, by a critique of conclusion-oriented typologies as inadequately nuanced. However, rather than expanding to a multi-dimensional model, Malik specifically proposes a unidimensional system because it 1) "helps avoid confusing and mixing religious and scientific *beliefs* or *attitudes*" and 2) "can clearly demarcate between *what* individuals accept regarding evolution versus *why* they accept or reject evolution" (Pear and Malik 2022, 632; emphasis original). Thus, a concept-oriented typology is thought to be more useful than a conclusion-based one, an idea I will come to later.

1.2 Using Typologies

At the start of the previous section, I noted that scholars have neither distinguished between the various kinds of typologies on the market, nor talked about the particular uses of typologies. In this section, I show that typologies in religion-and-science are used in (at least) two distinct ways: 1) as classifications of how religion and science are themselves related and 2) as a way of taxonomizing scholars and scholarly contributions. These two uses can be found simultaneously appealed to by the same authors and at times even in the same work. I should note that Andrew Loke 2023 actually *does* explicitly recognize these two uses

(which he glosses, respectively, as "perceived" vs "expressed"). But one gets the impression that he takes such a distinction to be unique to his typology (into which the distinction is built) rather than recognizing the two as ways in which any typology can be used.

For my purposes, call the first usage "first-order." Here the goal is to characterize the space of logically possible RSRs and then sort particular religion–science interactions within that space. For instance, in using Barbour's (fourfold) typology, one might say the Galileo Affair represents a Conflict between religion and science—or conversely one might understand Newton's career as exemplifying Integration (e.g. Iliffe 2017). Were we to use Stenmark's typology instead, we might say that the Galileo Affair represented a period of epistemological overlap.

That typologies are indeed *expected* to have this use is further demonstrated by the critiques launched against them. Consider, for instance, Cantor and Kenny's critique of Barbour's fourfold typology (G. Cantor and Kenny 2001). As they explain, "The first point to notice is that these [four options] are the only viable alternatives—the only shows in town—and they must therefore cover all cases" (ibid., 766): Barbour is interpreted as offering a first-order characterization of how religion and science could possibly be related. But, as Cantor and Kenny argue, this typology over-essentializes the categories of religion and science, presuming that they are diachronically definable and stable concepts. "As historians," they take grave issue with this presumption: "neither science nor religion (nor the conjunction 'science and religion') possesses clear historical continuity" (ibid., 771), and thus typologies like Barbour's are ill founded. Regardless of whether or not one agrees with Cantor and Kenny's historicizing criticism, what is clear is that they interpret Barbour's typology in a first-order manner: if Barbour were not understood to be specifying the logically possible relations between religion and science, then it wouldn't make sense to problematize the categories "religion" and "science."[8]

[8]Stenmark agrees with this first-order critique of Barbour—thus implicitly accepting the first-order use of typologies. He defends himself (or at least tries to) from Cantor and Kenny's historicizing critique by

Likewise, in a much less antagonistic manner, Shin 2016 objects to the typologies of Barbour and Haught on the basis that they fail to adequately capture how religion and science are understood and related in East Asia. The East Asian context is different in at least three major respects: historically the categories "religion" and "science" were introduced to East Asia via Western cultural imperialism (see also Josephson 2012); those categories are understood through a nondualistic, Yin-Yang approach/worldview; and East Asian religions emphasize practice rather than "theoretical knowledge" (Shin 2016, 205). These differences mean that the RSR is understood (according to Shin) in a radically different way in East Asia than in the West. Thus, it is problematic that "typological categories tend to be seen as representing some unchanging reality like a fixed *idea*, rather than as provisional concepts in which the boundaries are loose and flexible" (ibid., 217)—a tendency that can supposedly be dissolved by adopting an East Asian way of thinking. Clearly this kind of critique is motivated by a first-order understanding of the typologies: they haven't successfully carved out the total possibility space—there are other ways that religion and science might be related, but which have been missed due to cultural assumptions surrounding the nature of religion and science.

In a rather different manner from G. Cantor and Kenny 2001 and Shin 2016, Latour's critique in his "Thou Shalt Not Freeze Frame" (2010) also belies a first-order conception of typologies. As Bigliardi explains, Latour believes that Barbour and Stenmark have fundamentally misunderstood the natures of religion and science, which leads them to mischaracterize the possible relations between them (Bigliardi 2014b, 893, 896–897). In particular, the typologists fail to realize that religion and science are simply engaged in different language games, and so there cannot be any real contact between the two: Barbour and Stenmark have thus improperly carved up the space of possible relations—there can be only one (trivial) relationship, not four or more. Again, this kind of criticism only makes sense if we understand

employing a dynamic, multi-dimensional understanding of the RSR (though interestingly not of religion and science themselves; Stenmark 2004, 257).

typologies in a first-order manner, as speaking about the "on-the-ground" relationship between religion and science, where both are understood as (abstract, perhaps social) objects interacting in the world.

Typologies, however, are also used in another way which tends to avoid the kinds of critiques offered by Cantor, Kenny, Shin, and Latour. This other way is often presented alongside the first, although neither is distinguished from the other. In the second-order mode of employment, typologies aim to classify *scholarship* on religion and science as manifesting/representing some particular view of the RSR. That is, rather than focusing on the "actual" RSR itself, these typologies focus on work produced *about* the RSR. Thus, using Barbour's typology, we might classify Galileo himself as a proponent of Dialogue (Blackwell 1991) and out Andrew Dickson White's *History of the Warfare of Science with Theology in Christendom* as endorsing Conflict (White 1896; though as we will see, this traditional characterization is largely mistaken). Likewise, someone like Stenmark would want to classify scientific materialists like Dawkins as scientific expansionists rather than as "mere" supporters of Conflict.

This understanding of the use of typologies actually better matches Barbour's own self-description in *Religion and Science* than the first-order use, for he explicitly admits that "particular *authors* may not fall neatly under any one heading" (I. G. Barbour 1997 77; my emphasis).[9] He then goes on to sort particular authors according to his headings. In introducing his 3x3 classification scheme, Drees likewise explains, "in practice, most *authors* focus on one area, a single column, or a single row, or at least have a characteristic emphasis there" (Drees 1996, 44; my emphasis). And Malik, for his part, explicitly employs his typology to classify Muslim thinkers (Malik 2021, 113). We can even understand these scholars' typologies as directly trying to expand the ways we can classify the scholarship by offering more nuanced niches into which scholars fit.

[9]Barbour in fact cites this same line in defending himself against Cantor and Kenny's critiques (I. Barbour 2002).

Likewise, there is, in fact, a whole industry within the discipline of sorting various historical figures into the Barbourian categories. For instance, Arther 2001 tries (and fails) to fit Paul Tilich into the typology; Bigliardi 2012 too attempts (and fails) to fit a host of more-or-less contemporary Islamic scholars into the categories (though he finds more success with Stenmark's; Bigliardi 2014a); Qidwai 2019 does much the same. The examples go on and on.

Just as we saw with the first-order use, the critiques also highlight the expectation. For instance, Stenmark presumes the second order use of typologies in his critique of Barbour's Dialogue model. "Irrespective of which of [Barbour's] science-religion views we hold," Stenmark explains, "we could argue that its advocates ought to get engaged in a *dialogue* with each other and thus drop the polemics or stop ignoring each other. ... It is therefore infelicitous to call one science-religion view the 'dialogue view' because it is desirable that people—regardless of whether they accept the conflict view, the contact view, or the independence view—should at least sometimes try to become involved in a dialogue with each other and listen carefully to what people with differing views think about these issues." Stenmark in fact calls on us to "immediately stop talking about a dialogue view" (Stenmark 2004, 253; emphasis original). Clearly this kind of talk conceives of dialogue (and possibly contact, overlap, and independence) as a view had by people, rather than (or in addition to) an on-the-ground (possible) fact about the RSR. That is, Stenmark, at least in this particular critical passage, understands Barbour's categories in a second-order fashion: they classify people rather than concepts.

This second-order focus is also evident in Stenmark's broader critique of Barbour's typology. Consider, for instance, the case of Dawkins. According to Barbour, Dawkins is a Conflict theorist. But Stenmark points out that Dawkins doesn't think that *all* of science is in conflict with *all* of religion. Unlike a true (monistic) Conflict theorist like E. O. Wilson, Dawkins doesn't think science can totally replace religion—religions are supposed to "help

us deal with our existential questions and offer us ethical guidelines," and since Dawkins (according to Stenmark) doesn't think science can do the latter, he doesn't believe science can replace religion (ibid., 255–256). Stenmark takes this to show that Dawkins is in fact a proponent of Overlap, not (monistic) Conflict; the realms of religion and science overlap but are not identical. He goes on to point out that other writers similarly fail to fall neatly under Barbour's headings (see also Stenmark 2010). The point of all this is to show the inadequacy of Barbour's model in its second-order usage: it fails to properly categorize participants in the religion and science literature.

So typologies are used in (at least) two main ways in the literature: to characterize the space of logically possible RSRs and to classify the scholarship. When employed in the first-order manner, typologies are thus typologies of the RSR; when employed in the second-order mode, they act instead as typologies of scholars' views of the RSR.[10] These two uses are possible regardless of whether the typology in question is conclusion-oriented or concept-oriented, although concept-oriented typologies are perhaps most naturally used in the second-order way (since they are developed according to the *concepts* of religion and science at play).

Before proceeding, it will be helpful to clarify the two sets of distinctions I have made above. There are, on the one hand, two *types* of typologies: conclusion-oriented and concept-oriented. On the other hand, there are two ways in which typologies—of any kind—can be used: first-order and second-order. In the rest of this chapter, although I will talk of both types of typologies, I will focus on the second-order usage of typologies. Despite this focus, I should note that I do not think we should stop using typologies in the first-order manner; that use has its time and place. However, I focus on the second-order usage of typologies because it is far more prevalent in the scholarly literature. Later, in §4, I will introduce a

[10]One might think that, somewhat trivially, the second mode of employment is derived from the first: scholars are typed based on their characterization of the religion–science relationship. But this need not be the case; as we will see below in the typology of methods, we have a typology meant to be used in the second-order manner which does not depend or even bear on the possible ways in which the RSR could be configured.

third type of typology specifically suited for second-order use.

1.3 The Aims of Typologies (in Their Second-Order Use)

So far, we have only looked at how typologies are actually used in the literature. We have not, however, talked about what typologies might aim or aspire to do. In general, this topic is also neglected in the literature. One of the rare places where it has appeared is in Barbour's defense of his own typology against Cantor and Kenny's famous attacks. In this section, I review Barbour's aims, and then outline three other goals we might wish a second-order typology to obtain.

1.3.1 Barbour's Aims

Recall that conclusion-oriented typologies all refer to the same thing: the *conclusions* scholars draw about the RSR. But of what use is this kind of typology? That is, in what way is it helpful to class the scholarship in this fashion, typing scholars and their work by their conclusions? One defense, offered by Barbour against Cantor and Kenny, is that such typologies serve a pedagogical function: "Typologies might still be useful in introductory courses. ... Especially in dealing with contemporary thought students need to be aware of a wide range of alternative views that would be difficult to treat... in the time that is usually available" (I. Barbour 2002, 347–348). And indeed, as we saw above with e.g. A. E. McGrath 2020, this is how many introductory textbooks, and so presumably syllabi, are in fact structured. But it's important to note that this kind of consciousness-raising aim is more sensible for a typology in its first-order, rather than second-order, use. Yes, explaining to students that, say, Conflict, is not the only configuration of the RSR might be useful. But what about

classifying *scholars* as proponents of Dialogue vs. Integration? It's not clear to me that this contributes to raising awareness "of a wider range of alternative views" beyond what they can get from the first-order classification. In any case, once we move past the introductory context, consciousness-raising doesn't seem a proportionate justification for the widespread appearance of Barbour's typology in the scholarly literature.

Another, more second-order-focused reason cited by Barbour is that these kinds of typologies offer maps of the religion-science literature: "A broad overview of a range of possible relationships can be helpful to readers new to this interdisciplinary field, even though an overview inevitably oversimplifies the complexities of the real world. A guidebook to any territory is not intended as a substitute for firsthand exploration but is intended to help people find their way around" (ibid., 348). Likewise Stenmark: "the aim of developing a typology is primarily to give a map which sorts out the main positions regarding how to relate science and religion" (Stenmark 2004, 262). True enough; the literature is vast, and a map/guidebook would surely be useful. But not all maps are useful. Just because one can trace the territory along certain contours does not mean that the resultant sketch will aid you in any way. What I find peculiarly missing is any explanation of how exactly slotting scholars into categories like "Conflict" or "Independence" is actually useful for the scholar. In a sense, conclusion-oriented typologies are almost trivially true: yes, Dawkins is indeed a Conflict theorist and Gould embraces Independence—we can get all that on the first page (or sooner). But so what? What can a scholar (or a lay reader) do with that kind of information?[11] The literature does not explain. That said, ultimately this cartographic aim is not unfounded, and in the next section I will revisit this aim and unpack it further.

Barbour, however, draws a more sophisticated justification for typologies from the social scientific literature. Citing Weber and others, he points to the idea that classification schemes

[11] One might think that classifying scholars on the basis of their conclusions can help predict their conceptions of religion and/or science, or even the general arguments they might use. As we'll see below, however, this is not the case; conclusions underdetermine both the methods (§4 in general) and concepts (§4.1) used.

are useful for highlighting the complexity of individual cases, for only very rarely will a particular case fall perfectly into the scholarly categories. Typologies thus help us to compare individual cases to one another by providing a kind of metric: approximation to the idealized category (I. Barbour 2002 p. 348). I think this is an admirable aim of typologies, but unfortunately it does not appear as if this is how typologies, at least in the religion-and-science literature, are actually used. They are far more commonly used to *eliminate* nuanced differences—as in the case of scientistic atheists and biblical literalists in Barbour's own system. Be that as it may, I think Barbour is right to think that typologies should aim to clarify, or highlight the unique contributions and views of particular authors and how they relate to others. What is not clear, or argued for, I think, is whether conclusion-oriented or concept-oriented typologies do this better or worse or simply in different ways. Based on the critiques given of Barbour's typology (as with Malik's above), I would suspect that concept-oriented typologies believe their typologies obtain this goal better—theirs provide a more refined metric.

The above aims are ones which I take any scholar would wish a typology to achieve. I must acknowledge, however, Barbour's over-arching aim in presenting his typology: to advocate for Integration. The point of laying out Conflict, Separation, and Dialogue, and in that order, is didactic; it enables Barbour to highlight the issues facing these characterizations of the RSR and thus build a case for Integration. Drees glosses the purport of the typology slightly differently, as a way of representing alternatives to Conflict in an increasingly secular world (Drees 2010, 1). Richard Olson likewise takes this to be an important use of Barbour's typology, and explicitly explains that a major reason for proposing typologies is their use in countering/defusing a simplistic form of Conflict which has great hold on popular imaginations (Olson 2011). I have chosen to leave out these kinds of aims, however, because they are partisan. Since typologies are analytic tools used by scholars across the spectrum of first-order positions regarding the RSR, I limit discussion to those aims that can be recognized by scholars no matter their particular view of the RSR.

1.3.2 Three Other Aims

In this sub-section, I consider three other aims we might wish a typology to achieve in its second-order usage: 1) illuminating the ways in which contributions in the field do/do not effectively engage with one another, 2) explaining why particular pieces of scholarship receive more public uptake, and 3) providing a useful public guide to the literature based on their values/reasons for being interested in the RSR. Along the way, I'll comment on when conclusion- and/or concept-oriented typologies achieve those goals.

Effective Engagement

The religion-and-science literature is notoriously rife with authors talking past one another. As such, we might want a typology to help identify when scholars are doing so—a development of Barbour's third goal above. Concept-oriented typologies seem especially well-suited to doing this. By calling attention to the concepts at play, they can help us see when particular authors are effectively engaging with one another—and when they are not. Ideally, effective engagement would involve the same concepts of religion and science being deployed by all involved. Unfortunately, however, this is not always the case; the literature is filled with authors with sometimes radically different conceptions of religion and science, all of whom take themselves to be discussing the same subject. While in some sense this is true—they are talking about religion and science—it can be misleading since they are often talking about different conceptions, or forms or aspects, of religion and science. But since authors do not typically explicitly state what conception of "religion" or "science" they are working with, it appears to their readers that their discussion is of singular, monolithic entities which are understood in the same way by other scholars, which, of course, is simply not true.

For instance, imagine that someone understands religion (and science) along the "cognitive" line in Drees' typology—they think that "religion... is an attempt to grasp the true, ultimate

nature of reality" (Drees 1996, 42). On the basis of this conception of religion (and science), they conclude that the two are incompatible; religion and science employ different methods but aim at the same thing; and ultimately, as the philosopher Tiddy Smith has recently said, "the methods of science out-compete the methods of religion" (T. Smith 2019, 1). It seems remiss to object to Smith's argument by pointing out, like sociologist John Evans, that ordinary folk simply do not conceive of religion (and possibly science) as "knowledge structures," but rather, see it as a kind of therapeutic experience; they see religion as something *used* rather than something assented to (J. H. Evans 2018 esp. Ch. 5). This objection seems to miss the mark because Smith and Evans seem to be talking about different things: Smith is talking about an intellectualized, scholarly conflict between religion and science while Evans appears to be focused on public perspectives. Smith's retort is easily anticipated: "I am not concerned with what the public think but rather with what religion *truly* is about—(at least partially but significantly) knowledge." Likewise Evans' response would likely be something like: "But what is most important is the way in which the public understands their religion and its relation to science!" By insisting that they are engaged in the same debate, Smith and Evans would find themselves talking past one another without realizing it; it is only once we take the time to carefully think through the notions of religion and science they have in mind that we can see how the two fail to effectively engage.

Perhaps a stronger example of this comes from the many responses to the Conflict/Warfare theses of Draper and White. Many of the objections stem from assuming Draper and White conceive of religion as a monolithic entity which is in eternal conflict with science—supposedly they support a general, rather than a nuanced, form of Barbour's Conflict (e.g. Numbers and Hardin 2018). This is perhaps understandable in the case of Draper who titled his book *History of the Conflict between Religion and Science* (1874), but it is a bit more puzzling in the case of White, who writes in the introduction to his *History of the Warfare Between Science and Christian Theology*, "[Draper] regarded the struggle as one between Science and Religion. I believed then, and am convinced now, that it was a struggle be-

tween Science and *Dogmatic Theology*" (White 1896 Introduction; my emphasis). Indeed, White takes great pains to clarify that his opposition is to *systematic/dogmatic theology*, not religion itself—in fact, White understood his work as helping to *strengthen* Christian religion by detailing the negative impacts of theology on "true" religion: "Thus, in this field (Geography), from the supremacy accorded to theology, we find resulting that tendency to dogmatism which has shown itself in all ages the deadly foe not only of scientific inquiry but of the higher religious spirit itself, while from the love of truth for truth's sake, which has been the inspiration of all fruitful work in science, nothing but advantage has ever resulted to religion" (ibid. Ch. II P. V).

Even in the case of Draper, however, it is far from clear that he also embraced a broad form of Conflict, assuming that *religion*—rather than some particular form of it—is opposed to science as a whole. For instance, Draper gives a rather rosy account of the relationship between Islam and science (Draper 1874 Ch. IV), and shows great enthusiasm for emanationist versions of Christianity (ibid. Ch. V). Scholars have thus more recently come to understand Draper as employing "religion" as a front for "Catholicism," hence understanding his argument as concerning not religion as a whole but instead the Catholic Church in particular (Ungureanu 2019, 12).

As Ungureanu points out, there is an irony in the fact that Draper and White employ these more specific conceptualizations of religion since "the actual conflict Draper and White envisioned is remarkably similar to how [modern] historians have sought to redefine the idea of 'warfare' or 'conflict' between science and Christianity as one *within* religion" (ibid., 13; original emphasis). Thus, recognizing the particular conceptions of religion Draper and White had in mind threatens to disrupt the many historical objections that have been raised against the two. For instance, the rather common practice of pointing to religious scientists (past and present) as problem cases for Draper and White's Conflict thesis[12] loses its teeth

[12]E.g. Qidwai 2019; Connor 2004.

once it's realized that Draper and White object not to religion no matter its manifestation but instead one particular form/aspect of it—Catholicism or dogmatic theology.

Had scholars instead thought of Draper and White through the lens of a concept- rather than conclusion-oriented typology, perhaps they would have avoided this mischaracterization and thus engaged more fruitfully with the actual arguments of these nineteenth-century figures.[13] By calling our attention to the particular concepts in use, concept-oriented typologies help us understand when different scholarly works are actually relevant to one another's theses—something we might miss by focusing overmuch on the conclusions those scholars reach.

1.3.3 Explaining Public Uptake

Historians have recently raised a puzzle: why do certain works on the RSR receive more public uptake than others? Ronald Numbers, for instance, laments that "four or more decades of revisionist [anti-Conflict-Thesis] scholarship has not trickled down very far into popular culture, especially in North America and Western Europe" (Numbers 2019). This puzzlement is shared by others (see e.g. Hardin, Numbers, and Binzley 2018). Several years before Numbers' lament, Richard Olson explicitly demanded that typologies be able to answer this question, criticizing conclusion-oriented typologies because "they offer no help in trying to figure out why certain patterns of interaction dominate within particular groups at particular times and places, nor do they suggest how the dominant patterns change over time in any culture" (Olson 2011, 70–71).[14]

To explain why particular works, especially those that support Conflict, have a stronger hold on the public imagination, a number of explanations have been proposed. One is rhetorical:

[13] To be fair, Drees does this in Drees 1996, 67f.

[14] Olson's "dynamic model" does go some way in explaining these processes by focusing our attention on particular subgroups within "Religion" and "Science," and the rhetorical moves members of those subgroups may make in response to competitors. However, this is not so much a feature of Olson's particular typology, but instead a consequence of his recognition that "Religion" and "Science" are not monolithic, but are rather composed of often competing/interacting subcultures.

many of the works supporting the Conflict thesis are polemical, and as is well known, polemics sell. It's not difficult to find examples; open Harris' *The End of Faith* (2004) and you'll find blatant Islamophobia within two pages—and you don't even need to open Dawkins' *The God Delusion* (2006) to understand the tone within. Likewise, Rodney Stark's works are both polemical and widely read, though he is an advocate of Harmony not Conflict (see e.g. Stark 2003). But rhetoric by itself can't explain why these particular works are *New York Times* Bestsellers—one can find polemics almost everywhere in the religion-and-science literature; people engage in the topic because they care deeply about the two relata of the RSR, which almost certainly guarantees a substantial amount of fiery language.

So rhetoric alone can't be the full story; the content itself must also be relevant, if the sales charts and narratives in popular media are anything to go by. In this vein, several recent scholars have suggested that particular religion–science narratives (especially Conflict) play into larger public/political social narratives, and because of this cozy connection they are absorbed and perpetuated (Harrison 2015; J. H. Evans 2018; Numbers 2019). This kind of thinking can make sense of the popularity of works like Hitchens', Harris', and Dawkins' which are explicitly Islamophobic—they were all published in the aftermath of 9-11.

Focusing on political context has a further advantage in that it can also go some way in explaining smaller-scale trends—like the popularity of Plantinga's apologetic work or Rodney Stark's relatively good sales among Evangelicals. These works, which argue against the Conflict Thesis in favour of something like Harmony, appeal (as we'd expect) to particular segments of society.

Note that the narrative focus is derived from conclusion-oriented typologies: such a taxonomy provides the categories by which we distinguish the narratives. So conclusion-oriented typologies (or at least ones such as Barbour's) can, contra Olson, achieve this goal.

However, narrative paired with political context doesn't prove very satisfactory in explaining

why only particular works get traction—why Dawkins' work and not Yves Gringas'? And it doesn't explain why, despite the emergence of a vocal Christian Right, authors like Harrison and Numbers—or even the more polemical Plantinga—haven't entered the public limelight in the same way as their New Atheist predecessors, even in religious circles.

We might expect a more nuanced view of the question of uptake to be provided by concept-oriented typologies, which, again, draw our attention to the particular ways in which scholars construe religion and science. Perhaps the understanding of religion, and of science, offered by more popular authors is simply more consonant with the conceptions held by their lay readers. Thus, for instance, maybe Dawkins is so popular because he speaks to a form of religion and a form of science that is easily accepted by the lay public—whereas a work like Peter Harrison's *The Territories of Science and Religion* (2015) gets much less publicity because it explicitly tries to explode the everyday concepts of religion and science.

A Guide to the Public

A third feature we might wish a typology to provide is a guide to the (vast) religion-and-science literature for the public—an elaboration of Barbour and others' "map" aim. Concept-oriented typologies can provide such a map. The main idea behind this kind of guidance is simple: it is likely that the works which will be most relevant to readers will be those which employ understandings of religion and science similar (if not identical) to those of the reader. The typology highlights the particular conceptions of religion and science in a particular work, so we can easily (we hope) sort through the literature to find what is likely to be most relevant for our reader. The guidance scheme would then look like this: "If you conceive of religion in way X, and science in way Y, then read works A, B, C..."

Imagine, again, our freshman biology major standing before the library shelves. She stands there wondering, "Can I flourish as a religious biologist?" But with all the books on religion-

and-science before her, where should she start? According to the guide offered by concept-oriented typologies, she should proceed by considering how this student conceives of religion and science, or ask "what conception(s) of religion and science are relevant to your situation?"

Perhaps our student is more disposed to understanding (her) religion as a "personal relationship between herself and God"—more along the lines of Drees' "experiential" conceptions of religion. In that case, the guide would recommend biographies like Iliffe 2017 and Hunter 2010 over, say works like T. Smith 2019 or Plantinga 2011, which take a much more intellectualized, "cognitive" approach to religion. On the other hand, if our student *is* worried about what appears to them to be a difference in epistemic standards between religion and science, then Dennett and Plantinga *would* be better recommendations.

Thus, concept-oriented typologies can be useful to the public: they can be used to generate guides for navigating the vast religion-and-science literature. This is something the conclusion-oriented typologies of Barbour and Haught cannot do; they are simply too coarse-grained. Further, even if such typologies became *more* fine-grained, more nuanced, it is unlikely that the guides they produced would be desirable—confining recommendations to views of the RSR the reader already accepts seems at best stifling, at worst nefarious; presumably a map ought not generate an echo chamber.

1.4 A Typology of Methods

Above, we've seen how the typologies currently on offer fulfill various goals we might wish typologies to fulfill in their second-order usage. In this section, I develop another kind of typology, a method-oriented typology, which fullfills those goals in novel ways. This typology is based not on the (possible) RSR, whether in the broad conclusion-oriented manner of Barbour and Drees or in the more particular concept-oriented manner of Drees and Stenmark,

but rather on the process by which scholars arrive at their conclusions about the RSR. It is thus not relationship-based.[15] Importantly, this kind of typology is essentially of second-order use: it classifies scholars and scholarship rather than the "on-the-ground" RSR.

A method-oriented typology builds on some of the insights behind concept-oriented typologies: it demands greater attention to the ways in which scholars frame their discussion of the RSR. My typology, however, focuses on the arguments scholars employ, not just the concepts they use.

In what follows, I outline four main methods which are widely used in the religion-and-science literature and with which I believe that literature can be usefully typed: conceptual analysis; (historical) case studies; deconstruction;[16] and, very broadly, fieldwork. This is not meant to be an exhaustive list of all the logically possible methods scholars may use. This quartet of methods was chosen because I think they together span a majority of the religion-and-science literature, are largely orthogonal to each other, and do not generate an overly complicated typology. Further, I should stress that authors can, of course, use several (perhaps all) of these methods—both across their careers and within particular works.[17] However, I think that many scholars and most scholarly works tend to employ one of these four methods at least a majority of the time.

I should also note two more points. First, although the methods sketched below derive from and are most often used by scholars housed within particular disciplines (e.g. the method of case studies is largely used by historians), they are by no means limited to those disciplines.

[15]It might be the case that there are other kinds of typologies aside from typologies of methods which also are not relationship-based. In that case, we might understand method-oriented typologies as just one species of a more general class of "relating-based" typologies.

[16]In Chin 2023, I labeled this method "relativizing." I discuss the shift in terminology in Ch. 4.

[17]McGrath offers a nice example of this kind of methodological blending. For instance, in his *Twilight of Atheism* (2004), McGrath mostly employs the method of case studies to refute Dawkins' claims about science (A. E. McGrath 2004, 95), while in *Dawkins' God* (2005), he instead takes a more conceptual analytic approach (A. McGrath 2005, 53). In other works, like *The Foundations of Dialogue in Science and Religion* (1998), we find a blend of historical case studies, deconstruction, and also sociological studies all employed to demonstrate the complementality of religion and science—likewise in the much more recent *The Territories of Human Reason* (2019).

For instance, although conceptual analysis may most naturally find use among philosophers, it is also used by anthropologists like James Frazer (discussed below).

Second, this taxonomy cross-cuts relationship-based typologies like Barbour's: if one so wished, one could classify a scholar who employs the method of case studies as a proponent of (restricted) Conflict (for instance White 1896), while another supporter of Conflict (restricted in a different way) could make use of conceptual analysis (for instance T. Smith 2019). As I shall argue in §4, however, I believe that typing scholars according to the methods they use rather than the particular position they support or the concepts they employ is more illuminating and ultimately useful—to both other scholars and to those members of the public who often consume this kind of literature.

So, the methods.

1.4.1 Conceptual Analysis

A common way of determining the relation between religion and science is via conceptual analysis. Conceptual analysis, of course, has been conceptualized in a wide variety of ways. For my purposes, what I mean by the method of conceptual analysis in religion and science is this: one first determines definitions[18] of "religion"—or particular religions—and "science"—or (less commonly) particular sciences—, and then one logically deduces their relationship on the basis of those definitions.

We see this method employed by, for example, Stephen J. Gould: science and religion are both human endeavors, but they have very different "magisteria." In fact, those magisteria are so different that they do not overlap—and thus there can be no conflict between them (Gould

[18]Some readers might find "definitions" too strong a term. While in some cases I do think that scholars employ full-blown definitions, I only intend here some kind of formal characterization of the terms involved. If the reader would like to think about "explications" or "conceptualizations" or even just "analyses" instead of "definitions," they are welcome to do so.

1998). Reaching a very different conclusion using the same method is Tiddy Smith: religion and science do in fact overlap in their explanatory target (the world and its happenings), but they employ radically different epistemologies—religion makes use of highly individualistic evidence, while science respects only intersubjective evidence. Given this, the two inevitably wind up in conflict (T. Smith 2019). Yet again, Alvin Plantinga reaches a conciliationist view through conceptual analysis: "there is superficial conflict but deep concord between science and theistic religion, but superficial concord and deep conflict between science and naturalism" (Plantinga 2011). He gets to the concord by characterizing science as a particular kind of enterprise which requires that: 1) the world be regular, predictable, and constant (in its operations) and 2) we as humans/scientists believe in that regularity (ibid., 282–283). Since "theistic religion" gives reason to expect 1) and 2) (due to the nature of God and humans being created in His image), science and (theistic) religion are compatible. In a somewhat similar vein, Wright tries to show that Buddhism just *is* a particular kind of science, based on a certain narrow definition of Buddhism as a set of meditative practices aimed at distancing the self from emotional and material constraints (Wright 2017).

It should be pointed out that the particular way in which a conceptual analysis is conducted may vary greatly between scholars. One might, like Tolstoy (Tolstoy [1879] 1987; Tolstoy [1902] 1987), simply intuit the notions of religion and science *a priori*. On the other hand, one could instead arrive at conceptions of religion and science more empirically: James Frazer, for instance, does this in his famous and widely influential *The Golden Bough*: that religion makes appeal to Wills/agents while science appeals to regular Laws is a conclusion (supposedly) reached by induction over many cases (Frazer 1922, Ch. 4). So too Gregory Dawes (2021) arrives at conceptions of science and of religion via this kind of method. But regardless of how they determine the definitions of "religion" and "science," the above authors all arrive at their characterization of the RSR by comparing the definitions. This is the method of conceptual analysis.

1.4.2 Case Studies

Perhaps the most common method employed in the literature, however, is what I'll call the method of case studies. Here, rather than comparing definitions, one performs a kind of induction over some number of historical episodes of religion–science interaction. The goal is that such an induction will reveal the RSR.

Exemplars of this method go back to the early history of religion-and-science as a discipline: the works of John Draper and Andrew Dickson White. In their now rather infamous histories, Draper and White enumerated dozens (perhaps hundreds) of historical episodes (some fabricated) on the basis of which they made claims like: "The history of Science is not a mere record of isolated discoveries; it is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditionary faith and human interests on the other" (Draper 1874, Preface).

Working at a perhaps more modest scale, historians like David Hollinger and Marwa Elshakry have pushed for Harmony on the basis of their studies of twentieth-century Jewish scientists (Hollinger 1996) and the reception of Darwin in Islamic cultures (Elshakry 2013).

These kinds of "positive", or "constructive" inductive projects can be contrasted with more "negative" projects of a "debunking" nature. Indeed much of the historical work from the past five decades has focused on debunking the narratives of the classic Conflict theorists (Lightman 2019 calls it "myth-busting"). Ronald Number's aptly named *Galileo Goes to Jail and Other Myths about Science and Religion* (2009) is representative, as are John Heilbron 1999's revisionist account of the Galileo Affair and a number of recent religion-focused biographies of scientists[19] of eminent scientists—like Rob Iliffe 2017's *Priest of Nature: The Religious Worlds of Isaac Newton.* In all these cases, particular historical episodes or thinkers

[19]Cantor and Kenny cite biography as a genre/method of particular importance (G. Cantor and Kenny 2001, 779). I take biography to be one form that the method of case studies can take: the case study is the life of a scientist, or an episode in their life, rather than a broader group/societal experience.

are consulted to make a broader claim about the RSR: it *should* or *shouldn't* be characterized in such and such a way.

1.4.3 Deconstruction

A closely related but quite distinct method is what I will call "deconstruction." While the method of case studies engages with historical actors and their actions, deconstruction engages with the history of the concepts at hand. It comes in (at least) two flavours: cultural and historical (i.e. "historicizing").

The general idea is this: take the concepts expressed by the terms "religion" and "science" in use today and show (or assert) that they either did/do not exist, or had/have radically different meanings in different times/places. On the basis of this, one argues for some particular characterization of the RSR. Often, deconstructions conclude that one cannot provide a universal and/or diachronically stable characterization of the RSR—any such attempt must either fail or be hyperlocal (temporally and/or culturally).[20]

In religion-and-science, the roots of historicizing lie in the work of John Hedley Brooke (especially J. H. Brooke 1991), in some sense the originator of the "Complexity Thesis." But I think the historicizing approach is best exemplified in the work of Peter Harrison, especially in *The Territories of Science and Religion* (2015), wherein he demonstrates how various socio-historical contingencies from the sixteenth century til now set the parameters for how we in the West understand the RSR. Had things turned out differently (e.g. had the Protestant Reformation not happened or Aristotelian virtue ethics been maintained), had our notions of "science" and "religion" taken slightly different forms, we may not have even been able to conceive of religion and science as being related in one of the four Barbourian

[20]See Josephson Storm 2021 for a "formula" for such deconstructions across the humanities and social sciences. (Josephson Storm 2021, 69–71). I should also note that these methods are frequently used in religious studies as well as the history and philosophy of science.

ways. James Ungureanu's recent work (Ungureanu 2019) likewise highlights how the notion of conflict between religion and science emerged from a very particular socio-historical moment in nineteenth-century Victorian England.[21]

On the other hand, a good example of cultural-relativizing is found in Jason Ānanda Josephson's *The Invention of Religion in Japan* (2011). Josephson contends that prior to the Meiji Restoration and the US' forceful "opening" of Japan's ports, there was no native Japanese conception of religion—or of science. Instead, this concept was invented (quite explicitly) by a number of scholars and political figures in order to appease the foreigners' demand for "religious freedom": what they found was that "religion" was simply Christianity (Josephson 2012, 78–79, 92)—which itself was understood as a heretical form of Buddhism (ibid., 22–23, 84)! The moral of the story (if taken to heart) for the RSR is that we ought not generalize our characterization of it temporally or spatially; the things related are so radically different (perhaps even non-existent) in different times and places that we cannot usefully provide a general account of the RSR.[22]

1.4.4 Fieldwork

The final method I consider encompasses a range of methods drawn from the social sciences, and which I broadly call "fieldwork." This embraces methods such as survey work, interviews, and ethnography. What distinguishes these methods from the above in the religion-and-science literature is their explicit focus on the "everyday," quotidian experiences of/encounters with "religion" and "science." The essential idea behind fieldwork is that the proper characterization of the RSR is to be found reflected in the responses or

[21] See also Turner 1978. Although Turner cites sociological data, note that his conclusion about the RSR (that it ought not be characterized by (simplistic) Conflict) is outside the data: he does not claim that the proper characterization of the RSR is reflected by the sociological data. For this reason I classify scholarly works like Turner's as historicizing rather than instances of fieldwork.

[22] See e.g. Lopez 2008 and Shin 2016 for similar cultural-relativizing arguments about the RSR in East Asia.

actions of everyday, ordinary scientists and religious folk.

The classic example of this is Leuba's (1916) survey of those listed in the *American Men of Science*, a directory of scientists first produced in 1906. Observing that only about 30% of the "greater men" (marked as "eminent" in *American Men of Science*) among his sample indicated belief in a prayer-granting God, Leuba claimed a basic incompatibility between religion and science, anticipating that future scientific communities would be even less religious. Leuba-esque studies have been repeated several times in the intervening century-plus, with varied interpretations (Larson and Witham 1997; Larson and Witham 1998). A much more complex instance of fieldwork can be found in the work of Elaine Howard Ecklund, sometimes in collaboration with Christopher Scheitle. In addition to surveying hundreds of academic scientists and everyday religious folk, Ecklund has also performed an extensive sleuth of interviews with university scientists and immersed herself in various religious communities across the United States (Ecklund 2010; Ecklund and Scheitle 2018).

1.5 A Typology of Methods and the Aims of Typologies

Above, I sketched three goals we might wish typologies to obtain. We saw that conclusion- and concept-oriented typologies achieve these aims to varying degrees in various ways. Here, I revisit those aims and show how a typology of methods obtains them in its own unique way.

1.5.1 Illuminate Effective Engagement

As with concept-oriented typologies, a typology of methods can illuminate how particular works engage, or fail to engage, with one another—and can indicate how to most effectively engage with others. By calling explicit attention to the methods used by scholars, the typology encourages us to address the *arguments* rather than the conclusions found in the works to which we respond. The different methods outlined above clearly employ different kinds of evidence—for instance, the method of case studies does not rely on the firsthand reporting of everyday laypersons, as does fieldwork. To try to use fieldwork-based evidence against a scholar employing the method of case studies might thus be illegitimate. On the other hand, actually recognizing that different scholars are using different methods in arguing against (or with) each other could be immensely generative.

To see these two cases, consider some of McGrath's early responses to Dawkins (briefly discussed in fn. 17 above). In *The Twilight of Atheism* (2004), McGrath counters Dawkins' claim that science and religion have distinct methodologies (one uses faith, the other does not) by employing historical case studies of religious scientists (A. E. McGrath 2004, 95). But Dawkins reaches his conclusions via conceptual analysis, which *could* offer an "easy" out: perhaps McGrath's religious scientists are simply mistaken about the nature of religion and science, and thus are not good judges of their relationship. Theoretically Dawkins could always evade McGrath's criticism in this way.

However, I think that if the different sides recognized that they were using different methods, they could fruitfully advance their discussion. For instance, Dawkins could acknowledge McGrath's examples and try to refine his analysis of "science" and "religion" in light of them—after all, conceptual analysis can be done in various ways, as we saw with e.g. Frazer above. Likewise, McGrath might choose his examples differently, using Dawkins' conceptions as a way of isolating relevant historical examples.

Unfortunately, discussion of scholars' methods is generally lacking in the literature. One place where the (possible) dangers of talking past one another as a result of different methodologies can be found in Tiddy Smith's *The Methods of Science and Religion* (2019). Right at the start, he clarifies that he is speaking of an *epsitemic* conflict between religion and science, not a historical one:

> ... I will argue in the course of this book that the conflict between science and religion is quite real, and further, that the conflict has a clear victor. The methods of science out-compete the methods of religion. I must emphasize from the outset that I do not dispute what has already been said by [historians]: the *historical* relationship between science and religion has been complicated. ... But this book is not about history. This book is about epistemology: the theory of knowledge. And the questions that this book seeks to answer are primarily about knowledge, not history. (T. Smith 2019 p. 1)

The message is clear: he believes it is simply not relevant to bring up historical case studies as objections to his account—religion and science are here understood as particular kinds of intellectual endeavours employing particular kinds of evidence to explain particular, *overlapping* classes of phenomena, and thus are by very definition bound to conflict with one another, at least at some point (and in such a way that science will always come out on top).

By drawing our attention to the scholarly methods used in favour of a particular characterization of the RSR, a typology of methods can thus help determine what kinds of objections will be relevant to particular authors and their works. It can also point to potentially surprising places of disagreement—where we might have expected agreement. We see this perhaps most starkly in the case of historicizing and the method of case studies: if we fully embraced the historicizing method and all its implications, then we would not even permit the lumping-

together of distinct historical episodes to form the base for a case-studies induction.[23] On the other hand, focusing on methods can also highlight ways in which particular authors should, perhaps, alter their methods to better accommodate/acknowledge their critics—as we saw with the imagined Dawkins–McGrath dialectic.

1.5.2 Public Uptake

We saw above that both conclusion- and concept-oriented typologies provide some traction on the question, "Why do some pieces of scholarship receive more public uptake than others?" A typology of methods provides a another take on the issue. Parallel to the schema derived from concept-oriented typologies above, the idea is simple: some methods are easier to understand, follow, and digest than others. The method of deconstruction, in particular, is itself quite complex, and doesn't lend itself easily to public exposition or, when that is achieved, to uptake. Other methods, however, *are* more liable to absorption by the public. At least some forms of conceptual analysis, for instance, are amenable to sloganization—"Science uses Reason, Religion uses Faith"—which can help their conclusions stick. Likewise, the narrative style employed by some instances of the method of case studies lends itself to public remembrance: who can forget the great struggle between Galileo and the Church or the burning of Bruno?

Notice that, this is a distinct way of approaching the issue from that suggested by concept-oriented typologies. Its explanatory power comes from focusing on the ways various publics digest information rather than on their particular conceptions of religion and science.

Much work, of course, is still to be done in exploring exactly how this methodological strand of analysis can contribute to resolving the question of public uptake—and surely in the end

[23] Oddly, this tension between historicizing and the method of case studies has not, to my knowledge, been acknowledged in the field—and very often historians, especially, are quick to endorse both simultaneously (in particular as ways of criticizing the Conflict Thesis; see e.g. Lightman 2019, 5–6). We will return to this in Ch. 4, §3.

it isn't just method or rhetoric or politics,[24] but a blend of all (and others) which do the explaining. But focusing on how the methods used appeal/fail to appeal to particular publics can offer fruitful insight into the issue.

1.5.3 Guide for the Public

A typology of methods' greatest strength, I believe, lies in its ability to provide a guide to the public in navigating the religion-and-science literature. We saw above that concept-oriented typologies do this by asking what concepts of religion and/or science the subject has and directing them to literature which employ those same conceptions. In this way, concept-oriented typologies can help consumers (scholarly or not) find work that is actually relevant to them. A typology of methods can provide a similar guide, but one that is, I think, even more useful to the subject.

A methods-oriented guide builds off the idea that different methods are likely to appeal to different readers. Now, it's important to note that the consumers of the religion-amd-science literature are a highly diverse group. Readers have all kinds of different reasons for delving into the work on the RSR: some seek ways to defend their faith, others seek ways to attack others' faith; some have purely academic interests in the RSR, others a much more personal investment; some are embedded in a particular faith tradition, others are not. And the particular set of circumstances which lead readers (and researchers) to the literature contribute to the kinds of evidence they will find relevant (and convincing). Since different methods employ different kinds of evidence, it follows that the different methods will be more or less well-equipped to deal with different particular readers' concerns/interests in the RSR. By isolating what kinds of methods are best suited to which kinds of concerns, a typology of methods can thus help direct members of the public (and scholars!) to those

[24] I should also point out that the slowness/reluctance of high school history and social science textbooks to change their presentation of the RSR (especially in their characterization of the Enlightenment) is surely relevant (see Aechtner 2019 for more on this strand).

works which would be most relevant to them. Schematically, the guidance would look like this: "Readers with concerns X should read works Y and Z because they use method A."

This focus on values rather than concepts results in real, pragmatic differences. Recall, for example, our freshman biology student considering which books to read about the RSR. What kind of guidance could a typology of methods give? It might well be that what concerns this student most is whether she can fit herself into a narrative of religious biologists (or religious biology). Given that, it would make sense to direct her to the case-study literature, perhaps to the work on Darwin's reception in Victorian England and in the US (e.g. Moore 1981)—rather than to historicizing work like Harrison 2015, or even conceptual analytic work like Plantinga 2011, which our student may find too abstract. Likewise, this kind of student might be interested in how she will be treated as an academic biologist who is also deeply religious, in which case fieldwork-esque studies will be the most relevant.

Now consider a case with broader social implications: a politician navigating her, say, Muslim constituents' opposition to stem cell research. The politician in this case wants to understand the root of the opposition, and thus find ways of defusing it or communicating it to her colleagues. Here, again, fieldwork studies, like the work done by the Pew Foundation (**pew21**; Pew Research Center 2009) or Everhart's study of Muslim physicians (Everhart and Hameed 2013), will be more appropriate rather than historical case studies or conceptual analyses.

Note the difference in how this case is treated by a methods-oriented guide rather than a concept-oriented guide. Using concepts, we would ask after the politician's conceptions of religion and science, or perhaps about their constituents' notions. But it's easy to see how this might not lead to a result that is actually *useful* for the politician. For suppose that both the politician and her constituents understand religion and science as competing forms of knowledge production about the natural world. We would then suggest that she read works from, again, T. Smith and Plantinga. But it is not clear how those works would lend

themselves to actionable recommendations for the politician's actual situation: How does it help to know that indeed the methods of science out-compete the methods of religion or that true science is really compatible with true religion? Would this help our politician address her constituents' concerns? Instead, fieldwork studies which indicate how lay religious folk actually interact with science seem more likely useful—regardless of the politician's own understanding of what religion and science are. [25] Such studies can give the politician a better sense of what is "really" at issue in Muslim opposition to stem cell research because it builds on actual studies of on-the-ground individuals rather than abstract, idealized concepts.

In the above cases, we have seen recommendations against the use of conceptual analytic works. This is an artifact of the examples, not an indication of the methods-oriented guide's opposition to conceptual analysis. Consider, for instance, a Buddhist apologist in the West. To the extent that they see a need for legitimizing their religion in a Christianity-dominated society, such a person might indeed find the conceptual analytic literature more relevant. If it is indeed the case that religion, and Buddhism in particular, is such-and-such a thing, and that it is in fact compatible with science (as properly understood as such-and-such), then that seems to be a strong reason to take Buddhism seriously (given that we take science seriously). Likewise, if it is actually the case that Buddhism is a *type* of science (c.f. Wright 2017), then this is even better fuel for the apologist.[26]

Again, notice that this recommendation side-steps the concepts of religion and science that the apologist holds and instead cuts directly to their values and situation. The question a method-oriented guideline asks is "Why do you care about the RSR?" rather than "How do you understand 'religion' and 'science'?" And in fact, asking this latter question is *irrelevant* to the apologetic purpose of the Buddhist (or politician). It *might* be relevant to understand how their opponent conceives of religion and science. However, if their opponents are a

[25] In a sense, we might say that the politician's conceptions of religion and science are irrelevant to the issue at hand; what matters is how her constituents relate the two in their actual lives.

[26] Historically, conceptual analysis has in fact been strategically employed by Buddhists to resist Christian colonizers and to win legitimacy for the religion worldwide (see especially Lopez 2008).

diverse bunch, with many conceptions of religion and science present, then the recommendations from a concept-oriented guide will quickly get out of hand: read everything!

1.6 Conclusion

In this chapter, I have done four main things. First, I proposed a taxonomy of typologies in the religion-and-science literature: some are conclusion-oriented while others are concept-oriented. I then considered the ways in which typologies are used—as first-order classifications of the RSR and as second-order taxonomies of scholars and their works regarding the RSR. This put me in a position to talk about what we might want typologies to do; I reviewed the reasons proposed by Barbour and then outlined three further goals (some of which were elaborations of Barbour's): 1) highlighting effective scholarly engagement; 2) explaining the public uptake of particular scholarly works; and 3) providing a useful guide—or map—of the literature for the public (and for scholars). Finally, I proposed a different kind of typology, one based on the methods used by scholars in their studies of the RSR, and discussed how this typology achieved the goals I outlined.

I should emphasize that my purpose in outlining this typology has not been to argue in favour of any one of the particular methods. As discussed above, the different methods have their different uses: depending on one's reasons for entering into the religion-and-science literature, one will find particular methods more or less useful. Perhaps the worried student finds solace in case-study biographies; perhaps the politician is better helped by fieldwork; and perhaps the apologist (or the philosopher) is more interested in conceptual analysis. For what it's worth, I tend to find fieldwork studies to be the most relevant; I come to the literature interested in relatively mundane issues related to religious tolerance—what matters most to me is what "everyday" people think *now* regardless of how odd I think their conceptions of "religion" or "science."

I should also reiterate that my typology of methods is not meant as a *replacement* for relationship-based typologies, whether they be conclusion-oriented like Barbour's or concept-oriented like Stenmark's. This is so for two reasons. First, these different typologies cross-cut one another; they are often mutually compatible. If one so wished, one could find Conflict theorists within the category of Conceptual Analyzers just as much as they could find Historicists within the category of Neo-Harmonists. But second, a typology of methods is focused only on classifying scholars (or other authors) and their works. Relationship-based typologies can also be used in the first-order way as a means of categorizing ways in which the RSR could be itself configured. Method-oriented typologies simply cannot do this; they are not typologies of the RSR, but of those who discuss the RSR. In that sense, a typology of methods cannot *replace* relationship-based typologies; their uses are not identical. And I should emphasize, again, that I think the first-order use of typologies has its place. However, given that the second-order use is more prevalent in the literature, it was high time to discuss just what we want from such typologies.

In the rest of this dissertation, I will flesh out this typology of methods by examining each of the four methods in more detail. The chapters will take each method in turn, clarifying how I conceive of them, reviewing their problems, proposing improvements, and highlighting the publics for which they are most relevant. A central theme throughout my critiques of the methods revolves around the questions (sometimes asked in the literature, but I think not adequately incorporated): Whose science? Whose religion? In particular, I unpack the disconnect between academic conceptions of these endeavours/institutions/practices and how they are encountered in particular contexts, whether they are everyday or academic.

Chapter 2

The Method of Conceptual Analysis

She takes a chance and pulls a book at random from the shelf. It starts off blandly enough—science is about the natural world, religion is about ethics, so there's no conflict between them. Our undergrad pauses, "But is that really all there is to say?" she wonders. She pulls another and learns that really science employs empirical methods to learn about the world whereas religion uses something else—faith—to learn about that world, and that means religion and science are constantly in tension. Something about this surprises her. It's not the conclusions, but rather the starting places. How do these authors find these definitions? Oddly there aren't many scientists or religious figures being quoted in the books. And how is there even disagreement about the definitions in the first place? How can there be disagreement about what science is? Doesn't everyone know that science is... Her thoughts trail off as she tries to recall what her textbooks had said.

But she snaps out of it and realizes that there's something else odd about these books. These definitions—where do they come from? Do they just come from the authors' imaginations? And are the science and religion featured in these books, defined in this way, actually relevant to her own life and experience?

In this chapter, I consider the method of conceptual analysis as it is used in the public-facing religion-and-science literature and in particular the attempt to characterize the RSR. I begin by specifying what I mean by "conceptual analysis" and highlighting what I take to be exemplars of the method in the literature past and present. I then consider several problems with the method and its common implementation. Many of these problems derive from a failure of scholars to ask the question: *whose* concepts of "religion" and "science" ought to be analyzed? I argue that most scholars over-emphasize the theoretical aspects of science at the cost of ignoring the social-embeddedness of science and the much more widespread industrial practices of real-world scientists—that is, scholars generally characterize science as a theory-oriented *knowledge-producing* enterprise, which fundamentally mischaracterizes the vast majority of professional scientists. Another way of putting this is that too much attention has been given to "basic" science rather than "applied" science. Given that these scholars are engaged in a conceptual analysis of science in order to make socially relevant claims about the RSR (by virtue of being public-facing scholars), this focus is problematic for it ignores a large majority of science actually pursued in modern society, which is the relevant concept for analysis. I conclude with a discussion of what kinds of readers might find conceptual analytic studies useful.

2.1 Varieties of Conceptual Analysis

By "conceptual analysis" in religion-and-science, I mean the method which proceeds (roughly) as follows:[1]

[1]To be clear, this definition of conceptual analysis is not supposed to be a standard definition of the eponymous, possibly distinctly philosophical method—though it is, of course, similar. In particular, I do not think this method is the same as that "conceptual analysis" which forms the ancestry of modern "analytic" philosophy.The "conceptual analysis" I discuss here seems broader than that particular method, and allows for the analysis (the process of definition) to proceed in any number of ways.

> **Conceptual Analysis**: 1) define 'religion' (or a particular religion) and 'science' (or a particular science), then 2) on the basis of those definitions, derive their relationship.

For instance, one might define 'religion' as "a system of knowledge about the world which relies on faith" and 'science' as "a system of knowledge about the world which relies on empirical observation". Given these definitions, one might then claim that religion and science are in conflict since they are both systems of knowledge about the world but rely on conflicting methodologies (granting, of course, that 'faith' and 'empirical observation' are antithetical; as we'll see, this is essentially the argument of T. Smith 2019).

There are a number of things to note in this characterization of conceptual analysis. First, 1) involves *definitions*. In some philosophical circles, 'definitions' carry significant baggage—the provision of necessary and sufficient conditions. For our purposes, I do not require the 'definition' in 1) to satisfy any stringent requirements—if the reader would prefer to replace 'define' with 'analyze' or 'characterize,' they are free to do so. In the literature, however, many authors *do* go so far as to provide definitions. Rodney Stark, for instance, does this (Stark 2003, 4, 124). Furthermore, many authors talk of *defining* 'religion' (or a particular religion) and 'science' (or a particular science) at the start of their works, even if they do not provide a "proper" definition or even attempt to at all. Here are a couple examples:

> How can one speak about the relationship between science and religion, either as practices or as systems of belief, without first **defining** terms? It is possible to go only so far in meeting this objection. ... Too restrictive a **definition** can, however, be counterproductive because it may exclude too many questions before they have been asked. If the study of history is to be instructive, it is important not to establish foregone conclusions through the rigidity of **definitions**. (J. H. Brooke 1991, 6; my emphasis)

> Before looking more closely at how Christianity and science relate, we should briefly **define** these terms as we are using them in the introduction and conclusion, as well as how our contributors understand them. (Reese 2021, 12; my emphasis)

Thus, in what follows, I will adhere to the conventions of the literature and typically refer to authors' "definitions," without the more sophisticated connotations of especially picky philosophers.

Second, 1) can proceed in any number of ways. "Conceptual analysis" often implies an a priori method; one might think of the canonical armchair philosopher pontificating on the nature of things from their ivory tower. But conceptual analysis can be done in a variety of ways and need not be done by philosophers. Although some—like Leo Tolstoy (1828–1910)—do indeed employ a priori methods when defining 'religion' and 'science', many do not. The anthropologist James Frazer (1854-+1941) provides a good example of an empirical form of conceptual analysis. After surveying ancient forms of worship, Frazer felt that he could extract a general characterization of religion as an explanatory system of the natural world that appeals to agential wills (Frazer 1922 Ch. IV). Gregory Dawes employs a similar empirical method in his much more recent *Deprovincializing Science and Religion* (2021).

The analysis, of course, can isolate different aspects of religion/science (or their species); the definitions arrived at by different scholars can differ quite radically. As we saw above, Smith focuses on the *methods* he takes to be characteristic of religious and scientific ways of knowing. But one could instead focus on the social structure, endorsed propositions, or aims of religious/scientific communities, just to name a few. Furthermore, a conceptual analyzer could also generate definitions which mix these various aspects, as suggested by Stenmark 2004, whose work and recommendations I'll discuss below.

One more note on 1): the qualifiers are important. Some scholars do talk of Religion and

Science as capitalized, global, seemingly monolithic categories; others instead discuss much more local species. Interestingly, whether a scholar analyzes religion in general or some particular religion in specific seems to be highly correlated with the aims of the scholar, and ultimately their view of the RSR. The trends seem to be as follows: Those with a negative view of the RSR (e.g. Conflict theorists) tend to take a more global approach; we saw this, again, with Smith and Frazer. Also in the globalizing camp are Separatists like Stephen J. Gould (1941–2002) and Michael Ruse. On the other hand, apologists tend to focus on their religion in particular—Alvin Plantinga, for instance, is only concerned with (a particular form of) Christianity. This global/local focus does not often spill over to the science side, however: Even when authors offer definitions of particular religions, they tend to still seek a general definition of Science. There are a few exceptions, of course: evolutionary biology is often singled out for discussion (as in Plantinga 2011), as are relativity and quantum mechanics. No one, though, seems to be interested in chemistry, environmental science, agricultural science, or any of the "non-theory-oriented" sciences (like genome sequencing, cosmetic chemistry, and conservation biology). We'll return to this lacuna later on when I discuss general problems with the current use of conceptual analysis in the field.

Regarding 2), I should clarify that the "derivation" involved is strictly (purportedly) logical. It is not empirical. Thus, after Frazer has arrived, empirically, at his definition of 'religion' and (via some other process, perhaps armchair pontificating) 'science,' their relation is arrived at *logically*: religion appeals to wills, science does not, and so they are in conflict since they try to explain the same thing (Frazer 1922 Ch. IV). Frazer does not present us with historical examples of religion–science interaction and then arrive at their relationship via induction (this would be a instance of the method of case studies, to be discussed in Chapter 3).

Finally, the "then" between 1) and 2) need not be explicit. That is, the definitions in 1) need not be laid out plainly for the reader to see; they may instead be implicit. The key,

however, is that the derivation in 2) is made on the assumption of the definitions in 1), even if there is no formal location where those definitions are spelled out clearly.

So the method of conceptual analysis proceeds by defining the terms and "then" deriving their relationship based on those definitions. The method is used widely by philosophers, historians, social scientists, and scientists alike (among others). I'll now turn to some actual examples past and present, then proceed to a critique of the method.

2.1.1 Some Exemplars from the Past

Frazer, Tolstoy, and D.T. Suzuki (1870–1966) all published explicitly public-facing works on the RSR which enjoyed some amount of popularity. Frazer's *The Golden Bough: A Study in Comparative Religion* was first published in 1890 as an enormous two-volume study of the Greek cult of Diana, though this main target served as a stocking horse for a larger discussion of the roots of religion in general. In subsequent years, Frazer first expanded the work into three volumes in 1900 (when it was retitled *The Golden Bough: A Study in Magic and Religion*), then into twelve volumes published over 1906–1915, and finally published a much-condensed, single-volume version totaling only(!) about nine hundred pages in 1922.[2] The condensed edition was widely read by both academic and popular audiences in its day and continues to remain a key text (if only for historiographic reasons) in the study of religion, especially in anthropological circles. On the other end of the spectrum, Tolstoy's works on the RSR are quite short. Here, I only discuss "A Confession" (1879) and "Religion and Morality" (1893), wherein he explicitly discusses the RSR in his reflective essay style. The first of these essays was originally censored (in an attempted publication of 1882), but was eventually published in Geneva in 1884 and in Russia by 1906—in both cases appearing in literary journals. "Religion and Morality" (1893) on the other hand was originally written for an ethical society based in Germany, though it was printed in the

[2]It is this condensed version which I draw from below, cited as Frazer 1922.

"magazine of thought" *Contemporary Review* in 1894. Finally, D. T. Suzuki, writing in a quite different cultural context, wrote extensively on the RSR in his early career. Many of his works are explicitly apologetic in nature: They were presented in order to defend the legitimacy and sophistication of Asian religion against a climate of Western religious chauvinism (Lopez 2011, 220). This is the case with his seminal *Outlines of Mahâyâna Buddhism* (1908), written specifically for a Western (English-speaking) audience, which I discuss below. Though these writers all employ the method of conceptual analysis, they do so in very different ways.

As discussed briefly above, Frazer's approach is (perhaps arguably) empirical. In the *Golden Bough*, Frazer reconstructs the practices of dozens of ancient and medieval cultic forms of worship (mostly European and Middle Eastern). It is presumably on the basis of this vast amount of research that Frazer then generates his definition[3] of 'religion' as "a propitiation or conciliation of powers superior to man which are believed to direct and control the course of nature and of human life."[4] As Frazer points out, his definition of religion is twofold, containing a "theoretical" (belief in superior powers) and a "practical" (propitiation of said powers) element.[5] An implication of this definition is that "the course of nature is to some extent elastic or variable"; propitiationary acts can alter "the current of events from the channel in which they would otherwise flow."

Frazer's conception of science is more difficult to pick out; he never explicitly defines it as he does with religion. However, from his discussions of magic, something of an intermediate "stage" between religion and science—reminiscent of August Comte's metaphysical spirit which lies between the theological and positive/scientific ages of humanity's development—,

[3]Frazer himself calls it a definition, although he cautiously acknowledges that "there is probably no subject in the world about which opinions differ so much as the nature of religion, and to frame a definition of it which would satisfy every one must obviously be impossible. All that a writer can do is, first, to say clearly what he means by religion, and afterwards to employ the word consistently in that sense throughout his work" (Ch. IV).

[4]All quotes from Frazer here are taken from Ch. IV "Magic and Religion" in Frazer 1922.

[5]Incidentally, Frazer distinguishes religion from theology on this basis: theology lacks the practical element.

we can piece together a Frazerian science. As in magic, so too in science "the succession of events is assumed to be perfectly regular and certain, being determined by immutable laws, the operation of which can be foreseen and calculated precisely; the elements of caprice, of chance, and of accident are banished from the course of nature." But whereas magic misapplies the (rather Humean) "fundamental laws of thought, namely, the association of ideas by similarity and the association of ideas by contiguity in space or time," science does not.[6] So Frazerian science, like Frazerian religion, involves both a theoretical aspect (assumption of the regularity of events) and a practical one too (proper application of the laws of thought).

Once Frazer has erected his conceptions of religion and science (the definition of religion actually comes after his discussion of science and magic), he then moves on to assess the RSR: the "implied elasticity or variability of nature [in the definition of religion] is directly opposed to the principles of magic as well as of science, both of which assume that the processes of nature are rigid and invariable in their operation, and that they can as little be turned from their course by persuasion and entreaty as by threats and intimidation." So religion and science disagree in both their theoretical and "practical" parts—a classic case of Barbourian Conflict. But the locus of disagreement can be more accurately pinpointed in the explanations they offer. Frazer goes on to explain that the real distinction between "the two conflicting views of the universe turns on their answer to the crucial question, Are the forces which govern the world conscious and personal, or unconscious and impersonal?" Religious explanations feature the former, scientific the latter. We thus have, in Frazer, *epistemic methodological* conflict between religion and science.

Tolstoy reaches a very different kind of conclusion, but also arrives at his characterization of science and religion via empirical means, although Tolstoy's are much more "personal" than Frazer's. In *A Confession* (1879), he writes, "I searched everywhere and thanks to

[6]In this way, magic and science lie on the same spectrum, and "were [magic] ever to become true and fruitful, it would no longer be magic but science" (Frazer 1922).

a life spent in study, and to my connections with the world of learning, I had access to scholars of various disciplines. I was not denied insight into their erudition, both through books and in conversation with them, and I learnt everything that knowledge has to answer to the question of life" (Tolstoy [1879] 1987, 34). After talking with many scholars, Tolstoy then concludes, "Experimental science only has to be introduced to the question of final causes for it to turn into a nonsense. ... [It], therefore, only deals with positive knowledge and reveals the greatness of the human intellect when it does not introduce the question of ultimate causes into its inquiries" (ibid., 38). So science does not address questions of ultimate concern. Religion, however, Tolstoy discovers, *does* address these questions, but does so in a non-intellectual—in fact *pre-intellectual*—way, as stated more explicitly in his later work.

Later on, in "Religion and Morality" (1893), Tolstoy responds to a set of questions posed by a "German ethical cultural society" (Tolstoy [1893] 1987, 129fn. 47): "(1) What I understand by the word 'religion', and (2) Do I consider it possible for morality to exist independently of religion, as I understand it?" (ibid., 131) This answer is quite direct: "The essence of religion lies solely in the answer to the question: why do I exist, and what is my relationship to the infinite universe that surrounds me" (ibid., 134). Tolstoy then provides a kind of definition of religion as "the relationship a person recognizes himself to have with the external world, or with its origin and first cause" (ibid., 137). This characterization of religion is arrived at by a priori (possibly unintentional) introspection, or "revelation." As he explains, "this understanding is not acquired through any study or effort on the part of any particular person, or people, but only through acceptance by a person, or people, of the manifestation of infinite reason which is gradually revealing itself to mankind" (ibid., 140). Thus, Tolstoy arrives at his definitions of religion and science in different ways: the former via "revelation," the latter via personal empirical means.

Once he has his conceptions, however, the nature of the RSR becomes clear. Since religion is

simply the "relationship established between [man] and the infinite, never-ending universe, its origin and first cause," insofar as the sciences depend on a particular understanding of the relationship between the individual and the world, they must come after religion "since religious knowledge is the thing on which all else depends..." (Tolstoy [1893] 1987, 140).[7] Science and religion are thus incommensurate: science is some intellectual endeavour seeking answers to particular questions about the universe, while religion is "simply" the relationship one feels to that universe. A far cry from Frazer's competing explanatory systems!

While Frazer and Tolstoy speak of religion in a global, general sense, Suzuki limits himself to a more local discussion of Buddhism in relation to science (which he, like Frazer and Tolstoy, also takes in a global sense). Although he wrote extensively on Zen Buddhism and is perhaps most known for popularizing Zen in the West, I will here discuss one of his earliest works, *Outlines of Mahâyâna Buddhism* (1908). This book is explicitly intended for a Western audience of varied intellectual background: "It is popular in the sense that it tries to expose the fallacy of the general attitude assumed by other religionists towards Mahâyânism. It aims to be scholarly, on the other hand, when it endeavours to expound some of the most salient features of the doctrine, historically and systematically" (Suzuki 1908, v). It thus is also both advertisement and apology: Mahayana Buddhism has been widely misunderstood in the West, in part because there have been so few translations of its major texts, and so "it is a great pity that so few of the precious stones contained in the religion of Buddha are obtainable by Western people" (ibid., vii).

This apologetic angle frames Suzuki's subsequent discussion of the RSR. Like Tolstoy, Suzuki

[7]This sentence actually continues with, "... we cannot define it because we have no instruments with which to make the definition" (Tolstoy [1893] 1987, 140). He goes on, of course, to then define "religion" quite explicitly. The key thing to note is that the "definitions" Tolstoy speaks of are ones made within an intellectual pursuit, in particular an analytic pursuit which requires categories, or concepts (instruments), for breaking down terms. But religion is pre-intellectual: all intellectual endeavours are only possible within the framework of religion qua the understanding of the relationship between man and the universe. Thus it is that the nature of religion can only be known through revelation—as opposed to science or philosophy.

In my terminology, this characterization of 'religion' still counts as an act of 'defining,' as laid out in my definition of 'conceptual analysis' in §1.

thinks that religion operates where "the intellect" fails (ibid., 25–26). But unlike Tolstoy, Suzuki's religion does not undergird intellectual endeavours; instead "it must work in perfect accord with the intellect... religion must guard herself against the unrestrained flight of imagination" (ibid., 26). And in fact, science itself, as a form of intellectual activity (though Suzuki sometimes uses it as synonymous with the "intellect"), must also work with religion: "Religion and science, when they do not work with mutual understanding, are sure to be one-sided," leading to an unhealthy "imbalance" (ibid., 26). Thus Suzuki denounces "those pious religious enthusiasts who see a natural enemy in science and denounce it with all their energy" as well as "those men of science who think that science alone must claim the whole field of soul-activities as well as those of nature" (ibid., 26).

Further, Suzuki emphasizes that neither is religion entirely divorced from rationality nor science from imagination—though they are still different. What differentiates them is "their respective fields of activity" (ibid., 27)—the well-known doctrine of Separate Spheres, or Barbourian Independence. It is not just a difference in subject, however; Suzuki conflates explanatory form with subject matter: "Science is solely concerned with things conditional, relative, and finite. When it explains a given phenomenon by some fixed laws which are in turn nothing but a generalisation of particular facts, the task of science is done..." (ibid., 27). According to Suzuki, religion picks up where science leaves off because the soul is not satisfied: it yearns for teleological explanations, final causes which science cannot—or does not allow itself to—provide. So we have here something of a mixture of Frazer and Tolstoy; both the territory and the method used to investigate it are brought in to characterize 'religion' and 'science,' and ultimately derive their relation. The conclusion drawn, though, is different from both: Suzuki does not see inevitable conflict as a result of differing methods, perhaps because religion and science operate in different domains. But Suzuki also does not, like Tolstoy, think that one domain is the foundation for the other; Suzuki's religion is complementary to his science; they are co-equal partners.

What is important for us to note here is not the particular conclusion Suzuki reaches, of course, but the method by which he arrives there. Religion and science are defined, and their relationship falls out from comparing these definitions—conceptual analysis. But how does Suzuki construct his definitions? There is no evidence that he surveyed either the sciences or scientists—or religions and the religious. Instead, it seems that the definitions were arrived at through personal introspection: "the human heart never gets tired of its yearning and demands satisfaction" beyond what the intellect (qua science) can provide (ibid., 25). So here we have a case of purely a priori conceptual analysis.

2.1.2 Some Exemplars from the Present

I now want to turn to more modern applications of conceptual analysis to the RSR. The method itself has not changed since the early twentieth century. Nevertheless, it will be instructive to see how twenty-first-century authors have conceptually analyzed the RSR so that I can offer a critique of the method as well as recommendations for how it ought to be altered, or refocused, in order to make it more relevant to modern discourses surrounding religion and science.

I'll focus on four authors, most of whom have published public-facing work on the RSR: Alvin Plantinga, Michael Ruse, Rodney Stark, and Gregory Dawes (the only one whose work is not explicitly intended as public-facing). As in the previous century, so in this one the form taken by particular instances of conceptual analysis varies: some are empirical, some a priori. The authors examined here were chosen because of their popularity and clarity of expression, though I recognize that others could have served as well.[8] Finally, I should note that although these authors have written extensively on the RSR across many works, I will focus my attention on select book-length works which I take to be representative of

[8]See §2 of the Introduction for a discussion of the criteria used in my selection of the public-facing literature examined in this and subsequent chapters.

their author's view; in most cases, the instantiation of conceptual analysis found in one of a scholar's works is essentially the same as that found in another of their works (though exceptions will be noted).

So, the authors.

I'll start with Alvin Plantinga's widely read *Where the Conflict Really Lies* (2011), based on his 2005 Gifford Lectures. As an Evangelical Christian, Plantinga seeks to demonstrate the compatibility of Christian faith with science, and further advances the controversial claim that science is in fact incompatible with philosophical naturalism. The overarching slogan of the book is "there is superficial conflict but deep concord between science and theistic religion, but superficial concord and deep conflict between science and naturalism" (Plantinga 2011, e.g. 265)

Plantinga's thesis is at once both local and global. Although he talks at times of (theistic) religion as a whole, he is clear that he means Christianity in particular, and a very particular form of Christianity at that. On the other hand, when he speaks of science, he seems to speak of science writ-large—the total institution of modern science—although he focuses on particular cases from the special sciences (especially quantum mechanics and evolutionary biology). Regardless, the argument is straightforwardly conceptual-analytic: he defines his terms and derives their relationship. Plantinga's Christianity is "defined or circumscribed by the rough intersection of the great Christian creeds: the Apostle's Creed, the Nicene Creed, and the Athanasian Creed, but also more particular creeds such as the Catholic Baltimore Catechism, the Reformed Heidelberg Catechism, the Belgic Confession, and the Anglican Thirty-Nine Articles" (ibid., 8). His science, on the other hand, is a bit more nebulously defined, but is related to the method it employs; it is that enterprise which takes as its starting place 1) that the world be regular, predictable, and constant (in its operations) and 2) that we as humans/scientists believe in that regularity (ibid., 282–3). Once these definitions are on the table, the argument for Plantinga's positive thesis is relatively straightforward: The

prerequisites of science are eminently compatible with the beliefs of Christianity—in fact, those religious beliefs offer justification for the preconditions of science since "theistic religion" gives reason to expect 1)—given God's character—and 2)—since humans are created in God's image. Thus, there is "deep concord between science and theistic religion." The conceptual analytic form of the argument is clear.

Likewise, Rodney Stark provides a similarly clear example of conceptual analytic argumentation to reach a different—though possibly compatible—conclusion in his earlier *For the Glory of God* (2003).[9] The definition of 'science' is quite explicit: "*Science* is a *method* utilized in *organized* efforts to formulate *explanations of nature*, always subject to modifications and corrections through *systematic observations*" (Stark 2003, 124; emphasis original). In so defining 'science,' Stark limits its scope: "there are entire realms of discourse that science is unable to address, including such matters as the existence of God" (ibid., 125). And since "*religion* consists of *explanations* of *existence* based on *supernatural assumptions* and including statements about the *nature* of the *supernatural* and about *ultimate meaning*" (ibid., 4; emphasis original), science and religion occupy different spheres, and so do not conflict. Thus we have a kind of separate spheres argument via conceptual analysis.[10]

That said, it's important to note that Stark defines 'science' as a certain kind of *method* used to generate explanations, while 'religion' is defined as some collection of *explanations*. These definitions allow for some kind of interaction between religion and science, even if they generally speak of different phenomena (the supernatural or the natural). This is important for Stark as he ultimately argues that religion, and Christianity in particular, actually *led* to the rise of science. Thus, even if religion and science are separate endeavours, "*Christian theology was essential for the rise of science*" (ibid., 123; emphasis original). To get there, however, Stark also appeals to a mix of historical case studies—to be discussed in future

[9] I should note that Stark provides case study-based arguments as well, as will be discussed in Chapter 3.

[10] In fact, the classic example of the separate spheres view—Stephen J. Gould's Non-Overlapping Magesteria, or NOMA—is also the result of conceptual analysis (Gould 1998).

chapters. But what enables Stark to come to this conclusion at all is his conceptual analysis: religion and science are such that, even if they occupy different realms of discourse, the former can impact the latter in important ways.

Stark's conceptions of religion and science appear to stem from different roots. His definition of science appears to be *a priori*; we are given no justification of why we should conceive of science as a particular method used to formulate explanations of nature. On the other hand, the conception of religion as a set of explanations based on supernatural assumptions is supposed to be generated empirically: after surveying a wide variety of religions/religious practices, this emerges as a unifying trait.

The philosopher of biology Michael Ruse has also written extensively on the RSR, sometimes in general terms, more often focusing on evolutionary biology ("Darwinism") and Christianity (see e.g. Ruse 2001), and, like Stark, arguing for a separate spheres characterization. Here, I will focus on the picture Ruse presents in his contribution to Zondervan Publishing's *Counterpoints* series entry *Three Views on Christianity and Science* (2021). The series is explicitly public-facing, with the aim to "[provide] a forum for comparison and critique of different views on issues important to Christians." In this particular volume, the editors asked contributors to respond to the questions, "How do you view the relationship between Scripture and science?" and "In what ways does God act in the world?" (Reese 2021, 18). Ruse seems to have generalized this question (before coming back to these more particular ones) and begins his entry by phrasing it, "What is the relationship between Christianity and science?" (Ruse 2021, 19) The method he employs in addressing that question is, as he points out in a footnote, the same (at least in broad strokes) as in his previous work (ibid., fn. 1), and so I take it to be a fine representation of Ruse's methods (especially in his public-facing work).

The overarching message throughout Ruse's rather meandering—and often tongue-in-cheek—contribution is that religion is about faith, which is about God—and science is not. So, in

talking of natural theology as a possible convergence of religion and science, he concludes that "What it does not do is lead us to God, and most certainly not through science. That is the exclusive role of revealed religion. Faith" (ibid., 34). Science, on the other hand, is not God-oriented; it does not involve faith. Instead, it seems to concern regular natural phenomena—though Ruse notably does not lay down an explicit definition. Thus, science and religion[11] are entirely separate: as defined, they just cannot interact and either be in conflict (as Dawkins, his common target, would like) or converge (as a natural theologian might desire). They may complement each other, but neither religion qua religion or science qua science can aid the other in its unique endeavour.

How Ruse arrives at these characterizations of religion and science, he does not state. He most certainly does not derive it by surveying the views of those classed as religious and those as scientists—for he is comfortable saying that Young Earth Creationists and scientists like Richard Dawkins overstep their categorical boundaries: Creationists improperly use religion to try shaping science and Dawkins draws conclusions beyond the ken of science. His definitions come from elsewhere. And Ruse's argument does not proceed by first considering historical interactions between religion and science or reviewing what others have to say about the RSR, and then concluding something about the nature of the RSR. He instead begins with nascent definitions of religion and science and then proceeds to discuss particular possible encounters on the basis of his definitions—classic conceptual analysis.

The final author I'll discuss is the philosopher Gregory Dawes. Although Dawes' work isn't public-facing itself, it serves as an excellent and clear example of conceptual analysis. In his recent *Cambridge Element* (2021), Dawes argues that we cannot provide a general characterization of the RSR,[12] but only particular, "conditional" characterizations of the form "if the religion [in] question is of kind x, and the [science] in question is of kind y, then

[11] Although Ruse at times seems to speak just of Christianity, I think Ruse, in focusing so much on faith, takes himself to talk of all religions.

[12] Elsewhere Dawes does argue for a general incompatibility between religion and science; see Dawes 2016.

they will be related in manner z" (Dawes 2021, 12). This conditional approach is in stark contrast to the other authors discussed above, and Dawes' analysis is in many ways a model for how conceptual analysis may be fruitfully done. Indeed, Dawes' analysis is much more complex than the previous authors', and his definitions seem to be crafted with several of the critiques we'll discuss below in mind.

Despite the conditional approach, however, Dawes still postulates overarching definitions of what he characterizes as two ways of thinking about the natural world (elsewhere he calls them "forms of understanding," e.g. ibid., 2). He glosses the distinction on the first page as follows:

> A first way of thinking about the natural world explains its functioning by reference to a set of principles, which are derived from observations of the way the world regularly operates. ("Why did the stone fall when released from my hand?" "Because all objects fall toward the center of the earth when not otherwise supported.") The other interprets and explains the natural world by reference to what we may call "metapersons"—gods, spirits, and ancestors—who inhabit a realm inaccessible to ordinary perception and who have qualities and powers human beings lack. ("Why was the city destroyed by an earthquake?" "Because God was punishing its inhabitants.") (Dawes 2021, 1)

This first gloss of the distinction is only the beginning, and the definitions of 'religion' and 'science', the latter of which he re-terms "scientia" in the hopes of casting off some of our modern preconceptions, are refined later on. Thus, he defines '*scientia*' as "a communal tradition of inquiry whose aim is to create a systematic account of the principles governing a set of regularly observable phenomena within the natural or human world" (ibid., 6). 'Religion' is likewise defined in terms of its aims as a community endeavour: "a communal tradition of ritual action that seeks to make contact with a hidden realm of metapersons

and powers and whose goal is to bring this-worldly and/or other-worldly benefits to the individuals or community in question" (ibid., 8).

Rather than discussing religion and *scientia* all at once as monolithic entities, however, Dawes makes a point to localize his discussion to three different periods and locations in which religion and *scientia* are manifested in different ways. Thus, on the scientia side, he focuses on "integral cosmology" in ancient China (roughly 400BCE–the first century CE), "natural philosophy" in early modern Europe and the medieval Muslim world, and "modern science" from the nineteenth century onward (ibid., 6-7). On the religion side, he considers "diffused," "institutionalized," and "privatized" forms of religion (ibid., 10), which typically align respectively with the time periods of the different forms of scientia, though this alignment does not always hold. Further, Dawes focuses his attention on four different "dimensions" of religion and *scientia*: the cognitive, teleological, organizational, and epistemic.[13]

Once he has relativized to a particular kind of religion, x, a particular form of *scientia*, y, and—to add on a nuance he discusses but does not include in his general formula—a particular dimension, d, Dawes then derives possible ways in which the RSR could be characterized, z. Importantly, however, Dawes sees the definitions, and their particular manifestations, as what enable one to draw tentative conclusions about the RSR: because 'integral cosmology' is defined in such a way with particular aims, and because 'religion' in ancient China is defined as diffused in some particular sense, they therefore were not in conflict.

Dawes' argument is an exemplary application of conceptual analysis which avoids many of the issues I discuss in the following section. It can thus serve as a kind of aspirational model towards which employers of conceptual analysis should aim, although as we shall see it can

[13]This "multifaceted" approach is inspired by Mikael Stenmark's "multi-dimensional" approach (as Dawes himself notes; Dawes 2021, 4), which will be discussed in §2.1.

still be improved in an important respect if scholars would like to use conceptual analysis in public-facing work.

Now that we have laid out several exemplars of the method of conceptual analysis in the religion-and-science literature, we are in a position to consider some critiques of that method. In doing so, I aim to provide concrete recommendations for how to *improve* applications of conceptual analysis. So, while I will discuss shortcomings of the method of conceptual analysis—both those pointed out by others as well as novel issues of my own—my aim is ultimately constructive: by outlining the shortcomings, we can see how the conceptual analytic approach may be strengthened. Though it faces significant problems as currently practiced—especially in public-facing contexts—conceptual analysis should not be abandoned; when appropriately improved, it can still be useful to several publics concerned about the RSR.

2.2 Some Problems with Conceptual Analysis and its Use

The method of conceptual analysis has been widely critiqued in the religion-and-science literature. In this section, I want to bring together the various heads of the critical hydra and discuss their merits and drawbacks. Some critics of conceptual analysis claim that the method is hopelessly mired with difficulties and so ought to be abandoned. I think that this is overstating the situation. While I do agree that conceptual analysis in the style of most extant scholarship is in need of improvement, I do think that the method has its place; conceptual analysis really *is* relevant in some situations where the RSR is of real public concern (see §3 of this chapter). That said, if public-facing scholars wish their conceptual analyses to be of *more* utility, that is, if they wish to reach a wider general audience, or at

least reach particular public audiences more meaningfully, then I believe greater attention needs to be paid to the particular conception(s) of religion and science being analyzed. In particular, I think scholars have (in some cases knowingly) ignored the industrial, non-academic sciences which, I will argue below, form a large part of many publics' contact with science as a social institution. Thus, in order to make their analyses more proportionate to many publics' understanding(s) of science, scholars ought to focus on these other (from most scholars' standpoint) less familiar sciences.

This critique builds on the general observation, made often in the literature, that greater attention needs to be paid to the questions, "*Whose* science? *Whose* religion?" While many scholars have indeed begun to pay more homage to the variety of religions and the distinction between lay and "academic" religion (i.e. theology), or between religious practice and religious belief, insufficient work has been done exploring the other, scientific side, of the RSR.

The general worry around current implementations of conceptual analysis is that they feature problematic cases of synecdoche: they illicitly take the part for the whole. This can play out by taking a singular aspect of religion/science as representative of the whole (monolithism), supposing that there is a singular stable feature defining 'religion'/'science' (over-essentialism), or taking particular religions or sciences as representative of the entire family of practices captured under the heading of "religion" or "science." In the following subsections, I'll address each of these three forms of synecdoche in turn.

2.2.1 Monolithism

One issue facing many conceptual analytic accounts is their focus on only a single aspect of religion and/or science (often both). That is, many employers of conceptual analysis treat religion and science as monolithic entities rather than as complex social phenomena. Paul

Tyson puts it this way:

> It is typically assumed that this mode of philosophising can bring clarity and precision to the discussion and provide a neutral bridging language that facilitates conversation between [religion and science]. But for this very reason, the approach of some analytic philosophers has the potential to exacerbate the distortions inherent in the categories themselves, often reducing "religion' and "science" to their propositional contents or their approaches to knowledge, and thereby disembedding them from their real-life contexts. (Tyson 2022, 4)

Given that religion and science are both dynamic, multifaceted institutions, monolithic treatments may simply fail to engage with reality—the conclusions reached are conclusions about scholarly constructs rather than real-world entities. Even when the aspects discussed are real features of religion and science, however, it is problematic when scholars want to claim they have reached general conclusions about the RSR full-stop.

Aside from Dawes, each exemplar discussed in §1.2 of this chapter is open to this kind of criticism. Each of them reduces religion (or Christianity) and science to some particular aspect: realms of discourse for Stark, methods for Ruse, and some combination of both for Plantinga. Conceptual analysis, however, need not focus on just one element of religion and/or science, let alone an epistemic one. Mikael Stenmark has proposed several ways in which analyses of the RSR can be broadened so that the constituents—and their relation—are understood in a dynamic way representative of their actual complexities. Stenmark's aim is actually much broader than sharpening up conceptual analysis; he argues for a more general methodological change across the discipline: scholars (and non-scholars) should try to relate religion and science along particular dimensions rather than wholesale as monolithic entities. This recommendation, however, is especially relevant to employers of conceptual analysis, and his system can be used as a template for doing conceptual analyses well,

providing guidelines for the kinds of things to which scholars should be more attentive.

In his *A Multi-Dimensional Approach* (2004), Stenmark outlines four main aspects, or dimensions (or "levels"), of religion/science which might be relevant to their analysis: social, epistemological, teleological, and theoretical. This list is not meant to be exhaustive, but it is intended to represent elements of religion/science that are important to their existence as complex social institutions. As such, it is worthwhile exploring these dimensions in a bit of detail—and considering what further dimensions might be added—with an eye towards how the method of conceptual analysis could be better executed.

The label "dimensions" actually belies the fact that wrapped up in each of Stenmark's four are a number of what we might call "sub-dimensions" (though he does not call them such). In the case of the social dimension, Stenmark has in mind those features of religion/science which concern the process by which new members are enculturated. The particular social aspects he focuses on are trust in authorities and diversity of practice. Trust in authority is a central feature of both religion and science. It's required in order for the institutions to operate; if there were no trusted authorities in science, for instance, very little progress could be made in any research area: current work must build upon the mountains generated by predecessors, and there are too many previous results for each scholar to independently evaluate. As such, scientific initiates undergo extensive education in fundamental methodological and theoretical principles, many of which they are to accept on the basis of authority alone; likewise in religion. Of course, the role that authority plays in either institution may not be identical, but identifying and exploring those differences along this particular dimension is likely to be more fruitful than approaching religion and science *in toto*.

The other social sub-dimension Stenmark explores concerns what he terms "the diversity of practice" among religious folk and scientists. By this he means the fact religion and science are practiced 1) on an individual and a collective level and 2) by diverse populations. Thus, discussions of the RSR sometimes concern the practice of individuals—why certain

scientists accepted certain theories, or why certain religious folk rejected others. On the other hand, religion and science are often talked about as coherent group practices, united by common methods (which are perhaps ideals striven toward by individuals).[14] While collective practices might very well differ from particular individual practices, Stenmark points out that collective practices sometimes change in response to particular individuals—and this may occur in both religion and the sciences. Thus, understanding the ways in which individual practices can impact broader collective activity in both religion and science might be worth examining/paying attention to.

Beyond this, it is also important to note that religion and science contain a diversity of practices in the sense that each captures many particulars: religion encompasses Christianity, Buddhism, Hinduism; science physics, biology, (possibly) sociology. Each of these particulars may differ from their co-categoricals in any number of ways, and so, "it is therefore sometimes better to focus on how to relate a particular religion, like Christianity, to a particular science, like biology" (Stenmark 2004, 24). More importantly Stenmark points to the fact that there is an asymmetry between religion and science in that scientific practitioners are practitioners of a "discipline." Among the religions, we might have a correlate of this in theologians,[15] but there are many lay religious folk who do not undergo anything like the kind of extensive professionalization/training needed to become the religious correlate of a "scientist." On the flip side, "in science... we have nothing similar to ordinary believers" (ibid., 25).[16] Scholars must, therefore be careful to specify whether they are relating *religion* and science or *theology*

[14]It's interesting to note that whether a scholar focuses on individual or collective activity might be rhetorical: individuals seem to feature much more prominently in critical remarks—for instance, pointing out that Newton or Darwin or Einstein (supposedly) believed in God, or that Augustine or the Pope (supposedly) opposed heliocentrism. The activity of groups, however, tends to underlie more constructive arguments: in general, scientists use these methods, religious folk these methods, and so... insert conclusion. Paying attention to the level of activity discussed might thus be especially illuminating when we try to understand the social-rhetorical role of work in religion-and-science.

[15]Though Stenmark points out another disanalogy: "The task of the scientists is normally not to reflect on the life and commitments of the scientific community; it is rather to reflect on the natural world. ... Many theologians, on the other hand, take this to be their key occupation" (Stenmark 2004, 25).

[16]I'll return to this asymmetry below in §2.3.2 and discuss what it might look like to discuss the scientific correlate of ordinary religious believers.

and science—something our exemplars above are often lax in doing. I will return to these forms of "diversity of practice" in §2.3.

We should note that Stenmark's social dimension is an *internal* dimension. That is, it focuses on social aspects *within* religion and *within* science; it does not consider religion and science in their wider social context. But the external social dimensions of religion and science also seem like relevant points to consider. Different social forces operate to push potential initiates into religious circles than they do into scientific ones, forces which may operate not just based on the internal form of religion and science themselves, but on their public perception. Understanding how general conceptions of religion and science lead individuals into them might be relevant to understanding how the two are related, just as understanding the ways in which popular racial conceptions lead to class differentiation can help us better understand racial relations.[17]

The focus on the individual–collective distinction appears again in Stenmark's discussion of the goals of religious and scientific activities—his "teleological" dimension. Scholars' attention tends to center on the collective goals the idea being that religious folk and scientists *as communities* aim at some particular goal(s). Indeed, Dawes explicitly defines his conceptions of science and religion around community-level goals: they collectively aim at the same type of thing, explaining natural phenomena. Other writers are less explicit about it. For instance, although he doesn't outright say so, it becomes apparent that for Ruse, science *as a whole* aims at explanations of natural phenomena, religion *as a whole* at expressing feelings and understanding God, and so they are separate. And when scholars outside the religion–science literature discuss the "goals" of science, they also typically talk about communal goals: Merton's famous four norms, for instance, are supposed to be ideals held by

[17]As an example, because Blacks are popularly understood to be, say, less educated, they are less likely to obtain white-collar jobs. This then results in disproportionate representation of Blacks in lower socio-economic brackets compared to their White peers. This economic divide then drives further tensions between Black and White communities. Again, the point here is that these tensions are much better understood in a larger social context by taking into account more general racial perceptions.

the scientific *community* (Merton 1938).

Of course, individual goals might be radically different from the group's goals. A particular scientist might simply aim to make money rather than to share knowledge; another might be invested in saving a particular species of endangered goat rather than in the objective production of knowledge. Likewise, a convert to Christianity might do so to save their own soul while their community may instead aim to bring God's kingdom to Earth. For the most part, these individual-level goals can coexist with community-level goals, though, as Stenmark points out, investigating the ways in which individual- and community-level goals may be brought into tension—either within religion/science or between religion and science—might shed interesting perspectives on the RSR (Stenmark 2004, 29).

In addition to the individual-collective sub-dimension, Stenmark discusses two others: the epistemic-practical and the latent-manifest. As canvased above, the recognized goals of religion/science can exist on a spectrum from purely epistemic (generation of objective knowledge) to purely practical (making money). Likewise, those goals might be held explicitly, expressed on websites, in grant statements, or in conversations; or they could be "latent," revealed perhaps in actions but not in words—Stenmark's example is patriarchalism in Christianity: "after empirical studies we may come to understand that Christianity also has the implicit goal of maintaining a patriarchal relationship between men and women in religion and society" (ibid., 49).[18] This last example points to the fact that manifest and latent goals may be in tension: Christians purportedly hold to the collective manifest practical goal of aiming "for the mutual respect and love of all human beings," which might be in conflict with the collective latent practical goal of maintaining patriarchal relations in society. We can also see this rather clearly in the history of science: presumably, medical researchers employed by Big Tobacco embraced the collective manifest epistemic goal of producing intersubjective, uninterested knowledge—while they in fact also had the collective latent practical goal of

[18]Surely we should limit this from "Christianity" to "certain Christian communities"!

producing results which demonstrated the safety of tobacco consumption (see e.g. Conway and Oreskes 2010).

Stenmark brings up the teleological dimension of the RSR to argue that much scholarly disagreement about the RSR is a result of disagreement over the aims of religion and science: "I have suggested that scholars who write about the relationship between religion and science should address certain teleological questions. ... The reason why they sometimes come to different conclusions and seem to be talking past each other is often that they are, in fact, committed to different accounts of the goals of religion and science, which are not clearly stated" (Stenmark 2004, 50). Stenmark further faults scholars not only for failing to be explicit about their own conceptions of the aims of religion/science, but also for failing to be explicit whether they believe those aims are static (ibid., 47).

Our exemplars above, however, seem rather committed to the stability of the aims of science—at least when they mention those aims. Again, Ruse and Stark, seem to think that there is a unique thing at which religion and science aim, and none of them provide temporal (or, for that matter, cultural) indices. Even Dawes, although he does speak of particular times and cultures, still thinks that scientia and religio as manifested in those locales, aim at "creat[ing] a systematic account of the principles governing a set of regularly observable phenomena within the natural or human world" (Dawes 2021, 6) and "mak[ing] contact with a hidden realm of metapersons and powers and whose goal is to bring this-worldly and/or other-worldly benefits to the individuals or community in question" (ibid., 8), respectively. We'll come to this issue in the next subsection.

To return to the larger picture, Stenmark finds it important to pay attention to the teleological dimension because the goals scholars acknowledge for religion and science shape the way they define religion and science—and thus at least partly shape the characterization of the RSR at which they arrive. By being clear about what goals they focus on, scholars can not only sharpen their definitions, but by taking seriously the actual goals of their intended

audience, they can make their work more relevant.

I come now to Stenmark's last two dimensions—the theoretical and epistemic. These are, in a sense, less interesting than the social and teleological dimensions, since extant scholarship is often more attentive to these more cognitive dimensions. The theoretical dimension is perhaps the most discussed in public-facing literature; it centers on the propositional content promulgated by religion/science. Interestingly, Stenmark does not offer a decomposition of this dimension—it appears to be flat; science might make certain claims about, say, the origins of life, and religion might make claims which differ from or are compatible with those claims. But Stenmark seems to miss that not all propositions are the same. For instance, religion and science (or specific religions/sciences) make both general and particular claims. A biologist might claim that speciation occurs by a process of random genetic mutation paired with natural selection (a general claim) and that the seahorse and pipefish diverged because of differential foraging behaviours (a specific claim[19]).[20] Likewise, a religious individual might claim that all aspects of one's life can be explained via karmic law (a general claim) and that my own current existence as a human being is the result of my good works in my immediately prior life (a particular claim). Often, particular claims are derived from, or backed up by, general claims—and often particular claims can be a motivation for discovering some general claim which unifies them (or the existence of a general claim can motivate the discovery of particular claims via application of the former to particular bounded conditions). Being mindful of this distinction could be useful in discussing the RSR, for it might be the case that analyses along the theoretical dimension could differ based on the kinds of propositions considered. For example, perhaps scientific particular claims are more often compatible with religious claims—be they general or particular. This kind of nuanced analysis, however, is not often found in the literature; our exemplars above think of religious and scientific

[19]See e.g. Van Wassenbergh, Roos, and Ferry 2011. Thanks to Jaehyun Lee for this example.

[20]These examples should make clear how the general–particular distinction is not the same as the universal–existential distinction: even if the general character of evolutionary explanations can be expressed as a universal, the particular evolutionary story of the seahorse cannot be cashed out as an existential claim.

claims as homogeneous collections—for Ruse and Stark they concern different phenomena, for Dawes they try to explain the same types of things, but they make no distinction between general and particular claims.

In contrast with the theoretical dimension, Stenmark identifies several sub-dimensions beneath the label "epistemic." For example, Stenmark defines the "epistemology of religion/science" as "the attempts to understand and explain how belief (in science, typically, theory) formation and regulation is conducted within religion or science and to assess whether these belief formations and regulations are acceptable and successful ways of carrying out one's cognitive affairs in these realms of human life, and, if they are not acceptable, to propose alternative ways for conducting religious or scientific belief formation and regulation" (Stark 2003, 52). So, when considering the epistemic aspects of religion/science, a scholar might focus on belief formation, belief regulation, and/or belief reformation.[21] Stark's conception of science, for example, gets at both belief formation and reformation: we generate scientific beliefs and "subject [them] to modifications and corrections through *systematic observations*" (ibid., 124; emphasis original).

Stenmark's overarching goal in *How to Relate Religion and Science* is to explain how we *should* relate religion and science. Of course, "how we *should* relate religion and science" is ambiguous. On the one hand, it could be a first-order claim about the proper characterization of the RSR. One the other hand, it might be a second-order claim about how we should go about determining that characterization. And both hands have two possible sides: normative and descriptive. In fact, Stenmark embraces the normative side of both hands: he walks through how we ought to proceed and then provides his own first-order characterization of the RSR (they ought to be seen as, on the whole, compatible along all dimensions). Above, we've focused on this first step and tried to extract lessons which can be used to bolster the

[21] In Stenmark 2010, Stenmark expands upon this reforming dimension.

method of conceptual analysis. The way to proceed is to think multidimensionally, rather than monolithically, to think of religion and science as multifaceted, complex phenomena. By nuancing our conceptions of religion and science in this way, not only will we be able to derive more accurate characterizations of the RSR—because we pay attention to the actual nature of religion and science—but we will be able to do so in a way which is adaptable for different audiences—and so more applicable to the groups we public-facing scholars wish to reach. Recognizing that religion and science are multidimensional and that they are understood differently in different contexts can better help us understand what is really at stake in public discussions of religion-and-science—and thus point towards how to most fruitfully engage with that discussion.

2.2.2 On Essentializing

One of the most frequently encountered critiques of conceptual analysis in the religion-and-science literature is that it relies fundamentally on overly essentialized notions of religion and of science. There are stronger and weaker versions of this critique. The weaker version simply points up the difficulty of finding satisfactory definitions of 'religion' and 'science' that will unify our intuitions about the various cases they're supposed to cover. Perhaps one *could* generate relevant and useful definitions of the terms of the RSR. But, these authors maintain, such would be very difficult (requiring more effort than, presumably, past and present scholars have employed), and so our time might be better spent using other methods to investigate the RSR.

It is true, of course, that the conceptual analytic route may be difficult. But the difficulty of a task is not a sign that it should not be undertaken, nor an indictment of the product produced. So this weaker critique has no real bite against conceptual analysis.

On the other hand, the stronger version of the anti-essentializing critique *would* do just that,

challenging conceptual analysis before it even begins. This stronger form is also present in the literature. Here, for instance, is one part of Geoffrey Cantor and Chris Kenny's famous attack on Barbour's fourfold typology and the use of the "copula" "religion *and* science":

> [N]either science nor religion (nor the conjunction "science and religion") possesses clear historical continuity... in spite of the unbounded and fluid extensions of the categories, *science* and *religion*, many writers treat them as distinct classes with fixed, temporally independent, and self-evident meanings. ... We suggest that [historical episodes] cannot be analyzed in terms of the interactions between broad categories—for example, between science and religion—no matter how subtly we redefine the boundaries between them." (G. Cantor and Kenny 2001, 771–773)

The problem is stated even more explicitly by Stephen P. Weldon:

> The greatest problem is that the very terms 'science' and 'religion' encourage an *essentialist* approach to history, an approach that tries to describe all events in the past in terms of the two modern categories of science and religion. Yet these terms are inadequate to describe the nature of the historical topics that are covered under that rubric because both terms refer to Western institutions and ideas that assumed their current form after 1800. (Weldon 2017, 3)

Weldon's characterization of the issue indicates two separate strands of the essentialist critique: historicism and cultural relativism. The idea seems to be this: ⟨religion⟩ and ⟨science⟩ are neither diachronically nor cross-culturally stable concepts. But these kinds of stability are necessary for a concept to be usefully analyzed in a way allowing broad and representative claims to be made about the RSR. Thus, conceptual analysis cannot contribute usefully to an understanding of the RSR because we cannot—and *could not*—successfully

generate definitions of 'religion' and 'science' which are representative across time periods and cultures.[22]

The historicizing critique is, I think, best exemplified in the "After Science and Religion" project spearheaded by Peter Harrison and John Milbank. As Paul Tyson states in the introduction to the inaugurating collection *After Science and Religion*, current "genres" of religion-and-science literature

> "share a common commitment to the idea that 'science' and 'religion' are valid, trans-historical categories that capture more or less perennial features of human culture. If it is true that science and religion, albeit in various guises, have been the chief lenses through which the world has been interpreted, then posing the question of how they relate to each other makes good sense. But what if it is not true? The guiding principle of the present collection is that we can initiate a much more fruitful discussion if we begin by questioning these two basic categories that frame and delimit the current conversation about how to interpret the world. *After Science and Religion* is thus an exploration of how the discussion might be changed if we were to relinquish, or at least critically examine, these two categories 'science' and 'religion.'" (Tyson 2022, 1)[23]

Harrison has argued for this view for across numerous works especially in the last two decades. In his *The Territories of Science and Religion* (2015), for example, Harrison claims that "science and religion are not natural kinds; they are neither universal propensities of human beings nor necessary features of human societies... the fact that science and religion are not natural kinds means that there are no firm criteria for adjudicating what should or should

[22]The way I have presented these two relativizing critiques is adapted from Josephson Storm 2021. These critiques also form the basis of a different methodological approach to characterizing the RSR, which I call "Deconstruction." I consider this method in more detail in Ch. 4.

[23]To be clear, Tyson and Harrison's critique is **not** limited to conceptual analysis; they are pointing to an issue they take to be pervasive throughout the religion-and-science literature, regardless of the methods used.

not be included in the concepts" (Harrison 2015, 194–95)—the application of conceptual analysis to the RSR is thus misguided. He arrives at this conclusion by considering the ways in which the notions of religion and science have changed over the past 1500 years in the European West. In particular, he focuses on the fact that both religion and science used to be understood as *virtues*, whereas now they are seen as bodies of knowledge.[24] When 'religion' was '*religio*' and 'science' was '*scientia*,' they could not possibly have been in conflict—in fact, the question of their relationship would never have arisen at all.[25] It is only because they have slowly morphed into radically different things, through a long and—quite importantly—contingent process, that we now speak of their relationship. But if our capacity to think of the RSR is so dependent on historical accident, the argument goes, how can we think that there is such a thing in the world such as the RSR that *can* be deduced from definitions of the constituent terms? Not only are those terms themselves Protean, but the relating act itself is suspect.

If taken seriously, this strong form of anti-essentializing *does* pose a problem for conceptual analysis—not just within religion-and-science, but more generally. For 'religion' and 'science' are not unique in having varied ancestries; almost all concepts which we might subject to analysis have diverse, often tortured histories. But this very universality of the critique ultimately calls into question its applicability.

Consider, for example, the concept ⟨fish⟩.[26] Today we understand 'fish' to apply to creatures of the classes Agnatha (the jawless fish), Chondrichthyes (cartilaginous fish like sharks), and the superclass Osteichthyes (bony fish). But the term has a long history in the English language and has been applied to a much wider variety of species. For instance, up until quite recently the concept included mammals like dolphins and whales (hence the name

[24]Interestingly he doesn't consider them as social institutions, or even social phenomena in general.

[25]Of course, virtues *can* be in tension with one another. Honesty and kindness, for instance, may come into conflict—perhaps even often. But Harrison does not seem to think that the intellectual virtue of *scientia* could ever compete with the moral virtue of *religio*.

[26]In what follows, I use brackets to denote concepts.

"blackfish" for orcas). Further, 'fish' has been used by a wide array of English speakers, from scientists-proper to fishermen to politicians. In these different contexts, 'fish' has had different valences, ranging from "creature in the sea" to "thing with gills and fins" to "member of the classes Agnatha, Chondrichthves, etc." In a famous California wildlife conservation case, even insects such as bees were categorized as 'fish' (*Almond Alliance v. California Fish & Game Commission* (2022))—though surely no fisherman worth her net would call a bee a fish!

Given this variety, a historicist might wish to claim that we cannot meaningfully discuss such topics as the conservation of the ocean's fish, for the concept ⟨fish⟩ is simply too slippery: it has no stable form throughout time and place. I take this to clearly go too far; surely we *can* meaningfully discuss ⟨fish⟩ despite its rather strange history. What we must do, though, is pay careful attention to the local contexts in which that term gets used.

A much more discussed example can be found in race. 'Race,' like 'science' (and 'religion') has been used in a variety of incompatible ways since its origins as a technical "biological" term in the late seventeenth century. Whether there were three, five, seven, or more races depended heavily on time and place (Darwin 1871, 226).[27] The particular attributes said to constitute or follow from membership in a specific race also varied significantly: at one time, Jews' superior performance in basketball was said to follow from racial traits; now the same is said of members of the Black race (see, e.g., Sclar 2008, Ch. 4). On this basis, the hard-line historicist would dispute the cogency of discussions of 'race,' let alone relations between different "races"—neither, say, 'White' nor 'Black' refer to diachronically and/or transculturally stable groups!

[27]The passage from Darwin's *Descent of Man* (1871) reads, "Man has been studied more carefully than any other organic being, and yet there is the greatest possible diversity amongst capable judges whether he should be classed as a single species or race, or as two (Virey), as three (Jacquinot), as four (Kant), five (Blumenbach), six (Buffon), seven (Hunter), eight (Agassiz), eleven (Pickering), fifteen (Bory St. Vincent), sixteen (Desmoulins), twenty-two (Morton), sixty (Crawfurd), or as sixty-three, according to Burke" (Darwin 1871, 226).

Clearly, however, this is not a feasible claim! It is true that, for all the reasons listed above and more, scholars (for the most part) have concluded that ⟨race⟩ has no biological basis; it is instead a social construct. And like all social constructs, ⟨race⟩ can change, often quite significantly, based on the social groups which construct it. But its status as such does not mean that ⟨race⟩ is, in general, an empty concept. Race still has real-world effects. Witness differential health care treatment and policing experience in the US (see e.g. Macias-Konstantopoulos et al. 2023 and Pierson et al. 2020, respectively). Even if race is not *biologically* real, it is still *socially* real (and very much so). And because of this, it is still quite meaningful to talk of race, and even the relationships between different races.

So too with ⟨religion⟩ and ⟨science⟩. Even if there are not meaningful diachronic characterizations of the concepts, religion and science still exist as entities in contemporary discourse that have actual impacts on real-world actors. Medicines get given to patients when they are backed by the label 'science;' institutions receive money for doing, or producing 'science;' organizations get special tax treatment for being 'religious' (at least in certain countries). And if 'religion' and 'science' can have real influence in these ways, it is not clear how anti-essentialist critiques can do away with analyses of ⟨religion⟩ and ⟨science⟩—or subsequent discussions of their relationship(s).

Some may balk at this kind of deflationary response. If ⟨religion⟩ and ⟨science⟩ are not stable concepts, is there anything at all in the world beyond mere use that their terms pick out? And if there are no referents, then how can we even have definitions, let alone derive relations on the basis of those definitions? Readers with these worries may be comforted by recent work in social ontology by Jason Ānanda Josephson Storm. Seeking a kind of middle ground between over-blown essentialism and socially irresponsible deconstruction, Josephson Storm offers a new way of conceiving social kinds like race—and religion (Josephson Storm 2021). 'Race' and 'religion,' it is argued, are best understood as referring to process-power-clusters: they refer to clusters of powers (the ability to impact/change something), but what

particular powers are always subject to change. Those changes are due to dynamic social forces—"anchoring mechanisms"—which cause groups to settle on/select different powers as relevant at different times (Josephson Storm 2021, 118–26). Understanding 'race' and 'religion' in this way allows us to still speak of the concepts ⟨race⟩ and ⟨religion⟩ as unified, existing concepts, but is responsive to the fact that they are unstable. And we can still refer to their real relations with other social kinds—and real world-effects—since they are "anchored" by real social forces. Thus, when we speak of the RSR, we can understand ourselves as referring to particular underlying social forces—e.g. the professionalizing of certain endeavours—which led contemporary discourse to conceive of 'religion'/'science' as it does, a move which seems quite in line with Harrison 2015. That said, Josephson Storm's "metamodernist" take on social kinds faces some issues—for instance whether the anchoring mechanisms are themselves best understood as process-power-clusters, and what might anchor those (personal communication)—but it does provide a reasonable middle ground for productively thinking with social concepts. Of course, if using this account, we will be forced to stay away from universal, global characterizations of the RSR—but that does not mean we cannot use conceptual analysis to arrive at our characterization.

This aligns with an issue with the strong version of the anti-essentialist critique which emerges from the relevance of ⟨race⟩, ⟨religion⟩, and ⟨science⟩ to ordinary folk today. While it might be true that these concepts cannot be analyzed in a way which reduces them to diachronically stable and still-useful cores, that does not mean we cannot analyze the concepts at all, and in particular that we cannot analyze our concepts *now* (whether or not we accept Josephson Storm's account). In fact, historicists like Peter Harrison (see especially Harrison 2015 and the "After Science and Religion" project it started (Tyson 2022)) are still committed to there being concepts-at-a-time which are stable enough to compare diachronically; this more piecemeal approach still requires distinct pieces to examine! That is, Harrison must be comfortable isolating, say, $\text{science}_{1800\text{s}}$ and $\text{science}_{2000\text{s}}$, for he must be comfortable claiming that they are not the same; analyzing either term is a precondition for determining their

difference. So why can a conceptual analyzer *not* simply talk of $\text{science}_{\text{2000s}}$ and its relation to $\text{religion}_{\text{2000s}}$? And similiarly for the cultural-relativizing branch of the critique: why not analyze $\text{religion}_{\text{Western}}/\text{science}_{\text{Western}}$? The anti-essentialist critique does not seem to pose a problem for this much more local discussion. It does, of course, limit the scope of any conclusions drawn about the RSR. But local discussions are useful nonetheless. In fact, to a large extent, local discussions are the *most* useful discussions we could have: insofar as the authors we have been discussing as exemplars of conceptual analytic methods are public-facing, their goal is to talk to local audiences, folks who live in a particular time—the now—and place—for the authors, the Anglophone West. Such authors presumably hope to influence current opinions concerning the RSR to enact (or resist) real change in the ways people interact with religion/religious folk and science/scientists, be it as everyday lay individuals, as members of religions/scientific communities, or as policymakers. To that extent, limiting discussion to $\text{religion}_{\text{2000s, Western}}$ and $\text{science}_{\text{2000s, Western}}$ to make a claim about the $\text{RSR}_{\text{2000s, Western}}$ seems eminently reasonable; those are the forms of religion and science with which people living in the 2000s in the global West are actually engaging.

So the strong anti-essentialist critique should not force us to abandon conceptual analysis. Of course, recognizing the historical/cultural contingency of our concepts is important; an important lesson conceptual analyzers could learn is to explicitly localize the analyses and be clear about having done so, or at least be upfront about the limits of the analysis presented. We should note that this more piecemeal approach to the RSR is not giving up on the method of conceptual analysis. Limiting oneself to a particular place-time does not mean that one cannot start with definitions of 'religion' and 'science' and derive the RSR, logically, from those definitions. It simply means that the concepts examined are more confined, more specific. So moving from universal, general conclusions about the RSR to more piecemeal ones is not abandoning the method; it is simply changing the kind of conclusion we make. But even if it were the case that we could make some claim about how religion and science have been related, on average, since the beginning of time throughout the world (which is

doubtful), we would need a further argument that this fact is relevant to the RSR as it is here-now, i.e. that our current concepts are not unique. But as far as I can tell, no such further argument has been offered. None of this, again, rules out a discussion of the contemporary RSR based on our contemporary concepts 'religion' and 'science.' We ought not essentialize overmuch, but we *can* still talk—and usefully at that—about concepts and their relations at a particular place-time.

2.2.3 Whose Science, Whose Religion?

Above, we've considered two general issues with traditional scholarly conceptual analysis: monolithism and essentialism. We saw that monolithism is an inaccurate characterization of the many dimensions of religion and science; our analyses must pay close attention to the non-epistemic features of both institutions if they are to more accurately capture them as they are actually practiced in the world. The lesson from anti-essentialism is that conceptual analysis would be better served sticking to temporally (and culturally) local analyses of religion and science. The advocates of these critiques in some sense build on each other, yet in another sense also talk past one another. On the one hand, Stenmark's account focuses on singular entities, Religion and Science, but complicates them by insisting on their multi-dimensionality. Anti-essentialists, on the other hand, insist that we must consider multiple Religions and Sciences across time periods and cultural places, although in Harrison's case one gets the feeling that each of those temporal-cultural-indexed Religions and Sciences are themselves singular: they *were* "just" virtues, but now are bodies of knowledge claims.

In this section, I will consider a different set of critiques which takes takes the key insights from anti-monolithism and anti-essentialism, and builds upon them. While these previous critiques focused on "internal" features of religion and science, the critique developed here will emphasize "external" ones; that is, it will consider the ways in which religion and

science interact as a result of their being institutions embedded in broader social contexts: the recommendation is that we consider the multiple multi-dimensional entities, religion and science, which operate in the same time period and same cultural place. A pithy way of putting this is that *scholars ought to pay greater attention to just whose 'religion' and whose 'science' is being analyzed.*

Calls under similar headings have been sounded many times by scholars within the literature (and not just as a critique of conceptual analysis). For instance, J. H. Brooke and G. N. Cantor 2000 entitle one of their chapters "Whose Science? Whose Religion?" and Glennan 2007 does the same. These scholars, however, have in mind very different kinds of possible responses to the questions. On the science side, Brooke and Cantor simply wish to call attention to specific sciences that may have been prominent in the past but may be left out of our modern "map of science." They thus suggest that scholars "engage those sciences and theories that do not feature in the modern pantheon, such as alchemy, scriptural geology, phlogistic chemistry, and phrenology" (J. H. Brooke and G. N. Cantor 2000, 62). On the religion side, Brooke and Cantor, as well as Glennan, call on scholars to realize that there is much disagreement about what religion is—either because non-Judeo-Christian religions are quite different from Judeo-Christian ones (ibid., 63–64) or because within particular religious traditions there is extensive disagreement about fundamental claims (e.g. the nature of faith or the sacredness of scripture; Glennan 2007).

But these calls to consider "whose science" and "whose religion" still leave out a large and very important swath of—to recall Stenmark's term—"diverse practices" resulting from the historico-cultural context of religion and science. For instance, surely, the lay Buddhist conceives of Buddhism differently than the theologian does (an expert–lay distinction), just as the industrial chemist may conceive of science differently from her research-university peer (a theory-oriented–or-not distinction). Addressing these other distinctions is especially salient for public-facing work since, by its very nature, it aims to engage with the RSR as

an object of public concern. Insofar as this is really the case, greater attention must be paid to how various publics actually conceive of religion and science.

The sociologist John Evans has recently critiqued many "elite" scholars for doing just this: focusing on "elite" conceptions of 'religion' and 'science' which do not align with everyday, quotidian versions of those concepts. In particular, Evans argues that academics and most popular media in the United States portray religion and science as competing knowledge-producing enterprises, which can thus be in conflict over the generation of knowledge claims (or over particular claims themselves). However, according to data obtained by re-examining the 2012 General Social Survey (GSS) along with the results of several interview studies, Evans claims that most Americans do not understand religion or science in terms of knowledge, but in terms of morals—that is, insofar as Americans are concerned with religion and science, they are concerned with them as competing moral systems. Thus, opposition to, say, evolutionary accounts of humankind by, say, conservative Evangelicals, is due to concerns about the moral implications of such accounts rather than concerns about the reliability of the evidence (J. H. Evans 2018, 77).

Evans is surely right to focus on public conceptions of religion and science—especially if his focus is on public-facing work on the RSR. In the rest of the section, I will first (§2.3.1) discuss in more detail the over-emphasis on "elite" views which Evans criticizes. Second (§2.3.2), I will unpack an asymmetry that is often noted in how science and religion are treated by conceptual analyzers: often the focus is on academic science in contrast to everyday religion. I'll look at how this argument relates to our exemplars and point to some ways in which this asymmetry could be resolved. Finally (§2.3.3), I then turn to a distinction that is almost always ignored on the science side of the relationship: the distinction between theory-oriented science and non-theory-oriented science. I argue that the public is much more likely to encounter and interact with the latter type of science—in the form of people (industrial scientists are a much larger population), products (e.g. cosmetics or food), and processes

(e.g. environmental agencies)—and so conceptual analysis must pay greater attention to these sciences. I provide a start in this direction, although fleshing out the philosophy of non-theory-oriented sciences is beyond the scope of this dissertation, especially since it has not been developed elsewhere.[28]

Experts, Experts, Everywhere

Evans' basic argument, put forth in J. H. Evans and M. S. Evans 2008 and most explicitly in J. H. Evans 2018, is that were we to consider non-elite conceptions of religion—and of science—then we would see that (insofar as there is conflict) religion and science are not in epistemic conflict, but in moral conflict (e.g. J. H. Evans 2018, 2). This has significant implications for how we should approach the RSR in public spaces. In particular, the knowledge-deficit model, by which concerned scientists attempt to address religious opposition to particular scientific facts, must be understood to be ill founded. If the issue is not epistemic, then public education campaigns which focus on better informing the public about the details of, say, evolutionary theory, are misguided. Instead, outreach should involve demonstrating the moral compatibility of scientific evolution and traditional worldviews.[29]

Evans' argument, however, is a bit more nuanced than this general picture—and that nuance demands several qualifications to the overarching critique. In the first place, Evans at least purportedly has a particular conception of "elite" in mind—those with outsized influence: "an elite is anyone who has a social role that allows them to influence the views of other people beyond their immediate acquaintances and family members on the issue under debate. So, obviously all academics are potentially elites, as are scientists, politicians, clergy, theologians, church officials, journalists, pundits, TV and movie producers, and leaders of social movements" (J. H. Evans 2018, 6). Although this definition is a bit vague, it's easy

[28] Although I should note that I plan to develop this in subsequent work.

[29] This is similar to the way in which Maya Goldenberg has recently argued that vaccine hesitancy is not a matter of knowledge-deficit either, but is instead a moral matter (Goldenberg 2021).

to make it more precise by thinking about social networks. Consider a given network. An elite is a node which contains, say, an order of magnitude more connections than the average for any given node of the network. As we will see, however, this conception of an "elite" (even when left in its original vague form), leads to several issues with the details of Evans' arguments.

In the second place, Evans acknowledges both a strong and a weak form of epistemic conflict between religion and science (ibid., 7–9). The strong version (which he labels "systematic knowledge conflict") claims that religion and science (*in toto*) are always in conflict because they are the products of competing knowledge-generating systems. The weaker epistemic conflict only claims that there are particular, proposition-by-proposition disagreements between religion and science (hence it is referred to as "propositional belief conflict"). Evans argues that the stronger version fails to actually exist while the weaker, to the extent that it does exist, is generally toothless (see ibid., Ch. 5).[30]

His argument against strong epistemic conflict centers on what he calls "knowledge-structures." These are formal ways of representing how an individual relates the various knowledge-claims she embraces. Elites, Evans claims, generally see religion and science as consisting in knowledge-structures, essentially foundationalist epistemologies in which basic scientific claims (facts) form the justificatory foundation for higher-level beliefs. Since this is how elites structure their own knowledge claims, and they think that both religion and science make knowledge claims, they consequently assume religious and scientific claims exist in competing structures. Given the chains of justification linking higher-level beliefs to foundational ones, disagreement between the religious and scientific structures at a high level necessarily entails deep, foundational disagreement. Thus, disagreements between religion and science are deep. We see this way of thinking in, for example, Dawes: religion and science are both

[30]I should note that labeling systematic knowledge conflict and propositional conflict "strong" and "weak" respectively is my own convention. Evans, however, does use the strong–weak distinction in discussing two forms of systematic knowledge conflict: the stronger form assumes metaphysical naturalism, while the weaker form does not. (J. H. Evans 2018, 9–11)

knowledge-producing endeavours which, because they employ radically different forms of evidence/knowledge-generation, are in necessary conflict. "Ordinary" folk, however, do not think of religion and science in terms of knowledge-structures, at least according to Evans. That is, "folk beliefs" (in religion and science) are not structured in a top-down hierarchy of justification and so disagreement about "high-level" claims does not belie deep-seated conflict. As an example, Evans considers American conservative Evangelical opposition to human evolution (i.e. the idea that *Homo sapiens* evolved from some other non-human species). Operating under the assumption of knowledge-structures among the public, elites expect this disagreement over human origins to belie a larger disagreement between conservative Evangelicals and the whole edifice of scientific knowledge. But, as Evans points out, such religious individuals are perfectly fine with many, if not most, other scientific claims—for instance that the Earth revolves about the Sun or that abortion ends pregnancy (e.g. ibid., 132, 145–146). Where these individuals take issue with scientific claims is when they have, or are thought to have, moral consequences. The ties between human evolution and eugenics (and in particular the Nazi program), for instance, fill the anti-evolution rhetoric of conservative Evangelicals. The fact that anti-abortion platforms self-identify as "pro-life" also indicates that opposition to abortion is ethically motivated. Thus, an elite picture of the RSR fundamentally mischaracterizes the relationship as understood and experienced by non-elites: insofar as there is conflict, Evans maintains, it is about morals, not knowledge.

We can understand Evans' critique as a critique of the method of conceptual analysis, at least as it is often used in the religion-and-science literature: scholars have employed elite conceptions of religion and science and thus missed the actual way in which they are related by members of the public—scholars over-emphasize the epistemic aspects of the two, neglecting the moral.

There are a number of issues, however, facing Evans' critique. First, Evans seems to be inconsistent in his conception of "elite" sources. As discussed above, an "elite" is first defined

as someone with outsized influence relative to the average member of the elite's network. But Evans quickly slips into talking about *academics* rather than "elites" in general: it is academics whose knowledge-structure conceptions are misleadingly projected onto the public. This is especially surprising since one might have thought that the average academic does not have an especially large influence! He also cites religious elites (like pastors and the Pope) as sources for supposedly non-elite views (ibid., 89, 110). Thus, we have a conflation of popular notions of elite social status with what started as a more technical notion. Further, if an elite is simply someone with outsized relative influence, we might expect that social media influencers (e.g. on TikTok) should qualify—and it is by no means obvious that such individuals' conceptions of religion or science would be knowledge-structure-based![31]

Second, Evans has been criticized for "failing to acknowledge the diverse 'publics' that comprise the U.S. religious landscape" (Ecklund, Mehta, and Bolger 2019, 637). While he is clear from the start that his focus is on religion in the United States, and so Christianity in its various forms will be his model religion (J. H. Evans 2018, 13), the diversity of Christianity in the US is often glossed over. For instance, he ignores the ways in which race might impact the kinds of conflicts—moral and otherwise—particular religious communities might encounter with particular sciences. Further, Evans' analysis centers on individual-level views of moral conflict between religion and science rather than on moral communities, which are arguably the "spaces where view of science and morality are often formed" (Ecklund, Mehta, and Bolger 2019, 640).

Third, we might worry that Evans' focus on the moral dimension may obscure meaningful epistemic tensions between religion and science even among the everyday Americans he studies. For while it may be the case that what "truly" motivates religious opposition to science are particular moral qualms with the particular sciences involved, such opponents

[31] Elsdon-Baker makes a similar critique of Evans, although the point is that Evans has not explained from where the public gets its conceptions or religion and science—and it may very likely be from internet sources which Evans does not examine (Elsdon-Baker 2019).

may truly believe that the opposition is more than moral. And, in fact, opponents of, for instance, human evolution *do* cite epistemic reasons for opposition to human evolution. Common apologetic moves include, for instance, questioning the reliability of radiocarbon dating and citing the supposed inability of step-by-step evolutionary processes to account for complex structures like the human eye. Evans may be right to point out that the selection of this particular point of opposition may well be driven by moral concerns. But that does not mean the epistemic aspect is not important, especially when the arguments against human evolution are couched in knowledge-oriented rather than morality-oriented language; the context of discovery does not make the context of justification irrelevant. And recognizing this fact is important.

Consider, again, the case of race. Even if racist actions are "really" *not* motivated by particular biological beliefs, but instead are motivated by a combination of social and economic factors, it is still eminently relevant that racists understand themselves as justified in their actions by biology. Indeed, countering these false biological narratives is a key part of defusing racism. Of course, it is also important to recognize the non-epistemic reasons why racists are racist, and non-knowledge-related interventions may even prove more effective than knowledge-dumping ones. But we should not be so caught up with the moral-social dimension that we neglect the epistemic. Telling everyday conservative Evangelicals that their knowledge-oriented arguments about missing fossils and fluctuating constants miss the mark, and that all they *really* care about are the moral aspects of evolution simply adds fuel to conservative Evangelical anti-intellectualism. As public-facing scholars, we need to be able to meet people where they're at—which seems to be Evans' overarching point anyway.

Despite all these issues, Evans' criticism of the elite discourse surrounding the RSR is still insightful. Unpacking it as a critique of conceptual analysis highlights the ways in which that technique can be misapplied in public-facing contexts. Evans calls on scholars to look at the actual social scientific data on public perceptions of science and religion, and argues

that doing so will help to decenter the epistemic aspects of science and religion and lead to a more relevant discussion of their relationship. This does not mean we need to abandon conceptual analysis—and indeed we might cite Ruse as an example of a scholar who does pay close attention to the moral dimensions of religion—but Evans is right that conceptual analysis would benefit from closer attention to the actual conceptions at play among everyday/popular audiences.

Before moving on, I want to point out that Evans' criticism can be seen as a modern extension of the "God of the philosophers" criticism which has existed for several centuries. Philosophers, so it is claimed, often discuss a "God" which is almost entirely divorced from the "God" of everyday religious practitioners (see e.g. Harrison 2006, 101). And yet, those very same philosophers ultimately want to make claims that fit into the folk religious framework.

A more generalized version of this critique can be found launched against employers of conceptual analysis, especially those who work in the tradition of Analytic philosophy (though they are not always philosophers). Rather than limiting themselves to God-talk, however, these analyzers talk of religion writ large, though in a form alien to actual religiosity. In most cases, the critique takes the form of claims like the following: "some analytic philosophers... often [reduce] 'religion' and 'science' to their propositional contents or their approaches to knowledge, and thereby [disembed] them from their real-life contexts" (Tyson 2022, 4). This is similar to Evans' point above that academics and the popular media too often present 'religion' and 'science' as systems of knowledge generation. Actual on-the-ground religious folk, however, do not think of either side of the RSR as just a collection of propositions or even as the total propositional output of a particular methodology—religion and science are in fact much more complicated phenomena, irreducible to knowledge claims and methods.

That said, there is danger in taking this argument too far: even if religion and science are not ultimately reducible to collections of propositions, propositions certainly *do* matter to

religious and scientific folk. Attention must be paid, however, to *why particular* propositions matter. In fact, Evans' point is that particular *propositions* become salient loci for religion–science conflict because they have moral implications. Thus human evolution but not heliocentrism is considered problematic among twenty-first-century conservative Evangelicals.

Beyond this, however, we must also recognize that there are non-propositional ways for religion and science to relate to one another, and I take this to be the main point folks like Tyson are trying to make. Perhaps the most obvious and most discussed is the "worldview" that tends to come along with the packages of propositions associated with "religion" and "science." Thus Plantinga takes great pains to demonstrate that naturalism qua materialism is not an essential part of science (Plantinga 2011, esp. Ch. 10). That very effort makes clear just how easily a particular materialist worldview can attach itself to the sciences (at least in twenty-first-century Western contexts) and thus set the stage for friction with religious immaterialist worldviews. We might even say that the effort shows how deeply entrenched in the traditional, everyday conception of "science" a naturalistic worldview is.

But there are even more mundane ways (moving even farther from the philosophers' conceptions) in which non-propositional, even non-moral, factors related to religion and science can affect their relationship. Above, we saw Stenmark recommending that scholars pay attention to the internal social structures of religion and science. But scholars should also consider the external social contexts in which religion and science are embedded. I mean this not only in the Harrison-esque sense of understanding how religion and science have co-constructed one another (Harrison 2015), but in a much more everyday sense. When a young adult enters the wider world, they must make decisions about what to do with their life. Many forces compete for their time, and though perhaps religion and science are never really in zero-sum competition, the mere fact that they are separate institutions does pose a resource-allocation problem. And this competition plays out at many levels: Should they take more physics

study sessions or attend more bible studies? Should they attend grad school for chemistry or go to seminary? Should they go on a mission or take up the post-doc? Scientific jobs can be demanding on one's schedule in ways that are essential to the scientific process (whatever that might be), but not clearly in opposition to religious practice in particular. Consider, for instance, a biologist who must take care of her cells every day, including Saturday: such a career is closed to conservative Orthodox Jews and Seventh Day Adventists. Or consider a cognitive scientist who must "sacrifice" mice—no (traditional) Jain could do such a thing. Yet, I find it hard to accept that these states of affairs point to any hard incompatibility between religion and science, or even between some particular religion and some particular science. But even still, we must recognize that individual cases like these *do* contribute to a larger impression of a tension between religious and scientific commitments. The point, though, is that these tensions have more to do with the fact that religion and science are not the same social institutions than any fundamental incompatibility: other forms of employment pose these same kinds of resource-management problems both for religion and for science—as do familial obligations.

Along these same lines, it is also worth considering the ways in which religious and scientific identity are not all-encompassing identities: they intersect with many others. What barriers and bridges might exist between particular religious and scientific identities as a result of this intersectionality? For instance, it has been widely documented that women tend to be more religious than men (see e.g. Pew Research Center 2016). Yet it is also the case that women are underrepresented in most fields of science. One might wonder if these two facts are related: perhaps women are discouraged from entering scientific fields partly because they identify as religious but sense a hostility towards religiosity in those disciplines—which only then fuels the general perception that women and the religious are incompatible with science. More work in this area is certainly needed.

When discussing the RSR in public contexts, conceptual analysis would do much better to

take all of these non-epistemic aspects of religion and science more seriously. We might sum this up rather pithily: Leave your ivory towers, scholars! Come and view the world of concrete and asphalt!

The Elite and the Quotidian

So far, I have only discussed one small part of the "concrete and asphalt" world, using Evans as a guide. Interestingly, the criticism that the religion-and-science discourse overemphasizes elite perspectives exists alongside another criticism which pushes in the opposite direction. In many works, there is an asymmetry in the treatment of religion and science in that scientists—scientific experts—are used as the exemplars for the science side, while everyday religious folk—religious non-experts—are taken as the representatives for the religion side.[32] Thus, for instance, Dawkins famously refuses to consider the works of theologians, "engaging" only with popular conceptions of Christianity and Islam (see e.g. A. McGrath 2005, 83, 99). Much more mildly, Dawes, as we saw, considers everyday religious folk in contrast to academic scientists (Dawes 2021). Instead, critics argue, scholars need to present equal-status representatives on either side: bring the religion up the tower and compare the science of scientists with the religion of theologians, or defenestrate the science and compare the religion of everyday folk with the science of the masses.

What this criticism points out is that there are really four possible general relationships we might talk about when discussing the religion–science relationship, as depicted in Figure 2.1: elite–elite, elite–quotidian, quotidian–elite, and quotidian–quotidian.[33]

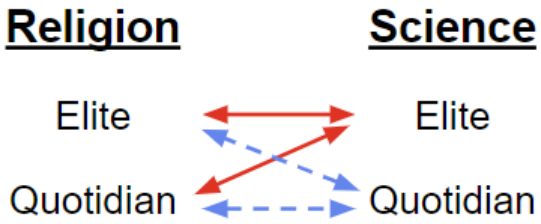

Figure 2.1: Matrix of conceptions of religion and science. Solid red arrows indicate relations most commonly discussed in the literature; dotted blue arrows indicate those which have been neglected.

[32] See e.g. Boespflug forthcoming; paper presented at the Ian Ramsey Center Conference in Honour of Alister McGrath, July 2022.

[33] Of course, I acknowledge that the distinction between elite and quotidian is not absolute but spectrum;

Most discussion focuses on the quotidian–

elite relationship. Often, those who believe that there is tension between religion and science (e.g. Dawes) or that the two are entirely separate/non-interacting (e.g. Ruse) focus on this relationship. By contrast, the elite–elite relationship tends to feature in apologetic works in which scholars try to demonstrate the compatibility (often going beyond non-interaction) of their religion with science writ-large or some particular sciences (e.g. Plantinga). However, the elite–quotidian and quotidian–quotidian relationships are almost never discussed.

There are no in-principle reasons for this emphasis on elite conceptions of science. But especially in public-facing work, it would seem relevant to consider more quotidian conceptions of science. That is not to say, however, that considering the quotidian–elite RSR is fundamentally misguided; it is surely of interest whether there is tension or harmony or whatever between quotidian religion and elite science, if only because that can reveal deeper insights into the general expert–lay divide, which is especially important (and perhaps recently exasperated) in the contemporary US where there are often especially strong political divides between the two groups. But it is also worth our time paying attention to the other vectors in the space—not only on their own, but also in comparison to each other. Evans has already pointed to the benefits of paying attention to the quotidian–quotidian relationship: we see that whatever tensions exist seem to be moral in nature, an observation which might then inform policy surrounding science education. But imagine putting this alongside an analysis of the elite–elite relationship. Perhaps we'll find, as Plantinga does (and coincidentally in opposition to Evans), that there is actually no tension between elite-religion and elite-science. This might be highly relevant to the scientist with a quotidian conception of religion: perhaps they'll be motivated to brush up on their theology rather than throw out

and I think trying to provide clear definitions of elite and quotidian conceptions is not only doomed to failure but also not relevant to this project. What matters is that there is not just one religion or science concept at play in the wide religion-and-science discourse which encompasses university-entrenched academics, temple-tied religionists, and ordinary baristas. Dividing the concepts into general classes of "elite" and "quotidian" is certainly a simplifying device, but it is nonetheless useful for highlighting the fact that there are really quite different conceptions at play (and besides, makes for much smoother reading).

their religion—or their science. So exploring the rest of the matrix in Figure 2.1 and being explicit about the particular conceptions analyzed helps make clear what exactly is at stake in discussions of the RSR. And it can also point the way to conceptual reform.

Now, how are we to go about determining the quotidian conception(s) of science? It is admittedly much easier to come to armchair conclusions about the elite conception(s) with which we as academics have been inoculated in the process of becoming scholars. But to really get at the on-the-ground, asphalt-view understandings of science, I think we must engage in some amount of empirical investigation. This need not mean that conceptual analysis must adopt wholesale the social scientific methods which I collectively call "fieldwork" (and which will be discussed in more detail in Chapter 5)—the quotidian is not invisible to conceptual analysis. Indeed, we have already seen instances of empirical investigations used to build up the definitions from which we logically deduce the RSR, as in Frazer and Dawes. These previous scholars, however, have mostly relied upon elite sources to determine their definitions. Instead, to get at quotidian ideas, one must consult quotidian sources: conduct interviews, hold surveys, open up K–12 textbooks, read Tweets, scroll through posts, comb blogs, watch YouTube—and read the comments. We already see at least some of these sources analyzed in experimental philosophy, although that relatively new discipline still also often focuses on elites and their concepts. But those tools can be easily directed at non-elite groups. And doing so, I maintain, could greatly enhance conceptual analysis of the RSR.[34]

[34]For those who still have reservations about taking folk conceptions of science seriously, let me make another analogy with race: While conceptual analyses of race may explode folk conceptions, it would be ill advised to entirely dismiss those folk racial conceptions. After all, it is the popular understanding of race which is at work in most people's everyday lives. And so even if we know that the folk idea of race as discrete biological kinds packaging particular mental and social traits is entirely unsubstantiated—and even incoherent—we cannot dismiss it; in fact, we would be worse off ignoring it (see e.g. Bonilla-Silva 2003). So too with folk conceptions of science. Elite, academic conceptions of science are not the conceptions with which those on the asphalt think or interact. And if we would like our conceptual analytic work to have impact outside the academy, then we must engage with these folk conceptions of science.

This is not, again, to say that we cannot, or should not discuss and analyze elite conceptions of science—we should not stop doing philosophy of race. And we can also hope to reform folk conceptions of science just as we hope to do with race. But for our message to take root, we need to be willing to meet the folk where they are at.

So where do we start? Within the US context, one place could be the Bureau of Labour Statistics (BLS), which compiles employment data across most sectors of the country's economy—including scientific ones. The information they compile can give us one window into the types of scientists a randomly selected US citizen might encounter—and so give a sense of what the quotidean conception of science might be.

Theory or Not

Before getting into that data, however, there is one more feature of the traditional treatment of science which I would like to discuss which widens the gap between ivory-tower-science and asphalt-science (and so will be useful for understanding the BLS' numbers). This is a distinction between what I term the "theory-oriented sciences" (TOSs) and "non-theory-oriented sciences" (NTOSs).[35] This distinction is quite similar to the basic–applied distinction with which most scholars are likely familiar. But while by "theory-oriented science" I mean more or less the same as "basic science," my category of "non-theory-oriented science" is broader than the usual conception of "applied science." These divides also exist alongside the very closely related academic–industrial divide. But my divide between TOS and NTOS is also not identical to this divide: the academic–industrial divide has to do with institutional affiliation, while my divide is based on the goals and actions of the scientists and the science itself. Clearly one embedded in a university can do basic or applied research, just as much as the scientist employed in a pesticide factory, but a university-bound scientist is not likely to engage in NTOS. In what follows, I will focus on the theory–not-theory-oriented distinction, although I acknowledge that the basic–applied and academic–industrial distinctions may also be important as external context which may lead to different perceptions of science and scientists along the lines of the discussion in §2.3.1. For instance, academic science may

[35] In Chin 2024, I spoke of this distinction as one between "research-oriented" and "non-research-oriented" sciences. However, I think the root differences between the kinds of sciences I wish to call our attention to here centers on the role of theory and the goal of knowledge generation, not on the performance of research.

carry with it the politically liberal overtones associated with universities—at least in the US—while I would expect industrial science to not. Such differential perceptions may have real-world consequences for the RSR: perhaps we are more likely to find religious scientists in industrial settings, and perhaps that is due to the public conception of academic science's liberal leanings.

In any case, what I wish to focus upon here is the fact that there exists a difference within elite academic worldviews (though it is not acknowledged) between TOS and NTOS, such that the latter is generally left out of the conception of science (or sometimes "real science"). But, and this is the key point, there is no such division in the quotidian conception of science. Thus, if conceptual analyzers would like to address members of the public, they would do well to recognize the importance of NTOS to lay conceptions of science—and incorporate considerations of such sciences into their analyses.

This argument will require some unpacking, so let me begin with the banal observation that almost all of the conceptual analytic accounts of science focus on academic, theoretical science–indeed that academic, basic science just *is* the elite conception of science. So we saw with all of our exemplars above: no one considered aerospace engineering or marine conservation ecology or cosmetological chemistry. And this isn't limited to just scholars in religion-and-science; the trend is widespread throughout the philosophy of science (and, as we will see in future chapters, most other disciplines which take science as their object of study).

There are, of course, social and historical reasons for this focus on basic science. One might point out rather trivially that philosophers are interested in basic metaphysical and epistemological questions—what's out there and how do we know it—questions which the basic sciences attempt to answer more so than the applied sciences. It may also be relevant that, embedded as they are within academic spaces, philosophers do not have as ready access to industrial science. On another tack, some even understand the philosophy of science as

an extension, or part, of science itself[36]—and that part is likely the theoretical, basic kind of science, as evidenced by journals like *Theoretical Biology* and *Foundations of Physics* which regularly publish articles by academics employed as philosophers. On the historical side, there is also the fact that much analytic philosophy of science had its origins in reactions to the theoretical physics of the early twentieth century, a historical accident which has resulted in almost all subsequent philosophical models of science taking theoretical physics as the base model for all other forms of inquiry. Only recently has there emerged push-back against this physics-first attitude. In *Science without Laws: Model Systems, Cases, Exemplary Narratives*, for instance, Angela Creager, Elizabeth Lunbeck, and M. Norton Wise bring together a host of scholars to explore what happens when physics is replaced with biology, geology, and the social sciences (Creager, Lunbeck, and Wise 2007). Adrian Currie has similarly investigated the historical sciences more broadly (Currie 2018). Yet this replacement does not decenter basic science; conservation science and assay-development do not feature in these authors' conceptions of science.

Against these basic science-oriented approaches, Mark Wilson has advocated for the inclusion of the non-theory-oriented, or at least applied, sciences into general philosophical accounts of science. He has argued, compellingly if (admittedly) a bit opaquely, that Theory-T-style philosophy of science, whereby the philosopher claims that all natural phenomena will one day be explicable in terms of some single Theory T, simply fails to capture the complexities of the world. His main case studies are drawn from engineering, where multi-scalar analyses are needed to solve specific practical problems. For example, when one is concerned with fractures in steel beams, one cannot restrict oneself to the molecular level, since the molecular world cannot "see" the cracks and issues of alignment at the molecular level (Wilson 2017, see 208–12). But Wilson has been a lone voice in the wilderness, and few are those who heed his call.

[36]See e.g. e.g. Maddy 2007 and Maddy 2022, especially Essay 1, "A Plea for Natural Philosophy" (13–48).

As it is, then, scholars almost always assume that (a) science is (a) theoretical enterprise, one focused on the production of knowledge, often in the form of theories: science is taken to be theory-oriented. But—and this is important—the *vast majority of people classed as "scientists" do not engage in this kind of practice.* According to the US Bureau of Labor Statistics (BLS), as of May 2022, there were about 1.3 million individuals with "Life, Physical, and Social Science Occupations." Of these, only about 24% are found in research-oriented industries (or about 305,910 individuals, combining those who work in "Scientific Research and Development Services" and "Colleges, Universities, and Professional Schools"—assuming (problematically) that those in the latter do research). The remaining 76% majority do not engage in the first-order forms of research comprising what is known as "basic science." Instead, the vast majority of people identified, at least by the BLS, as "scientists" are engaged in more practical endeavours: the creation of (non-novel) assays, doing routine analyses of commercial products, assessing the soil composition of fields, determining the structural integrity of old buildings.

Given this, when we enter the field of religion-and-science, the focus should not be exclusively on the theoretical aspects of science, for the RSR is understood to be something which goes beyond the boundaries of the university: it affects, or is manifested in, everyday religious folk—and scientists.

So the understanding of science here must be broadened: we care about the RSR *in society*, and so we must engage with science *in society*—and this must especially be true of scholars who take themselves to be addressing a larger public audience, not just other academics. Considering national statistics on scientific occupations is one way of getting at the quotidian conception of science, what science is like in society. And media analysis can show that the numbers are actually representative of quotidian experience.

Academic, theory-oriented science is clearly a part of the popular conception of science; we need only peruse Netflix or HBO Max to see this popular presentation of the scientist in

e.g. *Stranger Things* and *The Big Bang Theory*. But academia is not all of society—it is not even an especially large part of it; according to the BLS, only 8.8% of scientists are employed in academic contexts. So an analysis of science in society must take into account applied science as well; and we need only peruse Netflix to see such scientists as well in e.g. *Breaking Bad* and *Jurassic Park*. This kind of Netflix-based analysis also points to other non-academic, non-industrial, more informal kinds of science as in e.g. *The Martian*'s call to "science the shit out of this," by which the astronaut protagonist means applying principles from chemistry and botany to produce water and grow potatoes (*The Martian* 2015). For my purposes, however, I will stick to the BLS data and consider how we might incorporate the non-theory-oriented sciences into an analysis of science.

There are at least two different ways of taking NTOS seriously in our analyses of science in society:

1. discuss the two sciences separately or
2. alter the general characterization of science.

This is akin to the qualification provided in the definition of conceptual analysis in §1 that the objects analyzed may be religion/science writ-large or particular religions/sciences (e.g. Buddhism and cognitive science or Islam and evolutionary biology). We might, in the first case, limit our discussions to particular sciences in their theory- or non-theory-oriented modes, or as in the second case, talk about a broader kind of science (or particular sciences) which incorporates the basic and applied modes (e.g. we might think of physical chemistry as a single activity done both in academic labs aimed at understanding new chemicals and in industrial settings aimed at producing more of some chemical). I think that if scholars wish their objects of analysis to be more in line with popular conceptions of religion and science, then the second option is more desirable, for I don't think most popular conceptions of science separate TOS and NTOS. Nonetheless, in what follows, I want to explore each of these

options, providing a sketch of how our analyses might change when incorporating NTOS into our scholarly conception of science.

Two "New" Sciences: the Separationist Approach

The separationist approach discusses TOS and NTOS as entirely distinct entities. As mentioned earlier, some scholars explicitly acknowledge that they will not talk about the latter form of science. For instance, Ian Barbour does so at the start of *Issues in Science and Religion*. What he says is informative: "we will deal with 'pure science' (scientific ideas, methods, theories, and ways of looking at the universe) rather than 'applied science' (practical inventions, industrial processes, the instruments of war and peace). Applied science raises many important ethical and social issues, but these are not discussed here" (I. G. Barbour 1966, 9). Most authors, like Barbour, simply ignore applied science; they do not take it seriously.

This ignoration is in many ways similar to the ignoration of the non-belief-oriented aspects of religion which used to populate the religion-and-science literature, as discussed above. And even those authors who recognize that religion often has more to do with practice than belief, and so ground their definitions in practice, do no such thing with the sciences. Dawes, for instance, very explicitly crafts his definition of religion in terms of practices—recall he gave it as: "a communal tradition of ritual action that seeks to make contact with a hidden realm of metapersons and powers and whose goal is to bring this-worldly and/or other-worldly benefits to the individuals or community in question" (Dawes 2021, 8–9). But his definition of *scientia* is unambiguously knowledge-focused: "a communal tradition of inquiry whose aim is to create a systematic account of the principles governing a set of regularly observable phenomena within the natural or human world" (ibid. 6). What would it look like, however, to explore the neglected, applied side of science?

First, again, clearly the way in which NTOS is defined will be more focused on practice

than on belief in theory in general: while it is true that aerospace engineers at Boeing employ theories, that is not the focus of their work. Second, insofar as knowledge is sought in NTOS, it is particular, rather than general. The definitions of science generated by our exemplars all demand that the sciences aim at producing "systematic account[s] of the principles governing" natural phenomena, i.e. laws. But the engineer at Boeing is not in the business of making—or discovering—laws,[37] any more so than the chemists at the local water treatment plant or the assay-producer at the biotech start-up. While all these scientists make use of natural laws, it is, again, the application of those laws to produce particular results in very particular contexts which governs their lifework.

It should also be clear that NTOS is not by definition production science. NTOS might often be employed in production (e.g. of bridges, chemicals, glass), but not all NTOS is applied in that way. Further, I want to fend off the idea that the NTOSs are in the business of business; again, they should not be conflated with the industrial sciences. Yes, NTOS encompasses fields and scientists with commercial interests, but it also includes others. For instance, water treatment plants which employ chemists to test for lead content seem to have public health rather than financial gain in mind, and it is hard for me to imagine a less lucrative endeavour than condor preservation.[38] So NTOS is not always in the business of production; it is also sometimes in the business of testing, preservation, and other practices.

A second distinguishing feature of NTOS is the distance between the research context and what we might provocatively call "matters of real concern." The idea is that while both TOS and NTOS might have very local, tightly constrained research foci (e.g. particular spacetime manifolds under particular theories of quantum field theory vs. particular desired overpasses above particular residential structures), those working in the non-theory-oriented sciences are

[37]Though, of course, engineers may contribute to basic, theoretical science research in the course of their work. This is especially well-illustrated in Bloor 2011's *Enigma of the Aerofoil*.

[38]That said, however, I think it is quite important to recognize the ways in which NTOS fits into modern economies, since, as discussed above, this way of being embedded in a broader socio-cultural context may have important bearings on how individuals relate applied science to other institutions and practices—like religion. But this is different from taking commercial interests as essential to the notion of NTOS.

somehow closer to issues of everyday human flourishing. Indeed, the "non-theory-oriented" label is meant to have just that connotation: it is concerned with "real life" rather than theory!

So there are at least two aspects which differentiate TOS and NTOS: knowledge/practice-orientation and distance from "matters of real concern." Any definition of NTOS should thus make use of features. We might, then, venture a tentative definition:

> **Non-theory-oriented science** (in the "West" in the twenty-first century) is a communal activity which aims to address particular problems of direct practical import within the natural or human world.

Thus, our engineer at Boeing, the scientists at the local water treatment plant, and the conservation ecologist all fall squarely under this definition. On the other hand, the university physicist investigating QFT and the biologist studying dinosaur genomes do not.

How might conceptual analytic investigations of the RSR change in light of this definition of NTOS? In this separationist approach, the idea is that we have separate analyses of the relationship between religion (in general or in particular) and TOS/NTOS science.

On the whole, I would expect conflict theses based in conceptual analysis to be harder to justify for the non-theory-oriented sciences. It is hard to see how bridge-building might conflict with religion in general. Of course, particular NTOS projects might indeed conflict: weapons research seems at odds with some religions' desire for peace. On the other hand, some NTOS projects are clearly in harmony with many religions: medical drug production appears in most cases to be in-line with religions which support care for the sick and needy.[39] However, I do not think a general harmony picture will be easy to build on this definition

[39]Though of course there are some religions which take explicit issue with the medical sciences as currently practiced. Christian Scientists, for example, claim that current medical practice is fundamentally misguided in its diagnosis of ills as originating in the body, whereas they believe physical ailments are due to spiritual sins.

of NTOS either. If anything, independence seems the most likely candidate for a general characterization of the NTOS-religion relationship—if such a general characterization along Barbour's fourfold typology is even desired at all.

All this said, I won't attempt to offer a particular derivation of the NTOS-religion relationship; if others would like to do so, they may, and in fact I encourage future scholars to do so alongside derivations of the TOS-religion relationship. I believe that doing so will help to highlight just what aspects of each kind of science are doing the work in generating the proposed relationship, and will thus bring more clarity and insight to the field.

Further, keeping the theory- and non-theory-oriented sciences distinct, and being explicit about whether one is dealing with one or the other, will be useful for consumers of the literature who deal mostly with one form of science or the other. For instance, if a school administrator is concerned with education regarding a particular NTOS—like species or water conservation—then their time might be better spent focusing on accounts which concern religious concerns with NTOS rather than having to think through whether the concerns raised with TOS (again, the focus of most current scholarly work) are actually applicable to their case.

A Single Science: the STEM Approach

The singular approach, whereby we blend TOS and NTOS into a single, general conception of science, is perhaps already present in the conglomerative term with which the public so often interacts: STEM. As it is, STEM stands for Science, Technology, Engineering, and Math—a flurry of terms that, because they are separate letters of the acronym might belie a recognition of their differences. But I think the unity of the acronym dominates the separateness of the letters: STEM is not discussed as a set of disparate disciplines; it is a single entity. Indeed, students talk of majoring in STEM, employers talk of the employability of STEM, public "science" policy focuses on making STEM more appealing and more accessible.

What exactly counts as STEM? Certainly the "traditional" theory-oriented sciences: biology, chemistry, physics. But also engineering: aerospace, mechanical, chemical. Even computer science, botany, agricultural studies. In fact, in some college's STEM advertisements, the basic, theory-oriented sciences are barely even mentioned. For instance, Southern New Hampshire University's "What Nobody Told You about Being a STEM Major" lists the following under the heading "What Are Some Examples of STEM Majors?": cybersecurity, data analytics, environmental science, game programming and development, geoscience, health information management, information technology, and mathematics (Maddocks 2023). Interestingly, (pre-)medical students are also classed as STEM majors; doctors are often employed in images of STEM—though the M is for maths, not medicine. But one doesn't need to obtain a STEM degree in order to participate in the STEM workforce. Indeed, according the NSF's 2021 "STEM Labor Force of Today" report, "a little over half of STEM workers do not have a bachelor's degree and work primarily in health care (19%), construction trades (20%), installation, maintenance, and repair (21%), and production occupations (14%)" (National Science Board and National Science Foundation 2021).

STEM as a concept thus has the advantage of incorporating the non-theory-oriented sciences along with the theory-oriented sciences. Further, it is also a concept widely recognized and used by many publics as well as professional societies. So what would an analysis of science qua STEM look like, and how would it differ from the more traditional analyses of science?

Well in the first place, it must be recognized that STEM is not always in the business of knowledge production. That is, STEM does not always involve learning about the world, or even providing explanations. Structural engineering may certainly rely upon knowledge about the world—e.g. physics—but when it comes to building the local freeway overpass, the engineer is not even trying to learn about the world or explain the principles of transportation; there is a practical job that must be done, and no paper to be published aside from the news that the project is complete. Of course, there may well be cases of engineer-

ing in which new and interesting knowledge about the world *is* produced. Chandra Mukerji provides a nice illustration of this in her exploration of the construction of the Canal du Midi, a feat which was considered impossible by the lights of contemporary physics (Mukerji 2009). But this is the exception, not the rule. Likewise, consider the vast number of medical practitioners who engage in patient care. Their focus, their goals, are patient health, not the production of general theories of diseases and wellbeing. Again, some doctors may very well contribute to research questions—perhaps they participate in studies or themselves test out new diagnostic techniques. But on the whole, one works in a medical space in order to apply the knowledge learned, not to produce novel investigations of human biology.

What unifies STEM, I think, is simply the *use* of knowledge—sometimes theory—in the investigation of the world, though we can be a bit more particular than that. I do not think there is an overarching, unifying goal, and there is certainly not a unifying, common methodology at least in any precise sense as in Frazer, or Dawes. But what one *does* see in all branches of STEM (in the "West" in the twenty-first century) **is an application of knowledge of the natural world to objects in that world**.[40] This, I think, is the message spread by many STEM propagandists, academic and non-, and is the notion most folks encounter in their everyday life.

Understanding STEM as unified in this very basic way is useful because while it decenters knowledge as the end of the activity, it preserves a place for it; it is just that *application* of knowledge takes center stage, though what that application is, exactly, is left unspecified. Thus, both basic research in, say, quantum field theory, as well as applied work in, say, species preservation, fall quite comfortably under STEM-so-conceived; advances in QFT rely on the application of particular physical theories in particular contexts just as rehabilitating the California condors relies on the application of biological knowledge.

[40]The "objects" here may be material entities in the world, like rocks, goats, and pipes; or theoretical entities like theories, models (e.g. of climate change), and—if one is a provocative anti-realist—electrons.

Again, I want to emphasize that STEM does not carry with it any inherent goal, either explicitly or implicitly. STEM is a practice, and that practice can be put to work in any number of ways. Likewise, STEM does not imply any particular social structure; STEM, in fact, belies a huge diversity in organization—think of comparing the labs at the local university's chemistry department with those at the local pesticide factory. And STEM can operate—and operates quite differently—in different social contexts. Toxicology looks very different in Senegal than in the US, for instance (Tousignant 2018). But it is STEM nonetheless, regardless of context, at least in part because in both cases we have the attempt to apply knowledge of the natural world to objects in the natural world (availability of funding and technology notwithstanding).

With this analysis of science qua STEM in mind, we can return to the RSR. As defined, STEM might very well differ from at least some religious practices insofar as those religious practices deal with objects/entities/knowledge/whathaveyous beyond the natural world. But I think it is hard to see how tensions must be inevitable between them. I won't lay down a particular characterization of the religion-STEM-relation here, but I do think independence claims like Ruse's are easy to make when operating with STEM, while conflictual and integrationist narratives focused on epistemic aspects, like Dawes' and Plantinga's, seem prima facie less plausible given the "diversity of practice" present throughout STEM. How the derivation of the religion-STEM-relation goes on the basis of my conception of STEM, however, I will leave to others.

2.3 For Whom Is Conceptual Analysis Useful?

Suppose that the method of conceptual analysis is "cleaned up." That is, the insights of the critiques above are incorporated as recommendations into an analysis of religion and science, and their relationship. We employ multi-dimensional models relativized to particularly

salient times and locations, and pay close attention to the type of science (and religion) considered by our audience, including non-academic perspectives when necessary. What publics would find conceptual analysis useful?

It should be clear that, even when it is augmented in the before-mentioned ways, conceptual analysis will not be for everyone; not all folks are interested in the logical relation between particular definitions of religion and science. For instance, it is hard to imagine that a policymaker trying to secure public funding support for stem cell research among a traditionally hostile Muslim community would be very interested in the fact that biology is in fact compatible with particular Muslim views. But there are certainly other members of the public, people with other aims, values, interests in the RSR, that would find conceptual analysis useful.

In this section, I outline a handful of these cases, though I by no means attempt to be exhaustive.[41] The hope is that this section can form a kind of guide to folks coming to the religion-and-science literature: if you have these kinds of concerns, works employing conceptual analysis might be relevant for you. Likewise, this section can be used as a guide for scholars: if you wish to reach this kind of audience, conceptual analysis might be especially well suited for addressing their concerns.

Apologists: Conceptual analysis may be especially well suited to religious and non/anti-religious apologists. Showing that there is a fundamental compatibility between religion and science in general along some particular dimensions is an especially powerful way of convincing possible skeptics that religion and its practitioners ought not be dismissed outright on the basis of the RSR. So perhaps folks interested in advocating general religious toleration (what we might call a "soft" apologetic context) would find this line of argument fruitful;

[41] One group I do not address below are individuals who are interested in general philosophical claims about the relation between different ideas. This rather nebulous group will clearly be interested in conceptual analytic approaches. I forgo their inclusion below, however, because they don't form a clearly coherent group with unified aims/goals.

conceptual analysis can at least defuse one potential barrier to acceptance of religious folk. Indeed, we already see this at work on the National Academies of Sciences, Engineering, and Medicine's official statement on the RSR found on their website. Although the webpage is mostly focused on the compatibility of Darwinian evolution with various forms of religious faith, it offers a general analysis of science and religion according to their methods:[42]

> Science and religion are based on different aspects of human experience. In science, explanations must be based on evidence drawn from examining the natural world. Scientifically based observations or experiments that conflict with an explanation eventually must lead to modification or even abandonment of that explanation. Religious faith, in contrast, does not depend only on empirical evidence, is not necessarily modified in the face of conflicting evidence, and typically involves supernatural forces or entities. Because they are not a part of nature, supernatural entities cannot be investigated by science. In this sense, science and religion are separate and address aspects of human understanding in different ways. Attempts to pit science and religion against each other create controversy where none needs to exist. (National Academies of Sciences, Engineering, and Medicine 2023; accessed 23 March 2023)

Of course, conceptual analysis can also be used in the opposite direction by religious skeptics; Norman and Lucia Hall do just this in their "Is the War Between Science and Religion Over?" (N. F. Hall and L. K. B. Hall 1986), one of the recommended essay readings on the American Humanist Association's website (accessed 23 March 2023).[43]

In the perhaps more familiar ("hard") apologetic contexts in which the apologist is embedded

[42] I should note that the National Academies also makes use of case studies in their argument that religion and science are compatible; the quote given is followed by lists of "statements" from both religious leaders and scientists, all of which promote a compatibilist picture.

[43] I recognize, of course, that there are ways in which Humanism may be classed as a religion itself. The Halls, however, clearly do not identify as religious individuals, even if they in some places qualify their critique to Western, traditional, supernaturalist religions.

within a particular religious tradition, conceptual analysis is also likely useful. I'd expect this to be especially so among those apologists who find themselves in what we might call "redemptive" contexts, i.e. where they feel compelled to defend their religion as reasonable in a largely hostile environment. This is the case especially when the apologist represents a religious minority against a hostile religious background. In those cases, both sides often agree that compatibility with science is a virtue, and so demonstrating that the minority religion is in fact compatible with science along such-and-such dimensions is a meaningful argumentative move. Historically this has been a strategy employed by Christian missionaries in new colonial encounters (Stenhouse 2019) as well as by East Asian Buddhists against such missionaries in colonial Christian settings (see e.g. Lopez 2011).

That said, it is not clear to me that conceptual analysis will be especially useful to apologists in all contexts. For instance, many campus ministries targeting college students often host religion-and-science talks in which they argue for some form of compatibility between particular forms of religion and science in general. In these cases, however, it is not obvious that these rather abstract arguments are adequately aligned with most student concerns. Of course, it is definitely true that some students are interested in the abstract compatibility between their religion and science in general, or some particular scientific theory (e.g. evolution). This might especially be the case in religious traditions which emphasize individual, informed intellectual assent to accepted theologies—e.g. in some forms of Evangelical (Reformed) Christianity. But for the most part, I would expect that students are more concerned with more mundane ways in which their religion and science might be compatible: would it be permissible for them to be a biologist? Will they face severe workplace discrimination? Suspicion in their religious community? Their worries, of course, might stem from a popular perception of abstract conflict between (their) religion and (some particular) science, but I expect that stories about successful religious scientists (the method of case studies) or data about religious folk in scientific contexts (fieldwork methods) would have more influence on such students because they get at the heart of those students' concerns: whether they can

live a life relatively free of mistreatment.[44]

So I expect conceptual analysis to be useful to at least some (non-trivial number of) apologists, especially those who find themselves in redemptive contexts. And in these cases, performing analyses of the concepts of religion and science relevant to their opponents will be most useful. Hence, scholars who wish their work to be employed in this way would be well served to consider the kinds of apologetic contexts in which their works may feature.

Legal Contexts: One might expect that the clearest place where conceptual analysis could be relevant would be in the courts. After all, conceptual clarity is especially relevant in the legal arena, where the specificities of definitions often determine outcomes. And perhaps the most obvious cases of public religion–science interaction have taken place in the courthouse, in the famous series of US trials focused on textbooks and evolution in public schools.[45] But the way conceptual analysis of the RSR enters into the judicial context is not obvious.

It is important to note that most court cases concerning religion and science are not typically about the RSR. Instead, they are about particular theories or books and whether they count as scientific or religious. They do not deal with the compatibility, incompatibility, or otherwise of religion and science. It is true that courts deal in general with conceptual analysis: they must define "religion" and define "science." But the courts do not then, on the basis of those definitions, derive general characterizations of the RSR—nor do they take interest in such characterizations. Instead they focus on classifying particular other objects (theories, books, practices) as "religion" or "science" and, to put it roughly, plugging it into the law: if it's "religion," it can't be in the classroom; if it's "science," it can be.

In this sense, the kind of conceptual analysis I discuss in this chapter is *not* clearly applicable in the judicial context, or at least not in the judicial contexts which often dominate

[44]I should note that campus religion-and-science talks often do feature religious scientists who talk about their careers and how they personally found the religious and scientific spheres of their life compatible.

[45]In this section, whenever I speak of "schools," I mean *public* schools *in the US*.

the religion-and-science literature. The reason is almost trivial: courts are not typically concerned with the RSR but instead with whether particular things/actions/theories are religious or scientific. Thus, when Michael Ruse acted as an expert in *McLean vs Arkansas* (1981), his conclusion to Overton was not "therefore religion and science are entirely separate endeavours" but rather "by every mark of what constitutes science, creation-science fails" (Ruse 1982). There may, of course, theoretically be particular cases where the RSR might be the central point of contention—but these are certainly not representative.

Where conceptual analysis of the RSR *does* enter the legal sphere is where that context overlaps with the apologetic context. Conceptual analysis may be an especially useful tool for apologists who wish to argue, for instance, that their particular religion is science (or a particular science). As mentioned, Buddhist apologists have used this as a tool of resistance against their Christian opponents. And it is at least conceivable that an apologist could try to leverage a conceptual analytic characterization of the RSR to demonstrate that their religion is a science, and therefore should be afforded a place in the classroom. Notice how this differs from the argumentative strategy discussed in the previous paragraph. The apologetic argument has this general form:

1. Science is X.
2. (This) Religion is Y.
3. But Y⊆X.
4. Therefore (this) Religion is Science.
5. Science should be taught in schools.

C Therefore (this) Religion should be taught in schools. (And in particular this particular claim, which is part of (this) Religion should be taught.)

The key difference is that the apologist's argument *does* make reference to the RSR: it is a key component of the argument (step 4). In the typical cases mentioned above, however, the relationship is side-stepped; the argument occurs in the context of an un-argued assumption that religion (in particular or in general) and science are not identical. But, again, for apologists at work in the legal arena, the method of conceptual analysis—those which focus on particular religious traditions—may be a useful tool.

Hiring/Funding Religious/Scientific Professionals/Projects: One group that might—perhaps controversially, perhaps problematically—find conceptual analyses of the RSR especially useful are those looking to hire or fund religious/scientific professionals/activities. For instance, a grant committee deciding among many applicants might think it relevant if some particular religious tradition is fundamentally incompatible with the particular science being done. Likewise, a religious organization seeking to hire an advocate could reasonably think it important to know if an individual trained in some particular science is thus primed by such training to be in tension with the organization's beliefs and/or practices. Put more concretely, committees might worry whether, say, a team of Hare Krishnas should be given funding for their early cosmology project or an evolutionary biologist is well suited to be a Southern Baptist pastor. In these cases conceptual analyses, regardless of the resultant analysis of the RSR, might be an appealing resource.

Of course, committees (and individuals) ought to recognize that individuals may deviate from the dictates of conceptual analysis—the analysis is of concepts, not of people. Even if the conceptual analysis is shored up in the ways recommended above—e.g. being careful to specify cultural and temporal contexts, paying attention to practiced forms of religion and science, incorporating the non-theory-oriented sciences—conceptual analysis will always be an analysis of (purportedly) *shared* concepts, and individuals' conceptions may (perhaps always?) differ from that conception. This is no fault of conceptual analysis; to become hyper-individualized would result in something more like biography rather than conceptual

analysis. And when faced with hundreds of applicants, committees may be well justified in making use of the kinds of generalizations created by conceptual analysis. They should, however, balance the efficiency of conceptual analysis' broad declarations with individual uniqueness.

When it comes to employers, we should also acknowledge the fact that, at least in the US, using conceptual analysis in this manner may be problematic given that employers (employing 15 or more employees) are not legally allowed to discriminate based on religion. This restriction places clear constraints on the relevancy of conceptual analysis: even if religion X and science Y are related in such-and-such a way, employers may not—legally at least!—be able to use that information in their hiring decisions. The US Equal Employment Opportunity Commission (EEOC), however, does leave some space for religious considerations in special situations. As the Compliance Manual on Religious Discrimination (2021)[46] explains in Section D, "Bona Fide Occupational Qualification,"

> Title VII permits employers to hire and employ employees on the basis of religion if religion is "a bona fide occupational qualification ["BFOQ"] reasonably necessary to the normal operation of that particular business or enterprise." Religious organizations do not typically need to rely on this BFOQ defense because the "religious organization" exemption in Title VII permits them to prefer employees of a particular religion. See supra §12-I-C-1. But for employers that are not religious organizations and seek to rely on the BFOQ defense to justify a religious preference, the defense is a narrow one and rarely successfully invoked.

Thus, it could theoretically be argued that if, on the basis of conceptual analysis, some particular religion Y is eminently compatible with science X, i.e. such that having religious

[46]It should be noted that the EEOC qualifies the force of the manual: "The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. Any final document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies" (Equal Employment Opportunity Commission 2021, accessed 4 June 2023).

background Y "is a bona fide occupational qualification," this could be actionable information for employers hiring scientists in X. Similarly, religious organizations could possibly discriminate against scientists of science X if they could show, perhaps via conceptual analysis, that in being such a scientist, one could not in "good faith" (either to their profession or their religion) "personify [the organization's] beliefs" or "minister to the faithful" (Equal Employment Opportunity Commission 2021 Section C.2, accessed 4 June 2023).[47]

To be perfectly clear, I am not advising that employers—religious or not—use conceptual analysis as a means of arbitrating between potential employees, and I certainly make no claims about whether, if challenged, such decisions would hold up in a court of law. I only wish to point out that such individuals *could* see a possible use for conceptual analytic approaches to the RSR. In such a case, the relevant kinds of conceptual analysis would need to be local, focusing on one particular religious tradition and a particular science.

Religious Schools: One final group for whom which conceptual analyses of the RSR may be relevant are educators or administrators at religious schools. Perhaps a new religious school is working on establishing its curriculum and is thinking through what scientific topics to include—if any. Conceptual analysis may provide guidance: if some particular science is not compatible with the school's religious beliefs/practices, then that may be a reason to exclude such a science from the curriculum. Of course, rather than excluding it entirely, the school may instead decide to "teach the controversy" and outline the (supposed) incompatibility between the school's faith and this particular science.

For this group, the most relevant kind of conceptual analysis would be a local one, focusing on a particular religious tradition and particular sciences. And presumably something like this already occurs at least in some contemporary religious schools in the US. For instance,

[47]This "ministerial exception" emerged from the Supreme Court's ruling in *Hosanna-Tabor Evangelical Lutheran Church and School v. EEOC* (2012) that the establishment clause forbids at least some employment discrimination claims brought against religious organizations.

Village Christian School—a non-denominational Protestant private K-12 school in Sun Valley, California—requires students entering their AP biology course to read works advocating the compatibility between evolution and their religious faith. Past works have included lead PI of the Human Genome Project and former head of the NIH Francis Collins' *The Language of God* (2006) and the biochemist and influential intelligent design advocate Michael Behe's *Darwin's Black Box* (1996). Both of these works employ conceptual analysis (Collins also makes appeal to personal biography) to make their points, and although they are both scientists, presumably work by non-scientist public-facing academics could easily make their way into such curricula using the same method.

2.4 Conclusion

In this chapter, I have examined the use of conceptual analysis as a scholarly tool for characterizing the RSR. The method begins by defining the terms 'religion' and 'science,' and logically derives the RSR on the basis of said definitions. I discussed a variety of critiques of the method as often employed—scholarship tends to focus on only one aspect of religion/science; the method improperly essentializes the concepts; and it fails to consider just whose conceptions are to be analyzed. By considering the multifaceted nature of religion and science, or being careful not to extrapolate from particular aspects of these phenomena to wholesale generalizations about them; by locating the concepts in time and cultural place; and by taking seriously non-elite and non-theory-oriented conceptions of science, the method of conceptual analysis can be significantly improved. In so doing, scholars would make a valuable resource available to a wider range of publics—from apologists to hiring committees. Contrary to some, the method of conceptual analysis need not be abandoned. It, like the other methods I will examine, has its time and place.

Chapter 3

The Method of Case Studies

As she reads the spines of the books, our undergraduate notices something. While some of the titles are grandly broad—*Science and Religion*, *Christianity and Science*—others are oddly specific. There's a book about religion and science in Victorian England, another on religion and science in America, specifically from 1800–1860. She notices one title carrying a phrase she recognizes and pulls it down, *The Creationists* by Ronald Numbers. She flips through the hefty text, glancing at the timelines in the front and the names upon names that fill the pages—Rimmer, Price, Morris, Whitcomb... Scanning the titles again (for *The Creationists* are quite heavy), she notices what look like biographies, featuring the likes of Boyle, Newton, Faraday. What strikes her is the sheer amount of stories here, stories told of people and times long dead.

Is any of it useful? Are any of these historical accounts relevant to the present, relevant to her particular concerns?

In this chapter, I'll examine one of two broadly historical methods used for characterizing

the RSR, what I call the method of case studies.[1] This method focuses on historical data—in various forms—and, in its most basic form, performs an induction over historical cases to reach a conclusion about the RSR. In the first section, I will explain in more detail how I understand this method and provide several exemplars—historical and modern—to illustrate the different ways the method can be implemented. I then move to a critique of the method, examining issues the contemporary exemplars face. In particular, I begin by considering how the inductive bases used by scholars are generated and how they may be generated more responsibly. I then address a question sometimes put forward by scholars using other methods (especially the method of conceptual analysis), viz., how the past is relevant to the RSR. This then sets up a discussion of the proper level of analysis at which the method of case studies should be performed—some operate, for example, at the level of individuals, others at the level of institutions. I argue that no particular level of analysis should be privileged in all cases, but that "the" "proper" level of analysis will depend on the particular reasons scholars and their readers are interested in the RSR. I then explore the questions of "whose religion" and "whose science" are included in the method of case studies. As in other chapters of this dissertation, I argue that scholars over-focus on elite/academic versions of religion and science; by opening up the analysis to non-elite scientists, non-traditional religions, and non-theory-oriented forms of science, scholarly work using the method of case studies can be significantly enriched. After these critiques, I discuss a slightly different use of historical case studies which primarily aims not at characterizing the RSR, but instead at encouraging identity formation in particular directions. The chapter closes with a consideration of what particular non-academic publics may find the method of case studies especially relevant to their concerns and interests in the RSR.

[1] The second historical method, the method of deconstruction, will be examined in the following chapter.

3.1 The Method of Case Studies

At the start of their 1995–1996 Gifford Lectures, later published in book form as *Reconstructing Nature: The Engagement of Science and Religion* (2000), John Brooke and Geoffrey Cantor laid out five modern ways scholars could approach the subject of religion-and-science historically. There is the contextual approach—look beyond the merely intellectual features of past episodes to consider the influence of social, political, economic, etc. factors; the functional approach, whereby one looks to the role "the theology might be playing within the science and vice versa"; the rather different linguistic approach, in which the rhetorical aspects of discussion of religion and science are highlighted; the biographical approach[2]—focus on particular individuals rather than events or more general periods; and finally, the practical approach, where the focus is on the actions of practicing scientists/religious individuals and groups (J. H. Brooke and G. N. Cantor 2000, 22–34). These were not meant to be either exhaustive of the ways in which religion-and-science could be approached historically or to be entirely distinct from one another. And of course, individual scholars—more often historians than not—might blend these different approaches, often to the enrichment of the overall analysis.

What unites these approaches under the heading "historical approaches" is their use of past episodes of religion–science interaction—case studies. To be clear, it is not simply that these approaches make use of the past, but instead the way in which they use the past which distinguishes these approaches from other approaches—or what I call methods. For even those that employ conceptual analysis make use, at times, of the past—Gregory Dawes, for instance, examines integrated cosmology (a species of *scientia*) in Warring States-era China (475–221 BCE; Dawes 2021). What distinguishes Brooke and Cantor's historical approaches is the way in which they use their case studies. In fact, we can understand

[2]Cantor, along with Chris Kenny would later advocate for this biographical approach as the most way of investigating religion–science encounters (G. Cantor and Kenny 2001

their five approaches as species of a more general "method of (historical) case studies." That method proceeds roughly as follows:

> **Case Studies:** 1) detail a number of (actual) historical episodes of religion–science interaction, then 2) employ those episodes as a basis for an induction to the proper characterization of the RSR.

This method is perhaps the most familiar and most commonly employed of the methods analyzed in this dissertation; the argument which refers to the Galileo Affair as the basis for concluding that religion and science are constantly at odds is a classic example.

At the outset, I must note that the "proper characterization" found in step 2 is to be understood in epistemic terms. That is, the method of case studies specifically aims at providing a historically accurate characterization of the RSR—the goal is descriptive. This is important to keep in mind because not all scholars who make use of case studies in the religion-and-science literature share this aim. Rather than trying to provide a historically accurate characterization of the RSR, scholars may instead use case studies in more motivational, prescriptive ways: their case studies may be intended to present ways in which they hope the RSR could be in the future, or involve cases that may inspire others to relate religion and science in particular ways in their own lives. Indeed, the most powerful uses of case studies may fall into this latter category. The distinction between these two uses of case studies in the literature—both academic and public-facing—has, to the best of my knowledge, not been noted. The default assumption seems to be that the case studies literature aims to be descriptive. This is likely due to the fact that the seminal late nineteenth-century studies by John William Draper (1811–1882) and Andrew Dickson White (1832–1918) (which will be discussed in more detail below) did aim to provide a general, historically accurate account of the RSR. Their work set the initial discursive shape of religion-and-science as a discipline, and much subsequent work took—and to this day continues to take—itself to respond to

Draper and White's Conflict Thesis. Thus, even scholars who may elsewhere indicate that they aim at a more prescriptive account of the RSR fall into the trap of assuming that their work is more or less descriptive, so as to rebut Draper and White. Paying attention to the distinction between scholars with descriptive rather than prescriptive aims, however, is important because these differing goals shape the way in which the scholars use their case studies: the former do use case studies in a way which follows the general form of an enumerative induction (as outlined in more detail below), while the latter may not. Indeed, those with more prescriptive aims need not use enumerative induction to reach their conclusions, a fact which further shows that recongizing the difference between descriptive and prescriptive aims should shape how we evaluate the scholars' work.

Thus, for most of this chapter, I will focus on the descriptive literature, that is, the scholars and works which aim to provide historically accurate characterizations of the RSR. After all, this is the form of scholarship with which this dissertation as a whole is primarily concerned. However, in §3, I will discuss the use of case studies for purposes other than the *epistemically* proper characterization of the RSR. For now, though, we will focus on instances of the method of case studies which aim at descriptive characterizations.

Before turning to some concrete examples of this method in recent public-facing religion-and-science literature, there are a number of points to clarify. First, the parenthetical in step 1 is important: the method of case studies is not counterfactual or fictional. The method does not ask what historical actors would have, or could have done, in particular situations, but looks to what they did in fact do; the method works not by priming intuitions about possibilities, but by referencing concrete, actual historical episodes. Of course, scholars using the method may get the details of their episodes wrong. But the intent of scholars employing the method of case studies is to canvas those episodes correctly: the actual facts of the cases are meant to provide the justification for the inductive characterization arrived at in step 2.

Second, the "episodes of religion–science interaction"—the cases being studied—can take a

variety of forms. They may be general fields over particular time periods—physics in the seventeenth century, Victorian Darwinism—or concrete events—the Huxley–Wilberforce debate (1860), John Tyndall's (1820–1893) Belfast Address (1874), the Galileo Affair (roughly 1616–1632)—or individuals or groups—the life of Isaac Newton (1643–1727), the Catholic Church—or any of a number of other such temporally bounded subjects. These examples also illustrate the ways in which case studies can vary in generality. Some are expansive: how religion in general was approached by Tyndall in his lectures, or how physics in general was received by seventeenth-century religious folk. Others are more restricted: how evolution in particular was received by Victorian elites (Lightman 2007), or how Pierre Duhem (1861–1916) understood his work in thermodynamics alongside his Catholic faith (Jaki 2004). Ultimately, however, many employers of the method of case studies, especially those writing public-facing works, seek to draw a more general conclusion about the RSR "in general"—that it is one of conflict or harmony or is simply too complex to be universally characterized. The fact that case studies come in a variety of forms, however, poses interesting questions about the scope and relevancy of particular instances of the method of case studies. That is, are studies of biographies more useful than studies of events in shedding light on the RSR? G. Cantor and Kenny 2001, for example, argue as much, while Yves Gingras argues that such a focus on individuals is misleading and that the RSR is better understood by examining interactions between *institutions* (Gingras 2017, 7). We'll return to this discussion of the "proper level of analysis" in §3.2.3 below.

Third, by "induction" in step 2 of the method, I mean simple enumerative induction. Enumerative inductions have the following general, abstract argumentative form:

1. All (or most of) the Fs observed so far are G.

2. Many Fs have been observed.

3. Therefore, most Fs are G.[3]

The first proposition asserts what is called the "inductive base" which provides justification for the conclusion. Sometimes the language of "populations" is also used when talking of inductions. There are two types of populations: the target and the sample population. The sample population is the inductive base, the group of Fs that have been observed. The target population, on the other hand, is the total collection of all Fs, the group about which we want to make some conclusion.

Enumerative inductions are widespread. Consider, for instance, this kind of everyday reasoning:

> All the pygmy goats I've seen so far are under 6ft. tall. And, as a goatherd, I've seen *hundreds* of pygmy goats. So I'm quite confident that pygmy goats are all under 6ft. tall.

Here, it should be clear why enumerative inductions are "enumerative": the goatherd essentially counts up the pygmy goats she's seen and then draws some wider conclusion about all pygmy goats. As the example shows, though, inductive arguments are generally understood to be defeasible—the goatherd is confident that there are no pygmy goats over 6ft., but there *could* be a 7ft.-tall pygmy goat; it just seems pretty unlikely (at least according to her). And these arguments are not only defeasible, but they are also quite prone to error. Consider a case where the goatherd believes that all pygmy goats are brown (or the vast majority are), since all the pygmy goats she's seen are brown. Of course, there could be black pygmy

[3]I should note that sometimes this kind of reasoning which I have called "enumerative induction" is called instead "abduction." This is often done to differentiate the rather hand-wavy "some Fs are Gs, therefore all Fs are Gs" kind of argument from more nuanced, and generally more well-respected, inductive arguments based on statistics and/or frequencies: "we have observed X% of all known Fs and they are all Gs, so we are well justified in thinking that all Fs are Gs" (see e.g. Douven 2021). For our purposes, it does not matter if we call the inferential move made in step 3 of the method of case studies an (enumerative) induction or an abduction.

goats—and indeed there are—but the goatherd may never have seen one despite the hundreds of goats she's bred: if she started with goats whose gene pool did not include genes for black hair, then she could very well have simply never seen a black pygmy goat. This kind of stumbling block to enumerative inductions is called selection bias: the sample population (the goatherd's pygmy goats) looked at is special in some way which biases the conclusion about the target population (the collection of all pygmy goats). Another way of putting this is that the sample population just isn't representative of the target population. This issue will be especially relevant for us later.

For now, however, let's return to the method of case studies. With this method, the "Fs" are particular religion–science interactions, and "G" is some particular characterization of the RSR. Hence, the inductive argument looks like this:

3. All (or most of) the religion–science interactions observed so far are G.

4. Many religion–science interactions have been observed.

5. Therefore, all religion–science interactions are G.

In the method of case studies (as previously defined), step 1 of the method is meant to warrant proposition 3, and proposition 4 is implicitly assumed. Together, these then provide the inductive base which is used in step 2 of the method to assert the scholar's characterization of the RSR—proposition 5.

Of course, as just mentioned above, the particular scope of the conclusion may be constrained—perhaps some scholars only wish to speak about religion–science interactions at particular times, or in particular places, while perhaps some are only concerned with particular religions or particular sciences. But the general form that such arguments take is that of enumerative induction: lay out a handful of cases, and generalize. We will explore a variety of critiques of this kind of argument in §3.2.1.

Finally, I want to be clear that what Brooke and Cantor call the "historical approach," and what I call the "method of case studies," is not the only approach/method open to historians—either in the sense that it is used only by historians or that it is the only method used by historians. And again, it is not even the only method that may make use of historical case studies. For instance, as we saw in our discussion of the method of conceptual analysis (Chapter 2), one may arrive at definitions of religion/science empirically via historical investigation—as James Frazer (1854–1941) does with religion. But this is not the same as using a case study in an induction to the characterization of the RSR.

Likewise, Dawes makes use of a historical case study—the Galileo Affair—in his *Galileo and the Conflict between Religion and Science* (2016), but it is only to illustrate a conclusion that he has already reached via conceptual analysis. In that sense, the case study is actually irrelevant to the characterization of the RSR Dawes provides. This is made clear by the following statement from his Introduction:

> There is a deep divide between the world of science and that of faith, a fact that is illustrated by the clash between Galileo and his ecclesiastical opponents. That divide is not bridged by focusing on the doctrines of religion and science and observing that the pronouncements of religious authorities and scientists sometimes agree. ... Nor is the divide bridged by the observation that scientific and religious communities overlap. Yes, there are, and have always been, scientists who are themselves religious. But so what? The real divide is to be found on the level of epistemic norms: expectations regarding claims to knowledge." (Dawes 2016, 17)

For Dawes, the history merely illustrates the epistemic norms typical of religion. Perhaps it was in researching this history that Dawes came to his conceptualization of religious epistemic norms, but ultimately the historical details of the Galileo Affair—the identities of

the participants, its outcomes, its manner of proceeding—do not matter to Dawes' argument. That argument proceeds as follows: religion employs epistemic norms X, science employs epistemic norms Y, X and Y are incompatible in many cases, therefore religion and science are always in potential conflict. This is straightforwardly conceptual analytic; there is no induction in this argument, as there are in applications of the method of case studies.

Further, as we will consider in the next chapter, there is another, quite distinct historical methodology—which I will term "deconstruction," with historicism being a particular species of the genus—that historians, especially in the past thirty or so years, have employed (see e.g. Harrison 2015). Often this method is run together with the method of case studies, assumed to be more or less the same or at the very least to converge to similar conclusions (Lightman 2019). But the method of case studies and the method of deconstruction are in fact not only different in execution but furthermore in tension with one another, and—in some rather famous implementations of the latter—even mutually inconsistent. Or so I shall argue in Chapter 4 §3. For now, we will focus our attention solely on the method of case studies and return to this other historical method later.

3.1.1 Some Exemplars Past and Present

The method of case studies is perhaps the most widely employed method in the religion-and-science literature, both in its public-facing and more scholarly forms. As might be expected, it thus takes on a wide variety of forms. As seen above, Brooke and Cantor identify five broad forms of what I call the method of case studies: contextual, functional, linguistic, biographical, and practical. This five-fold typology is rather odd, for the categories it relies on cross-cut each other so often—though its authors are clear that the categories are not meant to be mutually exclusive. Biographical approaches—like Robert Iliffe's recent investigation of Newton (Iliffe 2017, discussed in more detail below)—for instance, are often contextual,

functional, and linguistic all at the same time: to understand how Newton related religion and science, Iliffe examines his social station and political views, his unique theological views, and the ways in which he mobilized discussions of religion-and-science to confront irreligion. Likewise, contextual approaches, insofar as they are truly contextual, must treat extensively with the ways in which theology is used in science and vise versa, as well as with the rhetorical aspects of religion–science discussions and the actions of the individuals involved. This "promiscuity" of the categories is due to the fact that Brooke and Cantor's different categories focus on different methodological considerations. The biographical category is a general category concerning the scale of historical analysis: individual actors rather than events. On the other hand, the contextual "approach" concerns the types of features we take to be relevant about the general object of analysis: think about social properties rather than "merely" intellectual ones. Finally, the functional, linguistic, and practical approaches concern specific social properties. Thus, as we can see in Figure 3.1, the different approaches can be mutually embedding.

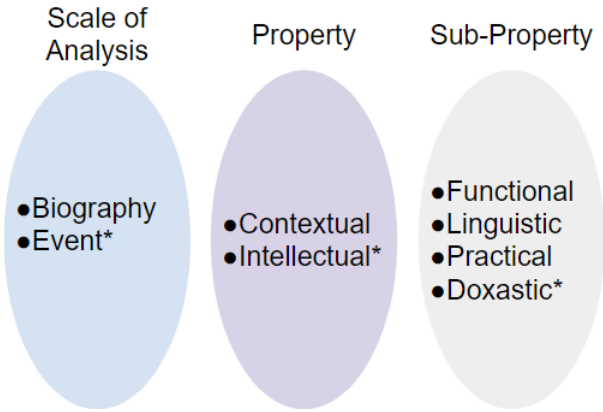

Figure 3.1: A re-visualization of Brooke and Cantor's typology of historical approaches to the RSR (J. H. Brooke and G. N. Cantor 2000), highlighting differences between the approaches. The approaches focus on different methodological considerations: the object of analysis, the properties to be examined, and particular sub-properties. Items marked with a * are my own, provided for contrast with Brooke and Cantor's.

As an alternative to Brooke and Cantor's typology, I'll work with a different one focused exclusively on the approaches by which scholars using the method of case studies populate

their inductive bases: they may consider a wide variety of religion–science encounters, focus on a particular encounter, or focus on biographical details. This typology is closely related to the scale of analysis category in Figure 3.1. The focus of my own division, however, is the diversity and number of cases brought into the induction: many-cases brings together a large number of cases from across scales; episode studies focus on particular religion–science encounters; biography focuses on individual lives. Like Brooke and Cantor's divisions, my categories are not meant to be either exhaustive or mutually exclusive; authors *can* generate their inductive bases using other approaches or even using a combination of these approaches, although mixing them may be rather awkward and artificial. These different approaches, however, are more distinct from one another than those collected together by Brooke and Cantor, and will help to illustrate the variety of ways the method of case studies can be implemented. This division will also help set the stage for a discussion of a contemporary debate in the historical literature over the proper level of analysis at which the RSR should be investigated.

In what follows, I look at these three different forms of the (inductive, descriptive) method of case studies and outline past and present examples of each.

Many-Cases

The two works which set the stage for much contemporary scholarly—and popular—religion-and-science discourse employed the method of case studies in a form which appealed to many different historical encounters between religion and science. These were the possibly misleadingly titled *History of the Conflict between Religion and Science* (1874) and *History of the Warfare of Science with Theology in Christendom* (1896), by the chemist John William Draper and the historian Andrew Dickson White, respectively. These voluminous tomes—Draper's was over 400 pages in the first printing, while *Warfare* was almost 1,000—were widely read by scholars and lay audiences alike. Draper's work in particular was the product

of a request by Edward Youmans (1821–1887), founder of the magazine *Popular Science*, to write an entry for the "International Scientific Series," and ultimately became the best-selling of the entries (Lightman 2019, 4). Together, Draper and White's books laid the foundations for what came to be known as the Conflict/Warfare thesis—that religion and science are fundamentally incompatible—and for years their work served as the basis of religion-and-science discourse. Today, histories of and introductions to the discipline of religion-and-science still regularly cite Draper and White as the origin of the field, though modern scholars tend to disagree with the Conflict/Warfare thesis they inspired.[4]

Recent scholarship has in fact shown that Draper and White's characterizations of the RSR were more nuanced than simple declarations of perennial conflict, as their titles may have led readers to believe. James Ungureanu, for instance, has shown that the forms of conflict/warfare proposed by Draper and White were not meant to characterize a universal RSR. Instead, both are reacting against particular forms of Christianity—post-Vatican I Catholicism (which embraced papal infallibility) in the case of Draper and dogmatic theology in the case of White. Further, Draper even went so far as to say that Islam was especially friendly to science (Draper 1874, Ch. IV), and both authors in fact proposed reformed versions of Christianity which they saw as compatible with science. Ultimately, then, Ungureanu concludes, Draper and White's arguments are best understood as arguments not against religion but *within* Christianity (Ungureanu 2019).

Regardless, Draper and White employ essentially the same method in making their cases about the RSR: in true Baconian-scientific fashion, they mined the history of science for particular instances of conflict/warfare between science and religion—familiar cases like Bruno's immolation (White 1896, Ch. III.II) and Galileo's trial (Draper 1874, Ch. VI), as well as less classic episodes like the opposition to the use of lightning rods (and the consequent 1767 fatal destruction of San Nazaro at Brescia, in Venice (White 1896, Ch. XI.IV)) and the

[4]See e.g. A. E. McGrath 2020, 23. Dixon 2008 is a surprising exception as he does not mention either Draper or White.

(supposed) suppression by the Catholic Church of the Florentine *Accademia del Cimento* (est. 1657), an early scientific society (Draper 1874, Ch. XI). Arranging these cases under heads ranging from "Geography" to "The Antiquity of Man: Egyptology and Assyriology" to "From Diabolism to Hysteria,"[5] they then conclude that, on the basis of all these historical cases, "the history of Science is not a mere record of isolated discoveries; it is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditionary faith and human interests on the other" (Draper 1874, Preface). This is the method of case studies in its "many-cases" form—a wide array of historical religion–science encounters are enumerated, and an induction to the RSR is performed.

A more recent example of this version of the method can be found in Ronald Numbers' (1942–2023) recent collection, *Galileo Goes to Jail and Other Myths about Religion and Science* (2010). In this volume, each chapter examines a different "myth" about the history of religion-and-science, focusing on particular historical episodes/encounters—for example, the medieval Catholic Church's stance on human dissection (Ch. 5), deism and Newton's clockwork universe (Ch. 13), and the Huxley–Wilberforce debate of 1860 (Ch. 17).

Many of the cases examined in Numbers 2010a in fact appeared in the works of Draper and White, where they were used to reach a very different conclusion from that of the contributors to *Galileo Goes to Jail*.[6] The volume thus follows in the hugely prolific tradition of historical

[5]These are the titles of Chs. 2, 6, and 16 of White 1896.

[6]Other modern responses to Draper and White also show how some of their cases were in fact fabricated (e.g. Peterson 2021). As an example to my knowledge as-yet-unnoticed, in Ch. XI, Draper claims that "the Accademia del Cimento, established at Florence, 1657, held its meetings in the ducal palace. It lasted ten years, and was then suppressed at the instance of the papal government. ... It numbered many great men, such as [Evangelista] Torricelli and [Benedetto] Castelli, among its members. The condition of admission into it was an abjuration of all faith, and a resolution to inquire into the truth" (Draper 1874). While the Accademia del Cimento was indeed founded in 1657 and survived for only ten years, almost everything else Draper has said appears to be false. Torricelli (1608–1647) and Castelli (1578–1643) simply could not have been members of the Accademia: both died before the group was established. The two natural philosophers *were* a significant influence on the Accademia, however (Boschiero 2007). But influence is not membership. Unfortunately, Draper's statement has been widely accepted, and one can find popular sources including Torricelli among the members of the Accademia. An online exhibition put on by the University of Sydney, for instance, states that "its most distinguished member was Evangelista Torricelli" (University of Sydney

scholarship which reexamines the cases canvased by Draper and White. While many such studies are isolated, however, Numbers' collection brings many reanalyses together to form the basis for an induction to an explicitly non-Conflict characterization of the RSR, as is clear from the very first sentence of the introduction (after two epigrams from White and Draper): "The greatest myth in the history of science and religion holds that they have been in a state of constant conflict" (Numbers 2010a, 1).

On the contrary, Yves Gingras' rather polemical *Science and Religion: An Impossible Dialogue* (2017) brings together a host of episodes to argue explicitly "against the current trend—dominant in history of science since the end of the 1980s—that tends to deny or minimize the existence of significant conflicts between science and religions" (Gingras 2017, 4), and instead propose that conflict between religion and science is inevitable. He reaches this conclusion by focusing on the ways in which a particular institution of religion—the Catholic Church—fundamentally opposed the institution of science by restricting the freedoms of sci-

accessed 8 October 2021). Perhaps the persistence of this error explains why Sturdy finds it necessary to explicitly state that Torricelli was not a member of the Academia del Cimento (Sturdy 2009, 184).

Moreover, there was almost certainly no "abjuration of all faith" required for membership. Prince Leopoldo de' Medici (1617–1675), for instance, often thought of as the founder of the society, was made a Cardinal in 1667, and regular member Nicolas Steno (1638–1686) converted from Lutheranism to Catholicism, also in 1667, eventually becoming a bishop and contributing—perhaps ironically in light of Draper's gloss of the Accademia—to the censoring of Baruch Spinoza's (1602–1677) work. The closest I can find to such an abjuration is the determined opposition of the Accademia to the use of speculation, and their dedication to the process of repeatedly testing proposed ideas. But that is by no means an *abjuration* of all faith!

To be fair, at times Draper and White were also victims of their sources. For instance, in Ch. XI.IV, "Franklin's Lightning-Rod," White discusses a case in which a Venetian Catholic church was destroyed by lightning, apparently because churchmen had resisted the installation of a lightning rod, which White maintains was conceived as an tool for thwarting God's will. The example is supposed to be particularly instructive because, as a result of the church's obstinacy, "no rod having been placed upon [the church], it was struck by lightning, the powder in the vaults was exploded, one sixth of the entire city destroyed, and over three thousand lives were lost." White references an "article on Lightning in the Edinburgh Review for October 1844"—notably almost eighty years after the lightning strike in 1767 (though see below). The article is penned by one W. Snow Harris, F.R.S., (originally penned in 1843) who discusses "the Means of Protecting Buildings and Shipping against the Destructive Effects of Lightning." The episode of St. Navaro is found almost word-for-word in Harris' piece, and the statement of casualties is italicized: "*About three thousand persons perished by this catastrophe*" (Harris 1844). Interestingly, however, the official Breccian account from 1771 claims that not only did the explosion occur in 17*69* (not 1767), but also that only about 400 died (with perhaps 800 more injured (Garbelli 1771, Ch. IV)).

In the case of Draper, it is harder to say whether the errors (or, less charitably, falsehoods) in the work are due to imperfect sources or his own mistakes/fantasies, for he wrote in a style (somewhat common for the time) which omitted almost all references.

For more on the errors in Draper and White's seminal works, see Peterson 2021.

entists. Gingras thus draws his cases from the history of the Catholic Church, roughly from 1620–1850, most of which deal with the censorship of particular scientific ideas/theories by the Congregation of the Index. Included in his collection of cases are the famous Galileo case as well as the burning of Giordano Bruno (1548–1600), but also less well-known cases like the banning of *Il Newtonianismo per le dame* (1737) (ibid., 106), a popular science book by Francesco Algarotti (1712–1764), and the placement of François-Vincent Raspail's (1794–1878) materialist work, *Nouveau système de chimie organique fondé sur des méthodes nouvelles d'observation* (1833), on the Index in 1834. In all of these cases, the censors cite conflict between particular scientific claims/methodologies and accepted Catholic doctrine. By collecting together this track history of censorship of scientific work by the Catholic Church, Gingras argues that we see a clear history of conflict between religion and science. That conflict is due to "a conflict of authority between institutions with different aims" (ibid., 72). Though Gingras unfortunately does not explicitly specify what the aims of religion are in contrast to those of science, it is apparent that in the cases Gingras examines, members of the Congregation of the Index at least did not share scientists' aims of freely inquiring about the world, and instead attempted to defend the authority of their institution by banning works which seemed to contradict the Church's teaching. This much, Gingras argues, we can induct from his case studies.

I should note, however, that Gingras nowhere makes an explicit claim about the RSR. In places where it would seem natural for him to draw a general conclusion about the RSR, e.g. at the end of his chapters, he makes no such claim—in fact, his chapters do not end with general conclusions based on the chapters' contents. This style makes it rather difficult to pin down Gingras' view of the RSR, and ultimately what he wishes to argue. To make matters more complicated, in the second half of the book, it becomes clear that one of Gingras' aims is to critique not just the view that religion and science are not in conflict, but the scholarship which, in his eyes, attempts to erase the fact that historical actors themselves perceived conflict between religion and science. Scholars like Ronald Numbers, Gingras argues, try to

do so in order to argue that the RSR is not properly characterized by conflict. In this vein, Gingras claims that "the fact that there is a perception of conflict among many actors since at least the beginning of the nineteenth century is therefore indisputable, as the previous chapters have amply shown" (ibid., 132). He then goes on to explain, "In sum, and contrary to the now dominant trend in the historiography of the last twenty years, the study of the history of conflict between science and religion should not seek to partake in the debates that oppose the different factions in this disputed terrain, but should, more simply, follow the discussions and the actors in order to see who speaks of conflict and in what context" (ibid., 132). Thus, here it almost seems that Gingras argues that scholars of the RSR should approach their subject only from what we might call a second-order perspective. That is, scholars should not try to characterize the RSR itself, but only lay out how historical actors perceive the RSR and what reasons they may have had for their perception.

In that sense, Gingras is careful (to put it positively) to not make any particular claim about how the RSR should be characterized; he simply, in Gradgrindian fashion, presents the historical facts. However, given the very polemical tone of the work, and the constant framing of his work as going against the current of mainstream "ecumenical," anti-Conflict Thesis scholarship, it is clear that Gingras advocates a conflict characterization of the RSR. Although the induction may not be explicit, it is certainly implicit. Indeed, that this is obvious to his public readers is made clear by the blurb on the back of the cover: "In contrast to the dominant trend among historians of science, Gingras argues that science and religion are social institutions that give rise to incompatible ways of knowing, rooted in different methodologies and forms of knowledge, and that there never was, and cannot be, a genuine dialogue between them." I'll return to Gingras' arguments below, where we will examine his innovative call to focus on institutions, rather than individuals, and assess his use of case studies in more detail.

Episode Study

While Draper, White, and Numbers brought a whole host of encounters together, some works instead examine a particular encounter in extensive detail, and use that single case as a means of generalizing to a more wide-reaching characterization of the RSR. I'll call such applications of the method of case studies "episode studies." The Galileo Affair—that set of interactions between Italian natural philosopher Galileo Galilei and the Catholic Church from roughly 1616 to 1632—is perhaps the most famous of the historical religion–science encounters which are routinely examined as representative of the RSR as a whole. This case has occupied a large space in religion-and-science discourse, both scholarly and popular for a long time. Examples include Blackwell 1991, Heilbron 1999, Sobel 1999, and Finocchiaro 2019, many of which aim to recast the traditional Conflict narrative of the Affair in more complex and typically more ecumenical terms.

Another encounter which has more recently become the target of several episodic studies happened about three centuries after and halfway around the world from the Galileo Affair: the so-called Scopes Monkey Trial. In 1925, the American Civil Liberties Union challenged Tennessee's Butler Act, which prohibited the teaching of human evolution in state-funded schools, after John Thomas Scopes (1908–1970), a public high school teacher in the small town of Dayton, incriminated himself for doing just that. Handled by heavy-hitting lawyers—Clarence Darrow (1857–1938) for the defense and William Jennings Bryan (1860–1925) for the prosecution—the case was widely publicized: it was the first court case to ever be live-broadcast on radio (Larson 2006) and formed the basis for the much-viewed screenplay *Inherit the Wind* (1955). The decision of the trial—that Scopes was guilty of violating the law (though the verdict was later overturned by the Tennessee Supreme Court on a technicality—is less important than the image of the RSR portrayed by coverage of the case: one of conflict fueled by ignorant religious conservatism.

Edward J. Larson's Pulitzer Prize-winning *Summer of the Gods* (2006)[7] is one of a handful of recent public-facing scholarly works which examine the Scopes Trial and seek to characterize the RSR by exploring the sociocultural details of the case. Larson sees the Scopes trial as fitting into a long series of conflicts between fundamentalist Christianity and biological science (Larson 2006, 247–248, 267–268). Those conflicts unfold across the US in the context of legal cases centered on textbooks and public schools. The Scopes Trial, as the first major—and highly publicized—such case thus deserves special attention, for it reveals various facets common to other antagonistic encounters between Christian fundamentalism and evolution. In particular, Larson unpacks the economic interests of Dayton, a dying mining town; the rural–urban political divide and worries that urban elites were using the law to impose their cultural norms on the countryside; the personal interests of Darrow and Bryan in the case; and the machinations of the media during and after the trial. All these contextual details go to show the complexity beneath the apparent conflict between Christian fundamentalism and biology. But, Larson thinks, that complexity doesn't defuse the existence of conflict—it is definitely there. What the details reveal are general patterns which can help explain the shape—and persistence—of the very public, historically persistent religious (or at least Christian) opposition to evolution in schools. For Larson, the Scopes Trial is simply one very representative example of the broad tensions between Christian fundamentalism and biology—tensions which he expects to persist into the future (ibid., 278).[8]

[7]Originally published in 1997, the book was republished in 2006 with a new Afterword in which Larson reflects on the trajectory of anti-evolutionism in the 80 years since the Scopes Trial.

[8]Most other modern treatments of the Scopes Trial set out to defend creationism by uncovering the poor press of the trial as a kind of anti-religious conspiracy of the ACLU and secular media—see for instance Jarrett and Yaeger 2023, Bergman 2023, and Perry and Olasky 2005. Perhaps most interesting is Sanchez 2023, which is designed for children, and offers a character study of Scopes as a composed voice "who stood up for his students' right to learn." This characterization flies in the face of most scholarly accounts of Scopes, which instead present him as not even sure whether he had taught evolution.

Biographical

A final form of the method of case studies treats with details of particular individuals rather than with broader religion–science episodes—this is what Brooke and Cantor call the method of biography. Biographical case studies may bring together a variety of biographies at varying levels of detail or deal extensively with just one individual. An instance of the former can be found in sociologist of religion Rodney Stark's *For the Glory of God* (2003). While Stark uses a variety of methods to argue that "religion and science not only were compatible; they were inseparable" and that in particular Christianity (as opposed to Islam or Chinese forms of religion) was essential for the emergence of modern science (Stark 2003, 3), he employs biographical case studies as a substep in his larger argument. He does so by surveying "scientific stars" in the period 1543–1680 (the period often associated with the Scientific Revolution[9]) for religious identity. This list includes fifty-two individuals (including Galileo, Newton, and Boyle)[10] selected because they were "active" and made "significant" contributions to science.[11] Although the reader does not get much specific information about these individuals, Stark does present two charts showing the scientists' nationalities, field of study, degree of "personal piety" (devout, conventionally religious, or skeptic), and whether they had ecclesiastical careers (ibid., 161–162). The big upshot from the data is that only 3.8% of these "scientific stars" were "skeptics"—the rest were either devout or "conventionally

[9]Though it should be noted that Stark is skeptical of the cogency of a particularly revolutionary "Scientific Revolution." He takes himself to show "that there was no 'scientific revolution' that finally burst through the superstitious barriers of faith, but that the flowering of science that took place in the sixteenth century was the normal, gradual, and direct outgrowth of Scholasticism and the medieval universities" (Stark 2003, 3).

[10]A complete list is found in Stark 2003, 198–199.

[11]As Stark was able to find by searching "books and articles on the history of science" and consulting "a number of specialized encyclopedias and biographical dictionaries" (Stark 2003, 160–161). Unfortunately, Stark does not explain how he decided if a particular scientist's contributions were "significant" or what exactly he means by "active." Nor is there an explanation or even list of the articles, books, and encyclopedias he consulted—though he does feel the need to "mention the several editions of Isaac Asimov's *Biographical Encyclopedia of Science and Technology* for its completeness and lack of obvious biases" (ibid.), and lampoons the *Random House Webster's Dictionary of Scientists* (no publication year given) for including James Fixx (1932–1984), an American popularizer of exercise.

religious" Protestants or Catholics.[12] Since these scientists were the big movers of the field, Stark explains, "[w]ere there any remaining doubt about it, these data make it entirely clear that religion played a substantial role in the rise of science" (ibid., 163).

Stark's form of biographical case studies doesn't deal with the details of his individuals' religiosity, their contributions to science, or their views on the RSR. Instead, by merely analyzing religious self-identification, Stark performs an induction like the following: if so many important scientists could be religious, then there can't be a fundamental incompatibility between religion and science.[13] This form of reasoning might leave much to be desired, since we might suspect that the particular details of a past scientist's religiosity may be relevant to how we understand the RSR.

In that vein, most biographical case studies do in fact deal extensively with the details of particular individuals. Iliffe's (supposedly) public-facing[14] biography of Newton's first roughly fifty years (from his birth in 1642 to roughly 1694), for example, provides a detailed account of the natural philosopher's life and thought (Iliffe 2017). By analyzing a wide array of letters, notes, and oft-ignored works, Iliffe explores how Newton himself related religion and science and how he considered himself a "priest of nature"—a label which in fact originated with Boyle.[15] Doing so is (in part) meant to complicate the "pervasive assumptions" both among the public and among academics that "religious belief is by its very nature separate from, or even opposed to the scientific method—and that theology is less

[12]Beyond proving the religious roots of modern science, Stark is interested in countering the Merton-Stimson thesis that *Puritanism* was responsible for the Scientific Revolution (Stark 2003, 160). In particular, what he aims to show is that Catholics played a large role (in fact a numerically equal role to that of Protestants) in the formation of science. Thus, it isn't specifically Protestant (or Puritan) work ethic or theology that spurred the birth of modern science, but something more general to Christianity.

[13]We'll return to this kind of claim in §2.2.

[14]I say "supposedly" simply because the work is densely detailed in a way that does not clearly to appeal to non-scholars (or an in particular non-historians!). However, as mentioned in the Appendix, Iliffe's work was reviewed by several popular outlets, for instance the *New York Review* (Duffy 2018) and The *Wall Street Journal* (Davis 2017).

[15]The idea of the "Scientist as Priest" appears first in Boyle's early "Of the Study of the Booke of Nature," which he began writing in 1649, though it appeared in print a decade later in Part 1 of his *The Usefulness of Natural Philosophy*. The idea was that the "Naturalist" was "bound to returne Thankes & Prayses to his Maker, not only for himselfe but for the while Creation" (quoted in Hunter 2010, 73–74).

intellectually rigorous than scientific research" (ibid., 12). In particular, what readers find is that Newton spent much of his time working on theological topics, in particular attempting to show that the doctrine of the Trinity was a farce, introduced by Athanasius of Alexandria (b. circa 296–298, d. 373) in the fourth century (ibid., Ch. 4). This theological work was careful and methodical, in many ways parallel in rigour and execution to Newton's methods in natural philosophy—though with important differences regarding the forms of evidence he thought acceptable (faith in the case of religion and a kind of proof in natural philosophy).[16] Further, contrary to popular belief, Newton's deep engagement with religion came not at the end of his illustrious career as his mental facilities declined, but at its height; and Newton arguably dedicated the majority of his intellectual efforts to these projects—as evidenced by the fact that he wrote far more on biblical chronology and scriptural interpretation than on optics and mechanics.[17] As Iliffe reads him, Newton himself in fact viewed his work on religious topics as far more important than his work in natural philosophy. The latter was in fact more of a distraction; "Newton's work on the *Principia* interrupted what he believed was the most significant form of study that a learned Christian could undertake," a view which led Newton to complain to his colleagues of being "deprived of freedom to pursue his 'other studies' by public disputes over his scientific work"—those other studies "referring as much to his historical and apocalyptic researches as to his chemical endeavors" (Iliffe 2017, 219; see also 128–131).

[16]Iliffe is clear that his point is not that Newton thought religion and science used the same methods, and plainly states that "the recent publication of [Newton's] religious, historical, and chronological papers has provided no support for the notion that there is some simple conceptual or methodological coherence to his work. This is not entirely surprising. Trained in the liberal arts, European scholars were conditioned to think, write, and argue in modes that were appropriate to distinct disciplines. Indeed, a key characteristic of Newton's own brilliance was his capacity to study at a level of exceptional technical competence in a wide range of intellectual fields. Moreover, in many places, he himself stipulated that separate forms of enquiry, argument, and demonstration were appropriate for specific subjects. In one passage, he maintained that the force of the demonstrations in his theological writings rested on faith and that men should consider how opposed to God's designs it was that religious truths should be as obvious as mathematical proofs" (Iliffe 2017, 14).

[17]Together, the *Opticks* (1718) and *Principia* (1726) comprise 204,381 words, as opposed to the 292,953 words spread across Newton's *Treatise on Revelation* (late 1680s), *Chronology of Ancient Kingdoms* (1728), and *Observations upon the Prophecies of Daniel, and the Apocalypse of St. John* (1733). Word counts are taken from the Newton Project and refer to English-language versions of the texts.

Like Iliffe's account of Newton, James A. Connor's very readable *Kepler's Witch* (2004) traces how Johannes Kepler's religious life greatly impacted his scientific work by paying attention to the intimate details of Kepler's life beyond his astronomical work. In particular, Connor focuses on Kepler's central role in defending his mother from an accusation of witchcraft. By tracing Kepler's professional and private life around Europe, partly through unpacking Kepler's journal entries and letters to friends, Connor seeks to reveal how Kepler managed to integrate his religion with his science, finding "God in the hidden mathematical harmonies of the universe in as deep a way as he found God in the revelations of Scripture" (Connor 2004, 3). Thus Kepler's life is meant to stand in contrast to the culturally dominant Conflict narrative—which we might expect to capture Kepler's experience of not only being excommunicated from the Lutheran faith but also being the losing defendant in an Inquisitorial case accusing his mother of witchcraft—and in particular to contrast with the popular picture of Galileo, the "guy who fought with the pope" (ibid., 4).

Having shown a variety of ways the method of case studies may be carried out, I'll now turn to a critique of the method in general as used to provide a descriptive characterization of the RSR.

3.2 A Critique of Case Studies

While the method of case studies is widely used in the religion-and-science literature, a general treatment of the method's limits and virtues in regards to providing a descriptive characterization of the RSR has not—as far as I am aware—been offered. In this section, I'll explore a number of issues the method faces as currently practiced and consider how employers of the method of case studies can avoid them. Some of the issues—for example

the question of the proper level of analysis (§2.3)—are discussed to some extent within the historical literature itself. Others are classic issues with enumerative induction and the application of history to the present (§2.1 and §2.2) which are not discussed in the religion-and-science literature but are dealt with, for example, in history and philosophy of science. The section will conclude by revisiting the question of whose religion and whose science are featured in our case studies, and I identify several new areas into which case studies scholarship can be expanded.

3.2.1 Some Classic Problems with Enumerative Induction

Recall that the method of case studies employs enumerative induction. That is, it begins by establishing a body, or basis, of case studies of religion–science interaction which are best characterized in some particular way, and then generalizes beyond that basis to all (or at least most) cases of religion–science interaction. Trivially, this type of argument is not logically valid;[18] just because some past interactions are best characterized in some way does not mean that all interactions are best characterized as such. Practitioners of the method of case studies certainly recognize this, and claims about the RSR made using the method are not usually meant to be logically valid. Instead, the claims are supposed to entail a kind of best-generalization of the religion–science relationship, even when there may be particular cases which don't fit the model. That said, there are obviously better and worse ways of doing an enumerative induction to arrive at a "best-generalization." In this subsection, I'll consider a major stumbling block to carrying out enumerative inductions: ensuring a representative sample population.

Since inductions extrapolate from a sample (the inductive basis) of a given population (the "target population") to the population as a whole, the sample ought to be a good model of

[18] In the technical sense that philosophers use this term. In philosophy, an argument is (logically) valid just in case, if its premises are true, its conclusion *must* be true.

the target population—at least if the induction is a good one. That is, properties/traits (relevant to the phenomena being studied) found in the target population should be adequately represented in the sample. In the social sciences, this often means that the frequencies of relevant traits within the target population should be reproduced/reflected in the sample. For instance, if a sociologist is interested in the "religiosity" of the American public (the target population), measured, say, by attendance at religious services, then they should ensure that their sample population has the same relative proportion of males to females as in the American public (given that gender is already known to be relevant to religious activity; see e.g. Pew Research Center 2016).

Translated to the context of case studies approaches to the RSR, the inductive basis/sample population is the "historical episodes of religion–science interaction" enumerated in step 1 of the method, and the target population about which scholars wish to speak/generalize is the whole body of historical episodes of religion–science interaction. If the induction in step 2 is to be a good one, then the collection of episodes enumerated in step 1 ought to reflect the major, significant features of the total collection of all such episodes. In practice, however, scholars employing the method of case studies do not show, or even attempt to show, that their cases are representative of religion–science interactions in general.

There are really two issues at play here. First, one worry is that not explaining how the sample of cases examined are representative of the target population as a whole may obfuscate the uniqueness of the cases examined. That is, readers may suspect the authors of cherry-picking their cases, thus essentially simply assuming their conclusion at the outset rather than showing it via induction. On the other hand, we might worry that if the inductive basis is not representative of the target population, then the cases enumerated may not actually be relevant to the conclusion—perhaps they are only relevant to a very special subclass of religion–science interactions and not to religion–science interactions writ large. I'll discuss this second worry in more detail in §2.3 and §2.4, which concern the proper level/unit of

analysis (event or institution or biography) and what forms of religion/science are featured in the case studies. For now, I'll just point out that although scholars, regardless of the conclusions they ultimately reach, tend to make claims about *all* religion–science interactions, their case studies are overwhelmingly drawn from interactions in the European context. If scholars want to make global claims about the RSR, then their inductive bases should include cases from around the globe, and not just as token references.

In any case, I'll focus here on the issue of cherry-picking. How can scholars avoid it? One way is rather trivial: simply include the entire population of religion–science interactions. In some sense, this seems to be what Draper and White attempted to do in their extensive histories. But of course, determining what the entire population of religion–science interactions is is a very difficult, perhaps impossible, task—to say nothing of exhaustively examining each such interaction! One immediate issue (which we will consider in more detail in §2.1.3) concerns what should be included in the target population: should we, like White, include particular theories alongside theorists, books, court cases, and explosions (see fn. 6)?

A way to avoid this worry is to narrow the scope of the target population, and thus of the inductive generalization the scholar wishes to make. Stark 2003 provides an interesting attempt at doing this by confining his analysis to "scientific stars" of the period 1543–1680. This provides a convenient set of boundaries within which to count up the total population of relevant religion–science interactions: just look for the "scientific stars" from 1543–1680.

The major problem with Stark's argument is that although he has narrowed the scope of his analysis in order to provide a manageable target population, he does not similarly narrow the scope of his conclusion. Instead, he still tries to claim that his analysis shows that religion (in particular Christianity) was a necessary condition for the emergence of science. Ideally, however, scholars should narrow the scope of their conclusion to match the scope of the populations they use.

Nonetheless, scholars would be well served in following Stark's example of providing a clear delineation of the target population. Such a delineation may narrow the target population enough so that an exhaustive examination of every relevant religion–science interaction can actually be carried out. Of course, if scholars want to talk of a large range of cases, beyond just the religiosity of scientists in a very confined time period, then taking the entire target population as the inductive basis will likely be impossible.

But there is another, less trivial way in which representative samples can be generated: simply sample a large enough proportion of the target population. If we know the rough size of the target population, then some simple statistics can tell us roughly how large our sample must be in order to be representative of the target population.[19] The trick, then, is getting an estimate of the size of the population of religion–science interactions. Doing so, again, may seem like an insurmountable challenge. But limiting ourselves to particular kinds of interactions can make the difficulty more manageable. For example, as a kind of twist on Stark's focus on scientists, we might use written works as a proxy for tracking religion–science interactions and use text-mining methods to estimate the number of relevant such works. Jon Roberts has done something like this, using searches on a search on the

[19] Although there exist a variety of ways for estimating how large a sample population should be (i.e. the ideal sample size), a standard way involves calculating the following:

$$n_s = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \frac{z^2 \times p(1-p)}{Ne^2}} \tag{3.1}$$

where z is the z-value pulled from a z-score table; p is the standard deviation, or expected variance of each member of the population from the mean; e is the preferred margin of error; and N is the total population size. Importantly, this formula assumes that the sample population is selected randomly. The z-value is chosen based our preferred level of confidence in how accurate our conclusion will be; the standard for most investigations is at least 95% (resulting in a z-score of 1.96), which seems fitting for running inductions over religion–science interactions. Given that we do not know at the outset how our data will vary, we can take p to be 50%. It is also standard to accept a margin of error of 5%, which seems more than enough for our purposes. Using these values, we can then estimate our preferred sample size using the following:

$$n_s = \frac{384}{1 + \frac{0.96}{0.0025N}}. \tag{3.2}$$

Interestingly, as N gets larger and larger, n_s approaches 384. What this means is that even if our target population is immense, randomly sampling "just" 384 cases will still give us a pretty good idea of the population's traits.

Online Catalogue for the Library of Congress, finding that there were a total of about 900 books featuring the (English) expression "science and religion" from 1810–1995 (Roberts 2011, 258–260). Given this estimate, a representative sample[20] would comprise around 270 works—not a small amount by any means, but perhaps manageable in a study the size of Draper and White's![21]

That said, size isn't the only thing that matters, for one can clearly still have a biased sample if specific examples are chosen even if, as in the case just outline, hundreds of such cases are sampled. Importantly, the statistical conclusion that a sample of size X will be representative of a population of size Y only works with the additional assumption that the sample is chosen randomly—that is, each member of the target population is equally likely to be included in the sample. To the best of my knowledge, however, no scholars choose their case studies randomly! But doing so would result in a far more representative inductive basis for the kinds of inductions scholars wish to draw. And this holds even if the target population is so large that having a statistically representative sample is impracticable—selecting cases randomly can still help ameliorate some of the fears over cherry-picking cases and prejudicing the conclusion.

Choosing cases randomly will look rather different for scholars engaged in more focused episode studies and biographies rather than many-cases versions of the method of case studies. For these more targeted versions of the method, whose intention is for their work to fit into a larger body of cases, the episode or figure chosen to study in detail would be chosen at random from the list of relevant cases. On the other hand, many-cases forms of case studies work would simply feature a randomly selected collection of cases, preferably chosen before doing any significant analysis of any particular case.

Ultimately, given the real constraints we face in processing the sheer number of religion–

[20] With a 5% margin of error and a confidence level of 95%.

[21] Gingras also engages in a similar quantitative investigation, using Google Books Ngram Viewer data from 1869–2005 (Gingras 2017, 133–141).

science interactions, ensuring truly representative inductive bases in case studies approaches to the RSR is likely impossible. However, narrowing the scope of the conclusion from a general characterization of the RSR to a more circumscribed characterization closely related to the cases studied, and randomly selecting one's cases (from a relevant collection) can help ensure the inductive bases are at least reasonably representative—or doing so will at least partially ameliorate concerns about biased sampling.

In many cases, public-facing scholars wish to provide broad characterizations of the RSR; they want to defuse social tensions due to what they consider misundertandings of the RSR or rally people to action by knocking them out of complacent misconceptions of the RSR. And for those kinds of socially oriented goals, gross generalizations about "The" RSR are powerful. But from the scholar's point of view, these global characterizations are simply not warranted by the highly selective inductive bases often found in the extant literature. If public-facing scholars do wish to continue providing broad characterizations of the RSR, then they need to take steps to ensure that their bodies of case studies are in fact representative of all religion–science interactions. As I have argued, doing so is difficult, but if the cases featured/studied are taken from a random sample then scholars are at least more likely to deal with a more representative population and avoid generalizing from a biased sample. Forgoing that difficulty, I have argued that scholars should at least be more clear about the limited scope of the conclusions their inductions warrant.

3.2.2 Is the Past Relevant?

Works employing the method of case studies fundamentally assume that the historical cases discussed are in fact relevant to contemporary relations between religion and science. After all, no induction from historical cases to a characterization of an RSR relevant today could be possible without such an assumption. But recently, some scholars have criticized this as-

sumption. Joshua Reeves, for instance, expresses skepticism about the denial of the Conflict Thesis which is common among case studies approaches: "Even if historians could show that science and religion have always been mutually supporting, it does not mean that present day sciences and different religious traditions are not currently in conflict on some key areas" (J. A. Reeves 2023, 93). Generalizing, scholars employing the method of case studies have not been clear in justifying their assumption that past episodes of religion–science interaction are relevant to characterizations of the RSR today. In this subsection, I will consider two lines of argument challenging the relevancy of the past to the present and show that, while these objections are forceful and in need of direct engagement, they can be defused by careful attention to the aims and scope of case studies approaches to the RSR.

I'll start with Reeves' objection: even if the RSR in the past was one way, that does not mean it is so in the present. This seems almost trivially true. After all, contemporary science is quite different from science even just a hundred years ago, and is certainly far different from the science featured in many of the early modern case studies appealed to by the authors above. Likewise with religious traditions: not only have institutional traditions like the Catholic and Anglican churches changed drastically over time, but less structured traditions—like Buddhism—have also undergone immense changes.[22]

Beyond changes in the beliefs accepted as normal within particular religious traditions, there have also been other changes which make the religious landscape of the twenty-first century quite different from that of the period from which scholars draw many of their case studies, roughly 1600–1900. For instance, religion was not understood in the individualistic, voluntary, and inward-directed way in which most religious folk today think of it (see e.g. Noll 1995 and Harrison 2006).[23] It might also be pointed out that the place of religion and science

[22]In the case of Buddhism, for instance, many of its "supernatural" elements—like belief in the Buddha's ability to fly and breathe fire—have been shed. Likewise, at least in some strands, reading Buddhist texts and meditating have been "democratized" and are now seen as a part of everyday Buddhist practice rather than, as in "classical" Buddhism, activities only performed by trained monks. For details on this history of religious change, and its deep ties to encounters with Western science, see Lopez 2008 and Lopez 2012.

[23]John Evans even argues that there has been radical change in Americans' understanding of religion in

in society have undergone important shifts which are deeply relevant to how they have been and currently are related. Only in the mid-1800s, for example, was science professionalized (Turner 1978), and in many cases around the world, religion was seen as a part of general culture, not something that could be individuated and "related" to something like science.[24] Further, many contemporary religious movements—like Scientology, Unificationism, and *Kofuku no kagaku*—simply did not exist prior to 1900.

Given all these changes, it would in fact be surprising if relations between religion and science have stayed the same. To repeat Reeves' point, "even if historians could show that science and religion have always been mutually supporting, it does not mean that present day sciences and different religious traditions are not currently in conflict on some key areas" (J. A. Reeves 2023, 93).

A rather different kind of critique of the relevancy of historical case studies can be extracted from an observation made by Dawes in a rather different context, not about historical figures but contemporary ones. In his *Galileo and the Conflict between Religion and Science* (2016), Dawes argues that the epistemic norms of scriptural-based religions may differ from those of science. Near the start of this work, he writes:

> Take, for instance, a devout Christian lay preacher who is also a scientist. There could be a real conflict between the epistemic norms governing such a person's scientific work and those governing her preparation of a sermon. But the individual may never notice the difference, since the two activities are exercised on different occasions and in very different contexts. From that person's point of view, the two activities may seem quite compatible. We can see, once again, why the observation that individual scientists are also believers is of little significance. It says nothing about the epistemic norms governing religious and scientific com-

even just the past fifty years (J. H. Evans 2018, 63).

[24]This "form" of religion is sometimes called "diffused religion."

> munities or about the modes of thought that characterise each set of practices. (Dawes 2016, 17)

This observation can be generalized into a worry specifically about the biographical forms of the method of case studies. For if individuals may be wrong about the RSR, why should we think they can provide evidence for any particular characterization of it? Put rather crassly, why should we care about what past folks thought/did—they could be wrong! Even if Newton was able to combine deep religiosity with scientific practice (see e.g. Iliffe 2017), perhaps he was simply misled; perhaps he just did not really understand religion and science, and so was mistaken. If that's the case, then, the argument goes, we can't use Newton to illustrate how religion and science are related. Using Newton and other historical figures in that way would be like using past anthropologists to argue that anthropology today is a racist discipline; even if the majority of anthropologists from 1600–1900 were racist (in the sense that they believed in a value-ranking of racial groups based largely on surface-level biological traits), it would be illicit to use that fact to claim that anthropologists today are racist.

The central objection in both Reeves' and Dawes' cases is that an inductive basis formed of historical case studies does not warrant claims about the modern RSR. This may, as with Reeves, be because the religious traditions and sciences examined in the past are different from those today, and so conclusions about interactions in the past may not be relevant to present-day interactions. Or, as with Dawes, it could be because past figures may have simply misunderstood the RSR, and so the way they viewed the RSR cannot be taken safely as a sign of the way the RSR really is today.

How should the advocate of the method of case studies respond?

I am not quite sure if there is a sure way to defeat these objections entirely, but let me propose some ways we might deflate their bite. First, as for Reevesian change arguments,

we might wonder how drastic the changes really have been, and if the changes themselves are actually relevant to changes in the RSR. It may be, for instance, that some beliefs which were once central to a particular religious tradition have since been abandoned in the period between the case studies and today. But that need not mean that there is not still some central core of beliefs which have remained. And if it could be shown that those beliefs are in fact still relevant to believers today, and that they played a significant role in the case studies, then it *would* be relevant to use such case studies in the inductive basis. In fact, Ian Barbour, in response to something like this critique from—perhaps ironically—the historians Cantor and Kenny, responds in this way: "Is it really the case that in Western history since Galileo (the topic of their writing and mine) neither science nor religion possesses 'clear historical continuity'?" (I. Barbour 2002, 347) Something similar could be said to objections related to the changed social place of religion/science or to generalizations to new religious movements; as long as it can be shown that the significant elements of religion/science in the historical case studies are still relevant to religion/science today, then the induction is warranted. What employers of the method of case studies must do, however, is make clear how their cases are indeed relevant to the present; the critics are right that this relevancy is too often assumed and unargued.

What of the Dawesian point about the fallibility of past actors? This objection is more difficult to meet. It is surely true that historical actors may have been wrong about the RSR—there is no reason to assume they had a better grasp of the relation than modern scientists do. But we should note that not all forms of the method of case studies rely so heavily on the views of particular individuals. Some, of course, do—biography in particular often relies explicitly on the view of individuals. One may also find quote-mining kinds of arguments which rely essentially on the authority of the scientists quoted—e.g. in arguments which cite Einstein, Heisenberg, and other famous physicists. Since these forms of the method of case studies take the beliefs of historical actors as normative, they are vulnerable to Dawes' objection: unless it is independently shown that these actors were *correct* about the RSR,

there is no reason to think they got it right—and if we *did* have independent arguments that they were right, then the case studies would be superfluous.

But importantly, not all forms of case studies rely so heavily on the claims of particular historical actors. Further, not all forms of biography take the beliefs of the scientists studied as normative. Instead, biography may focus on the *lives* of the scientists, and take their lives—the fact that they *could* integrate religion and science or that they felt religion and science to be in tension—as revealing of broader social structures which shape the RSR. Such forms of the method of case studies are immune to Dawes' objection; it doesn't matter if the actors were wrong.

So neither the Reevesian nor Dawesian worries about the relevancy of the past need to deeply trouble all practioners of the method of case studies. The past is relevant to the present—though the literature would be better if the particular way and the particular aspects of the past which are relevant were more clearly specified.

3.2.3 The Proper Level of Analysis

I now want to turn to a question which, though not so much an issue/problem with the method of case studies in general, has been used as a way of critiquing particular ways of performing that method. The question is: is there a particular level of analysis which is bound to be more fruitful than others?

At the start of his *Science and Religion*, Gingras provides a valuable insight into the kinds of arguments scholars—often using the method of case studies—have used. In particular, Gingras highlights what he terms the "scale (or sometimes level) of analysis"[25] at which authors like Brooke, Numbers, and Lindberg have operated: the scale of the individual (Gingras 2017, 8–9). Scholars working at the scale of the individual focus on the beliefs and actions of

[25] As Gingras uses these terms—scale and level—interchangeably, so will I.

particular historical actors. This is contrasted with the scale at which Gingras operates: the scale of the institution. Analysis at this scale instead focuses on how institutional policies—formal and informal—shape the kinds of beliefs, actions, and commitments historical actors may have, thereby constraining the ways religion and science (or particular forms of them) can interact. According to Gingras, authors working at the scale of the individual miss vital aspects of the RSR which can only be seen at the institutional level, which he deems the proper, or most informative, scale of analysis.

Interestingly, the authors Gingras criticizes all argue for more-or-less ecumenical views of the RSR (though Numbers is clear that sometimes there really is conflict; see e.g. Numbers 2019, 185), and Gingras argues that this is because they focus on the individual level. If these scholars had instead considered the institutional level, then they would, like Gingras, see that there is real conflict between religion and science (ibid., 132). This association between level of analysis and characterization of the RSR, however, is by no means necessary; one could surely have an individual-level analysis which leads to a more negative view of the RSR. And indeed some scholars have arrived at far more ecumenical conclusions about the RSR from institution-level analyses than Gingras has. For example, John Heilbron has pointed out that "[t]he Roman Catholic Church gave more financial and social support to the study of astronomy for over six centuries, from the recovery of ancient learning during the late Middle Ages into the Enlightenment, than any other, and, probably, all other, institutions." (Heilbron 1999, 3) And, as Gingras points out, scholars like Pierre Duhem have argued that institutional policies like the Catholic Church's Condemnation of 1277, which forbid the endorsement of a number of Aristotelian natural philosophical doctrines, have in fact nurtured scientific achievements (Gingras 2017, 9). So while Gingras might be right in arguing that these other institution-level analyses are unconvincing, that only goes to show that the scale of analysis used by a scholar does not fully determine the characterization of the RSR at which they arrive.

Gingras unfortunately does not explain exactly what is meant by a "scale of analysis" or what the exact difference is between the individual and institutional levels. As I've glossed it above, I think the intuitive idea is that a scale/level identifies the type of entities which form the unit of analysis for the scholar (akin to the "scale of analysis" I mentioned in §1.1)—thus at the individual scale, one focuses on individuals and their beliefs; at the institutional level, one focuses on institutions and their policies. Gingras' intended meaning, however, becomes more complicated when we consider Gingras' actual analysis. In some of his examples, the Catholic Church operates as a monolithic force which interferes with the publication or translation of books—and thereby ideas—thus stifling international scientific communications. Thus, the institution of the Catholic Church blocks the functioning of the institution of Science. At other times, however, the institutional focus is unbalanced: the Catholic Church is presented as a singular entity constraining the development of science—which itself is represented by a particular individual. Such is the case with Galileo. But in still other cases, even the institutional status of the Catholic Church seems to get lost. This is evident in Gingras' discussion of Buffon's *Natural History* (1749). After receiving a letter from the Trustees of the Faculty of Theology of Paris warning him of the dangerous ideas contained in the book, Buffon was compelled to recast his claims about the creation of the planets from parts of the sun as (mere) hypotheses. Yet here the Trustees, though not named, are presented as somehow not quite part of the institution of the Catholic Church; Gingras explains: "The theologians had to find a way to accommodate the conservatives who were lobbying to put the book on the Index and to work out a solution acceptable to the Court, the book having been printed at the expense of the King [of France] and become a popular bestseller" (ibid., 107–108). Here, then, it seems that the role the institution of the Catholic Church plays is in providing an explanation for the decisions made by individuals—affiliation with the Catholic Church constrained the Trustees of the Faculty of Theology of Paris to censor Buffon. But in this case, the Church qua institution is not the direct player in the drama.

What makes all of these diverse cases examples of the institution-level of analysis? In some

cases, it seems that the "scale of analysis" specifies where one locates the explanation for the beliefs and actions of individual historical actors. But this makes understanding what is meant by "work at the scale of the individual" a bit murky: is the idea that such work explains individual actions by nothing more than individual fancy?

Perhaps the issue can be cleared up by considering Gingras' argument for why scholars should work at the level of institutions rather than individuals. The reason lies in a distinction between what philosophers of science call the context of discovery—which Gingras prefers to term the "context of pursuit of research" (ibid, 73)—and the context of justification. The former refers to the context in which an individual scientist forms a belief about some natural phenomenon, the latter to the context in which that scientist defends their belief in interactions with the broader scientific community. The background beliefs of an individual may play an important role in the context of discovery, but they (supposedly) have much less of a place in the context of justification. Instead, Gingras points out, in the context of justification, "it is indeed institutions that set the rules of the game, and that establish the legitimacy of the arguments acceptable to the scientific community at any given time" (ibid., 7). Again, as he puts it, "individual religious beliefs do not constitute an *institutional* criterion of validity, even though they can obviously offer powerful motivation for some scholars" (ibid.). Thus, different scales of analysis highlight different aspects of scientific activity: at the level of the individual, we learn about the context of discovery; at the level of institutions, we learn about the context of justification.

Is there a preferable level of analysis? That is, is one scale more informative about the RSR than the other?[26] In the context of the method of case studies, this question amounts to whether it would be best to draw cases from the context of discovery or from the context of justification. This distinction cross-cuts the three broad types of case studies discussed

[26]We might also ask if the two scales Gingras identifies—individual and institutional—are the only relevant scales. Given the correlation between these scales and the contexts of discovery and justification, we might be tempted to say that there are no other relevant scales. But I think this is an open question.

above; the question of the proper level of analysis can be however the inductive basis is formed. Consider, for instance, episode studies of the Galileo Affair. Gingras argues that institutions are the proper level of analysis, and thus draws his examples from contexts of justification. But other studies, like that by Blackwell 1991, focus on individuals: what matters in understanding the religion–science dynamics of the Galileo Affair are the preferences, beliefs, and actions of individuals in the context of discovery. Hence Blackwell's analysis relies on detailed study of particular documents—the different copies of Galileo's 1616 letter from Cardinal Bellarmine (1542–1621) found among Galileo's belongings and in the Vatican vaults, the 1613 letter from Benedetto Castelli (1578–1643) about a breakfast conversation with the Grand Duchess Christina (1565–1637) and Galileo's 1615 response—and what they show about how individual actors grappled with understanding the RSR (Blackwell 1991). Is one way of studying the RSR better than the other?

Some scholars certainly believe so. Georg Cantor and Chris Kenny, for example, are enthusiastic advocates of biographical, individual-level studies. In the conclusion to a piece critiquing what they see as anachronistic assumptions about "the" RSR rampant in the literature, Cantor and Kenny suggest "that the individual human life—i.e., biography—can provide a major locus for studying science–religion interactions" far better than other methods (G. Cantor and Kenny 2001, 779). Gingras likewise has a particularly strong view of the scale at which the RSR ought to be analyzed, completely opposite of Cantor and Kenny, as is obvious in this polemical passage:

> With the return of an ecumenical discourse on the relationship between science and religion since the 1980s, innumerable articles have been written by historians of science that insist on the deep religious beliefs of the great scientists (Kepler, Newton, Faraday, Maxwell, Einstein, etc.), as if this somehow proved that the idea of conflict between science and religion was only a myth forged by "positivists" during the last quarter of the nineteenth century. There is here, however,

> a serious methodological confusion, because most of these studies are biographical whereas the question of the conflict between science and religion is above all *institutional*. It is based on a conflict of authority between institutions with different aims and not on the psychology of individuals and the reasons that motivate them to undertake a scientific career and to reconcile—or not—their faith and their discoveries. (Gingras 2017, 72)

These are strong words, on all sides. But what Cantor, Kenny, and Gingras all fail to see is that the RSR is something which occurs at both scales: individual and institutional. Yes, there are religious institutions and scientific institutions, and they interact in particular ways. But there are also religious individuals and scientists, and they too interact in particular ways.[27] Further, there can be crossing between these different scales/levels—the personal beliefs of individuals may significantly shape or be shaped by particular institutional policies. And besides, the context of discovery and the context of justification are *both* equally parts of science. Thus, when scholars talk of "the RSR," they may legitimately talk of any of these levels or even of a mixing of the scales. In that sense, we might even say that the RSR *transcends* the scales.

Gingras might be right that the particular cases he considers shows that there is conflict between religion and science qua institutions. But, just as he claims that "to show that the personal beliefs or religious motivations of a given researcher positively influenced his or her research may be interesting from a biographical point of view, but it fails to enlighten us about the way in which religious institutions have responded to a given scientific discovery or theory" (ibid., 7), so too does Gingras' institution-scale analysis fail to enlighten us about the RSR at the scale of the individual! It is undoubtedly the case that institution-level conflict can have implications for individual-level experiences of the RSR. But the relation is two-way. Individual-level experiences can also shape the institution-level RSR; the particular contexts

[27] And of course the same institution/individual could itself be *both* religious and scientific!

of discovery can impact the context of justification—as Gingras shows, individuals like Pope John Paul II (1920–2005) were able to change the Catholic Church's policies concerning science so as to rehabilitate Galileo. Even if Gingras sees this as superficial because post hoc, it is still an *institutional* change due to a collection of individual views of the RSR.

What all this goes to show is that it is unlikely that analysis at any particular level will offer the "best" characterization of the RSR in some inquiry-independent sense. Focusing on different scales will provide insight into different facets of the RSR. But since the RSR exists at and across all scales, no particular scale can fully inform us of the RSR; science is not limited to the context of discovery or the context of justification. And what particular scholars and their readers—public and not—find most relevant will depend on their own interests in the RSR. Thus, while Gingras is right to note a relative paucity of institutional-level analyses of the RSR, it would be wrong to think that only institutional-level analyses are useful or insightful in studying the RSR. Scholars can legitimately draw their cases from across the different scales of analysis.

3.2.4 Whose Science? Whose Religion?

In their chapter, "Whose Science, Whose Religion," Brooke and Cantor argue that "the perceived relation between science and religion depends on how both of these terms are defined, when and by whom" (J. H. Brooke and G. N. Cantor 2000, 45). Of course, Brooke and Cantor are not the only scholars who recognizes the way in which characterizations of the RSR depend on how religion and science are understood (see e.g. Livingstone 2011 for a very similarly titled chapter). There is a sense, in fact, in which this point is rather trivial: any relationship's characterization is going to be constrained by how the relata are understood! The point, however, is even more pointed in reflecting on the method of case studies, for scholars must be careful in ensuring that the understandings of religion/science used to select

their cases are aligned with the understanding of religion/science which features in their more general claims about the RSR. And in many cases, I think that this alignment is missing in the extant public-facing scholarly literature. For in those cases, the target understanding is the public understanding of religion/science, yet the cases generated focus almost exclusively on more scholarly forms of religion/science.

This is evident in how Brooke and Cantor approach the questions of whose science and whose religion scholars are analyzing. On the side of science, they suggest that "historian[s] must also be prepared to depart from currently-accepted notions of science and engage those sciences and theories that do not feature in the modern pantheon, such as alchemy, scriptural geology, phlogistic chemistry and phrenology" (J. Brooke and G. Cantor 2000, 62). Yet clearly these kinds of sciences are not going to be relevant to most modern conversations about the RSR! On the other hand, when it comes to religion, Brooke and Cantor seem to offer better advice: religion plays out at different levels—the existential, intellectual, institutional, and ethical (borrowed from Eric Sharpe)—and historians should pay attention to all these levels, and their differences. Clearly this would be relevant to those interested in the RSR! But why not do the same with the sciences? Why not unpack the different levels at which science is manifested?[28]

Mikael Stenmark suggests that we do that unpacking—that is the whole point of his multi-dimensional approach to the RSR (Stenmark 2004). But Stenmark, like Brooke and Cantor, neglects to consider huge—and hugely important—swathes of scientific activity and the population of scientists. Thus, in this subsection, I will explore several areas which the public-facing case studies literature generally ignores, but which would greatly enrich that body of scholarship—not only from a purely scholarly perspective, but also the perspective of those publics who are the intended audiences of the literature. In particular, I recommend

[28]Brooke and Cantor's focus on these esoteric forms of science becomes even more puzzling when one realizes that the chapter ("Whose Science, Whose Religion) opens with the motivating question: "What should we include in our undergraduate courses on the history of science and religion?" (J. H. Brooke and G. N. Cantor 2000, 44)

that scholars explore encounters involving non-elite scientists as well as scientific disciplines beyond theoretical biology and physics (including fields like chemistry, environmental science, and applied/industrial sciences). I will also consider whether public-facing scholars are called upon to broaden the type of science examined to include non-Western forms, and will, perhaps surprisingly, suggest that, at least given current public conceptions and perceptions of science, they are not.

Non-Elites

For now, though, let me turn to my first recommendation from above, namely that scholars using the method of case studies should pay more attention to non-elite scientists and religious folk, and the religion–science encounters in which such individuals participate. This is a very different kind of diversity gap from that just discussed; the focus is not on the religions or sciences as disciplines or bodies of knowledge, but instead on the practitioners. The absence of non-elites is particularly pronounced in the biographical literature, which focuses almost entirely on individuals like Galileo, Newton, and Einstein. Draper and White's more wide-ranging accounts likewise emphasize high-profile theologians like St. Augustine (354–430) and Cotton Mather (1663–1728). Stark's broader analysis, too, explicitly focuses on "scientific stars," which makes one wonder about what scientists are left out (Stark 2003, 161).

Neglecting non-elites and their interactions with religion and science is problematic for at least two main reasons. The first is scholarly: elites are, by definition, not representative of the wider population. Thus, insofar as scholars wish to talk about religion and science more broadly, they should pay attention to non-elites. This call mirrors one which has been taken up in the history of science to study not just the scientists who run labs, but also their laborers, or "technicians," who are often unacknowledged. This is especially so of historical sources, which tend to obfuscate the contributions of scientific workers, who were typically

working-class (Shapin 1989). Although there is now increasingly more historical literature on these "invisible technicians," there is little to no work which examines the religion-and-science dimensions of these workers' contexts and contributions.[29] Studying these non-elites would have the benefits not only of providing more warrant for scholarly generalizations about the RSR, but would also make scholarly work more relevant to publics who may consume it. Those who read the public-facing religion-and-science literature are likely not elite scientists or religious producers. Case studies which deal with more "ordinary" individuals and their ways of navigating religion-and-science encounters would thus be more relatable to the public readership.

What would this focus on non-elites look like concretely? Perhaps biographies of run-of-the-mill scientists, people who did not win prestigious prizes, did not hold fancy university positions, did not publish landmark papers, in other words, did not feature prominently in any way. Or perhaps take cases of standard lab operations rather than major events—this could be done, perhaps, by analyzing lab journals. Even better if they are lab journals of non-prestigious/non-historically noteworthy labs. This kind of information certainly exists for labs at least since the early twentieth century, though I profess that finding records prior to that may well prove more difficult than it is worth. On the other hand, scholars could look "beyond" the scientist, perhaps studying in more detail lab "technicians," and perhaps whether the religiosity of their employers had any impact on who was hired. More or less non-elite sources could also be mined from more popular publications—like the literary and popular science journals which emerged in the mid-nineteenth century. Likewise, studies of the emergence of the genre of science fiction and its reception among both scientific and religious readerships would, I think, provide an especially insightful window into historical religion–science discourses which would be both relevant to understanding how contemporary discourse has been shaped and also highly relatable to contemporary public readers.

[29]For a recent overview, see Morus 2016.

Some work in this direction has been done. For example, Bernard Lightman has pioneered the study of the percolation of Darwinian evolution through Victorian popular science media (see e.g. Lightman 2007). And Ronald Numbers has made a point of highlighting the work and contributions of non-elite scientists in his studies of the Creation Science movement, some of which has been public-facing.[30] Further, work on the Scopes trial does in fact tend to focus on non-elite dimensions; indeed, Scopes himself was a simple small-town school teacher.[31] Larson's seminal study, for instance, highlights the ways in which ordinary residents of Dayton capitalized on the religion–science discourse of the time, and in so doing helped to shape it. More work in this vein would greatly enrich the case studies literature.

One might have reservations about the feasibility of this suggestion, however. In the first place, identifying non-elite views is often difficult particularly because they are non-elite. As mentioned above, in many cases the contributions and views of technicians working in, say, early modern scientific spaces, were simply elided or else appropriated by the scientists for whom they worked (Shapin 1989). Part of the difficulty also stems from the vagueness of the elite–non-elite distinction. As in Chapter 2, by an "elite," I simply mean an individual with outsized influence relative to their contemporaries (a view borrowed from J. H. Evans 2018). This rather broad notion can be made at least slightly more tractable by using size of communication network as a means of measuring "influence." Operationalizing in this way may have the somewhat unintended result of classifying any historical figure who produced written work as an elite relative to those who did not, which would then explain why identifying non-elite views would be so difficult. I say "somewhat unintended," however, because part of the point in insisting on non-elite dimensions is to encourage scholars to pay attention to those elements of science—and religion—which may be missed in focusing

[30] Much of that public-facing work is found in collected volumes, however. Numbers' extensive monograph, *The Creationists* (1992), although an excellent piece of historical scholarship, is not meant for a general readership.

[31] Although sometimes the trial's main lawyers—William Jennings Bryan and Clarence Darrow—receive much of the attention, not least because of their high profiles. Neither lawyers, however, were scientific elites—though Bryan was arguably a religious elite.

exclusively on written work, particularly large scholarly tracts. It may be difficult to unearth the views, interactions, and lifeways of those who did not write, or whose written work does not survive, but difficulty is not a sign of unworthiness. Indeed, it is not clear why we should prefer the views of Boyle over the views of his unnamed laboratory helpers if our aim is to understand the RSR; all these men (for his technicians were all male) were equally a part of whatever interactions there may have been at the time.

One may also object that, for much of the period from which the case studies are drawn, science was itself an elite discourse, and so asking for non-elite perspectives is simply not sensible. To some degree this is may be true, though the use of uncredited labour in early modern laboratories at least shows that *some* historical scientific spaces featured non-elites in essential ways. But this objection seems to be a double-edged sword, for if science was, for much of the relevant historical period, an exclusively elite discourse, we might wonder how cases from that period are relevant to contemporary religion–science relations where science plays such a large role in even non-elite popular culture. Perhaps, we might worry, the views of the past were only applicable, only possible, when science was segregated from wider culture, a hobby of the elite, not diffused among *hoi polloi*. But of course public-facing scholars, by virtue of being public-facing, would not want to maintain such a thing—at least not while employing the method of case studies.

There is another kind of (traditional) non-elite in both scientific and religious circles that has been left out of the discussion so far: women. The cases featured in the works canvased above almost entirely focus on men. The one case involving a female "scientist" is found in Draper and White's discussion of the burning of Hypatia, which both authors take to demonstrate the incompatibility between Christianity and science—though Lindberg's contribution to Numbers 2010a presents a different gloss (Numbers 2010b).

Truly interesting work remains to be done in this area, which could shed light on the ways in which women could use religion—or distance from it—to legitimate their status as scientists/natural philosophers. In particular, interesting work could be done on such scientific figures as Margaret Cavendish (1623–1673) and Émilie DuChâtelet (1706–1749). This work can thus inform us not just about women' struggles in entering traditionally masculine spaces, but also about the rhetorical social role of religion and science, and the ways in which the RSR is beholden to other social structures—like gender.

Further, this work would be particularly relevant to modern readerships because: 1) those who self-identify as women tend to be more religious than those who do not, and 2) women are increasingly entering the scientific workforce. As briefly touched upon above, and as will be discussed more below, for such readers cases focused on women and the RSR would be especially relatable and therefore relevant.

Just as women have been neglected by the religion-and-science literature, so have members of minoritized races. Likewise, the cases appealed to by scholars almost always feature Western science; rarely is science as developed in other parts of the world considered (Dawes 2021 being a welcome exception).[32] While I will argue later (3.2.4) that contemporary scholars actually need not worry about the lack of non-European sciences, scholars should be worried about the lack of scientists and religious folk from racially minoritized groups and encounters involving such individuals. As in my suggestion to use cases involving women, investigating encounters involving racially minoritized individuals would be especially relevant because members of such groups tend to be highly religious[33] and are increasingly entering the scientific workforce, especially in the US.

[32]There are other exceptions. For example, in *Science and Religion around the World*, Brooke and Numbers bring together pieces which focus on Ancient Chinese science and African medical traditions (J. H. Brooke and Numbers 2011).

[33]At least according to traditional measures of religiosity; see e.g. PPRI 2021 and Pew Research Center 2016.

The Other Sciences

While the previous point centered on the particular *people* involved in religion–science encounters, this point has to do with science itself. The issue is simply that much of the religion-and-science literature focuses on just a small handful of sciences. Further, as I will argue, those sciences are not representative of the vast array of practices understood to be "scientific" by most public audiences. For the method of case studies, this is especially problematic insofar as practitioners of the method seek to offer general characterizations of the RSR; moving from a non-representative sample to claims about the target population is clearly problematic. After arguing that the traditional sciences from which the religion-and-science literature draws are not representative, I'll recommend several other sciences I think worth studying and suggest how scholars might go about choosing their cases.

To start, I'd like to note an interesting asymmetry in the diversity of religions as compared to sciences which are often explored in the religion-and-science literature in general—the case studies literature not being exempt. There is extensive scholarship on Christianity-and-science, Judaism-and-science, Islam-and-science, Buddhism-and-science, and a growing body of literature on Hinduism-and-science (Subramaniam 2019), "Asian religions"-and-science (Keul 2015), and New Religious Movements-and-science (e.g. Zeller 2010, Bigliardi 2023). There is even a growing recognition that more attention must be paid to indigenous forms of religion/spirituality, as evidenced by collected volumes on religion-and-science "around the world" (e.g. J. H. Brooke and Numbers 2011). So it seems, at least, that the religion-and-science literature is rather religiously diverse.[34] The same, however, cannot be said about the science side of the literature, where there is a noticeable lack of diversity which has gone largely unnoticed. For the most part, discussions of religion-and-science are limited to discussions of religion-and-physics and religion-and-biology. Occasionally psychol-

[34]Though we should acknowledge that this diversity is rather new in the history of the discipline which until quite recently was often said to really just be Christianity-and-science rather than religion-and-science (Kim 2015).

ogy appears, particularly when it intersects with evolution (as in the subfield of cognitive-science-of-religion (CSR)), and likewise with geology. But for the most part, the other sciences—chemistry, materials science, the social sciences, etc.—are ignored. Further, the kinds of physics and biology which are discussed are almost always of a theoretical bent—cosmology, quantum mechanics, evolution. There is an almost complete lack of discussion of non-basic, applied/industrial science, and especially of what I have previously called the non-theory-oriented sciences.

There are reasons for this neglect, of course, and it might be argued that the literature is in fact justified in focusing so much on astronomy, quantum mechanics, and evolution. Just as the diversity of the religion side of religion-and-science is likely due in large part to the rather wide scope of religious studies—which has always been interested in the diversity of religious practice—the lack of diversity on the science side likely comes from the rather narrow focus of history and especially philosophy of science. With its origins in reflections on the empirical success of early twentieth century physics, philosophy of science has largely focused on theoretical physics. It is only recently that philosophers have turned their attention beyond physics, especially to biology and, very recently, psychology and the social sciences.[35] Notably, even with this turn to the other sciences, the focus is overwhelmingly on theoretical branches of those sciences. This focus on the theoretical science is likely simply due to the fact that philosophical analysis is itself theoretical, and also perhaps due to the fact that since its early days, analytic philosophy of science has taken theories as its unit of analysis in studying science.[36] In drawing on the philosophy of science, then, contributors to the religion-and-science literature simply reproduce the lack of topical diversity in philosophy of science.

[35]Although the philosophy of chemistry exists as a subdiscipline, it is quite small, and has not grown large enough to, for example, be a course offered to undergraduates at most institutions—which do regularly offer courses on philosophy of physics, biology, psychology, neuroscience, and the social sciences. Efforts have also recently been made to establish philosophy of the historical sciences—like geology and archaeology—as a subdiscipline; see e.g. Currie 2018.

[36]Hence Russell, Popper, Kuhn, and Quine were all concerned with the development and justification of *theories*.

But this lack of diversity among the sciences considered is highly problematic for those works which wish to offer general characterizations of the RSR—like those discussed in §1.2—for theoretical physics and biology are not representative of science writ-large.[37] I'll start by explaining how physics and biology in general are not representative of science in general, then turn to how theoretical science in general is not representative of science in general.

One difference between physics and biology is that they operate at different scales. Physics, for instance, concerns the very large and the very small. Biology, on the other hand, concerns a quite particular class of medium-sized not-always-dry goods—the things we call living beings. Of course, there is overlap, and there are important ways in which physics bears on the biological, perhaps by constraining the kinds of living beings that can exist. But physics and biology are nevertheless quite different things, at least in terms of their subject matter. Likewise, they are quite different from the other sciences as well. In particular, think about the scales of chemistry, sociology, and environmental science. Chemistry is standardly taken to focus on a scale somewhere between physics and biology; sociology focuses on particular kinds of spatially distributed interactions between humans; and environmental science seems to be a kind of cross-scale discipline between physics, chemistry, and biology but which focuses on very particular kinds of phenomena. On the basis of scale alone, then, physics and biology don't seem especially representative.

And these differences in scale matter because they may result in differences in how those sciences or their practitioners encounter/are encountered by various religions and their practitioners. I would expect, for instance, that chemistry, dealing at the scale of molecules, would likely take on a quite different relationship with, say, Christianity, than biology would—my

[37]By "science writ-large" or "science in general", I mean a rather broad popular view of the sciences which encompass such things as chemistry, geology, sociology, cognitive science, and medicine—alongside, of course, physics and biology. This is essentially the notion of STEM discussed in Ch. 2 §2.3.3. There is some debate about whether or not some of the social sciences—psychology and economics in particular—count as "proper" sciences. But the fact that one can earn a Bachelors of *Science* in these fields at large public universities like the University of California, Irvine, I think goes to show that these kinds of disciplines are at least popularly taken to be science, and are thought to be so by the general publics which the scholarship under discussion seeks to address.

bet would be that chemistry and Christianity are largely independent of one another, historical debates over atomism notwithstanding. Likewise, I might expect environmental/climate science to be in more-or-less harmony with various forms of Buddhism, though possibly in significant tension with religions which place a higher emphasis on the perfection of nature or on the animation of natural forces. Whether or not cases drawn from these sciences would really give a different picture of the RSR than would current studies focused on physics and biology is an open question. Perhaps there are theoretical arguments to be made that the "important" aspects of "science" are adequately represented in physics and biology, and so really we should expect the same kinds of relations with religion to manifest when we turn to the other sciences. Perhaps—but scholars using the method of case studies need to provide those arguments, and I am not aware of such things. One area they may look to are conceptual analytic treatments of science (and possibly of religion)—the literature on the "Demarcation Problem" could provide a kind of through-line which would explain why physics and biology are representative enough to ignore the other sciences. Such analyses, however, tend to unsuccessfully navigate the Charybdis of over-inclusion (is comparative literature really science?) and the Scylla of over-exclusion (aren't sociology and archaeology sciences too?).[38] Ultimately, I think the most natural way for scholars using the method of case studies to argue for the representativeness of physics and biology is to simply compare cases from those two sciences with cases from the other sciences. If scholars could show that cases drawn from chemistry and sociology and environmental science are best characterized in the same way as cases drawn from physics and biology, then future studies could justifiably rely on studies limited to the latter. And doing so would also help settle any lingering discomfort which critics may have about the theoretical arguments used to justify the exclusive focus on physics and biology; presumably such critics would be more open to

[38]Though the recent rise in the Philosophy of Pseudoscience has offered slightly more compelling, but I think ultimately misguided, attempts at resolving the Demarcation Problem; see e.g. Pigliucci and Boudry 2013. On that note, it would be interesting to compare the RSR with what we might term the RPSR—the religion-pseudoscience-relation. Such a study could shed light not only on the RSR, but also on the public place of pseudoscience and the various ways in which the epistemic status of science is used and abused.

the empirical historical work featured in the method of case studies.

The case of environmental/climate science points to another kind of diversity often left out of discussions of the RSR: the non-theory-oriented sciences. As discussed in Ch. 2, these are sciences whose main goal is not the production of grand theories or even the application of those grand theories to particular cases. Instead, in this chapter, I have in mind those sciences which sometimes go by the name of "applied" sciences: those sciences most often done by industry rather than academia. These sciences include such disciplines as environmental science and materials science, but I also intend to capture more broadly those uses of science which interact more directly with human concerns—especially engineering, agricultural science, and the health sciences. Arguably these other disciplines may fall under the heading of physics or biology. Indeed, those in materials science, and sometimes those in engineering, are often trained as physicists, or else receive very similar education. Likewise, at least in the United States, those who wish to become medical doctors often must major in biology, and health sciences like cancer biology have "biology" in their very names. That being said, for the most part, extant literature on the RSR focuses on *theoretical* subdisciplines within physics and biology—think of astrophysics/cosmology and evolutionary biology. These are areas which we can describe as "theory-heavy," in which researchers apply an overarching theory (e.g. general relativity or natural selection) to explain or predict particular phenomena. This differs quite dramatically from even other so-called "basic" science research, as in for example cancer biology, where these types of theories just do not come into play in their day-to-day explanations. This absence is even more clear in the industrial/applied sciences—think of the scientists at commercial gene sequencing labs or the chemists at fertilizer manufacturing plants.

There are historical reasons for this focus on the theoretical sciences, of course. As previously mentioned, insofar as the philosophers of science have taken theories as their fundamental units of analysis, it has made sense for them to focus on the theory-heavy sciences, a practice

which has been absorbed by philosophy-informed participants in the RSR discourse. But I think the issue goes further and deeper than the fact that philosophers like abstracta. The very histories of science which are often told by philosophers and historians alike provide a narrative by which modern "science" evolved out of medieval and early modern "natural philosophy" (see e.g. Harrison 2015). As Harrison points out, little attention is paid to the "philosophy" aspect of "natural philosophy." But whereas Harrison exploits this to highlight the ways in which natural philosophy possessed a very different valence from modern science, I would instead like to highlight the institutional place that term denotes. Being a branch of "philosophy" meant that it was a part of a particular department within the university setting. Since their establishment throughout Europe in the eleventh and twelfth centuries, universities offered education and employment in four main departments: Theology, Philosophy, Medicine, and Law. Traditional students would take classes in the faculties of theology and philosophy, with specialized schools dedicated to medicine and the law. This medieval disciplinary division, when paired with modern histories tracing modern science back to natural philosophy, has the consequence of excluding from typical historical and philosophical analyses those topics covered in the school of Medicine. Further, in focusing on natural philosophy, discussions have a tendency to focus overmuch on university-bound science rather than natural philosophical or natural philosophy–adjacent activity which took place outside the university walls.

This is somewhat ironic given the prime place historians and philosophers often invest in scientists like Laplace, Boyle, Darwin, etc. who were not university-bound. But they do not look beyond these figures to the more commercial, industrial spaces in which science produced real impact on society. This is made even more ironic by the fact that some of the scientists who figure centrally in religion–science narratives—like Galileo—interacted extensively with artisans.[39] Likewise, insofar as medical topics feature in historical discussions of the RSR, it is almost always about cadavers being dissected in research spaces; scholarship does not

[39]See, for instance, Zilsel 1942/2000, Long 2012a, and Long 2012b.

often go beyond the anatomist's table to the hospitals themselves (though sometimes it does touch upon public demonstrations; see e.g. Park 2010). However, as we saw in Ch. 2, it is in these spaces—industrial and medical contexts—where much of modern scientific activity takes place. To that extent, science done in these spaces likely makes up a large component of public understandings of science. Furthermore, science done especially in medical and engineering contexts typically has a much more direct connection to the lives of everyday members of the public. Thus, scholars ought to pay more attention to the ways in which religion and science interacted in these spaces; case studies drawn from these contexts would likely resonate more with contemporary religion-and-science public readerships.

So what kinds of cases, concretely, could scholars look at? Here are a number of suggestions which I expect would be quite fruitful to explore. First, consider the medical sciences. We might look at how medical students in different time periods—perhaps different geographic locations—have related their medical knowledge to their religious identity, perhaps focusing on particular medical schools as our site of encounter. Or we could look at how doctors and patients have used and/or avoided religion in their consultations. More broadly, case studies could look to how religion has shaped the design of modern health care systems, either in general (e.g. regarding how death is treated in the hospital space) or in particular (e.g. in the funding and creation of particular hospitals). Comparative cases could be especially illuminating, for instance comparing how Korean funerary customs are integrated into hospital architecture—hospitals often have floors dedicated to funeral services—with the relatively segregated design of American hospitals, which do not typically have such floors.

Some historical work *has* been done on medical science–religion interactions. Ronald Numbers' early work, for example, focused on the ways in which Ellen G. White (1827–1916), the prophetess of the Seventh Day Adventists, blended her religious knowledge/revelation with views on health and healing (Numbers 1992).

Second, I'd like to strongly encourage scholars to explore industrial spaces. Scholars might,

for instance, look at how religious individuals have participated in agricultural science. How did religious individuals participate in and respond to the discovery and use of chemical fertilizers? Were there highly religious agriculturalists? For another example, I think it would be particularly interesting to look at ways in which religion has interacted with science in the context of the oil industry, which at least in the twenty-first century is often seen as a highly socially conservative industry. Looking at the oil industry in particular could also shed light on the interplay between environmental science and various religions.

Some interesting ethnographic work has already been done in industrial spaces. For instance, Aihwa Ong's *Spirits of Resistance and Capitalist Discipline* (originally published 1987) explores the experience of female, mostly Muslim workers in Japanese-owned microchip factories in rural Malaysia. As Ong shows, both Islam and local indigenous forms of spirituality affect the ways in which the technological workspace is structured, how the women understand their work, and ultimately how the women are treated and understood by broader Malaysian rural society. Cases like these could be used in broader case studies attempts to characterize the RSR.

Finally, more interesting work could examine how religious ideals shaped the kinds of anthropological and archaeological work done since the 1800s. Recently, Benjamin C. Pykles has examined the ways in which, since the mid-1900s, the inner dynamics and desires of the Church of Jesus Christ of Latter-Day Saints shaped the practice of sometimes-secular historical archaeology at large sites like Nauvoo in Illinois, which became, and still is, a major tourist destination (Pykles 2010). Studying additional cases like these—restorations of both secular and non-secular buildings—could shed more light on how religion interacts with science in places of large public relevance.[40]

[40]I think it would be especially interesting to compare the ways in which restoration of religious/sacred spaces has been done around the world, for instance in the restoration of Korean temples destroyed during Japanese colonialism to Greek temples in Sicily and the Hagia Sophia in Turkey.

Ultimately, if scholars wish to address the public in their works on the RSR, then they should do so in ways which meaningfully engage with religion–science encounters relevant to the public. When applying this principle to the method of case studies, what scholars should aim to do is draw their cases from contexts meaningful to their public readerships. To do so, I argued in the previous subsection that scholars should consider non-elites, considering "ordinary" scientists and their interactions with science, as well as more or less everyday interactions which are not the kinds of events to make headlines. In this subsection, I've argued that scholars should also attend to sciences not only beyond physics and biology, but also beyond the realms of theoretical science and outside the walls of universities. To that end, I encourage scholars to investigate the medical and industrial sciences, as well as their workplaces. Not only do these kinds of science employ a large proportion of science workers/scientists, but they also often have direct connections with the everyday lived experience of readers of the RSR. By drawing their cases from these other contexts, scholars using the method of case studies can produce work which speaks much more directly to the RSR as experienced and understood by their public readerships.

Eurocentrism?

There is another kind of diversity which has been largely ignored in the religion-and-science literature: the cultural diversity of science. When it comes to the science side of the RSR, it goes almost without saying that the religion-and-science literature tends to be, like the philosophy and history of science upon which it draws, quite Eurocentric. This, of course, is intimately related to the fact that the literature not only developed in the Western world, but has historically focused on Christianity, itself a traditionally European religion which, then, historically interacted mostly with European science. As noted above, however, the religion side of the RSR is often quite wide-ranging, not bounded by Europe (again, perhaps due to the rather international focus religious studies has had since its inception). But the

science these non-Europeans interact with is still almost always Western science; studies do not typically feature cases involving non-Western science—though, again, there are some exceptions.[41]

Provocatively, I want to ask whether this lack of diversity in forms of science is really an issue. The standard response, I would expect, would be that it is—science is increasingly being understood as a global phenomenon, in the sense that what has traditionally gone under the title of "science" is really just one species of science (thus it is now sometimes called an "ethno-science"): European/Western science. However, I want to propose a tentative but provocative answer: it is not clear that the almost exclusive focus on Western science is really an issue, at least for the *public-facing* religion-and-science literature. This is so only because the conception of science which dominates contemporary public discourse (in both Western and non-Western contexts) is that of Western science. Of course, this can change—and perhaps it *should* change to be more inclusive of what are sometimes rather patronizingly called "other ways of knowing." But as things are now, it is not clear that the religion-and-science literature needs to "decolonize" its case studies, at least when it comes to the science.

The urge to consider non-Western forms of science comes from recent trends in especially the history of science and science-and-technology-studies, or STS (philosophers of science seem less willing to broaden the scope of "science"). Historians and science studies scholars have become increasingly interested in various forms of "knowledge production" practiced by peoples outside of Europe, for instance the metallurgical knowledge of indigenous Peruvians (Bigelow 2020) and the astronomical and nautical knowledges of Pacific Islanders (Nelson 2023). Likewise, much work has been done on Chinese forms of nature-knowledge, in part due to reactions against the Needham Thesis, which claimed that the reason why Europe developed science while China did not was that the former had Christianity, a religion

[41] See, again, J. H. Brooke and Numbers 2011 and especially Sheldon, Ragab, and Keel 2023.

especially amenable to the law-like form of modern science (Hsia and Schäfer 2019). What this burgeoning literature tries to show, at least in part, is that the kind of science which developed in Europe was just one of many different types of science, understood now as different forms of world-oriented "knowledge production."

Given these trends in the study of science, I think it's natural to try incorporating these other sciences into the religion-and-science literature. For if science looks different in these other non-European contexts, then perhaps the RSR itself will look different. In fact, scholars of religion-and-science ought already to expect the RSR to seem different given the different ways religion manifests in non-Western cultures, where what the West terms religion is often not individuated from general culture—hence the saying, for instance, that "whether or not Confucianism is a religion is a question the West can never answer and the East could never ask."[42]

But the question for us is whether *public-facing* scholars should be interested in non-Western forms of science. My claim is that they actually need not, and perhaps *should not* be. This is simply because the kind of science with which modern publics interact is Western, European science. While it is true that non-Western science is appearing increasingly in some areas of public discourse (e.g. around climate change, where non-European, indigenous forms of nature-knowledge are sometimes appealed to in order to show other, arguably more responsible ways humans may relate to the environment[43]), for the most part, discussions of science are inevitably discussions of *Western* science. And to the extent that that is the case, and scholarly authors of public-facing religion-and-science work wish to sway the views of their readers concerning the RSR, then it isn't clear that they need to begin drawing their cases from encounters involving non-Western science.

[42]See also, Masuzawa 2005 and Josephson 2012 for further accounts of the difficulties of isolating "religion" in non-European historical contexts.

[43]See also the debates around incorporating Mātauranga Māori into public school science classrooms in New Zealand. Here the goal is to both encourage indigenous Māori to participate in science and also show how Māori ways of knowing can offer alternative ways of relating to the world which may be more climate-friendly. See e.g. Stewart 2020 and Parke and Hikuroa forthcoming.

I want to be very clear that I am not against the idea of opening up the religion-and-science literature to non-European forms of science. If scholars believe that science is broader than European science, then they *must* understand the RSR as going beyond religion-and-European-science, and so are in fact called upon to study cases which feature non-Western science. My point is simply that insofar as the *public-facing* literature aims to discuss an RSR familiar to the *public*, then it is not clear that it should discuss non-Western science, as that is the kind of science which dominates public discourse about the RSR. It is for this same reason that I have argued scholars need to discuss non-elite scientists/encounters and the non-theory-oriented sciences.

That said, public-facing scholars may legitimately aim at changing public perceptions of the RSR by trying to change their perceptions of what science is—and likewise with religion. To that end, discussing cases drawn from non-Western science would indeed be called upon! But my focus has been on public-facing scholarship which wishes to offer characterizations of the RSR as relevant to contemporary discourse, rather than problematize the RSR in general. For these authors—of which I take the exemplars above to be representative—I do not think cases of religion-non-Western science interaction would be relevant.

Cases Should Be Less Exciting

To wrap up this long subsection, my overarching point is this: the issue with the way scholars have chosen their case studies to build their inductive bases is that they have almost always sampled from high-profile, large-impact populations. They have chosen events which featured prominent figures or which others—scholars and non-scholars—thought significant. And they have chosen individuals who were famous and interesting. As with news media, they have focused on exciting events and popular people. Of course, these events and people were thought to be significant because they made clear how religion and science were interacting—and in that sense they may be taken to be revealing about how religion and sci-

ence can interact. But by focusing on these large-impact events and high-profile individuals, scholars generate a false impression of how and when religion and science come into contact. That contact is not just limited to flash-points, big exciting controversies of seeming conflict or big stories of harmony in the lives of prominent figures. Instead, religion and science continuously interact. Their interaction is omnipresent throughout the lives and work of individual scientists, religious producers, scientific institutions, and ordinary members of the public (among others). Focusing on particular events or people because they are noticeable is misleading. In fact, it commits the gross fallacy of taking outliers as standard cases, of substituting the tails for the whole; in order to make true generalizations about a population, you must look to the mundane, uninteresting middle.

How could case studies featuring more "boring" cases of religion–science interaction be found? Perhaps, as discussed in §3.2.4, in the work diaries of arbitrarily selected scientists or religious producers. Or perhaps scholars could look to smaller-scale events relating religion and science; one might think of lectures and Bible studies put on by college ministries. Likewise, drawing from §3.2.4, cases could be found in the minutes of chemical factories, the records of gentech companies, and the posters on hospital walls. Further, scholars can look to non-textual media for their cases. Consider, for instance, the pro-science, anti-communist, pro-religious films produced by the US during the Cold War—and conversely the USSR's pro-science, anti-capitalist, anti-religious films. This kind of propaganda can provide a valuable insight into the ways discussions of religion-and-science play into larger political discourses, and act as a foil for contemporary discussions as well. Similar kinds of work could also be done using popular films and TV shows.

Scholars need to pay more attention to mundane, often local and low-impact encounters between religion and science simply because such encounters are far more common—almost by definition—than the widely discussed episodes which currently populate the literature. If scholars really want to offer general characterizations of the RSR, then they need to pay

attention to how religion and science get related in ordinary circumstances. This is so for non-public-facing scholars, but especially pressing for public-facing ones since the audiences they aim to address are far more likely to encounter religion and science in boring, everyday ways rather than in exciting, thrilling debates, courts, and Nobel Prize winners.

3.3 The Motivational Use of Case Studies

At the start of this chapter, I noted that not all uses of historical case studies in the religion-and-science literature conceived of that use along inductive lines. The more-or-less inductive use discussed above aimed at providing a descriptively accurate characterization of the RSR. But not all employers of case studies share that goal, especially in the public-facing literature. Instead of providing descriptively accurate characterizations of the RSR, scholars may seek to provide *inspiration* to their readers. Harrison, for instance, argues that one of the biggest virtues of historical work is that "history can also show the potential of paths that were not taken (or were taken by only by [*sic*] the few) by pointing to alternative models of the relationship" (Harrison 2022, 316).[44] Likewise, this more motivational aim is evident in Connor's biography of Kepler; as he says near the end of the introduction, "Perhaps if you read this book, knowing Kepler will make your own life work a little better" (Connor 2004, 5). Better in what way? Perhaps by seeing the "suffering and triumphs" of a great scientific figure who preserved his faith through trials and tribulations.

Unfortunately, the literature does not distinguish between these different uses of case studies. But the difference is important, for objections which may apply to scholars aiming at description may not apply to those aiming at motivation. For example, recall the Dawesian objection regarding the relevancy of the past to the present. The objection seems directed

[44]Harrison, to be clear, doesn't use the method of case studies, and the paths that he discusses are possibly unavailable due to the ways in which our modern notions of religion and science are shaped. As we will see in the next chapter, he uses a different historical method: the method of deconstruction.

at scholars who aim at providing a descriptive account of the RSR. That is, what he finds important in debates over the characterization of the RSR are what religion and science actually *are* and how they are related. But scholars and some of their readers may instead be more concerned with the personal dimensions of the debate over the RSR—that is, they may be more concerned with *identity*. For example, one may be interested in the RSR because one wants to know whether it is possible for religious individuals to fruitfully engage in science, or, conversely, whether scientists can have rich religious lives. Here, what is important in debates over the RSR are issues of lived/liveable experience rather than more "directly" about the nature of religion/science. For scholars and readers with this kind of interest, the fact that past actors may be wrong is beside the point—for in some sense what these interlocutors want is not truth but belonging.

There are at least two ways in which scholars might aim to motivate or inspire their readers. The first aims *simply* at inspiration: showing that one can in fact understand the RSR in some particular way. The other involves identity formation: particular case studies might be understood as parts of a reader's own past.

On the first view, we might think that what the method of case studies is especially wellsuited to do is show possible ways of being. Consider, again, the racist history of anthropology. While the existence of so many racist anthropologists in the past does not warrant a conclusion about the racism of contemporary anthropologists, it does warrant the conclusion that it is possible to be a racist anthropologist. And recognizing that can be deeply important. In the anthropology case, it might encourage more critical self-reflection on the part of anthropologists when investigating particular kinds of human variation. Or, perhaps less positively, it may lead folks with racist ideas to enter the field in order to provide symbolic "scientific" protection for their racist ideology.

Returning to the case of religion-and-science, historical case studies can likewise warrant conclusions about possible ways of being. Biography in particular can be a powerful indi-

cation of ways in which individuals can be—in fact, one might think the whole appeal of biography is its ability to inspire. If we are shown that Newton, standardly considered a great scientist, was able to balance his scientific work with his religious commitments, then we might think that, despite claims to the contrary in popular media, it is possible to be religious and still a good scientist.

That said, the Dawesian worry still remains. If one wishes to argue for some characterization of the RSR based on claims figures have made in the past—a kind of quotation-mining argument—that seems like a bad kind of argument: perhaps they were wrong! All that we may conclude is that rational individuals are able to claim that the RSR is such-and-such—but that does not tell us that in fact the RSR is such-and-such.[45] Yet, for many of those interested in the RSR, that may be enough.

To a large extent, the actual induction performed in the method of case studies as outlined at the very start of this chapter—step 2 of the method—is actually not relevant to this kind of concern about how one can understand the RSR. Instead, the construction of the inductive base itself may be sufficient. If what are sought are role models, then merely arraying a variety of cases may be enough; no further *argument* is really needed to inspire readers.

The same holds when we turn to the identity formation-oriented use of case studies. While simple inspiration is in some sense forward-looking—it points to what one could become—work that seeks to promote the adoption of a particular social identity is more backward looking: it encourages the adoption of a particular past as one's own. Biography can be particularly powerful in this respect, as it presents individuals that one may conceive of as ancestors whose failures are to be avoided and whose successes are to be emulated. Scholars writing in this vein generally write with apologetic motives, and write explicitly for a

[45]On the contrary, one could embrace a rather deflationary view of the RSR: the proper characterization of the RSR is simply whatever folks say about it; there is no further fact of the matter. This view of the RSR in fact underlies, I think, most social scientific studies of the RSR. These studies, employing what I call the method of fieldwork, will be discussed in detail in Ch. 5.

readership that shares their religion. But of course readers themselves may read biography for the purposes of identify formation—even if the author did not have that intention in the first place. We can thus imagine a Christian physicist reading Iliffe's biography of Newton and coming away with a bolstered sense that she belongs to a strong tradition of Christian scientists—even if Iliffe himself did not have that intention.

For scholars and readers focused on identity formation, the affinity between the cases and the reader should matter more than it did for scholars (and readers) aiming for more general inspiration. This is trivially due to the fact that identification with a particular social group will only be aided by work that concerns members of that particular group. For instance, Iliffe 2017 may not actually be relevant to most contemporary Christians because Newton embraced a rather extreme form of Christian faith. Newton, after all, was passionately anti-trinitarian and wrote literally thousands of pages attempting to show how the doctrine of the Trinity was written into the Bible by corrupt priests. For most Christians today, such views would be anathema. What use, then, if Newton thought science and his form of Christianity were compatible?

Newton, however, can still be inspirational in a broad sense: even if he had rather heterodox religious views, he still demonstrates that religion and science can be brought together, perhaps even productively. Even a non-Christian may thus still find his life inspiring. Ultimately then, while scholars aiming at "mere" inspiration need not be overly concerned with the relevancy of their cases to their particular readers, scholars aiming at something more may need to take more care in selecting their figures. This discussion should also make clear another difference in the kinds of issues faced by the inductive and motivational uses of case studies. Whereas I've suggested that scholars working in the inductive mode of case studies should take care to examine more mundane scientists, scholars working in the motivational mode are in fact likely better served by focusing exclusively on major figures.

So far, I have only discussed the use of biography. But what of the episode-focused forms of

the method of case studies? Here it's not clear how these may be motivational for readers. Perhaps one may read of William Jennings Bryan's stand before the forces of secularism and be inspired to fight in the local school board. Or perhaps in reading of Clarence Darrow's skillful disarming of Bryan, one may be inspired to join that same fight—but on the other side. In these cases, however, it's not clear that what is providing inspiration in these cases goes beyond the individuals: that is, in these episodes, it is the biographical elements that seem to be doing the work.

3.4 For Whom Are Case Studies Useful?

As pointed out in the previous chapters, given the variety of reasons which draw non-scholars to the religion-and-science literature, we might expect that work produced by a particular method might not be relevant to all readerships. So what of the method of case studies? What groups would find these kinds of investigations of the RSR most useful, interesting, or meaningful? I actually believe that most readers have something to gain from the method of case studies, although perhaps not all audiences will find the same form of case studies useful. That is, some readerships may find, say, biographical case studies to be more relevant than, say, event case studies.

Furthermore, different audiences may find the different flavours of the method—in its inductive or motivational key—more or less appealing. In general, I expect that more readers will find the motivational form of case studies relevant than the inductive form—if they find the method relevant at all. Indeed, I expect that the readers who find case studies scholarship most relevant will be those for whom group identity is important, who want to see themselves as part of some larger tradition or line of scientists, co-religionists, or whathaveyou. These might be budding students and potential scientists. On the flipside, readers interested in *using* such desires for group identity for some other purpose—perhaps apologetic or

political—will also be interested in the method of case studies too, though more as a tool than as a means of self-conceptualization.

In what follows, I'll consider several groups for whom I expect the method of case studies to be especially relevant, taking care to specify what forms of case studies such groups would likely find most meaningful.

Aspiring Religious Scientists Aspiring scientists come in all shapes and sizes—and have all manner of concerns as well. They might be students—like our biology-curious undergrad—thinking of whether they'd like to take on a STEM major, graduates applying for grad school or jobs, or adults looking to change careers. For some religious aspiring scientists, besides the worries about training, pay, and general work–life balance facing all would-be scientists, there may be an additional concern about whether they will "fit in" as a scientist while still embracing their religious identity. This may be fueled by a broad cultural discourse about tensions between religion and science or personal misgivings about their own particular beliefs and practices. For these individuals, case studies approaches to the RSR could provide some help. In particular, for those looking for role models, figures with whom they can identify and thus be reassured in their ability to be religious scientists, biographical case studies may be especially powerful. A Christian reading about Johannes Kepler, or a Muslim reading about Ibn al-Haytham (965–1040), may find inspiration—they *too* can be a scientist while adhering to their religion. The many-cases style of case studies may also be found useful when the cases themselves are biographical: reading the lives of eminent Muslim scientists could surely be encouraging for those having doubts about their faith and profession.[46]

[46] Although here I've assumed the readers would encounter work presenting a harmonious picture of the RSR, readers looking for role models could still be well served reading biographies offering a very different characterization: if they found that there were no, say, respected Scientologist scientists, that could still be useful for readers concerned about "fitting in."

It is not clear, however, whether these same readers would benefit from episode studies beyond their value in highlighting *individuals* who were able to reconcile their religion and science. One way they could still be relevant to these aspiring scientists is in debunking common narratives taken to demonstrate tensions between religion and science. Perhaps episode studies could also be useful for aspiring scientists when they focus on specific kinds of science. For instance, work examining religion–geology interactions in oil companies or encounters between archaeology and indigenous religions might be especially informative for individuals aspiring to be industrial chemists or archaeologists.

In any case, I do not think aspiring scientists concerned about fitting into the scientist mold would find much use in the inductive form of the method of case studies. While the construction of the inductive base may be inspiring for the reader—look how many Hindus have been scientists!—it is not clear that the inductive step itself, and the conclusion to some general claim about the RSR, is really necessary. As discussed in §3, the mere existence of the cases is likely enough to satisfy the worries of these readers, scholarly concerns about representativeness of the sample population aside.

Apologists: As with the other methods, apologists—both for religion and non-religion—are likely to find useful material among works employing the method of case studies. Playing into the desire for role models, apologists for particular religions would surely find biographies of eminent co-religionists useful. One can even imagine parents wishing to assure their children that they can be scientists while retaining their religious identity giving such biographies as gifts (whether or not they are read!). Likewise, religious schools may do something similar—for instance requiring that students read a collection of biographical sketches of Christian scientists.

Apologists on either side of the religion–non-religion divide may also find episode studies

useful for debunking purposes in both defensive and offensive modes. To counter opponents' claims that some particular religion is/isn't compatible with science, they can refer to particular historical examples showing this is or isn't the case. In fact, this argument strategy is quite common in both high-profile televised debates and more low-brow forums. For those apologists seeking a constructive argument, the inductive form of case studies will likely be useful: having a legitimate induction to a more or less cogent generalization about the RSR may be quite powerful. However, for those seeking to attack an opponent's position, it's not clear that such inductions are needed—simply being able to pose counter-instances and challenge the representativeness of the opponent's sample population may be enough in the messy context of apologetic debates.

Policymakers: For rather different reasons, I think policymakers may have much to gain from the case studies literature. By "policymakers," I have in mind a broad class of individuals involved in the design and passage of legislation—and if they are coming to the religion-and-science literature, legislation likely revolving around science, or possibly religion. Like the apologists above, policymakers could have much to gain in playing into constituents' responsiveness to role models.

Consider, for instance, a policymaker who wants to expand diversity within science, in particular encouraging gender and ethnic/racial minorities to embrace STEM education. Campaigns in this vein already exist. One tactic used is to design and distribute motivational posters with famous woman scientists and scientists of colour, the idea being that girls and children of colour will be more likely to enter STEM when they see and understand that people like themselves can be successful in STEM. Now, it so happens that—at least in the US and in Europe—these groups tend to have high rates of religiosity (PPRI 2021 and Pew Research Center 2016). Clearly, then, a policymaker may find it useful to seek out a religious individual who is also a woman or also a person of colour—in addition to being a scientist—to

use in their motivational posters. Biographical case studies—especially those which discuss many scientists—could be especially useful for providing the faces the policymaker seeks. In this case again, however, the inductive form of the method of case studies is not clearly useful to the policymaker. The fact that the sample population of some particular study is not representative is of little importance. All that matters is the existence of a handful of cases which can motivate others to follow in their footsteps. In fact, a lack of representativeness may be exactly what the policymaker is interested in rectifying through their policy!

Beyond educational contexts, policymakers may also work on areas where scientific practice itself comes into contact with religion, perhaps proposing legislation which guides or restricts how research is done. Such cases may be especially relevant in the context of anthropology and archaeology. For instance, extant legislation such as the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 already places certain restrictions on how scientists are allowed to study the remains of bodies and sacred objects unearthed in the US—as a means of respecting the religious rites/rights of Native Americans.[47] Similar kinds of legislation are not, however, in place for shaping the way historical archaeologists may study religious sites held sacred by groups other than the Native American Church. This may pose an issue when, for instance, national and cultural-historical interests in the period or culture of the near past conflict with the interests of religious groups. In one telling case study, Benjamin C. Pykles shows how the competing interests of archaeologists associated with the National Park Service and members of the Church of Latter day Saints shaped and stalled the restoration of structures (including a Mormon Temple) at Nauvoo, a frontier city in Illinois (Pykles 2010). Likewise, while NAGPRA deals with bodies and objects, it does not deal with *land*. That this may lead to issues around which legal action is desired is evidenced by the controversy surrounding the construction of the Thirty Meter Telescope (TMT) on Mauna Kea in Hawai‘i. A long-dormant volcano, Mauna Kea is considered holy

[47]See Mihesuah 1996 and Dumont 2003 for discussions of the intersections of religion and science in the context of NAGPRA.

and sacred land by many Native Hawaiians—in fact, Mauna Kea is viewed as an *ancestor* of the Hawaiian people. Due to the exceptionally dry climate and lack of light pollution near the peak of Mauna Kea (which is one of the tallest mountains in the world), astronomers have placed around a dozen telescopes on the mountain. In 2009, a coalition of California astronomers at Caltech and UC Santa Barbara proposed building a large visible light telescope—with a diameter of 30m, the largest such telescope to date—on Mauna Kea. But Mauna Kea is viewed as sacred land to many Native Hawaiians (some of whom even see the mountain as an ancestor). Thus, when in 2014 construction began in October, locals immediately protested, and construction came to a halt in early 2015—which has yet to resume to this day. Although legislation is in place governing the use of land on Mauna Kea (which, for instance, is supposed to be protected by the state of Hawai'i for its environmental and cultural significance), further legislation is currently in production to set further standards for how land considered sacred in Hawai'i is to be handled (see e.g. Fernandez-Akamine 2024 for a timeline of events).[48]

Legislation pertaining to the use of sacred land by scientists outside of Hawai'i, and even the US, could also greatly benefit from attention to case studies literature which features cases such as the TMT. For instance, in Europe, questions about how sites like Stonehenge should be protected and made available have recently been highlighted by neo-Pagans who, in treating the sites as ritual spaces, leave behind garbage and make irreversible changes to the structures (e.g. by cutting away stone fragments). Archaeologists often see such use of these sites as damaging and thus undesirable as they may destroy evidence containing clues as to the original creation and purpose of these sites. This then leads them to lobby for the protection of these sites by limiting public access.[49] How should these conflicting interests be weighed, and how should the sites be governed?

[48] More on the interactions between religion and science in the context of the TMT can be found in Alegado 2019 and Nelson 2023.

[49] See Blain and Wallis 2007 for a discussion of these issues.

Understanding how scientists have interacted with religious individuals in the past can help to shape future policy by revealing what went wrong and what went right. Case studies literature which detail these types of interactions can thus be valuable for policymakers working in this area. Here, the inductive form of case studies may be more useful than the motivational use: that the sample population is in fact representative will be useful for deciding what issues are actually worth addressing.

Science Educators: A final group for whom I think case studies literature may be especially relevant are science educators. For reasons similar to those discussed above with policymakers, science educators may seek role models to inspire their students to enter STEM. For religious students who may be exposed to general cultural assumptions about the incompatibility between religion and science—or their particular religion and some particular science—biographical case studies can present educators with a range of figures they may point to to assure students that they could retain their faith and excel in science. This may be especially important in the contemporary US, where the politicization of both religion and science may disincline students from religious backgrounds from entering into scientific fields. This should cause worry for science educators, not least because significant swathes of the American public identify as highly religious. Thus, being able to reference individuals who have successfully integrated religion and science can be of great value for their potential to motivate STEM-disinclined individuals. Likewise, those same figures may be useful in communicating to religion-skeptical students (and adults!) that their religious peers can also successfully become STEM-educated—an important fact to realize given, again, the high percentage of Americans who identify as religious.

3.5 Conclusion

In this chapter, I offered a critique of the method of case studies. This method has two flavours. The first, which occupied the majority of this chapter, saw individual historical case studies as contributing to a broad base of cases, over which an enumerative induction could be performed to arrive at the correct, historically accurate characterization of the RSR. The second flavour eschewed this more descriptive end of providing an accurate characterization of the RSR and instead focused on arraying a variety of cases to inform or inspire readers about possible, typically favourable, ways of relating religion and science.

These different flavours of the method of case studies face different issues. In §2, I focused on the first flavour, and discussed a number of more-or-less standard objections to enumerative inductions. We then saw how the method of case studies, as currently used in the religion-and-science literature, could be improved: scholars should make clear that their inductive bases are representative of the class of religion–science encounters they wish to characterize. Scholars also need to go some way in explaining why the past cases they examine are relevant to contemporary religion–science relations. I also considered the issue of levels of analysis: what is the proper unit for composing the inductive basis—individuals or institutions? I argued that there is no single answer and that different levels of analysis simply reveal different facets of the RSR. Finally, I explored the question of what kinds of religion and science should be featured in their inductive bases. As in almost all other areas of the literature, employers of case studies tend to focus almost exclusively on elite scientists and religious folk, and also tend to draw their case studies only from a small handful of the sciences—particularly theoretical subdisciplines of physics and biology. These choices severely limit the representativeness of the inductive bases, and so I recommended that scholars expand to included cases featuring non-elites and sciences beyond theoretical physics and biology, in particular the medical and industrial sciences.

I turned in §3 to the second, more motivational/prescription-oriented flavour of case studies. Although misalignment between inductive base and target population is not an issue for this form of case studies since it simply does not aim at doing an enumerative induction, several of the recommendations I made for improving the first flavour still apply. In particular, scholars who wish to outline possible ways contemporary religious individuals could understand the RSR in their own lives would do well to examine those sciences which employ the majority of scientists—viz., *not* theoretical physics and biology.

Finally, I concluded this chapter with a discussion (§4) of what publics might find the method of case studies most relevant.

Chapter 4

The Method of Deconstruction

As our undergrad stares up at the rows upon rows of books before her, a title catches her eye: *The Territories of Science and Religion.* "What does it mean for science and religion to have territories?" she wonders, skimming the first few pages. She gathers that these "territories" have changed over time, that what we think of as science today is not what science was in the past—and so too with religion. Just as a nation's territory has been constructed (perhaps by warfare), so too have the boundaries of religion and science been constructed.

"Constructed." That term stands out, and as the student resumes her search of the shelves, she finds it popping up now and then.

These "constructive" accounts—or "deconstructions"—what exactly do they say about the RSR? How are they relevant to our student and her concerns—if they are at all?

In this chapter, I analyze the method of deconstruction[1] which has come into increasing use in

[1] In previous work, I discussed this method under the heading of "relativism" (Chin 2023). However, as I will explain below, calling the method "relativizing" is potentially misleading—hence my shift to "deconstruction."

investigating the RSR among religion-and-science scholars. This method is often run together with the method of case studies. However, as I will demonstrate, they are in fact distinct methods and, furthermore, are often in significant tension, at times even *incompatible*. I'll start by specifying what I mean by "deconstruction" and highlight some recent exemplars. I then consider several issues deconstruction faces as it's often employed: it can focus too much on words rather than meanings, seems self-defeating, tends to deny the causal efficacy of social kinds, and—like other methods—fails to consider whose concepts of religion/science are being deconstructed in a key respect especially relevant to non-scholarly audiences. After discussing these issues, I then turn to the presumed compatibility between the method of case studies and deconstruction which seems to dominate especially historically inclined pockets of the religion-and-science literature. I argue that the method of deconstruction—as practiced by some—in fact *undermines* the method of case studies. The chapter concludes by considering what public readerships may find deconstructivist scholarship especially relevant.

4.1 Deconstructing Deconstruction

By "deconstruction" in religion-and-science, I mean the method which proceeds (roughly) as follows:

> **Deconstruction:** 1) demonstrate the contingency (of the formation) of the concepts ⟨religion⟩ (or some particular religion) and/or ⟨science⟩ (or some particular science) at some place/time, then 2) on the basis of that contingency offer a characterization of the RSR.

A note on the term "deconstruction": it has been used in a wide variety of ways in a wide variety of disciplines. I don't mean to borrow the term from any particular sub-discipline which takes itself to be "deconstructionist"—whether in the French literary or American

theological sense. My own use of the term is instead derived from the general account of deconstructive methods found in Jason Ānanda Josephson Storm's *Metamodernism* (2021), in which Storm synthesizes a range of ways the term is used across disciplines, extracts a basic common core, and critiques it. Further, some scholars in religion-and-science refer to their work explicitly with the language of "construction" or "reconstruction," which is done for the sake of *de*construction. Peter Harrison, for instance, titled one of his most influential articles "Science and Religion: Constructing the Boundaries" (2006), a work whose main thesis was later developed in his Gifford lectures, published as Harrison 2015. Likewise, participants in the "After Science and Religion" project spearheaded by Harrison (among others) explicitly describe parts of their work as deconstruction: John Milbank, for instance, labels one of his entry's sections "Disenchanted Transcendence: Genealogy and Deconstruction" (Milbank 2022). To this extent, then, I take my use of the term "deconstruction" to be an adequate descriptor of the method defined above.

It is also important to clarify that the method of deconstruction, just like the other methods discussed in this dissertation, can be used to argue for any particular characterization of the RSR. As we will see below, some use it to argue for (or perhaps it is better to say *explain*) the existence of conflict between religion and science, while others use it to argue that there is no such conflict. Most often, however, deconstruction is employed in the service of a kind of relativism about the RSR in which the possibility of a general characterization of the RSR is called into question—a conclusion which is sometimes referred to as "(The) Complexity Thesis." But relativism is only one conclusion deconstructive scholars may reach—and furthermore is a conclusion scholars may reach using any of a large number of methods; scholars employing case studies often reach such conclusions too (John Hedley Brooke and Geoffrey Cantor give such approaches the special label of "contextual" (J. Brooke and G. Cantor 2000, 23–25)). Hence, the method is termed "deconstruction" rather than "relativizing," although in previous work (Chin 2023) I used the latter.

Now, there are several things to note in my definition of deconstruction. The first is simply that, again, the parenthetical qualifications attached to ⟨religion⟩ and ⟨science⟩ are important: some scholars discuss religion as a whole, others particular religious traditions; and so too with science and particular sciences. For instance, Peter Harrison tries to tackle all of religion and all of science by analyzing the linguistic history of those terms (Harrison 2015). On the other hand, Elshakry 2013 traces the ways in which Darwinism in particular was shaped and moulded in the Islamic world. Unlike what we saw with the method of conceptual analysis (Chapter 2), however, whether scholars speak of religion/science generally or particularly does not seem to correlate well with apologetic intent. While Harrison may ultimately seek to defend Christianity, the same goes for James Ungureanu, who examines Draper and White as specifically *Protestant* reformers of a sort (Ungureanu 2019). On the other hand, Donald Lopez Jr. does not seem to have any particular religious axe to grind in his work on Buddhism (in particular) and science (in general; Lopez 2011); nor does Jason Ānanda Josephson in *The Invention of Religion in Japan*, which takes both religion and science broadly (Josephson 2012). We'll examine some of these in more detail in the next section.

Second, the definition above features ⟨religion⟩ and ⟨science⟩, not just religion or science. These angled brackets are important, for they are meant to help clarify an ambiguity rampant in the literature as to what scholars mean when they speak of religion and science. I mean this not just in the sense that scholars may differ in how they define (roughly or more exactly) religion/science, but also, and for this chapter more importantly, in the sense that scholars may speak of religion/science—and what is contingent about them—at different levels. To make this more clear, it will help to bring in a set of distinctions often used by philosophers studying language and meaning: that between a term, its intension, and its extension. I'll briefly explain these distinctions, then introduce a typographical convention I hope will introduce more clarity to the discussion in the rest of the chapter.

A term is simply a word, spoken, signed, written. Terms express concepts, or sometimes we say that they have meaning or a particular sense—philosophers will call this the term's intension. But terms also refer to things; they are supposed to point to particulars, or collections of particulars, in the world. Those things to which terms refer are called their referents, and the collection of a term's referents philosophers call the term's extension—its extension from the realm of language to the realm of our world. The distinction between intension and extension, between sense/meaning and reference, is subtle. In many cases, they overlap: the concept expressed by a term is deeply grounded in the things-in-the-world pointed to by the term. But they can come apart. The classic example (from Gottlob Frege (1848–1925)) involves 'Hesperus' and 'Phosphorus,' Greek names for what in English are also known as the 'evening star' and the 'morning star,' respectively. 'Hesperus' and 'Phosphorus' have different meanings; they express different concepts: one appears in the evening, the other in the morning. But in fact they refer to the same thing in the world: the planet Venus. So while 'Hesperus' and 'Phosphorus' have different intensions, they have the same extension; while the concepts are different, their referents are the same. One can thus think of concepts as including other associations beyond the term's worldly referents. Another way of putting the difference between the concept/intension expressed by a term and the term's referents/extension is that the concept is that which groups particulars in the world together to form the term's extension—concepts are group*ings*; referents are the things grouped. Scholars sometimes also talk of concepts as categories, with the referents being the things categorized. These latter two images will be especially relevant below when we discuss several arguments put forth by Harrison (§2.1 and 2.2).

Coming back to religion-and-science, deconstructivists sometimes talk about religion/science as terms—other times as concepts expressed by terms—and still other times as the in-the-world things/beliefs/practices which our terms pick out. And unfortunately scholars are not always clear about what exactly it is they are deconstructing, and as it turns out some

even slip between these different "levels" within one and the same work.[2] The result is a general confusion both within the scholarship and among readers (real and potential). In what follows, I will try to offer some clarity as to the structure of some deconstructionists' arguments and the implications of those arguments by keeping clear what they mean by religion/science. As an aid, I'll use the following typographical convention: When we speak of religion (or science) as

- a term, I will enclose it in single quotes—'religion';
- the concept expressed by the term 'religion', I will enclose it in angled brackets (as in, we should remind ourselves, the definition of deconstruction given above)—⟨religion⟩; and
- the thing(s)-in-the-world picked out by the term 'religion', I will use boldface—**religion**.[3]

To be clear, the confusion among and slippage between these different uses of religion/science is not unique to the religion-and-science literature. This confusion is also present in—and perhaps inherited from—deconstructionist work in religious studies. For instance, as some participants in the discussion of the origins of Hinduism point out, some self-proclaimed deconstructionists simply unpack the term 'Hinduism', taking the fact that it was not widespread until the 1800s to justify the claim that the concept ⟨Hinduism⟩ was an invention of British colonial scholars and administrators. Detractors from this position—like Lorenzen 1999 and Pennington 2005—instead argue that what really matters is the existence

[2]This confusion is not unique to the method of deconstructuon, but it is particularly acute for the method since it often relies, as we shall see, on linguistic analyses to make further claims about concepts and even what kinds of practices could exist in the world.

[3]A few other typographical conventions I will use which are less directly relevant to the arguments below but nonetheless worth noting: When I write religion or science in plain text, without any special typographical features, I mean religion/science in the "ordinary" sense, as the things which we, admittedly rather unreflectively, tend to call religion/science. Sometimes I will also use italics, as in *scientia*, as an indication that the word is from a non-English language—in this case Latin—though sometimes italics will also be used for emphasis; context should make it clear which is intended. Finally, when enclosed in *double*—as opposed to single—quotes, "religion" or "science" mean instances of the term 'religion' or 'science', as found in sources I quote.

of on-the-ground beliefs, rituals, and otherings—**Hinduism**—and that since relevant such things existed before the British landed in the late 1500s, ⟨Hinduism⟩ was not merely an invention of a colonial culture.[4] Regardless of its origin, the confusion between a term, its intension, and its extension is prevalent in the deconstructionist religion-and-science literature. As we will unpack below, resolving the ambiguities present in much extant scholarship will not only help clarify the significance of the claims being made, but also, I hope, encourage future deconstructive accounts to be more clear—and hence more readily understood by readers of all backgrounds.

Returning to the definition of the method of deconstruction, the third thing to note is that the demonstration in step 1) can be done in a number of ways. Often, scholars appeal to historical case studies. Importantly, however, no induction is then performed over those case studies to a (direct) conclusion about the RSR—that would be the *method of case studies*. Instead, the case studies are taken to show (directly or perhaps via induction or abduction) that the contours of ⟨religion⟩ and ⟨science⟩ are contingent. Furthermore, the case studies used may differ in kind from those found in works using the *method* of case studies. Scholars engaged in *deconstrutive* projects will sometimes consider religion and science separately rather than directly engaging with episodes of religion–science interaction—though deconstructive accounts will also often consider such cases as well. So although particular religion–science encounters are an essential feature of the method of case studies, they are not essential to deconstruction as method: the deconstruction is ultimately more conceptual than historical, hence the angled brackets, ⟨religion⟩/⟨science⟩, in our definition. In that sense, the method occupies something of a middle ground between conceptual analysis and the method of case studies: unlike conceptual analysis, deconstruction doesn't aim for definitions; and unlike the method of case studies, it doesn't (always) focus on religion–science interactions. But like conceptual analysis, the method concerns itself with concepts which, as with the method of case studies, are often unearthed from historical facts—although im-

[4] I should note that the scholars referenced here do not use my typographic conventions.

portantly, again, it does not go directly from the historical facts to the characterization of the RSR: the historical facts are only used to demonstrate the contingency of ⟨religion⟩ and/or ⟨science⟩. And that contingency can also be shown in other ways, for example by appeal to contemporary sociological data or via (historical) linguistic analysis.

Fourth, the contingency being demonstrated can vary in form. It might highlight the instability of the concepts (Harrison), or it might emphasize the artificiality of the current division or of the consequent relation (Ungureanu). It might make use of the contingency of our terms ('religion'/'science') or their referents (**religion**/**science**) (Lopez). And it might do so by appeal to history or culture—by appeal to time or place. Appeals to history often go by the name "historicisim"; historicists offer historicist critiques of other methods and of what they take to be generally naive uses of the terms 'religion' and 'science'. There is no similarly concise and widely used term for deconstructions which appeal to culture; I'll simply use the term "cultural deconstructivist" to refer to scholars that use such a method.[5]

The basis of the appeal actually leads scholars to two different kinds, or flavours, of conclusions. Historicists conclude something about the temporal scope of the RSR—perhaps that there can be no tenseless characterization of the RSR or that, although it is best characterized by Conflict now, it was not always so. Cultural deconstructivists' conclusions, on the other hand, concern spatial (in the widest sense) scope: maybe it doesn't even make sense to ask about the RSR in particular cultures, let alone offer a global characterization of the RSR; or maybe there were certain forces at work within particular places which made it uniquely impossible for religion and science to come into conflict there. To be clear, these differently flavoured conclusions are not mutually incompatible; very often they are in fact complimentary, and often scholars will mix and conflate them. But they are distinct kinds of theses, and they by no means need to lead to the same conclusions.

[5]This term—"cultural deconstructivist"—is especially fitting since cultural deconstructivists often see religion as a facet of (some particular) culture, and so cultural deconstructions of religion are often also deconstructions of (some particular) culture.

Further, by contrast with the method of case studies, deconstruction does not typically employ induction. Instead, the "offering" in step 2) usually proceeds by abduction, or inference to the best explanation: the best way to understand the RSR given the contingency of ⟨religion⟩ and/or ⟨science⟩ is X. Of course, deconstructivists can use induction, or something similar to it; cultural deconstructivists in particular may do something like this by referring to a host of cultures and drawing their conclusion from them. Historicists, on the other hand, often employ something more akin to the deduction found in conceptual analysis: by looking at the historical trajectories of our concepts, we can see how the boundaries those concepts erect force us to conceive of the RSR in some particular way (as in Ungureanu 2019).

Finally, what is offered in step 2) is sometimes twofold—and sometimes local, sometimes global, and sometimes both. One might, for example, claim that step 1) has shown why the RSR is properly characterized as, say, harmonious in a particular time/place, but also that the very instability demonstrated indicates that there can be no global characterization of the RSR—a both local and global conclusion. Others might say that the concepts have been crafted in such a way that there *can* be a global characterization of the RSR, and in fact that it is best characterized as one of conflict. On the other hand, some scholars may hesitate to make a more general claim, and limit themselves to more modest conclusions about particular times and places. Regardless of the scope of the conclusion drawn, however, the process is the same: demonstrate the contingency of the concepts, and draw some conclusion.

Now that I have clarified what I mean by the method of deconstruction, I'll turn to some examples of the method drawn from the public-facing twenty-first-century literature.

4.1.1 Exemplars

Public-facing examples of the method of deconstruction are admittedly relatively hard to find compared to other approaches to the RSR. This is likely because the method itself is at least intuitively more complicated than the others—the link between the contingency of ⟨religion⟩/⟨science⟩ and the current RSR is much more opaque than direct deductions of the relation from definitions or even inductions from a variety of case studies. Further, deconstructions in religion-and-science typically build on a vast body of scholarly, inward-facing literature, especially in religious studies where deconstructions of "religion" have been central to the discipline for at least the past thirty years (see e.g. J. Z. Smith 1992, Masuzawa 2005, Nongbri 2013).[6] Some of these accounts also draw on an (impressively) overwhelming array of sources from different disciplines, often from many languages, in ways which are not easily digestible for public readers. Works in this vein include Jason Ānanda Josephson's *The Invention of Religion in Japan* (2011); James Ungureanu's *Science, Religion, and the Protestant Tradition* (2019); and the "After Science and Religion" project, spearheaded by John Milbank and Peter Harrison in their collected volume by the same name (2022).

There are, however, a handful of more public-facing examples, and we'll turn now to two such books: Donald Lopez Jr.'s *Buddhism and Science* (2008) and Harrison's *The Territories of Religion and Science* (2015).

The relation between Buddhism and science occupies a well-trod space in public discourse, and Lopez has shown in a variety of works that this has been the case since the early 1800s (Lopez 2008, Lopez 2011, Lopez 2012). In *Buddhism and Science: A Guide for the Perplexed* (2008), Lopez traces the rather tortuous history of that discourse through a series of historical episodes, from the nineteenth-century British "discovery" of Indian Buddhism

[6]The following quote from Arnal is representative: "The academic future of religion as a concept will need to focus on deconstructing the category and analyzing its function within popular discourse, rather than assuming that the category has content and seeking to specify what that content is" (quoted in King 2013).

to the Dalai Lama's twenty-first-century overtures to neuroscientists. Along the way, Lopez tries to show the ways in which the very conceptions of 'Buddhism' and 'science' morphed in ways which allowed supporters of Buddhism to maintain that Buddhism and science were compatible—eminently so in fact.

The story begins in colonial British India, with a group of language scholars who discover a set of Pali texts referring to an enlightened individual: Gotama Buddha (or Śākyamuni Buddha). These scholars, riding on the waves of biblical higher criticism, were quick to make analogies between these texts and the Bible, the Buddha and Jesus. An essential dis-analogy their Enlightenment almost-post-Christian lights landed on, however, was the Buddha's (supposed) emphasis on individual improvement through thought—and conveniently the Buddha's (linguistic-turned-racial) Aryan heritage. Dismissing contemporary practicing East Asian Buddhists' conceptions of a supernatural, often magical Buddha as corruptions of these Pali texts, British scholars were able to claim the discovery of a religion which championed the rational, empirical study of the self and world. This Buddhism, the scholars claimed, was therefore eminently compatible with science, if not in fact scientific itself.

This discourse was later picked up by practicing Asian Buddhists and used as a defense against their Christian colonizers in a rather ironic reversal. Whereas many Christian missionaries had tried to demonstrate the superiority of their faith by its compatibility with early modern science (see e.g. Stenhouse 2019), Buddhists could now turn the tables: Buddhism was empirical, and thus embraced the scientific method. The 'Buddhism' these apologists spoke of, however, was one shorn of various traditional beliefs—for instance in the existence of Mount Meru (sometimes Sumeru), an enormous square mountain made of four minerals (gold, silver, lapis lazuli, and crystal) said to occupy the center of the universe, with the known world being a triangular island continent to the south of Mount Meru (Lopez 2008, 42–43). By shaping ⟨Buddhism⟩ in this way, Buddhists could continue claiming that

Buddhism was compatible with science.

By a similar token, over time, what exactly participants in Buddhism-and-science discourses thought science was—a method, a set of ideas about the world, a series of inventions/technologies—shifted in the various apologetic contexts in which Buddhists around the world found themselves. And the conception of Buddhism—a temple-tied worship of a magical, fire-shooting being; a dispassionate analysis of the human mind; a set of meditative practices to increase body temperature—continued to change as well. By shifting the concepts in tandem with one another, Lopez argues, Buddhists over the centuries and around the world have been able to claim that Buddhism and science are compatible with one another in some way (sometimes because ⟨Buddhism⟩ simply is a science, other times because ⟨Buddhism⟩ is science-like, sometimes because it anticipates or encompasses the conclusions of science). As he puts it, "Over the history of the Buddhism and Science discourse, Buddhism has been identified in a variety of ways. Yet it has generally been the case that, regardless of the differences among the various Buddhisms that have been paired with various Sciences, they share a rather spare rationality, with the vast *imaginaire* of Buddhism largely absent" (ibid., 215–216).

In unpacking this dynamic history, the picture of Buddhism and science which Lopez paints is one of complexity and chaos coated with a thin veneer of simple harmony. We can offer a general characterization of the Buddhism–science relation only at the expense of ignoring the ways in which time and place shaped what Buddhism and science were/are. To that extent, although Lopez offers a picture of harmony, it is a limited kind of harmony, one made possible only by significant changes in the concepts at play.

Lopez's method is not conceptual analytic—though he does unpack how people have variously defined 'Buddhism' and 'science,' and does show how people have conceived of the Buddhism-science relationship on the basis of those definitions. But Lopez's conclusion is not based on his definitions; the point is that there have been a wide variety of definitions, all constructed in such a way as to ensure a particular characterization of the relationship.

So although definitions are important to how Lopez ultimately characterizes the Buddhism–science relationship, it is the contingency of those definitions which plays the more fundamental role. Likewise, Lopez does not use the method of case studies—even though he examines a host of historical cases in which Buddhism and science are understood to interact. The key difference between Lopez's actual method and the method of case studies is that Lopez does not talk of Buddhism and science per se, but about how other people (most of them historical) *conceived* them. His cases, therefore, are not interactions or episodes so much as particular conceptualizations.

Lopez's method, then, is a clear example of historicizing: one looks at how the concepts ⟨Buddhism⟩ and ⟨science⟩ have changed over time and concludes (not by induction) that the best way to understand the historical trajectory is by saying that Buddhism and science are in harmony, but only because particular cultural forces have had an interest in it being so, and they have been willing to reformulate the concepts of Buddhism and science repeatedly to achieve that characterization. A very nuanced kind of harmony!—one which we might suspect is lost on many readers. But some *will* find this kind of analysis useful—and we will consider several such groups in §4 below.

Harrison presents a similarly complex—and supposedly public-facing—account of the religion–science relationship—religion in the general, since he focuses especially on the particular English-language term and its Latin origins. From 2010–2011, Harrison delivered the Edinburgh Gifford Lectures, which he later condensed and edited into his 2015 *The Territories of Religion and Science*. The book traces the contorted histories of the terms 'religion' and 'science,' and the different concepts they expressed, exposing how it came to be so natural for us in the twenty-first century to assume that there is some conflict between religion and science.

Harrison's work is, like Lopez's, a case of historicizing: what is important for Harrison is the process by which the concepts expressed by our modern terms 'religion' and 'science' developed in Western European intellectual culture. To the extent that he focuses exclusively on Europe (and in particular on Christianity and Christian self-conceptualization as a religion), the account is culturally specific. But insofar as the contemporary use of the conceptual categories ⟨religion⟩ and ⟨science⟩ is global, the account is more wide-ranging. Regardless, to reach his conclusion, Harrison pays close attention to linguistic shifts in the scope of 'religion' and 'science,' and their etymological ancestors. In their earliest uses, '*religio*' and '*scientia*' (from which the English 'religion' and 'science' are derived) were used in quite different ways. While '*religio*' acted as something like what we would call today an "ethnic" marker, '*scientia*' was conceived as a discrete body of knowledge (i.e. ⟨*scientia*⟩ was a discrete body of knowledge). By the Middle Ages, however, a change had occurred whereby both *religio* and *scientia* were, to use Harrison's word, "interiorized." Rather than serving as markers to distinguish groups (of people or of ideas) from each other, the terms came to refer to inner qualities of individuals, or *virtues*. The guiding source for this new conception of *religio* and *scientia* is Thomas Aquinas, who describes them as mental habits (ibid., 11–16).

As mental habits, ***religio*** and ***scientia*** could be cultivated, and could be possessed in greater or lesser degree by particular individuals, who would often undergo specific training—meditation, study, etc.—to cultivate them. As virtues, they were not incompatible; in fact, it did not (according to Harrison) even make sense to speak of possible conflict or even of possible harmony between them—as virtues, they were simply mental habits one had developed to a greater or lesser extent.[7] Moreover, they were not even both *epistemic* virtues. While ⟨*scientia*⟩ concerned correctly producing knowledge (producing that which was also called "*scientia*"—though not as a virtue), ⟨*religio*⟩ was concerned with inner piety

[7]It is not clear why Harrison thinks virtues cannot conflict; surely they sometimes do. For instance, the virtues of kindness and honesty, or charity and moderation may frequently be in tension.

and proper practice/worship. In that sense, the two concepts occupied distinct realms, a fact which Harrison illustrates with the example of medieval bestiaries in which scholars accompanied descriptions of creatures (real and, often unknown to the authors, imagined) with explanations of the creatures' theological and moral significance. The pelican, for instance, was sometimes described as a symbol of Christ since it (supposedly) would kill its young, weep, then—on the third day—use its own blood to revive the chicks, just as Christ rose on the third day after his crucifixion (Harrison 2015, 61–62). For Harrison, the lesson is that topics which we would nowadays classify as explicitly scientific (descriptions of the rearing behaviours of pelicans) and religious (finding symbols of Christ) were mixed in ways unacknowledged and unseen by medieval actors; that they could even be in tension was not a conceptual possibility for them.

However, in the 1500s, a conceptual change began whereby the boundaries of the concepts shifted and the "territories"—Harrison's term for the referents of a term—of 'religion' and 'science' came to overlap. Through a complex mixture of socio-historical events—including anti-Aristotelian backlash, the Protestant Reformation, and the usage of "religions" in the plural—⟨*religio*⟩ was broadened from a particular virtue into a set of beliefs, or knowledge, accompanied by practices. At the same time *religio* was reified, its referent, ***religio***, shifted from an ephemeral interior habit of mind to a full-fledged social entity. As Harrison explains, "From this time on religion and religions *can* be understood in terms of beliefs and practices that are empirically available for comparison and analysis. Religion now exists concretely as something that can serve as an explanation for historical events and which in turn can be 'explained' by various social sciences. ... it is religion thus conceived that subjects its beliefs to confirmation or disconfirmation by the modern disciplines of philosophy and science" (ibid. 116; emphasis original). Thus, these early modern shifts of meaning enabled possible epistemic competition between religion and science—although for several centuries this was not widely seen as a live possibility; scientific knowledge was seen as in the service of religious knowledge, as in the case of Paleyan natural theology.

But by the mid-1800s the possibility of conflict became plausible—and perhaps actual. While ⟨religion⟩ underwent extensive changes as it lost status as an inner virtue, 'science' simply shifted to refer to knowledge in general, as the concept it expressed also lost virtue-ness. But in the latter half of the nineteenth century, given advances in theory and technology, and the increasing professionalization of those contributing to such advances, science began to change as it became linked to "a putatively unified set of practices ('the scientific method'), associated with a distinct group of individuals ('scientists')" (ibid. 147). And at the behest of historial actors like Thomas Huxley (1825–1895) and Francis Galton (1822–1911), who had ideological issues with religion and religious individuals, the concept of science was further reworked to exclude theological and metaphysical elements that had previously been deemed essential to ⟨science⟩. In so doing, ⟨science⟩ was reified into a concrete social object which, like ⟨religion⟩, could now serve as an explanation for particular historical events, thus enabling science to be put into relation with other social objects/forces like politics and, of course, religion. And influential scientists like Huxley ensured that conflict came to dominate discussion of the relationship between religion and science.

Hence, through a long, historical process of conceptual reimagination, religion and science came to be in conflict. But that process was contingent: the current configuration of the RSR was not, and is not, necessary. Had 'religion' and 'science' had different pasts, the way we relate the two may have differed—if it were even possible to relate them. Harrison's ultimate conclusion is admittedly difficult to tease out. One conclusion is that that "science and religion are not natural kinds; they are neither universal propensities of human beings nor necessary features of human societies. Rather they are ways of conceptualizing certain human activities—ways that are peculiar to modern Western culture, and which have arisen as a consequence of unique historical circumstances" (ibid., 194). What this means (according to Harrison) is that religion (and presumably science too, though Harrison does not talk explicitly about it) can neither be explained outside of historico-linguistic studies like his own, nor actually "serve as an explanation for anything, either" (ibid., 196). Likewise,

any attempt to characterize the RSR is misguided: all that such attempts do, regardless of their conclusions, is reinforce the idea that religion and science are in conflict since all such attempts reify "the propositional nature of religion, and the idea of a neutral, rational space" in which religion and science can be compared (ibid., 197–198), despite the fact that (supposedly) ⟨religion⟩ is not *essentially* propositional. Thus, on the one hand, Harrison has provided an explanation of how the modern RSR is a relationship of conflict, while also arguing that such general characterizations are ultimately misleading, for there are no **religion** or **science** out-there-in-the-world which can be so related.

Other scholars have drawn a variety of other morals from Harrison's work, however, and Harrison himself has subsequently highlighted a different consequence of his analysis. Even within the collected volume *After Science and Religion*, written as a kind of continuation of *Territories*, the participants draw a variety of different morals. Soskice, for instance, finds a major takeaway to be that "many, probably most, scientists in Britain of the seventeenth to early nineteenth centuries were Anglican clergymen"—and so theology and science really are not in necessary conflict (Soskice 2022, 144). This more theology-oriented lesson is also picked up on by Michael Hanby, who finds that Harrison's analysis "makes it possible to reconceive of early modern science as the flawed expression of a genuinely religious and indeed liturgical impulse, and to reconstruct an alternative modernity prioritising a Romantic and vitalistic strand of modern science which has never completely gone away, with its various life principles, teleological processes, forms, and archetypes, over the mechanistic reductionism that seems to have won the day" (Hanby 2022, 167). In a rather different key, D. C. Schindler's takeaway is that "to speak of an 'integration' of these [religion and science] is necessarily to have in mind something other than modern science" (Schindler 2022, 232). And in the same volume, Harrison explains that historical deconstructions like his "can also show the potential of paths that were not taken (or were taken by only by [*sic*] the few) by pointing to alternative models of the relationship that were possible because the cultural territory was differently divided in the past, but which nevertheless have some prospects

of success in the future" (Harrison 2022, 316). Unfortunately, this rather dense volume is explicitly directed at scholars, and it is unlikely that other audiences will have seen this—surely more easily digested!—message.

4.2 Some Problems with Deconstruction and Its Use

Some advocates of the method of deconstruction exaggerate the consequences of the contingency of the concepts ⟨religion⟩/⟨science⟩ in the move from step 1) to step 2), and for this they have been criticized. In this section, I first examine two variations on this general critique. These critiques unpack two guiding analogies which Harrison employs and focus on the meaningfulness of local analyses (shifts in meaning/intension do not preclude meaningful local discussions) and the need to recognize the reality of social constructs (that ⟨religion⟩ and ⟨science⟩ are not natural kinds does not mean they are not real). I then turn (§2.3) to a different kind of criticism of deconstruction based on the sources it consults, focusing on the fact that employers of the method almost always focus on elite conceptions of, and so elite sources concerning, religion and science. In pursuing these critiques, I aim to show the ways in which deconstruction should be limited and also expanded in order to make more useful, meaningful contributions to the study of the RSR.

4.2.1 Erecting Borders

Fittingly, Harrison begins his *The Territories of Science and Religion* (2015) with a discussion of territories:

> If a historian were to contend that he or she had discovered evidence of a hitherto unknown war that had broken out in the year 1600 between Israel and Egypt,

> this claim would be treated with some skepticism. The refutation of this claim would involve simply pointing out that the states of Israel and Egypt did not exist in the early modern period, and that whatever conflicts might have been raging at this time could not on any reasonable interpretation be accurately described as involving a war between Israel and Egypt. ... At issue here would be not whether the relevant geographical territory existed then, but whether there were comparable boundaries and self-conscious national identities. Denial of the existence of a sixteenth-century Israel does not entail a denial of the existence of the territory that currently comprises that nation, but rather a denial that the territory was then viewed in a particular light, as something circumscribed by a set of boundaries and informed by particular ideals of nationhood. ...
>
> My suggestion is that something similar is true for the entities "science" and "religion," and more specifically, that many claims about putative historical relationships are confused for much the same reason as claims about a sixteenth-century conflict between Israel and Egypt: that is to say, they involve the distorting projection of our present conceptual maps back onto the intellectual territories of the past. (Harrison 2015, 1–3)

This is a classic application of the map–territory distinction discussed across the human sciences, for instance by Alfred Korzybski (1879–1950) and the great scholar of religion JZ Smith (1968–2017)—from whom Harrison draws the analogy (Harrison 2015, 2 fn. 3). The essential idea is seemingly simple: if our current concepts (the map) slice the world (the territory) in ways foreign to—perhaps even incompatible with—past ways of slicing the world, then it is odd, illicit even, to describe historical actors using current terms laden with contemporary meanings. Terms like 'religion' and 'science,' Harrison argues, express concepts which cut up the modern world in ways totally different from how the world was carved up in the past: whereas nowadays religion and science are seen as something akin

to collections of propositions regarding the nature and workings of the world, they did not always exist in such a state. Thus, when we talk of the past using our terms 'religion' and 'science,' and try to suss out their past relation, we use concepts overburdened with anachronistic assumptions, which we are called upon to discard in the interest of historical accuracy for such concepts did not exist in the past. Thus, even if it is the case that the modern concepts ⟨religion⟩ and ⟨science⟩ are in conflict, we should not assume that the RSR was so characterized in the past—or if it would even be possible for it to be so configured, if at all.

This kind of map-territory analogy lies behind many deconstructive accounts of the RSR today, possibly because of the huge influence Harrison's work has had on the field. Most employers of deconstruction, in fact, take themselves to be building upon Harrison's work, as in the *After Religion and Science* project. Yet, despite the seeming simplicity of the analogy's lesson, it is often understood in problematic ways and is prone to being stretched beyond its own proper borders. In this subsection, I will consider two issues which emerge from less-than-careful readings of the map-territory analogy and its underlying logic as applied to the RSR. First, some interpretations focus too much on our (admittedly changing) linguistic conventions rather than on real underlying forces—that is, some readings place too much emphasis on the borders which constitute the map. Second, and far worse, some readings of the map-territory analogy are self-defeating for they are forced to acknowledge and compare the concepts ⟨religion⟩ and ⟨science⟩ in the past in exactly the way some deconstructionists wish to avoid.

It is admittedly rather easy to overemphasize the importance of the terms 'religion' and 'science' and their historical meanings in the map-territory analogy. Harrison's description of the analogy, after all, explicitly foregrounds the terms. But focusing too much on the terms themselves—rather than on the terms' referents—is liable to missing what is really of interest

in discussions of the RSR. Putting it rather flippantly, the issue is this: why should we care about the ways in which the terms were used in the past? Isn't the matter of real substance how the underlying practices to which those terms now refer interacted? Why should it matter if Galileo didn't identify as a scientist, if medieval peasants would not have identified as religious, or if *religio* and *scientia* were conceived as virtues? To be clear, the objection here is not that the question we are interested in is a question about the modern RSR as opposed to a past RSR. Even those who wish to take the past seriously—employers of the method of case studies, for instance—may worry that deconstructionists reading Harrison's analogy in this way focus too much on language and not enough on worldly phenomena; they place the map before the territory.

To bring the issue into sharper focus, it may be helpful to visualize the analogy as in Figure 4.1. Here, we have a particular term, say 'religion,' indexed to particular times (t_1 and t_2), where 'religion'$_{t_1}$ is the term as used by historical actors at time t_1 and 'religion'$_{t_2}$ is the term used by actors at time t_2.[8] Each of these terms expresses a concept, $\langle \text{religion}_{t_1} \rangle$ and $\langle \text{religion}_{t_2} \rangle$, respectively, which, again, are the concepts expressed by the terms *as used by historical actors* at times t_1 or t_2. Each term likewise refers to part of a real-world "Territory" composed of various actual human practices, beliefs, etc.—$\mathbf{religion}_{t_1}$ and $\mathbf{religion}_{t_2}$. When the terms' concepts are projected onto the real world, we get a set of borders encompassing portions of the world referred to by the terms; together those borders comprise what we might call a map. Importantly, the map is not identical to the territory; the concepts are not the referents.

It's important to be very clear about what is meant by these temporal subscripts. Suppose that t_1 is the "present" and t_2 is some time in the past, say the 1500s. Then 'religion'$_{1500}$

[8]Hence, Figure 4.1 represents the historicizing form of deconstruction, chosen as this is the form employed by Harrison. One could instead index by culture/location for a cultural deconstructivist. The relations between culturally indexed concepts are not always structurally the same as those between temporally indexed ones; for instance, while temporally indexed concepts tend to morph into one another, this may be, however, quite rare with culturally indexed concepts.

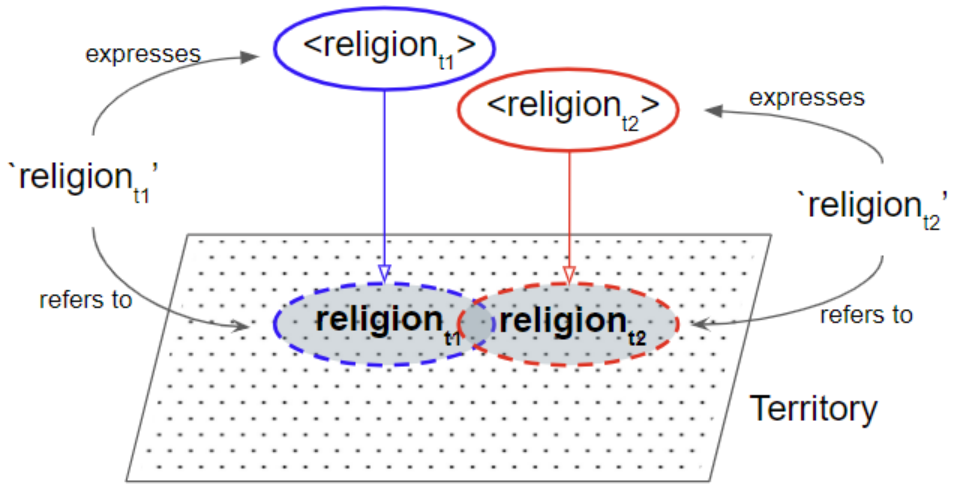

Figure 4.1: Visualization of the conceptual (historicist) map-territory analogy. Dots within the Territory represent distinct practices, beliefs, etc. The dotted ovals directly below the concepts indicate the borders (which together form a map) generated by projecting the concepts onto the Territory. In this case, there is partial overlap between these borders. The shaded areas represent the referents of the corresponding terms.

is the term as used by those living in the 1500s and $\langle \text{religion}_{1500} \rangle$ is the concept expressed by that term. I should stress that $\langle \text{religion}_{1500} \rangle$ is *not* the concept held by folks in the 1500s which "most closely approximates" our own concept, $\langle \text{religion}_{present} \rangle$. Likewise, the referent $\textbf{religion}_{1500}$ is the referent of the term 'religion'$_{1500}$, not that collection of practices, beliefs, etc. which "most closely approximates" the collection of such things to which we now refer with the term 'religion'$_{present}$.

With that in mind, there are three logically possible ways the concepts expressed by temporally indexed terms may be related: the borders they establish may overlap completely, overlap only partially (as in Figure 4.1), or may be entirely separate. Deconstructionists typically claim that the first of these possibilities does not accurately capture the history: the concepts being examined have changed over time, and so the borders have shifted.

With this picture in mind, we are in a better position to tease out how we could responsibly understand claims like Harrison's that talking of religion and science and their relationship "involve[s] the distorting projection of our present conceptual maps back onto the intellectual

territories of the past." For suppose that the historicist claims that the borders created by our modern concept only partially overlap with that of some past version's, as in Figure 4.1. Then one might easily argue that really what we care about are the parts of the territory captured in the overlap between the borders. Perhaps 'science'$_{past}$ did not always have the connotation of being the highest epistemic good. But perhaps $\langle \text{science}_{past} \rangle$ still did concern the natural world and its workings. Likewise, perhaps 'religion'$_{past}$ did not always connote a defined set of static dogmas. But perhaps $\langle \text{religion}_{past} \rangle$ still did concern (at least some) beliefs about the workings of the world. If this were the case, then even if our modern conceptions are not identical to the categories of the past, we can still meaningfully talk of the past RSR—they were not in-co-relatable. We might even talk of the relation between that past RSR and the modern RSR. So even if there is not perfect overlap, the overlap which does exist is what parties interested in the RSR are most often interested in.

To illustrate the point, Josh Reeves employs a different kind of territorial analogy. Rather than imagining a claim about a sixteenth-century war between Israel and Egypt, imagine instead a claim about the (very real) Hundred Years' War between England and France. The claim this time, however, is that "there was no such thing as the Hundred Years' War. ... The reason being that the meanings we associate with England and France—western liberal democracies with stable borders—were not present in the fourteenth century." Clearly such a claim is ridiculous, and would be dismissed out of hand. For what historians (and others) care about is not the *particular* collection of practices and properties picked out by the past terms 'England'$_{1337-1453}$ and 'France'$_{1337-1453}$, but rather the *overlap* between those collections and those of our modern terms (J. A. Reeves 2023).

Now we might interpret Harrison, in emphasizing the fact that *religio* and *scientia* were previously conceived as *virtues*, as trying to argue for the much stronger position that our modern concepts do not overlap at all with previous conceptions—the borders they project carve out non-overlapping parts of the conceptual territory. Many find this position doubtful.

Barbour, for instance, responds to a similarly strong point made by G. Cantor and Kenny 2001 by asking rhetorically, "Is it really the case that in Western history since Galileo (the topic of their writing and mine) neither science nor religion possesses 'clear historical continuity'?" (I. Barbour 2002, 347) But even if we accept this stronger position as plausible, it is ultimately no help to the deconstructionist. For in order to make the subsequent claim that the projection of our modern categories is really *distorting*, then deconstructionists need to show not just that the past categorical terms did not *refer* to the practices of interest, but that those practices *themselves* did not exist. What matters, again, for many interested in the RSR, is not the concepts that the terms 'religion' and 'science' express, but the *things-in-the-world*, the practices, beliefs, etc., to which they refer, **religion** and **science**; it is not the borders and the map they establish but the actual territory which matters.

To see this, consider the history of the term 'planet.' To the ancient Greeks with whom that term originated, a planet was a "wandering star," that is, a star which moved through the constellations rather than with them. Of course, different Greeks conceived of stars in different ways, but none of them conceived of them as we do today—as massive concentrations of light elements undergoing a continuous fusion reaction. Of course, we no longer think of planets as "stars" in any formal sense. Instead, we think of planets as cooling (in some cases cooled) bodies of heavy elements (typically metals), of a particular size which orbit a star (sometimes multiple). This modern conception overlaps (plausibly) not at all with ancient Greek conceptions of planets. And yet, we can still meaningfully speak of the ancient Greeks' studies of the planets' motions without committing any gross distortion of the history. This is because what matters is the fact that these particular bodies—planets in our modern sense—really did exist even in the times of the ancient Greeks. And ancient Greeks really did observe those bodies, even if they did not conceive of them in even remotely the same way. For that reason, we still include the Greeks in our histories of astronomy. Again, we care not about the *term* 'planet' but rather about the *thing-in-the-world*, **planet**, to which it refers.

So in reading the map-territory analogy, we should not fall into the trap of placing too heavy an emphasis on the language we use. For if deconstructionists would like to use the analogy to accuse others of being caught up in anachronistic language—as they often do—then they need to themselves avoid reproducing this kind of linguistic fallacy. It might be right that the terms we use now did not exist at certain times, or that the terms used in the past are not in use today. But in many cases, scholars and others are not interested in the terms themselves, but rather in the practices to which their terms refer. That is, what would be of more interest/relevance to participants in contemporary religion–science discourses is how those things/acts/beliefs in the world which most closely align with the referents of our contemporary terms 'religion'$_{present}$ and 'science'$_{present}$ were related. That is, our concern is not with the concepts expressed by and the things referred to by the terms 'religion/science'$_{past}$, but with whatever things there were in the past which are most closely correlated with the things we think of now when we think of religion and science. Harrison, in fact, directly addresses this:

> Admittedly, there would have been another way of posing [the question about the RSR] in the Middle Ages. In focusing on *religio* and *scientia* I have considered the two concepts that are the closest *linguistically* to our modern "religion" and "science." But there may be other ancient and medieval precedents of our modern notions "religion" and "science," that have less obvious linguistic connections. It might be argued, for example, that two other systematic activities lie more squarely in the genealogical ancestry of our two objects of interest, and they are *theology* and *natural philosophy*. A better way to frame the central question, it could then be suggested, would be to inquire about theology (which looks very much like a body of religious knowledge expressed propositionally) and natural philosophy (which was the name given to the systematic study of nature up until the modern period) and their relationship. (Harrison 2015, 16–17)

So why not talk of theology and natural philosophy rather than *religio* and *scientia*? In some sense, Harrison *does* go on to discuss them in the chapter immediately following the above quote. There, we learn how in the Middle Ages theology was considered a science and natural philosophy was truly a part of philosophy. Both of these facts are meant to give us pause because they so poorly align with our current conceptions of what religion and science are meant to be: thinking of religion as a science, or of science as a part of philosophy, runs wildly counter to our understanding! For this reason, Harrison thinks that "moving our attention to the alternative categories of theology and natural philosophy will not yield a substantially different view of the kinds of historical transitions I am seeking to elucidate" (ibid.), i.e. the deconstruction of ⟨religion⟩ and ⟨science⟩.

But we can see that if our concern is really with the closest correlates of the referents of our modern terms 'religion'$_{now}$ and 'science'$_{now}$ (i.e. with **religion**$_{now}$ and **science**$_{now}$), then Harrison's decision to stick with the closest linguistic correlates of our terms 'religion'$_{now}$ and 'science'$_{now}$ is rather misleading. In the first place, whether or not the medievals thought theology was a science is immaterial, since they dealt, as Harrison points out, not with ⟨science$_{now}$⟩, but with ⟨science$_{medieval}$⟩. The anti-linguistic will wholeheardedly accept that medievals operated with a different conception of science. But that does not change the fact that medieval theology rather closely resembles our modern practice of religion, and that the referents of both terms, 'religion'$_{now}$ and 'theology'$_{medieval}$, were quite similar: they concerned beliefs about the nature of God/gods. So while Harrison is right to say that we should not take medieval claims about theology being a science as claims about a relationship between modern theology and modern science, it is wrong to say that this warrants focusing on the linguistic—rather than referential or even conceptual—ancestors of 'religion'$_{now}$. And a similar thing can be said about medieval natural philosophy being considered a part of philosophy. It may very well have been that insofar as medieval natural philosophy was a part of medieval philosophy, its ultimate goals were inculcating habits to improve one's life. The anti-linguistic does not need, or even want, to claim that ⟨natural philosophy$_{medieval}$⟩ was

identical to $\langle \text{science}_{now} \rangle$. All that is claimed is that there is significant overlap between the two concepts—the production of systematic knowledge claims about the natural world—and that the phenomena contained within the conceptual borders (e.g. prediction of the motions of the stars, the use of mathematics to describe their motion, cataloging of animals) can be picked out and their relations with historical analogues of the referents of 'religion'$_{now}$ discussed. So for all the deconstruction that Harrison does, it is not clear how it forbids this kind of investigation of the historical RSR—there is no need for an overly linguistic reading of the map-territory analogy.

There is another possible issue with how we understand the map-territory analogy in deconstructionist accounts, and which we must be careful to avoid, for it is in a sense much worse than the overemphasis on language. Recall how Harrison concludes his introduction of the map-territory analogy: "many claims about putative historical relationships [between science and religion] are confused for much the same reason as claims about a sixteenth-century conflict between Israel and Egypt: that is to say, they involve the distorting projection of our present conceptual maps" (Harrison 2015, 3). How exactly are we to understand this distortion? One rather extreme way is to read it as the claim that it is not only illicit to ask about the concepts $\langle \text{religion} \rangle$ and $\langle \text{science} \rangle$ in the past—such would be historically "distorting"—but it is also improper to ask about their relationship. Why? Because—and this is the extreme reading—the concepts (somehow) did not exist in the past. Sometimes one gets the impression that this is how Harrison is read and understood, both within deconstructivist circles and by its critics. For instance, the whole idea of the *After Religion and Science* project is to forgo the use of our concepts $\langle \text{religion} \rangle$ and $\langle \text{science} \rangle$, in a kind of return to a pre-modern conceptual landscape.[9] And this is exactly what some take issue with—as Denis R. Alexander, founder of the Faraday Institute for Science and Religion, has recently

[9]Attempts at demonstrating what a return to the "territories" of the past could look like can be found in the six essays comprising Part II.

put it in a review of Harrison 2022 in *Theology and Science*, "Should we now re-name this The Faraday Institute After Science and Religion? Or perhaps this present journal should be re-named 'Beyond Theology and Science'? In both cases, I think not" (Alexander 2024). So deconstructivists are understood as advocating that the past does not contain the present concepts and that perhaps we should return to those times. And yet, simply by performing their deconstructions of religion and science, deconstructivists show the very existence of those concepts and the possibility of relating them not only to each other (in their historical period) but also to our modern concepts. Thus, we should not understand deconstructivist critiques as ruling out the possibility of discussing the RSR_{past}.

This much becomes clear when we consider Harrison's point that *religio* and *scientia* were previously virtues. If we can identify them as virtues, can we not also determine their relationship, and further, ask about how that RSR relates to the modern RSR? Harrison himself explicitly allows this, though rather circuitously, when he writes,

> It should be now be clear that the question of the relationship between science (*scientia*) and religion (*religio*) in the Middle Ages was very different from the modern question of the relationship between science and religion. Were the question put to Thomas Aquinas, he may have said something like this: Science is an intellectual habit; religion, like the other virtues, is a moral habit. There would then have been no question of conflict or agreement between science and religion because they were not the kinds of things that admitted those sorts of relations. ... When the question is posed in our own era, very different answers are forthcoming, for the issue of science and religion is now generally assumed to be about specific knowledge claims or, less often, about the respective processes by which knowledge is generated in these two enterprises. (Harrison 2015, 16)

If we, with Harrison, are comfortable asking Aquinas (hypothetically) about the RSR and

even providing a hypothetical answer, then it seems we are is committed to there being conceptions ⟨religion⟩/⟨science⟩ in the Middle Ages.

So what is "confused" or "distorting" about asking of the past—in this case of Aquinas—about the relation between religion and science? Notably, in this particular passage, Harrison doesn't claim that our query is misguided: he simply says that *the question* of the RSR was very *different* when posed in the Middle Ages versus the modern period. How exactly was it different? We might think it was different because Aquinas would have understood 'religion' and 'science' very differently from how we would, and thus would have given an answer presumably very different from what we would expect. Now, setting aside the fact that Aquinas' answer seems to fit very nicely into something like Barbour's Independence category, the fact that Aquinas provides a very different answer to our question is not the same as the question being illegitimate and confused—that is *not* how we should understand Harrison. For, again, if Aquinas can provide an answer, then it doesn't seem like asking about the RSR is using concepts which "distort" the past; if it did, then we would expect Aquinas to be unable to furnish an answer.

The possible confusion in how we understand Harrison's point lies, I think, in how he frames the issue, in particular in his using the definite article when talking of "the question" regarding religion and science. When Harrison "asks" this question, he is really asking two distinct questions; he is not posing a single question at one time and at another. Instead, the question "posed in our own era" features our modern concepts, $\langle \text{religion}_{now} \rangle$ and $\langle \text{science}_{now} \rangle$, while the question directed at Aquinas would have been about $\langle \text{religion}_{1200s} \rangle$ and $\langle \text{science}_{1200s} \rangle$. These questions might have different answers. But they are both perfectly legitimate questions to ask—though they are very different questions. Again, Harrison recognizes the legitimacy of the questions, and even implicitly acknowledges their difference—hence the parenthetical clarification that we ask about *religio* and *scientia* in the Middle Ages. But what allows potential readers to slip back into a feeling that something has been distorted, that

our question was really confused, is the definite article and the consequent lack of temporal indices. Once we properly index, we see that there is no distortion, no confusion. Aquinas has his answers, and we have ours; that's what we should expect, after all, if the meanings of terms shift over time.

More extreme versions of deconstruction, of course, want to claim that answers to these questions cannot be compared because they are answers to different questions. Even if Aquinas' answer looks suspiciously like Barbourian Independence, it's illegitimate to classify it as such, since Aquinas deals with $\langle \text{religion}_{1200s} \rangle$ and $\langle \text{science}_{1200s} \rangle$ while Barbour's typology trucks with $\langle \text{religion}_{now} \rangle$ and $\langle \text{science}_{now} \rangle$; to compare the answers would be, in Harrison's words, to "distort" the historical territories, to slip illicitly between questions. But this is dangerous territory, for comparisons across conceptual differences abound—permissibly—in contemporary discourse about $\langle \text{religion}_{now} \rangle$ and $\langle \text{science}_{now} \rangle$. Consider, for instance, the disagreements between, say, a Richard Dawkins and a Stephen Gould: the former conceives of both as ways of understanding the way the world works; the latter thinks religion is about how to get to heaven while science is about how the heavens go. Surely different conceptions of religion (and possibly of science) are at play here—but that does not mean Dawkins and Gould's positions on the RSR, fueled by their different conceptions, cannot be compared. So not only can we ask questions about religion, science, and the RSR of the past, but we can also compare answers (and the concepts on which they rely) to our present-day answers (and concepts).

Now there was one other way in which we might have thought interrogating the past with questions about religion and science was problematic. Perhaps Harrison's point was that asking our own question, "What is the relation between $\langle \text{religion}_{now} \rangle$ and $\langle \text{science}_{now} \rangle$?", would be illegitimate to ask of the past. And indeed, if Aquinas did not realize we were asking a question framed around our concepts, and if we did not realize Aquinas' answer were framed around *his* concepts, then we might make illicit conclusions about the historical

relation between religion and science. Even stronger, perhaps one would claim that, if asked our question indexed to the now, Aquinas—and his medieval contemporaries—simply would not have been able to answer, because they would not, and could not, have understood the question, our concepts $\langle \text{religion}_{now} \rangle$ and $\langle \text{science}_{now} \rangle$ being so foreign to their own. This is a very strong claim, and I don't think a plausible one. Were Aquinas brought up to speed on how we use the terms 'religion' and 'science,' although he might find our usage strange, I don't see why he would be unable to furnish an answer about the RSR_{now}. For, in the same manner, when, via this process of historical deconstruction, we are brought to see how Aquinas understood religion and science, we are also able to provide characterizations of the RSR_{1200s}—or at least Harrison certainly believes he can! So this stronger point cannot, I think, be made unless we forfeit the ability to understand and discuss any concepts from the past.

In any case, Harrison, in acknowledging that Aquinas can offer a characterization of the RSR, demonstrates that we can interrogate the past using our own conceptual categories without distorting the past. The key, of course, is acknowledging that there is not a simple equivalency between our modern concepts and those of the past, and that answers to questions about the RSR which were given in the past may not be directly applicable in the present. Generalizing, the issue which Harrison and other deconstructivists face is that their historical analyses focus on deconstructing religion/science at some particular point in history. But doing so demonstrates the possibility of analyzing past conceptions of religion/science. Furthermore, these analyses go on to show that the historical concepts are not identical to our modern ones, thus demonstrating the possibility of diachronic comparison between the concepts! So the deconstructivist cannot consistently maintain either that these concepts did not meaningfully exist in the past or that cross-temporal (or cross-cultural) comparisons are illicit—for they themselves assume as much and make such comparisons!

The lesson from deconstruction, I believe, is that we should not be so hasty in drawing

present-day morals from the past. The RSR is configured in particular ways today which may not match or align with how the RSR was configured in the past. The "religion" and "science" related today are different from the "religion" and "science" of the Middle Ages—that is true. But that does not mean we are forbidden from speaking of past RSRs or of drawing any kind of lesson about the contemporary RSR from the past. For, perhaps most importantly, although the maps may be different, the territories still exist; the underlying process and practice are still there to be examined and compared, even if they are not referred to by the same name. And deconstructionists themselves rely on the existence of past conceptions of religion and science so they can show that they are different from our contemporary conceptions. And if there are such historical conceptions, then we should be able to relate them to each other, indexed to their time, without distortion, and then compare that RSR to the modern RSR. And comparing these different RSRs could be incredibly useful; it can reveal artificialities in contemporary discourse; point to more productive forms of dialogue; encourage more nuanced, more careful examinations of actual history.

There is one other way we may interpret Harrison's map analogy, however. Returning to Figure 4.1, deconstructivists might make the incredibly strong claim that at some point in time, or in some culture, the relevant territory referred to by term_2 did/does not even exist. That is, the Territory of Figure 4.1 should itself be temporally or culturally indexed, as in Figure 4.2, and Territory_{t1} need not be identical to Territory_{t2}. On this view, then, it *would* be impermissibly distorting to use categories which apply to Territory_{t2} to try to map out Territory_{t1}. It would be, perhaps, like asking Aquinas which was better—MacOS or Windows. The key is that the underlying phenomena referred to by these terms, **MacOS** and **Windows**, simply did not exist, even in an approximate sense, in Aquinas' time. I doubt, however, that Harrison embraces this kind of view—indeed, he acknowledges that we can identify past actions which we would nowadays classify as "scientific," though they

were understood as falling under the term "natural philosophy" by contemporaries (Harrison 2015, 17).

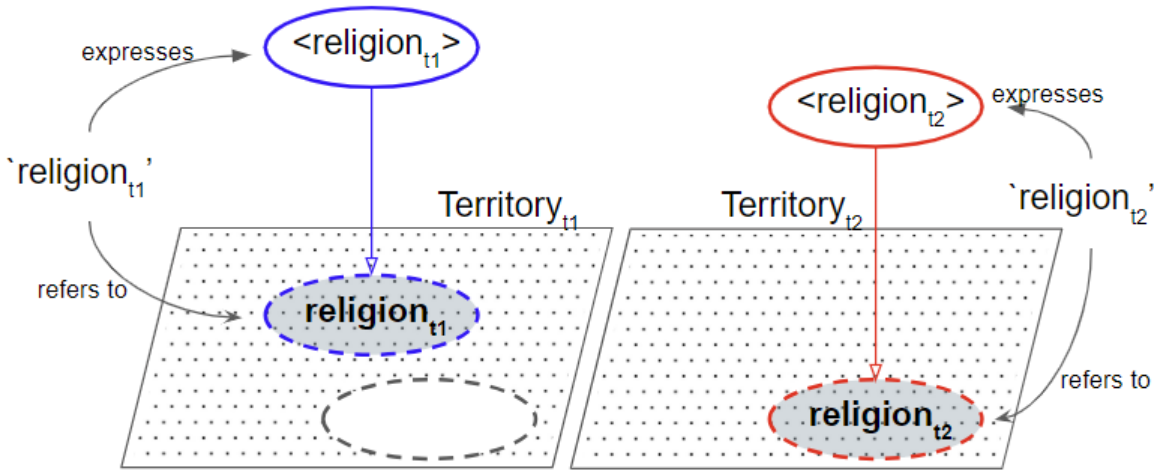

Figure 4.2: Visualization of a conceptual (historicist) map-territory analogy with temporally indexed Territory. Here there is no overlap between the borders projected by the concepts because some of the practices, beliefs, etc. extant in Territory$_{t2}$ do not exist in Territory$_{t1}$ (and in particular none of the practices, beliefs, etc. encompassed by the borders projected by ⟨religion$_{t2}$⟩ exist in Territory$_{t1}$).

Likewise, it is not clear if any deconstructivists actually embrace this strong of a position, though some come close. For instance, in his *The Invention of Religion in Japan*, Josephson proposes that in Japan the concept of religion did not exist prior to the forceful "opening up" of the country by the American military at the end of the Tokugawa era (Josephson 2012, 1). When American diplomats demanded that US citizens (in particular Christian missionaries) living in Japan be granted freedom of religion, state officials had to scramble to figure out what exactly was being demanded of them. After several meetings, the statesmen discovered the truth: the "religion" found in the Americans' documents was just "Christianity," which they realized was simply a front for Western nationalism (or a demonic form of Buddhism; see esp. Josephson 2012, 78–93). Equipped with this knowledge, the early Meiji government signed the Americans' papers, and proceeded to demand that American missionaries, while they no longer needed to trample the *fumie*,[10] still worship the Emperor, for the fact that the

[10] A practice that had been demanded of those suspected of being Christians in which they would step on Christian images (typically of Jesus).

Emperor was a descendant of the sun goddess Amaterasu was not, in fact, part of religion but instead a fact of "cosmic science"—itself a category recently invented by statesmen after being introduced to Western "science." Further, the Meiji government began to create what we now call Shinto, collecting together disparate local practices and beliefs into a centrally administrated bureaucratic organization (ibid., 94–131). But prior to this process of invention, Josephson maintains, there were no such things as $\langle \text{religion}_{Japan} \rangle$ and $\langle \text{science}_{Japan} \rangle$; these concepts simply were not present in the Japanese conceptual landscape. This point is further buttressed by a series of interviews performed by the Japanese scholar/"anthropologist" Arai Hakuseki (1657–1725) of Giovanni Battista Sidotti (1668–1714), a captured Italian Catholic missionary. After several days discussing Catholic doctrine, the differences between Catholicism and Lutheranism, and the nature of religion in Europe and Asia, Hakuseki concludes, "When I reflect on this, the Westerner's explanation of this is incoherent and superficial, and therefore not worthy of further discussion" (Josephson 2012, 264).

In this case, it *does* seem odd to speak of the RSR in pre-Meiji Japan—they just had no such concepts. But even so, there were certain practices which we might today gloss as religious—spirit worship for instance. And there were also practices which we might call scientific—like the metallurgic arts used to create samurai swords and explanations of the motions of the stars. So one could presumably look at relations between these practices and types of knowledge to come to some conclusion about a pre-Meiji RSR. Of course, one would have to be very careful in specifying what $\langle \text{religion}_{pre-Meiji\,Japan} \rangle$ and $\langle \text{science}_{pre-Meiji\,Japan} \rangle$ are, but this kind of comparative work could be done. And in fact, something similar to this *has* been done by some working on religion and science in Asia—including Dawes 2021, whom we encountered in Ch. 2 (see also Csikszentmihalyi 2011). Unfortunately, however, this kind of work is not always explicit about the notions of religion and science underlying their analysis and how they may differ from our current conceptions, an elision which leaves them prone to mis- and over-interpretation.

We should note that the problems with certain interpretations of the map-territory analogy discussed above aren't truly issues for the method of deconstruction so much as issues with some of the conclusions often drawn from the analogy, especially by scholars who are invested in the method—like the participants in the *After Science and Religion* project. The method of deconstruction can still be illuminating, even if it does not make such radical conclusions. Lopez, for instance, provides a nice example of a deconstructionist account which does not propose the impossibility of talking about Buddhism, science, or their relation(s). Yet, unpacking the historical contingency of the concepts ⟨Buddhism⟩ and ⟨science⟩ can still make clear facets of the Buddhism–science relation which are of interest to both scholars and—as we will see in §4—non-academics. As with the method of conceptual analysis, deconstruction ought not be dismissed out of hand because of the extravagances of a few of its most vocal proponents.

4.2.2 Discovering Jade

Harrison employs another analogy at the start of *Territories* centered on jade and natural kinds. Many of us, he points out, assume that jade is a "natural kind," "a label... applied to natural groupings of things, the identity of which is natural in the sense that it does not depend on human beings." Now, when Harrison says that we think of "jade" (he uses double quotes) as a natural kind, he must mean the concept, ⟨jade⟩, for only concepts can qualify as "kinds," be they natural, social, or otherwise; concepts are, in Harrison's terms, the "groupings" of things in the world, the "categories" (another of his terms) under which we group or place particulars. That being said, although we may think that ⟨jade⟩ is a natural kind, it is in fact not: "there are two chemically distinct substances that are called "jade"[11]—jadeite and nephrite. One is a silicate of sodium and aluminum; the other a silicate of lime and magnesia." But since for most human purposes this difference in chemical

[11]Here we should note that Harrison uses double quotes to talk about the term 'jade'.

composition is not relevant—the two types of jade look and feel identical—we mistakenly believe that ⟨jade⟩ is a natural kind. Harrison draws an analogy between our mistaken view of ⟨jade⟩ and ⟨religion⟩/⟨science⟩: "My argument with regard to the categories "religion" and "science"[12] is that to some degree we are mistaken in thinking that they are analogous to natural kinds, because despite the apparent similarities among those things that we call religions and the things that we call sciences, in fact the concepts and the way we deploy them masks important empirical differences" (Harrison 2015, 4).

There are at least two (compatible) ways of understanding why we make this "mistake." The first is historical: the categories of religion and science have changed drastically over time, as Harrison shows, from virtues to practices to sets of ideas and propositions. These diachronic shifts show (supposedly) that ⟨religion⟩ and ⟨science⟩ are not natural kinds: the very fact that we can meaningfully speak of temporally indexed ⟨religion⟩ and ⟨science⟩ indicates that their grouping has depended deeply on human beings. The other way of understanding why we are mistaken in thinking of ⟨religion⟩ and ⟨science⟩ as natural kinds does not depend on changes in the use of terms but instead on the diversity of things we *now* refer to with our contemporary terms. On this way of thinking, we find it overly artificial to group together such diverse practices as, say, Christianity and Buddhism, or epidemiology and quantum physics. It is admittedly not clear which of these Harrison takes to explain our mistake; at times, he seems to think the latter is more pressing, but *Territories* as a whole seems dedicated to providing a historicist account in line with the first understanding.

In any case, as Harrison sees it, the upshot is that if ⟨religion⟩ and ⟨science⟩ are not natural kinds, then they are not good concepts, and we ought to dispense with them and ultimately try to refrain from even using the terms 'religion' and 'science.' Thus, the contingency of the concepts—step 1) of the method of deconstruction—is taken to entail their inability to be natural kinds, and so Harrison concludes that they—and their terms—aren't useful

[12]Here Harrison uses double quotes to talk of the concepts ⟨religion⟩ and ⟨science⟩.

to the scholar (ibid., 196). This all seems a bit hasty, and the critic may reasonably ask why it matters if ⟨religion⟩ and ⟨science⟩ are natural kinds or not. What's the issue if the boundaries of these concepts are dependent on human beings?

One could be led on this path if one accepted the idea that natural kinds provide the only useful way of dividing up the world for scholars. Indeed, Harrison seems to think this is the case, and it is the central theme of the *After Science and Religion* project which emerged from *Territories*.

But natural kinds are not the only kinds useful to scholars. Even if some concepts are dependent on the whims of human beings and so are fluid, their boundaries flexible, vague even, that doesn't mean they are not useful concepts. Wittgenstein's discussion of games is often brought up as the classic counter to deconstructionists' over-emphasis on the (supposed) stability of natural kinds. In the *Philosophical Investigations* (1953), Wittgenstein explains that we can't provide a precise definition of 'game'—any attempt is sure to leave out examples we would like to include or capture ones we would like to leave out. Further, there is a great diversity among games; Wittgenstein notes how some involve particular objects like balls, some are competitive, but not all games share these features. Despite all this, Wittgenstein insists, the concept ⟨game⟩ is still useful; we *can* identify some class of phenomena which are roughly similar to one another—they share a "family resemblance"—even if we cannot specify the particular traits which they share. Surely these kinds are not natural kinds; they are eminently dependent on humans and what groupings we happen to find relevant (Wittgenstein 1953/2009, PI §66–76). But they are groupings that can be made and effectively exploited regardless.

How are they useful? In his critique of *Territories*, Reeves (in addition to bringing up this Wittgensteinian objection) points out that these categories, even if they are not natural kinds, are still useful for comparative analysis. Reeves, borrowing from Riesebrodt 2010, considers the example of ⟨economy⟩. Like ⟨religion⟩ and ⟨science⟩, its boundaries have shifted

over time—indeed, the Greek etymology of 'economy,' "law of the household," no longer adequately captures the intent of the term as used today! However, abandoning the use of the concept ⟨economy⟩ because it thus fails to be a natural kind (its identity relies on human beings) "would be an intellectual loss, for it would make comparison between feudalism, substance economies, and other ways of ordering economic behavior more difficult. Using the word economy allows one to demarcate the boundaries about which one is speaking, allowing for specialization" (J. A. Reeves 2023, 85).

Likewise with 'religion' and 'science'; these terms can still be useful for scholars since they allow us to compare different types of practices around the world. Indeed, religious studies scholars still call themselves "*religious* studies scholars," or "scholars of *religion*" for this very reason. In the late twentieth century, the discipline underwent a kind of identity crisis as work—from which Harrison draws!—showed the artificiality of the category ⟨religion⟩. If ⟨religion⟩ was not a natural kind, what exactly were "scholars of religion" studying? In what sense could they be engaged in a scientific practice (as religious studies was often understood, and still is so today in comparison to theology (see e.g. King 2013, 153–157)) if religion were not a natural object? Ultimately, scholars decided to keep the term—we still have Departments of *Religious* Studies (rather than, say, fragmented area studies scholars)—because they recognized the virtues of comparative analysis.[13]

The case is more complicated in the case of 'science,' at least when we consult historians of science. In response to a variety of criticisms concerning the cultural specificity of ⟨science⟩ and the ways in which it has been used in colonial endeavours, historians (and scholars in Science Studies more broadly) have come to employ the term 'knowledge production' to refer to those ways in which people around the world come to know about the (natural)[14] world. ⟨Science⟩ is thus provincialized: it is a particular form of ⟨knowledge production⟩

[13]See, for instance, Taves 2011 and King 2013.

[14]I use the parentheses because what counts as "natural" also varies widely across cultures, and a natural–non/super-natural distinction is not always recognized (see e.g. Ryūhei 2021).

which emerged in the West roughly at the start of the Early Modern period or a bit before, coincidentally the same time that Harrison marks the emergence of a more modern conception of science. For these scholars, however, 'science' is not discarded or seen as a useless term: it is preserved because it can still be used to refer to a particular way of doing something (learning about the (natural) world) which can be compared to other ways of doing similar things. By analogy (and echoing the point made in the previous subsection) we might ask why Harrison can't allow for the use of 'religion' and 'science' in this more circumscribed respect: they and the concepts they express are useful for comparisons, though they may only be species of some more general category.

Returning to the analogy with jade and natural kinds, we might ask what, in the first place, would motivate a deconstructivist like Harrison to accept the view that natural kind divisions are the only scholarly useful ones. Presumably the motivation comes from some intuition that only "naturally" existing kinds/entities can have real effects in the world. Thus, if ⟨religion⟩ and ⟨science⟩ are artificial, merely social constructs, then they cannot be used as explanations of real-world phenomena, since they are not themselves causally efficacious. This kind of thinking then allows Harrison to claim explicitly that "religion cannot serve as an explanation for anything, either," in particular religious violence. It will be instructive to quote him at length here:

> To take a single example—the association of religion and violence—it can be said that while it might be possible to establish connections between violence and elements that have been included in the *category* religion, there remains the question of whether these elements should be so categorized in the first place. This applies to any number of instances—conflict in Northern Ireland, the early modern "wars of religion," the crusades. ... Hypotheses that link religion and violence are unhelpful not simply because the categories are confused, but also because they prevent us from understanding the true complexion of causes of

> those ills for which a constructed "religion" is the convenient scapegoat. ... While we persist with these false categories, we will be prevented from discerning the true causes of the difficulties that presently beset us. (Harrison 2015, 196)

For Harrison, the Protean nature of concepts like ⟨religion⟩ and ⟨science⟩ disqualifies them as explanations. Further, using these categories obfuscates the real underlying causal structure. Harrison consequently suggests that we completely abandon the terms: they are not only causally inert, but are distracting.

I think Harrison is partly right here. It is certainly the case that ⟨religion⟩ and ⟨science⟩ as broad categories can serve—and have done so—as scapegoats for deeper, more complex social causes. But this is not due to ⟨religion⟩ and ⟨science⟩ being causally inert because their conceptual borders have changed. All that the contingency of ⟨religion⟩ and ⟨science⟩ shows is that they are, in contrast to Harrison's definition of natural kinds, dependent on human beings. They are *social* kinds, we might say, rather than natural kinds. And social kinds are not causally inert.[15]

One obvious example here is ⟨race⟩. As is widely recognized, racial boundaries have varied significantly across time and place. This is easily seen by looking at how the US census has gathered data about race (or until 1890, "color").[16] While many US government forms today employ a five-race division (American Indian, Asian, Black or African American, Caucasian, Pacific Islander), the racial typologies found in the census have varied dramatically from as few as three categories in 1850 (white, black, mulatto) to eight in 1890 (white, black,

[15] I use the term 'social kinds' here to highlight the contrast with Harrison's 'natural kinds.' Some may prefer, or be more familiar with, the term 'social construct.' I avoid this latter term partly because of the rather unsavory intellectual connotations it has as a possibly empty term due to its wide and varied use (see e.g. Hacking 1999), and partly because the most sophisticated accounts of so-called social constructs instead use the term 'social kind' (as in e.g. Josephson Storm 2021, discussed below). Of course, I recognize that the category of social kinds is larger than that of social constructs: any group-like behaviour falls under the category of social kinds, regardless of whether it is "constructed." But given that the targets here—deconstructionists—are already committed to the constructed-ness of the kinds discussed (religion and science), it makes more sense to use the broader term 'social kinds.'

[16] All information about the US census included here has been gathered from Barrett and TWO-N 2020, accessed 30 November 2023.

mulatto, quadroon, octoroon, Chinese, Japanese, Indian), to fourteen in 2020 (White, Black or African American, American Indian or Alaska Native, Chinese, Filipino, Asian Indian, Vietnamese, Native Hawaiian, Korean, Samoan, Japanese, Chamorro, Other Asian, Other Pacific Islander, as well as Other).[17]

In more scholarly circles, the racial boundaries were also fluid. The term 'race' came into prominence as a descriptor of human sub-types (sometimes sub-species) in the late seventeenth century (A. Smedley and B. D. Smedley 2005, 19). Quickly, such a wide variety of racial typologies emerged that Darwin was able to remark in *The Descent of Man* (1871), "Man has been studied more carefully than any other organic being, and yet there is the greatest possible diversity amongst capable judges whether he should be classed as a single species or race, or as two (Virey), as three (Jacquinot), as four (Kant), five (Blumenbach), six (Buffon), seven (Hunter), eight (Agassiz), eleven (Pickering), fifteen (Bory St. Vincent), sixteen (Desmoulins), twenty-two (Morton), sixty (Crawfurd), or as sixty-three, according to Burke" (Darwin 1871, 226).

The way in which racial boundaries have shifted even within just the Western cultural milieu is made quite clearly by the revisionist American history Joseph C. Hart provides in his *The Romance of Yachting: Voyage the First* (1848) (infamously known as the first published defense of the "Shakespeare authorship question"):

> I have shown by their (the English) own cotemporary [sic.] history, as well as by ours, that New England and her Puritans were more than a full century behind New-York and her people, in every thing that is of value in civil and religious liberty and progressive civilization. ...
>
> Our race (of New Yorkers) is not one in common with theirs. We do not admit

[17] We should note that "censuses problematically let the enumerator decide a person's race by looking at them" until 1980, when respondents were finally allowed provide their own answers (Barrett and TWO-N 2020).

> the English prefix of stupidity as belonging to our blood. While the root of the race must necessarily remain of Teutonic origin, the engraftments are of a better and a higher species. We are *Norman-Saxon*, not Anglo-Saxon. (Hart 1948, 41–42; emphasis original)

If Hart could claim that Normans and Anglos were of different *races*, how far we have come today!

Even within our contemporary time period, anthropologists have shown that racial categories differ cross-culturally. The classic examples of contrast with Western racial conceptions are Brazil and Japan. In Brazil, racial identity is fluid because it depends deeply on physical appearance rather than ancestry; individuals of the same family may be thought of as different races, and individuals may shift races from day to day based on skin tone (alterable by natural or synthetic tanning; Kottak 2013). Further, Brazilian racial identification may depend on social context as well (Telles 2002). On the other hand, race in Japan is deeply tied to a complex mixture of language, citizenship, and cultural practices more so than phenotype (though physical appearance does also matter; Yamashiro 2013). These present huge differences from the static, supposedly origins-based, supposedly genetic conceptions of race which dominate Western discourse.[18]

Thus, ⟨race⟩ is clearly in the same position as ⟨religion⟩ and ⟨science⟩: its boundaries have shifted immensely over time and is even understood in *inconsistent* ways in different cultures—it is a *social* kind, dependent in essential ways on the human beings that employ it. If Harrison were to treat ⟨race⟩ as he does ⟨religion⟩ and ⟨science⟩, he would be forced to conclude that "race cannot serve as an explanation for anything, either."

But surely this is false! Race has—in some cases—enormous influence on individual lives and more general life trajectories. Even when controlling for other variables—socio-economic

[18]Presumably contemporary racial realists must conclude that these other cultures simply do not understand the concept of race, or else are talking about something else.

status, education, etc.—race emerges as a statistically significant causal factor in health outcomes, for example (see Kuzawa and Gravlee 2016). And if social kinds like ⟨race⟩ can be causally efficacious, why not with ⟨religion⟩ and ⟨science⟩? After all, being categorized as a 'religion' has clear tax benefits, at least in certain countries, and work which is classified as 'science' is able to receive government funding which would otherwise be unavailable to it.

Now perhaps Harrison or other deconstructionists worry about the causal mechanism(s) by which social kinds act in the world. But there are numerous sophisticated accounts of social kinds which explain how they can act in the world—despite their not being natural kinds. One of the most sophisticated recent such accounts in fact comes from the deconstructionist literature itself. In his grand critique of "Theory," *Metamodernism* (2021), Josephson Storm provides a new way of conceiving social kinds which is meant to ground a new approach—metamodernism—to the "human sciences."[19]

On Storm's account, social kinds are process power-clusters anchored by various social processes. By this, he means that social kinds are not static: they are not defined by unique essences which persist diachronically and cross-culturally. Instead, social kinds are constantly in flux; they are by nature Protean. What exactly changes about a given social kind is the particular powers which get clustered together under the heading of the social kind by members of a social group in which that social kind exists. "Powers," for Josephson Storm, include actual properties as well as capacities—properties instantiated in particular circumstances, like my ability to jump even when I am not currently jumping. Social kinds are composed of collections of these powers, but no single power is essential to the social kind: particular instances of the kind could lack any given power in the cluster. In that sense, Josephson Storm's account of social kinds is similar to Wittgenstein's family resemblance

[19]I should note that while here I speak of kinds as concepts, Josephson Storm actually differentiates between the two. In his account, concepts are mental representations while kinds are understood as that which concepts represent (Josephson Storm 2021, 111). For my purposes, however, this distinction is largely irrelevant.

account.

But where it differs from, or expands upon, the Wittgensteinian account is in the insistence on some kind of causal anchoring shared by the various powers: what powers are clustered together is the outcome of particular social processes. Working in complicated concert with one another, various social forces select for particular powers to be included in the cluster. These social forces, or "anchoring" mechanisms, can take many forms (see especially ibid., 118–129). For instance, role adoption as a "scientist" can begin a selective process for particular powers to cluster together as ⟨science⟩ and others as ⟨religion⟩—a process which Harrison explicitly documents (Harrison 2015, Ch. 6; see also Turner 1978). Likewise, feedback loops generated by individuals who want to mimic others who identify as "scientists" or "Christians" can further entrench particular powers and exclude others from the clusters. Less abstractly, anchoring processes are social forces which determine what is relevant to something being, say, a religion. Those forces can (perhaps must always) change over time, which can thus change the conditions for what counts as relevant to the category ⟨religion⟩. Thus, as Josephson Storm puts it, "while conditioned, the formation of religion is non-arbitrary" (Josephson Storm 2021, 145).

On Josephson Storm's account, concepts like ⟨religion⟩ can thus still be causally efficacious—"despite" being socially constructed and hence "dependent on humans"—because they are grounded in real social forces. And thinking with such concepts can even be explanatorily powerful. Thus, to address Harrison's criticism of discourse around "religious violence" (Harrison 2015, 196), ⟨religion⟩ is relevant to religious violence insofar as perpetrators and victims of that violence understand it through the lens of ⟨religion⟩. On Josephson Storm's account, what thinking with ⟨religion⟩ in such a case helps us to do is think about the matrix of social forces which make various actors think of such acts as religious—forces which will necessarily tie in events and histories which go beyond isolated acts of violence. In that sense, contrary to Harrison, thinking with ⟨religion⟩ can help illuminate "the true complexion of

causes of" religious violence, which may not be visible were we to eliminate all instances of the term 'religion.' In Josephson Storm's words, we should not "delete the term" 'religion' from our scholarly work; "[w]e need rather simultaneously to recognize the contingency of religion and to track the causal processes that anchor its properties" (Josephson Storm 2021, 62).

So even if ⟨religion⟩ and ⟨science⟩ are, like ⟨jade⟩, not natural kinds but instead social kinds, advocates of deconstruction are not warranted in concluding that we cannot usefully employ such concepts or their terms. The terms *are* useful; they point to important social realities which have real consequences for many people. Deconstructionists like Harrison who claim we ought to abandon the terms go too far. That said, there is nothing wrong with the method of deconstruction in general or in showing the contingency of our concepts ⟨religion⟩ and ⟨science⟩ in particular. Indeed, Lopez again seems to chart a way to have a productive conversation about the relation between ⟨Buddhism⟩ and ⟨science⟩ while deconstructing those categories and showing how they have been shaped and crafted by participants in a Buddhism–science dialogue. And as Lopez shows, Buddhism and science both have real causal effects on people and policy. So long as deconstructionists understand their contingencies in a more circumscribed manner, as not leading to the total renunciation of the kinds analyzed, deconstruction can proceed without issue.

4.2.3 Whose Religion, Whose Science?

I'll now turn to a different kind of critique, one not motivated by the controlling analogies which frame some deconstructions, but instead one focused on the sources appealed to in showing the contingency of the concepts ⟨religion⟩ and ⟨science⟩. As in previous chapters, the issue centers on *whose* concepts are being deconstructed and whether the concepts deconstructed are actually relevant to the various readers public-facing authors target. I'll

consider two broad concerns in this vein: 1) the (possible) divide between scholarly and non-academic conceptions of religion/science and 2) the sources scholars consult in constructing the concepts they ultimately break down. In considering each of these issues, I recommend that deconstructivists embrace the diversity of religion/science concepts present across societies—at particular times and in particular cultures—and that they likewise interrogate a much broader range of sources than book-length, elite-produced works.

First, the question: Whose conceptions are being deconstructed? For the most part, scholarly conceptions. Harrison, for instance, tackles propositional conceptions of religion and science. What he shows is that religion and science were not conceived of propositionally: they were once virtues, loose associations of practices, etc. But we should also ask, who conceives of religion/science *today* as sets of propositions? It's not clear that those outside of academia think of them as such. Perhaps, of course, they may nod along and agree—yes, doctrinal beliefs are a part of religion and a part of science. But more likely, I would suspect, people in their day-to-day lives conceive of religion and even of science more along the lines of practices—loose associations of practices, rituals, ways of doing things. And if that is the conception they actually have, then it seems that those are the concepts which, for such readers, would be more relevant to deconstruct.

That said, I willingly admit that it is an open question how exactly the various readers of the religion-and-science literature conceive of religion/science. They may very well be just as wedded to propositional notions as academics are. But this is an empirical question, and we can't assume from the outset, as Harrison and others seem wont to do, that this is indeed how public readerships understand religion/science. The literature and its readerships would be well served by at least some amount of justification on the part of deconstructionists in explaining why the conceptions of religion/science being analyzed are relevant.

And in fact, I think there is at least some empirical evidence that everyday, non-academic readers operate with rather different conceptions of religion and science than do scholars.

The sociologist John Evans' work, for instance, seems to show that there are very different conceptions at play. In *Morals Not Knowledge* (2018), Evans argues that insofar as non-scholarly audiences—in the US—interested in religion–science relations perceive the RSR as one of conflict, they understand it in a moral, rather than epistemic, sense. Rather than thinking that science is a knowledge-competitor with religion in claims about the natural world, what motivates belief in conflict (among non-academics) is thinking that those embedded in scientific contexts act in ways opposed to those embedded in religious contexts. This is because non-scholarly audiences, according to Evans, do not conceive of religion or science mainly in terms of knowledge claims; instead, they place far more importance on the values these different facets of society endorse (J. H. Evans 2018, Ch. 7).

Evans bases his analysis on a wide variety of sociological data—including interviews and large-scale survey analyses—which seem to show that non-academics really do think of religion, science, and their relationship in very different ways from the scholars who contribute to the religion-and-science literature. For example, while knowledge-centering conceptions of religion and science might incline us to believe that, say, taking more college-level classes in the natural sciences concerning evolution would cause a decrease in religious belief for religious conservatives, this is not borne out in sociological studies. As Evans summarizes work by sociologist Robert Wuthnow, "Having more education only leads to stronger belief in evolution for nonbiblical literalists. For biblical literalists, more education does not change one's views" (ibid., 99). This is further supported by Evans' own analysis of responses to the 2012 General Social Survey, which showed that religious Americans were just as likely as non-religious Americans to take classes in and major in the sciences (ibid., 123–125). Evans also appeals to media analysis, citing the popularity of shows like *The Big Bang Theory* (watched by 6% of Americans in 2018, when Evans' book was published) whose "basic comedic premise ... is to play off of all of the available tropes in American culture about how scientists are unlike the rest of us" (ibid., 117). Science, as presented in these shows, is really more about *character*—being nerdy or a "mad scientist"—than propositions—in some

sense, ironically, more akin to the way Harrison argues science was understood as a virtue in the medieval period. Deconstructions like Harrison's, however, fail to engage with this conception of science as it appears in the modern day.[20]

The gap between academic and everyday conceptions is further illustrated by looking at the only Amazon review of Lopez's *Buddhism and Science: A Guide to the Perplexed* by someone who explicitly identifies as a Buddhist.[21] Reviewer Lal titles their review "Neither Science nor true Buddhism discussed..." and explains, "In my opinion, rather than being a 'guide to the perplexed', this book provides an inaccurate impression of Buddhism. ... It was such a surprise to me (being a Theravada Buddhist) that a complete chapter (the first chapter) is a discussion on a mythical Mount Meru, since I was not even aware of a Mount Meru. Even though I was born a Buddhist, I must admit that had[sic] not spent much time seriously studying Buddhism until a year ago." Lal then seems to imply that doctrine about Mount Meru is a corruption introduced by "other religions and other national myths" from China, Japan, and Tibet, but that the "cornerstone principles" of Buddhism—the Four Noble Truths and the Eight Noble Paths—remain eminently compatible with science (Lal, 13 June 2011; accessed 30 September 2023).

Evidently, Lal, who we might term an "everyday, practicing Buddhist," doesn't have the same conception of Buddhism as Lopez's more scholarly take. While Lopez is willing to admit beliefs like the existence of Mount Meru into the conception of Buddhism he ultimately deconstructs, Lal is not so willing. Ironically, though, Lal's review itself illustrates the main

[20]I should note that Evans' work focuses explicitly on the US context and that Harrison may not have had a US audience in mind, or at least may have had other national audiences in mind as well. Harrison, after all, is based in the UK, and the Gifford Lectures upon which the book is based were given in Edinburgh. And perhaps public audiences in the UK context *do* possess a more-or-less propositional understanding of religion/science. That said, however, the point still stands that Harrison should not simply assume that modern readers—wherever they are—will conceive of religion/science in the same way as scholars are wont to—Evans' work in the US context should at the very least caution authors like Harrison from assuming the prevalence of scholarly conceptions beyond the walls of academia.

[21]As of 30 September 2023, there are ten reviews total on Amazon. Only one of the reviewers publicly identifies as a Buddhist; the other reviewers do not discuss their religious background, except for one who says they are "against scientism, i.e. the view that natural science has authority over all other interpretations of life" (B. L. Cloud, 30 June 2009; accessed 30 September 2023).

point of Lopez's deconstruction: what exactly ⟨Buddhism⟩ and ⟨science⟩ are has changed in order to preserve the conclusion that they are compatible. Lal does just that by arguing—in a seeming mirror of apologetic moves which Lopez describes in the very first chapter of his book—that beliefs about Mount Meru are not essential to core Buddhist beliefs (and are perhaps even foreign corruptions!).[22]

But the point still stands: readers may come away from deconstructive texts feeling as if some straw man or red herring has been dissected rather than the religion/science with which they are familiar. To paraphrase one (academic) review of Lopez's book, they may come away not feeling guided, but rather perplexed (Lazenby 2010). In some cases, of course, this may be due to poor readings of the text—and such may be the case with Lal. But surely it would greatly help readers, regardless of academic stature, if deconstructivists were more upfront and clear about whose concepts were being analyzed. What scholars need to recognize is the fact that there is not just one single concept of religion or of science floating around to be deconstructed; there are in fact many different conceptions held by audiences of different backgrounds. And if scholars—like Harrison and Lopez—wish to effectively reach audiences beyond academia, then they need to pay careful attention to whose conceptions they are deconstructing and how they frame the conclusions of their deconstructions. For it is not clear why someone who does not conceive of religion/science in the scholarly way should care about deconstructions of scholarly concepts.

That said, particularly scholarly concepts—say of science and religion as sets of propositions—may be especially relevant to debates concerning the conflict between religion and science. Insofar as many Conflict Theses are motivated by propositional conceptions, it does make sense for scholars like Harrison to work at deconstructing those concepts. But, again, we must ask whether those debates are actually relevant to most readers. As Evans shows, the Conflict Thesis as understood by scholars—as one based on propositional conceptions

[22]Lopez himself has reported similar ironic misunderstandings arising during question periods after talks he gave based on *Buddhism and Science* (Lopez Jr. 2010).

of religion and science—is not the same as the Conflict Thesis embraced by non-scholarly audiences who do think there is tension between religion and science.

The issue ultimately lies in the assumption of universally shared conceptions of religion and of science in the present and likewise of universally shared conceptions in the past which can be mobilized to argue for the contingency of "the" concepts today. This assumption, I argue, is *not* warranted, or at least needs extensive justification which has not, as far as I am aware, been provided—especially given the empirical evidence that different conceptions of religion and science coexist within particular societies, e.g. between scholarly and non-scholarly conceptions.

To be clear, this is not a problem for the method of deconstruction in general. It is, again, a problem with how that method has been historically carried out. If it could be shown that really, say, the propositional conceptions of religion and science are widespread among readers of the religion-and-science literature, then this could actually bolster a deconstructionist argument. For if there were no such unified, widely shared conception in the past, yet there is one today, then that is surely an indication of the historical contingency of the concept. Of course, if there were not widely shared conceptions of religion/science in the past—as we might expect of, say the eighteenth century, where, as Harrison shows us, the contours of the scientific profession were being determined and contested (Harrison 2018, 159–164; see also Turner 1978)—then this presents a problem for analyses which try to distill particular conceptions as representative of the time, as Harrison does with Aquinas' virtue-conceptions of religion and science.

In a sense, we might say that the issue is that current deconstructionists do not go far enough. ⟨Religion⟩ and ⟨science⟩ are contingent not just in that their conceptual borders have shifted over time, or differ across cultures, but also in that they differ and shift *within* particular societies-at-a-time. This isn't, however, to say that we should always assume total conceptual anarchy: there are surely mid-level generalizations we can make about the

contours of ⟨religion⟩ and ⟨science⟩ among specific groups/subcultures. And it may in fact be the case that ⟨religion⟩ and ⟨science⟩, or at least *some* conceptions of religion and science, *were* created in closed environments, by small groups of elite scholars for particular purposes. That, after all, is one of the points many deconstructionists try to make both within religion-and-science and in religious studies, science and technology studies, and history of science more generally.

Even then, however, disagreement over conceptual boundaries within those small groups is often taken as the strongest proof of a concept's historical contingency. For instance, Josephson takes the variety of competing views as to how to understand the English term 'religion' as proof that there was no ⟨religion⟩ available to the Japanese, which in turn is meant to show that the whole concept of religion is culturally contingent (Josephson 2012, 1, 71–78). Works in religion-and-science, however, often fail to make explicit the disagreements over how to conceive of religion/science: we are told that there is some particular $\langle \text{religion}_{1200} \rangle$, not that there was $\langle \text{religion}_{1200,a} \rangle$ competing with $\langle \text{religion}_{1200,b} \rangle$ and $\langle \text{religion}_{1200,c} \rangle$. In a sense, being *more* deconstructionist may serve the literature even better, not only by better reflecting the history, but also in making the case for the concepts' contingency more obvious. Doing so would also better reflect the present state of affairs: there are many competing conceptions of religion and science even today. And that is something to be acknowledged and dealt with—for, as discussed in Ch. 2, perhaps not all works which deal with particular conceptions of religion/science will be relevant to all readers potentially interested in the RSR.

Again, the issue is this: scholars tend to deconstruct scholarly conceptions, but these may not be relevant to their non-scholarly readers. And scholars tend to focus on scholarly conceptions because they wrongly assume that there is a single conception of religion and a single conception of science widely held today which are to be deconstructed. Scholars can avoid falling into this trap in a few ways. On the one hand, they could simply be more upfront

and clear about the particular conceptions of religion/science they are dealing with, and how the conclusions they draw about "the" RSR must be contextualized and circumscribed by those particular conceptions. On the other hand, deconstructions could instead revel in the diversity of conceptions in the present—as well as in the past. Traditionally, they have been quite good at the latter. But there is very little investigation of modern-day diversity. By focusing on that diversity, I believe that deconstructionists could shine a great amount of light on the state of "the" RSR and the discourses it inhabits today.

In this vein, here are a few questions I think deconstructionists would be well suited to addressing: How do disagreements about conceptions of religion/science impact disagreements about the RSR? What factors are relevant in what conceptions actors take up? Are commitments to particular characterizations of the RSR tied to particular conceptions of religion/science? How are other identities—political, economic, racial, gender—tied to differing conceptions? Deconstructing our concepts in this way can be deeply revealing of the state of religion–science discourse, and the role that characterizations of "the" RSR play in various other discourses. This kind of analysis would be both relevant to a wider range of audiences and also simply better reflect the true state of "the" RSR in contemporary discourse.

My second, much smaller, critique of and recommendation to deconstructionists, which stems from questioning whose concepts are being deconstructed, centers on the sources used to build the deconstructive accounts. Essentially: when deconstructivists challenge the contingency of ⟨religion⟩/⟨science⟩, what sources do they consult? In almost every case, it is book-length tracts produced by scholarly elites often for other scholars or highly educated elites. For example, Harrison draws almost exclusively from Aquinas to construct the medieval conception of science (or *scientia*) and from a handful of theologians and philosophers—like William Paley (1713–1805), William Whewell (1794–1866), and John Herschel (1792–1871)—to con-

struct later conceptions. And the works which feature in Harrison's innovative quantitative study of the frequency of terms related to more contemporary conceptions of science—e.g. "scientist," "biology," "scientific method"—focuses explicitly on books (Harrison 2018, 159–171). Likewise, Lopez's account focuses on a litany of scholars of religion publishing in venues like *Asiatick Researches* and *Journal des Savants* meant for the eyes of other scholars—though Lopez does also make use of encyclopedia entries and works by e.g. the Dalai Lama which are explicitly public-facing.

My recommendation is that scholars expand their source base to include other forms of media, especially those produced for—and sometimes by—non-elites. Doing so will not only allow scholars to generate more accurate representations of the conceptions of religion held by various historical communities, but also help them to engage with conceptions that are more likely to resonate with non-scholarly audiences. This is especially the case with modern readers, whose sources for religious/scientific concept formation are not often the sources examined by scholars. Modern conceptions of religion and science should be explored as they are presented in films, YouTube videos, and podcasts. Some of these, like movies in the Disney *Marvel* franchise, reflect common views of religion, science, and their interaction (see especially *Black Panther: Wakanda Forever* (2022)). Others, like videos produced by science education channels on YouTube, produce work explicitly designed to advertise particular conceptions of science. In a similar vein, scholars could be served by analyzing advertisements and branding strategies which leverage conceptions of religion and/or science. And in their historical investigations, scholars could likewise look into the past correlates of these sources—pamphlets, newspaper articles, popular science/religion magazines—and the advertisements which appear therein. Harrison does this to some extent in *Territories*: Chapter 6 begins with a brief display of how science was conceived by contributors to the *Dublin Review* in the late 1860s, but the letters in literary magazines quickly disappear in the rest of the text, where one finds instead books and nothing more. A scholarly work which exemplifies the kind of analysis I propose is Carolyn Merchant's *The Death of Nature* (1980).

Although admittedly quite dense and, I would expect, rather inscrutable to the non-scholar, the work calls upon an immense variety of source types—from paintings to mining songs to local newspaper clippings to Shakespeare plays—to unpack the complex ways in which the Earth and "the" scientific process in general were understood (Merchant 1980).

Work which takes these other, non-book sources seriously *does* exist in the religion-and-science literature. Bernard Lightman, for instance, has studied the ways in which Darwin and evolution were discussed in popular science journals (Lightman 2007). Franz Winter has also investigated how science and technology are conceived by particular religious communities like *Kofuku no Kagaku* (Happiness Science) by studying their video and print advertisements as well as anime they produce, alongside their official book-length works (Winter 2015). And as discussed above, John Evans has fruitfully analyzed the ways science is presented in popular TV shows like *Star Trek* and *The Big Bang Theory* (J. H. Evans 2018, 116–117). Deconstructivist accounts could benefit greatly from incorporating this kind of non-book source analysis.

4.3 A Conflict of Methods

In this section, I will address an issue not with the method of deconstruction itself, but with how that method—especially in its historicizing form—is discussed within the religion-and-science literature. In particular, historicism is often seen as complementary to the method of case studies.[23] However, as I will argue, this compatibility is tenuous: historicism is at best in tension with the method of case studies, and at worst fundamentally undermines it.

I am not the first to distinguish historicism and case studies as distinct methods—although I believe I am the first to use such language. Bernard Lightman, for instance, refers to them

[23] In Ch. 3, I distinguish between two "flavours" of the method of case studies: inductive and motivational. Here, when I refer to the method of case studies, I mean only the inductive flavour.

as different "strategies for undermining the conflict thesis," one of which "involves the examination of a major episode, or development, in the history of science and religion in order to show that the conflict thesis does not capture the historical reality"—my "method of case studies"—and the second of which builds (admittedly rather vaguely) "an entirely new big picture for understanding the historical relationship between science and religion," as does Harrison 2015—my "deconstruction" (Lightman 2019, 5–6). Importantly, Lightman identifies a tight bond between the two "strategies." Not only are they often deployed against the conflict thesis, but "the shared aim of both these strategies is to ... [embrace] the complexity embedded in [John Hedley] Brooke's monumental *Science and Religion*." As Lightman explains, "For Brooke there was no single thesis—whether one of conflict or harmony or integration or separation—that explained the historical relationship over the centuries" (ibid.). That is, both the method of case studies and the method of deconstruction can be—and often have been, at least recently—used to argue for the same *conclusion*, viz., the lack of a general characterization of the RSR.

But although they point to the same conclusion, this does not mean that the methods are themselves compatible. Recall how the method of case studies works: One first surveys some number of historical interactions between religion and science, then one uses that survey as the basis for an induction to the characterization of the RSR. Importantly, the episodes included in the inductive basis must be related in some significant respects to religion–science interactions today. That is, if a conclusion is supposed to be drawn about the RSR_{today}, then the kinds of religion and science featured in the episodes comprising the inductive base must be representative of religion_{today} and science_{today}.

But now recall how deconstruction works: 1) demonstrate the contingency [of the formation] of the concepts ⟨religion⟩ (or some ⟨particular religion⟩) and/or ⟨science⟩ (or some ⟨particular science⟩) at some place/time, then 2) on the basis of that contingency offer a characterization of the RSR. In its historicizing form, step 1) proceeds by demonstrating the *historical*

instability of the concepts: their boundaries are not diachronically stable. But if it is the case that neither religion nor science have diachronic conceptual anchors, then it is not clear how historical episodes of religion–science interactions can be representative of the RSR today. In this sense, historicism can fundamentally undermine the method of case studies: although they may be used to reach similar conclusions, historicism—as sometimes practiced—could preclude the very possibility of induction over case studies.

This conflict between methods is well illustrated by Harrison's territories analogy which we tackled in §2.1 above. Remember how he put it:

> My suggestion is that something similar is true for the entities "science" and "religion," and more specifically, that many claims about putative historical relationships are confused for much the same reason as claims about a sixteenth-century conflict between Israel and Egypt: that is to say, they involve the distorting projection of our present conceptual maps back onto the intellectual territories of the past. (Harrison 2015, 1)

Those who wish to mine the past for cases of conflict or harmony or separation or even complexity are prone, in Harrison's language, to "distortingly project present conceptual maps back onto intellectual territories of the past." Again, this is because in order to do the induction in step 2 of the method of case studies, the cases in the basis need to be representative of contemporary cases. That is, if one would like to use, say, RSR_{t_1} and RSR_{t_2} to make an induction to the RSR_{now}, then it should be the case that the concepts $\langle \text{religion}_{t_1} \rangle$ and $\langle \text{religion}_{t_2} \rangle$ are similar in significant respects to $\langle \text{religion}_{now} \rangle$—and so too with $\langle \text{science}_{t_1} \rangle$, $\langle \text{science}_{t_2} \rangle$, and $\langle \text{science}_{now} \rangle$. Yet, historicizers like Harrison are wont to deny the possibility that $\langle \text{religion}_{t_1} \rangle$ and $\langle \text{religion}_{t_2} \rangle$ are similar enough to $\langle \text{religion}_{now} \rangle$ to warrant the inductions of the method of case studies. In this sense, the method of case studies seems fundamentally incompatible with the method of deconstruction: Harrison-

esque historicizing denies the possibility of constructing the inductive base necessary for the method of case studies.

Of course, Harrison-style historicizing is not the only form of deconstruction, and in fact a more moderate form of historicizing need not generate such a stark incompatibility with the method of case studies. A milder form of deconstruction, like that advocated above and throughout this chapter, can allow that $\langle \text{religion}_{t_1} \rangle$ and $\langle \text{religion}_{t_2} \rangle$ may not be equivalent while still holding that they are similar enough that they can together be used to say something useful about a more general RSR. There is still a tension, however, because taking the contingency of $\langle \text{religion} \rangle$/$\langle \text{science} \rangle$ seriously places real constraints on the inductions inherent to the method of case studies; not all collections of past RSRs can serve as permissible inductive bases to inform us about the present RSR. With that said, however, it is still instructive to think with the more extreme form of historicizing—not only because it is the form which dominates (however unfortunately) the scholarly discourse, but more importantly because it is the form which informs the conclusions scholars currently make when thinking of the method.

4.4 For Whom Is Deconstruction Useful?

In the anthology *After Science and Religion* (2022), the contributors outline a few reasons why deconstruction is a useful way of approaching the RSR. Tyson provides four "pay-offs" worth quoting at length:

> When we abandon the attempt to impose our present concepts on the past, we are in a position to see how past actors entertained very different understandings of how the formal study of nature (our 'science') was related to the fundamental questions of meaning and value (our 'religion'). ... How we get to naturalistic,

> value-free, modern science from this earlier, religiously inflected 'natural philosophy' is highly informative for our present thinking about how the realms of meaning and value should impinge upon the conduct and content of the natural science and about the possibility for the future reconnection of these domains.
>
> A second pay-off of close study of the emergence of the categories 'science' and 'religion,' and indeed of simply attending more closely to the history of science, is that it reveals how the modern sciences, during their early modern incubation, drew strongly and explicitly on particular metaphysical and theological assumptions while at the same time rejecting others. Once we become aware of these (now largely implicit) foundations, we can ponder the extent to which modern science remains tacitly indebted to them. This, in turn, can inform our thinking about how different various sciences might look had they drawn upon alternative theological and metaphysical positions, and indeed whether they might in future be reshaped and redirected in fruitful ways by such alternatives.
>
> Third, in addition to attending to the implicit philosophical commitments that continue to inform scientific practices from within, we are now in a position to see more clearly how and why a particular philosophical outlook – analytic philosophy – has tended to dominate contemporary Anglophone science-religion discussion from without. ...
>
> Finally, awareness of the history of the categories 'science' and 'religion' sheds crucial light on their present power relations. (Tyson 2022 3–5)

These are quite scholarly reasons, though some, I think, may appeal to non-scholars as well. But, of course, not all audiences—scholarly or non-scholarly—will find these particular reasons appealing. Some may not be moved by intellectual shifts from hundreds of years ago. Others might not see how the method is useful for whatever it is they wish to do with the RSR. In fact, I think it is a common (though naive) complaint that deconstructive

accounts—of the RSR or of other objects—are too academic to be relevant to to public discourses.

I think, however, that deconstruction—when done properly, when not over exaggerated, when being careful to deal with concepts relevant to non-academics—can be quite useful to at least some publics. In this section, I'll examine two kinds of public audiences which might find the method of deconstruction useful: apologists and policymakers. The analysis given here, as in previous chapters, is not meant to be exhaustive. But I would suspect the relevancy of this rather complicated and esoteric way of investigating the RSR to be rather circumscribed. That said, the two groups I discuss do have something to gain from deconstructions of the RSR. Given the relative paucity of public-facing works using this methodology, I would encourage scholars who employ deconstruction to try broadening their readership. There is, I believe, a market for the method.

Apologists: Deconstruction may be useful to apologists both when arguing against hostile audiences and when addressing sympathetic coreligionists. The way in which the contingency of ⟨religion⟩ and ⟨science⟩ are exploited, however, will differ in those contexts.

For contexts involving addressing hostile opponents, consider Lopez's account of "the" Buddhism–science relation. In the history of these debates, what exactly ⟨Buddhism⟩ is and what exactly ⟨science⟩ is have changed, although the conclusion that they are eminently compatible has (generally) stayed the same. Lopez's deconstruction proceeds by laying out the various ways Buddhism and science have been conceived by different parties—Buddhists and non-Buddhists alike—over the past 200 or so years. In a sense, Lopez's history presents a menu of possible ways of characterizing the concepts fit for different situations. Perhaps a given opponent has a more technology-centric view of science: then the Buddhist apologist may be well served to draw from Gendün Chopel's (1903–1951) conception of Buddhism as (at least in part) a repository of anticipations of contemporary inventions—and then some

(Lopez 2008, 127–128).[24] On the other hand, perhaps emphasizing the causal nature of Karmic Law could defuse an opponent's claim that Buddhism is not itself scientific. Apologists can thus view deconstructions as illustrations of possible moves one could make (and what moves *not* to make) in particular situations to defend their religion as compatible with science.

Deconstruction may also offer a more general kind of aid to religious apologists as well. Christian apologists drawing on work like Harrison's may, for instance, argue that since the only reason Christianity and science are in conflict was a series of historical contingencies, the conflict is unstable: it can be altered, changed. The past, on this way of thinking, presents an array of potential ways of (re)conceiving religion and science from which we may draw and which we may perhaps reinstate to influence the general shape of contemporary discourse about the RSR. As we saw above, participants in the *After Science and Religion* project, themselves often Christian apologists, value the method for this reason, and it is easy to imagine less-scholarly individuals seeing a similar value in these deconstructive accounts. The aim, in this case, is to change the general way conversations about the RSR are carried out, not just, as in the previous paragraph, to address a particular kind of opponent in a particular situation.

Notably, the way in which deconstruction—in any context—may be appealing to apologists is different from the way in which case studies may appeal to the very same group. Deconstruction does not simply refer to prior times in which relations were cheery, times to which we can return. Instead, deconstruction shows that a deeper change is possible: the very concepts themselves could be altered such that they are in harmony—or are entirely independent.

It is for this reason that I don't believe non-religious apologists will find deconstruction as

[24] Though such an apologist should heed Lopez's warning that tying Buddhism too closely to any particular scientific innovation may cause trouble down the line when that innovation becomes outdated (Lopez 2008, 128–129).

useful as they may find other methods. Conceivably, an atheist might leverage the contingency of just what ⟨religion⟩ is to try to make some argument about the general illegitimacy of claims to harmony between religion and science; one can hear the preamble to something like a God-of-the-Gaps argument. But again, as discussed above, this would rely on the mistaken inference that the fluidity of a concept's borders is a sign that it fails to latch onto anything at all which can be placed in real relation with other things—we can still rightfully say that fish are aquatic animals, that they are part of a genetic lineage which shares a common ancestor with the mammals which lived some 400 million years ago, even if the boundaries of ⟨fish⟩ have changed radically over the past 400 or so years. Further, at least in most real-world scenarios, atheists of this stripe tend to embrace a more temporally fixed conception of science than deconstruction could permit—figures like Dawkins seem to advocate the existence of an ever-present, eternal Science. The clever religious opponent could then easily counter that, although what exactly counts as religion has changed, so too has what counts as science. And, furthermore, changes in the boundaries of ⟨science⟩ have often been crafted explicitly to exclude ⟨religion⟩—and so if the atheist believes there is something fishy with the shifting borders of ⟨religion⟩, there is certainly something suspect about the shifting borders of ⟨science⟩. Thus, perhaps surprisingly, while deconstruction may provide fodder for apologists making pro-religious arguments, it doesn't seem to provide grist for the atheists' mill.

The case is less clear for skeptics of particular religions who want to exploit that religion's relation to science. Imagine, say, a Hindu skeptical of Buddhism. After reading a work like Lopez's, they might plausibly argue that the kind of harmony with science espoused by Buddhist apologists is only artificial, a consequence of cherry-picking definitions and conscientiously ad-hoc self-re-imagination. If Buddhism can be said to be in harmony with science, our Hindu might say, then—by the same token—Hinduism can also be said to be in harmony with science. In this case, then, deconstruction is used to level the playing field; if the definitions are up for grabs, then anyone can grab and craft them as they

please. Of course, perhaps the Hindu believes that while the Buddhism–science relation can be deconstructed in this way, the Hinduism–science relation cannot be—an implausible view from the scholar's standpoint,[25] but a possible one we could at least imagine someone holding. In this sense, the method of deconstruction itself, rather than any fruits of its use, can be relevant to at least religious opponents of some religious apologists.

Policymakers: Policymakers working on issues related to topics in the religion-and-science discourse (e.g. evolution in public schools, government support for possibly controversial research/technology (like gene-editing), mandatory vaccination) may—perhaps surprisingly—find deconstructive accounts useful. Thinking about policymaking is especially relevant for scholars who work in countries—like the US—where popular discourse around religion-and-science is often politically infused.

Policymakers pushing particular science-oriented legislation might be interested in better understanding the RSR for a variety of reasons—perhaps they need to overcome resistance put forward by some particular religious bloc, or maybe they simply want to galvanize otherwise non-enthusiastic potential voters. Consider, for instance, a politician who wishes to galvanize support for government-funded stem cell research in her area of jurisdiction, but who is being opposed by a group of politically active and strong Jehovah's Witnesses. Deconstructive accounts of the Jehovah's Witnesses' relation with medical science may help this politician better understand where this group is coming from and how to best address their concerns. Perhaps she can draw on ways in which the group previously conceived of themselves or of particular medical practices—like vaccination, which Witnesses originally opposed but later came to accept in 1952 (Grabenstein 2013)—in her advertisement/outreach. Thinking with the actual history of these groups may be more effective than the current practice of simply broadcasting the virtues of vaccines as understood by what opponents perceive (negatively)

[25]See, for instance, the discussions of the invention of Hinduism as a category within Western scholarly "world religion studies" in Nongbri 2013 and Masuzawa 2005, though see Pennington 2005 for a more nuanced account in which Hindus themselves play a more active role in the construction of the category.

as an untrustworthy "medical establishment." [26]

Something similar to this suggestion of playing into previous conceptualizations has in fact been considered and recommended by scholars interested in politically-coloured religion-and-science discourses in the Muslim world, in particular those having to do with evolution. It has been noted (e.g. by Hameed 2010) that while "in the Muslim world Islam and modern science are often seen as compatible," evolution stands out as a prominent exception. As Hameed explains, "The situation is further complicated by the fact that many Muslim countries are investing in biomedical fields that make use of evolutionary theory. Similarly we find support for stem-cell research in several Muslim countries concurrently with widespread opposition to biological evolution" (Hameed 2010, 132–133). In light of this, policymakers may benefit from understanding not only the complex socio-historical background to the present popular views of science and Islam (including how nineteenth-century Europeans promoted positive views of the Islam–science relationship to attack Christianity, and how that narrative was then used by Muslims to resist Westernization),[27] but also the ways in which evolution in particular has been conceived. Works which trace the history of these kinds of claims and the often quite political contexts in which they emerged (e.g. as ways of resisting Western cultural imperialism) could provide policymakers in the Islamic world with a variety of conceptions of evolution to help encourage acceptance of the theory by their constituents. Of course, this strategy may ultimately prove problematic. As prominent scholar of Islam-and-science Shoaib Ahmed Malik writes, "The motivation behind this line of thinking seems to be diminishing the highly charged polarity directed towards evolution found in the Muslim world. Though such a strategy might help reduce Muslims' social anxieties, and thus potentially help them embrace evolution, it resorts to a false stimulus" for the conceptions of evolution had by past thinkers differ significantly from evolution as understood in contemporary biology (Malik 2021, 159). That said, however, even if the particular

[26] This parallels the recommendation Goldenberg 2021 makes against "knowledge-gap" strategies for addressing vaccine hesitancy.

[27] See e.g. Küçük 2010 and Yalcinkaya 2010.

conceptions of past thinkers should not be appealed to (due to worries of anachronism), the fact that evolution—and Islam—*were* conceived in such a way as to be compatible could at least help show that there are ways in which Islam-and-science discourse could be shaped to be more evolution-friendly. This would be a close correlate to Harrison's point that deconstructive accounts can help illuminate "the potential of paths that were not taken" in conceiving the RSR (Harrison 2022, 316).

The relevancy of deconstruction to policymakers closely follows/mirrors the ways in which the method of case studies may also be relevant to them. The key difference, however, lies in the kind of motivation the different methods provide or recommend. The method of case studies essentially offers historical figures and events around which constituents may rally because of a shared religious identity. If we were to imagine local governments creating signboard advertisements to support particular legislation, the method of case studies recommends slogans like "XXX supported it, so you can too!" On the other hand, deconstruction focuses on concepts: it provides ways in which the policymaker can present or characterize the science/scientific policy at hand. The recommended slogan from deconstruction would instead look more like "ZZZ said Science is YYY—so what's the problem?" Advertising in this second way parallels successful programming in 2014 Australia to increase vaccination rates among socially progressive communities which had a history of opposing vaccination. In the "I Immunise" campaign, run by the Immunisation Alliance of Western Australia, visuals depicting e.g. women breastfeeding instead of using baby formula—at the time a progressive sign post—were accompanied by phrases like "I breastfeed, I use homeopathy, and I immunise" (reproduced in Goldenberg 2021, 62). Such advertisements made use of their audience's self-conceptions to garner support for a particular medico-scientific intervention. Deconstructive accounts of particular religious identities and/or their relations with science could help inform similar such programming.

To be clear, the way in which the method of deconstruction may be useful to policymakers

is also different from how the method of fieldwork (discussed in Ch. 5) may be useful. The method of fieldwork, as will be discussed, focuses on self-reporting and direct appraisal of self-conception through surveys, interviews, and ethnography. While such information may be useful, self-reflection may not illuminate larger structural features which may be relevant to the ways in which religion–science discourse is shaped in particular communities. Historical deconstruction, by contrast, tends to highlight broader structural forces/constraints which shape how particular communities understand science, religion, and their relationship.

This leads to a final point about the method of deconstruction. Perhaps ironically, what is useful in deconstruction to policymakers is not the conclusions drawn by deconstructionists. Instead, it is really only the first step of that method—the demonstration of contingency through the use of historical and/or cultural examples, which make the method relevant, at least most of the time. The general conclusion—that Buddhism is compatible with science or that religion and science are ultimately at odds—is likely more or less irrelevant; for what matters to the policymaker is not so much the correct characterization of the RSR itself so much as how people perceive the RSR and how that perception may shape their responses to particular pieces of science policy—or to religion/religious individuals.

4.5 Conclusion

In this chapter, I provided a critique of the method of deconstruction and offered several recommendations as to how that method could be better implemented in public-facing work. The method of deconstruction proceeds by first demonstrating the contingency—typically historical or cultural—of the concepts ⟨religion⟩ and ⟨science⟩, then arguing for some characterization of the RSR based on the demonstrated contingency. Scholars like Peter Harrison and Donald Lopez Jr. have written public-facing works which employ this method, although it is relatively rare in the public-facing religion-and-science literature—though the method

is quite common in scholar-facing venues in religion-and-science and especially in religious studies.

I considered three general issues with how deconstruction is currently practiced. The first two derived from ambiguity in the language used in Harrison's influential *The Territories of Science and Religion* (2015). Depending on how the deconstruction is read, one might be tempted to conclude that we should completely dispense with the terms 'religion' and 'science' because they not only distort the past but are also simply incapable of explaining real-world phenomena. I argued that while great care must be taken in drawing consequences for the modern RSR from past conceptions of science and religion, we need not dispense with the terms entirely. Transhistorical comparison need not always distort the past as long as we focus on the extent to which the practices, beliefs, etc. to which we take our current terms 'religion'$_{now}$/'science'$_{now}$ to refer did and did not exist in the past (§2.1). I also argued even if ⟨religion⟩ and ⟨science⟩ are not natural kinds, this does not rule out their utility as explanatory categories. As social kinds, they may very well be useful to scholarly analysis (§2.2). In §2.3, I moved beyond Harrison's work to suggest that deconstructivist accounts pay more attention to which conceptions of religion/science they deconstruct so that their analysis is more relevant to their non-scholarly readers. In particular, I argued that scholars should be more open to the wide diversity of religion and science concepts which are present in a society at any given time, and make use of sources other than book-length tracts produced by scholarly elites.

It has been claimed that the method of deconstruction and the method of case studies mutually support the Complexity Thesis. In §3, I showed that even if both methods may be used to lend support to some particular characterization of the RSR, they are still in tension with one another—especially when it comes to more radical forms of deconstruction.

Finally, I concluded with a look at what public audiences could benefit from public-facing scholarly work using the method of deconstruction. Although there is much room for im-

provement, the method is not, as a pessimist might have expected, irrelevant to non-scholars.

Chapter 5

The Method of Fieldwork

Our freshman biologist-to-be pulls a book from the shelf and flips it to a random page. What she sees surprises her. Rather than the walls of text she expected, the book presents a multi-page table filled with numbers. She pulls another book and finds, rather than an author's musings, an interview transcript.

What are these sources? What can they tell the student about the RSR? And are these numbers and transcripts useful? Are they relevant to her interests and concerns?

In this chapter, I analyze the method of fieldwork. As with other chapters in this dissertation, I begin by specifying what I take this method to entail and summarizing a few exemplars drawn from the public-facing religion-and-science literature. I then move on to a discussion of some issues facing the method of fieldwork. In turning to the question of whose religion and whose science is studied, I suggest several groups and spaces which have been understudied in the literature, especially those involving what I have previously called the non-theory-oriented sciences. In developing these critiques, I aim to show how scholars using fieldwork

methods may strengthen their work as well as make it more relevant to a broader range of readers by highlighting fruitful areas for future investigation. I conclude the chapter with a discussion of which public audiences may find the results of fieldwork most useful.

5.1 The Method of Fieldwork

By "the" "method of fieldwork," I intend to capture a range of methods which have their origins in the social sciences. Thus, the definite article is a bit misleading. However, the group of methods which I place under the general heading "fieldwork" all share an empirical bent. Hence, I'll define "fieldwork" like so:

> **Fieldwork:** those methods which extract the characterization of the RSR from the results of an empirical study of a contemporary target population.

The key here is that the characterization of the RSR is to be found in the population studied rather than in the mind of the scholar—at least ideally. That is, the amount of theory through which the empirical data is run is meant to be kept at a minimum. Put bluntly, according to the method of fieldwork, the way to understand the RSR is to find it in the voices of the people studied, not in the voice(s) of the scholar(s) studying them.

Before I move to some examples illustrating the method, let me clarify some aspects of this rough definition.

First, as mentioned before, my category of "fieldwork" brings together an array of particular empirical study methods. In the extant literature, the most common such methods are surveys, interviews, and participant-observations or ethnography.[1] For instance, the Pew Research Center has employed large-scale surveys and interviews (both one-on-one and in

[1] Although "ethnography" and "participant-observation" sometimes come apart, for my purposes here I will treat them as the same and simply use the term "ethnography."

groups) to study the RSR in Asia (Pew Research Foundation 2020), and Elaine Howard Ecklund and Christopher P. Scheitle have embedded themselves in religious congregations to see how the RSR is conceived there (e.g. Ecklund and Scheitle 2018). These are all empirical means of studying groups—of scientists, religious individuals, or lay non-experts—and foreground the views of those studied. As such, although surveys, interviews, and ethnography are all quite different ways of studying populations, I group them under the same heading. Indeed, these methods are often used in conjunction, in many cases *because* of their differences. Ecklund and Scheitle, for instance, pair their ethnographic work with analyses of survey and interview data; the latter provide, in their words, "a bird's-eye view" of the RSR which is inaccessible to necessarily local ethnography (Ecklund and Scheitle 2018, 4).

Fieldwork may make use of other means of studying the RSR aside from using surveys, interviews, and ethnography. For instance, one could presumably also use studies of material remains, as in archaeology, to study how religion and science interact in particular locations—perhaps by looking at waste in factories, churches, or university spaces (are there, say, fliers or discarded religious or scientific objects?). One might also study digital sources—like search trends or co-occurrent words in social media posts—to understand how contemporary actors relate religion and science. Most public-facing religion-and-science literature, however, does not make use of these other methods, and so for the purposes of this chapter, I'll focus on fieldwork which makes use of surveys, interviews, and ethnography.

Further, when I speak of empirical studies, I intend academic/formal studies which, in the case of surveys and interviews at least, have been carefully planned and executed. These kinds of studies have almost always (when responsibly done!) undergone an IRB-approval process to check that the methods used respect, for instance, the autonomy and privacy of those studied. This, then, excludes the kinds of one-off "interviews" one might have with a stranger on a plane or the informal survey one might conduct of one's friends by sending a question to the group chat. There is, of course, a continuum between these more

informal empirical "studies" and those which occur in academic studies—perhaps especially in the case of ethnography. However, for the purposes of this dissertation, which focuses on literature produced by scholars, I exclude these more quotidian kinds of "empirical study."

The above definition also specifies that the empirical study is of a *population*. Most fieldwork studies indeed use a non-trivial population of more than one individual. This is not necessary, although studies of single individuals are surely less informative. Nonetheless, some fieldwork may proceed by generalizing from a study of a particular individual—say an interview of a leading scientist. Such work still falls under the umbrella of fieldwork because the structuring/overriding/guiding assumption is that the RSR is to be found in the view(s) expressed by the individual studied, not by extra theorizing by the interviewer.

It is also important that the target population is contemporary with the study. That is, the individuals studied must exist alongside the one(s) doing the study. In this way, the method of fieldwork is explicitly different from the method of case studies, which may study past populations in ways roughly analogous to the ways social scientists study contemporary populations. As an example, Rodney Stark, himself a sociologist, "surveyed" what he took to be a representative sample of sixteenth- and seventeenth-century scientists. He does so by asking after their religious affiliation and level of religious commitment, the latter operationalized by biographies of the scientists which presented "clear signs of especially deep religious concern" (Stark 2003, 160–162). Stark then reads off that data the (claimed) fact that deep religiosity (at least in the Catholic and Protestant traditions) and science are immanently compatible. Although this process mimics that of contemporary studies of scientists (like Larson and Witham's (1998), discussed below), I think it is better classified as an instance of (biographical) case studies rather than fieldwork, not only because it concerns historical figures but also because the "participants" in the study do not really participate; their voices are in large part constructed by Stark.[2] In that sense, fieldwork is inherently

[2]The boundary between the method of biographical case studies and fieldwork is admittedly murky. If the reader is not convinced that Stark's analysis is more properly classified as an instance of fieldwork, they

present-focused: it is concerned with the RSR_{now}, although it may generalize from that to a temporally broader claim about the RSR.

Finally, the way in which the characterization of the RSR is extracted from the empirical study is importantly distinct from how it is arrived at in the other methods discussed in this dissertation. As we saw in Chapter 2, the anthropologist James Frazer used semi-empirical means to determine the definitions of "religion" and "science" in the *Golden Bough* (1890, 1922). Frazer's method of determining the RSR does not qualify as fieldwork because he then uses those definitions to logically derive their relationship—a clear case of conceptual analysis (as defined in Chapter 2). If Frazer had instead simply asserted that the RSR was reflected in the reports and actions of the people he studied, his study would have fallen under the category of fieldwork. Likewise, although the field of cognitive science of religion (CSR) uses explicitly empirical methods, it does not qualify as fieldwork in the sense I intend. Studies from CSR try to uncover the cognitive roots of religion, and such studies may be paired with studies of the cognitive origins of science to produce general claims about the RSR (e.g. that they are in conflict because they stem from competing cognitive faculties). To that extent, we can understand this kind of method, perhaps surprisingly, like Frazer's—as empirically informed conceptual analysis; the empirical work is done to show just what religion and science are before one moves to a conclusion about how they are related. Again, the essential feature of fieldwork is that it finds the proper characterization of the RSR among the voices (not brains) of the contemporary people (not events) studied.

This focus on "extraction," as I've termed it, also highlights the fact that fieldwork studies do not aim at producing prescriptive accounts of the RSR. That is, the characterization of the RSR the method aims at producing is descriptive—it is just the one found among the studied population. This is an important difference between the method of fieldwork and

are welcome to think otherwise. All that matters is that there is a general distinction between the method of case studies and fieldwork—which I take primarily to be a focus on the voices of those studied and, secondarily, on contemporary voices.

the other methods discussed in this dissertation: while conceptual analysis, case studies, and deconstruction could all be mobilized to assert how the RSR *should* be conceived, the method of fieldwork only asserts how the RSR *is* conceived by a particular population, often a population that does not include the scholar themselves (or does so only accidentally).

With these clarifications made I'll now turn to some exemplars past and present of the method of fieldwork.

5.1.1 Some Exemplars

The use of fieldwork to study the RSR goes back to the very beginning of the modern social sciences and in particular the use of statistics to study social phenomena. Francis Galton (1822–1911), widely recognized as one of the fathers of modern social science, was a significant advocate of statistical investigations of social issues like crime and mental illness. Using statistics to study how these phenomena varied with physiological traits could be used to the benefit of society in general through, for instance, being able to identify would-be criminals based on facial traits (Daston and Galison 2007, 168–171); and, more broadly, through eugenics, a term which Galton himself coined in 1883. But Galton was also interested in how particular sectors of society could be improved.

As a member of the newly emergent class of professional scientists, Galton turned his attention to the production of better scientists in his *English Men of Science: Their Nature and Nurture*, published in 1872. Of particular interest to Galton was the impact of religiosity on scientific character and success—an interest perhaps fueled by controversy over his half-cousin Charles Darwin's evolutionary work. Galton's methods were twofold. First, he looked at membership on the councils of British scientific societies from 1850–1870 and found that only 16 out of 660—or a mere 2.4%—of such members were clergymen. This statistic supposedly pointed to the fact that clergymen could not be good proper scientists, a reflec-

tion of a deep-seated conflict between religion and science (Turner 1978, 365–367). But the larger part of Galton's data came from responses to surveys he sent directly to scientists—specifically "distinguished members" of scientific societies in London—which asked a variety of questions ranging from height to birth place to number of siblings to views on religion. These responses were then used to construct the image of the "English Man of Science." In terms of religion, that image was generally negative: religion was not looked upon favourably by men of science. For Galton, this lent clear support to the counsel membership data, all of which spoke for the idea that religion and science were not compatible, or at least were in significant tension. Galton's methods thus qualify as a case of fieldwork: his conclusion is reached by extracting it from the responses of his survey respondents.

Likewise, using similar methods to Galton's, the American psychologist James Leuba (1868–1946) also arrived at a rather negative characterization of the RSR. In 1916, Leuba performed a survey (or "*questionnaire*" as he called it, italics original) of scientists to learn about their religious beliefs. The results were published in *Belief in God and Immortality* (1916), which also looked at the beliefs of college students. In contrast to Galton's study, Leuba's scientists were drawn not from the membership roles of British scientific societies but instead from the professional directory *American Men of Science* (first published in 1906 and updated in 1910[3]), and from the membership lists of the American Historical Association, American Sociological Association, and the American Psychological Association (Leuba 1916 219), providing in total somewhere around 5,500 possible participants. Leuba's survey, send to 1,000 scientists randomly sorted into two groups of 500, asked pointed questions concerning belief in God and in the efficacy of prayer. For instance, participants were asked to select one of the following options:

1. I believe in a God in intellectual and affective communication with man, I mean a God

[3]Although Leuba does not state which edition he used for the study, it must have been either the first or second; the third edition was not published until 1921. Subsequent editions of the directory continue to be published today—since 1977, under the new title *American Men and Women of Science*.

to whom one may pray in the expectation of receiving an answer. By "answer," I do not mean the subjective, psychological effect of prayer.

2. I do not believe in a God as defined above.

3. I am an agnostic. (Leuba 1916, 224–225)

By combining the respondents indicating 2 or 3 collectively under the heading "unbelievers," Leuba found that while 41.8% expressed belief in God, the other 58.2% did not. When restricting himself to the "greater men" of science (those marked "eminent" in *American Men of Science*), Leuba found that only 31.6% expressed belief in a prayer-granting God (Leuba 1916, 249). On that basis, Leuba claimed to have uncovered a basic incompatibility between religions featuring a personal God[4] and science, as demonstrated by the fact that belief in such a God was less frequent among those more heavily embedded in the institution of science.[5] This way of characterizing the RSR falls clearly under the heading of fieldwork, for that characterization is drawn from the voices of the study's participants—though exactly whose voices are heard is indeed determined by Leuba.

Since the early 1900s, Leuba-esque studies have been reproduced several times in the United States, e.g. by the Carnegie Commission (Trow 1969), Thalheimer 1973, Wuthnow 1985, Larson and Witham 1997, and more recently by the Pew Foundation in 2009. Despite some variation, these surveys have generally found that around 30–50% of scientists believe in God (or a higher power), although this number drops off sharply when restricted to "elite" scientists (Larson and Witham 1998). The typical conclusion by these studies' authors: it *is* possible to be both religious and a scientist—but perhaps not both religious and an "elite"

[4]Leuba does not think, for example, that "original Buddhism, which denies the existence of a personal God, and Comte's *Religion of Humanity*, which includes among its articles of faith neither personal God nor soul" are incompatible with scientific education and endeavours (Leuba 1916, x). See Lopez Jr. 2010 for more on what Leuba refers to here as "original Buddhism."

[5]Interestingly, Leuba found that belief in immortality was more frequent than belief in God among "lesser" scientists, though about the same for "greater" scientists (Leuba 1916, 251—253)

scientist.[6]

While the preceding examples have all employed surveys, more recent public-facing work has employed other means of studying their populations, in particular interviews.

The sociologist John Evans combines analysis of large-scale survey data with extensive interviews, mostly with religious laity. Evans' main contention in his *Morals Not Knowledge* (2018) is that, insofar as there is conflict between religion and science, it is only *propositional* conflict, rather than something larger (J. H. Evans 2018). This conclusion flies in the face of a (supposedly) widespread assumption in popular scholarly religion-and-science discourse that religious opposition to particular scientific claims is in fact a sign of more systemic *methodological* incompatibility between religion (or some particular religion) and science in general. While this might be true for religious scholarly elites, Evans argues that this is not at all the case with ordinary religious folk. For them, opposition to particular scientific claims—like the evolution of human beings or the age of the earth—is not part of a larger opposition to scientific ways of thinking or even science in general. Instead, Evans contends, religious opposition to particular claims is best explained by religiously motivated *moral* concerns.

These conclusions are reached by identifying trends in survey and interview data on the American "public." The way Evans narrows his target population is important, and he makes clear that his focus is on the RSR in the "public sphere," as understood by non-elites. He is explicit in the elite–non-elite distinction:

> For my purposes, an elite is anyone who has a social role that allows them to influence the views of other people beyond their immediate acquaintances

[6]It should be noted, however, that Thalheimer 1973 and Wuthnow 1985 take their work to show that the secularization thesis—the claim that religiosity in a society with widespread scientific education will decrease over time—is false: the statistics have remained roughly the same despite the passage of over half a century. Their conclusion seems compatible with, though possibly contrary to the spirit of, Larson and Witham's (1998) conclusion.

> and family members *on the issue under debate*. So, obviously all academics are potentially elites, as are scientists, politicians, clergy, theologians, church officials, journalists, pundits, TV and movie producers, and leaders of social movements. The public, or citizens as I will often call them, are all of the other members of the public who lack this power. Someone could be elite in one context but not in another. For example, corporate executives are likely elites on the issue of worker pay, but are unlikely to be so for a debate about religion and science. The elites in the religion and science debate are largely academics, scientists, and religious leaders, with a smattering of others we could call public intellectuals. (J. H. Evans 2018, 6; emphasis original)

Again, the views of non-elites on the RSR are accessed via both survey and interview data. Evans begins with analyzing the results of the large-scale General Social Survey (GSS) of 2012.[7] Since the GSS did not ask questions specifically about the RSR, Evans instead relies on statistical means to identify trends in responses to religion-concerned and science-concerned questions.

As he clarifies, in investigating this data, Evans is "primarily interested in the assumption of systemic knowledge conflict, where believing a religious fact-claim about evolution, for example, would lead to not believing other scientific fact claims for which there is no conflicting religious version, like global warming. If there is systemic knowledge conflict, then members of those religious groups that have propositional conflict with science—and conservative Protestants in particular—should avoid exposure to all of science" (J. H. Evans 2018, 125). To determine the extent of knowledge conflict between religious individuals and science, Evans considered respondents' answers to questions divided between two classes of scientific claims: "contested facts" and "uncontested facts." Two questions comprised the

[7]Since 1994, the GSS has been conducted each even numbered year. The survey is funded by the NSF and administered to a randomly selected representative sample of US adults over the age of eighteen by NORC at the University of Chicago. The 2012 survey featured 1,974 respondents. The data (including for the most recent iteration of the survey) is publicly available at `https://gss.norc.org`.

former category: "whether the universe began with a huge explosion; and whether human beings, as we know them today, developed from earlier species of animals" (ibid., 121–122). The "uncontested fact" questions included questions about the relative size of electrons and atoms, plate tectonics, and the heat of the Earth's core (ibid., 122). The results were interesting: while religious individuals in general (and conservative Protestants in particular) "scored" lower than non-religious individuals with respect to the contested facts (i.e. their answers did not align with the scientific mainstream), religious individuals scored roughly the same as their non-religious peers when asked about uncontested facts (ibid., 123–125). These results are clearly inconsistent with the expectation we might have if there were systematic knowledge conflict: disagreement with science in one area does not predict disagreement with science in toto.

Thus, what Evans claims to find is that insofar as religious individuals are in conflict with science, it is over particular propositions. Evans therefore concludes, if there is conflict between religion and science, it is local—confined to concerns over particular claims made by the sciences, not about the overall scientific endeavour itself. But why particular religious or scientific propositions come to be understood as in conflict with each other is a complicated matter (ibid., 130–136).

Evans proposes that (religiously inflected) *moral* concerns drive the selection of particular propositions as epicenters for perceived conflict, and tries to show that this is the case via interviews (ibid., Ch. 7). Conducted by Evans and his team of researchers, the small-scale interviews featured questions directly probing how and why interviewees felt about particular scientific claims and the RSR in general. What he found was that interviewees almost always cited moral concerns as their reason for opposing or worrying about particular scientific advances, technologies, or claims. Assuming Evans' samples are representative, then it seems like moral concerns do have a large impact on what scientific propositions come to be epicenters of conflict-discourse. Thus Evans' title: *Morals Not Knowledge*.

In all of this, it is clear how Evans' methods fall under the umbrella of fieldwork: he uses empirical methods to extract the voices of a particular contemporary target population—the American public.

Like Evans, much of Elaine Howard Ecklund's work also employs both survey data and interviews.[8] However, in a series of monumental studies of both scientists and ordinary religious folk, Ecklund (along with Christopher Schietle and a large team of researchers) also incorporates on-the-ground participant observation of religious groups. This involved embedding for hundreds of hours in "largely white evangelical churches, historically black churches, and largely immigrant mosques and historic synagogues in both Houston and Chicago" (Ecklund and Scheitle 2018, 4).

In the course of their studies, Ecklund and her collaborators determined that, despite public perceptions to the contrary, most academic scientists (drawn from R1 institutions) are not anti-religious; "what the scientists really think" is that religion just isn't relevant (Ecklund 2010, esp. Ch. 9), and so one can be a good scientist while being religious (even if it's unlikely for a religious person to enter science). Further, despite academic perceptions to the contrary, religious people are not anti-science; "what religious people really think" is that science is a net good (Ecklund and Scheitle 2018, esp. Ch. 2). The conclusions about scientists were mostly drawn from dozens of in-person interviews, while the conclusions about religious folk were drawn from a combination of survey data, group interviews, and ethnography. In both cases, Ecklund uses the methods she does to extract the voices of those studied, and her conclusions are meant to simply be general summaries of the patterns established by those voices—a clear case of the method of case studies.

Ecklund and her collaborators notwithstanding, ethnography is admittedly less common in the public-facing, scholar-produced literature than is survey- or interview-based fieldwork. This is not due to the lack of ethnographies by scholars, whether in the particular field

[8]Evans in fact draws extensively on Ecklund's work.

of religion-and-science or not.[9] But interestingly, public-facing work in this vein is rather scarce.

Some work on new religious movements (NRMs) may also fall into the category of scholarly produced, public-facing ethnography. However, the sub-field of NRMs-and-science is rather underdeveloped, though growing (Bigliardi 2023), and public-facing work tends to only discuss the science angle incidentally. This is the case, for instance, with Hugh Urban's studies of Scientology (Urban 2011) and E. Burke Rochford's work on Hare Kṛṣṇa/ISKCON (the International Society for Kṛṣṇa Consciousness; Rochford 2007). In both of these cases, the authors' ethnographic work shows how scientific discourse is interwoven with the religious discourse of the NRMs studied. However, Urban and Rochford's goals are not to highlight or unpack the RSR in each group; instead, they aim to uncover the social growth of the movements.

5.2 A Critique of Fieldwork

In this section, I turn to a variety of critiques that may be offered of the method of fieldwork, especially as currently employed. Critiques of the use of interviews and surveys are commonplace in the social sciences themselves, and it is widely acknowledged that they are not perfect methods. These kinds of critiques typically take the form of assessing whether particular kinds of questions predispose respondents to answer in particular ways or whether the particular statistical methods used to sort through the data systematically bias the results. Likewise, anthropologists regularly discuss the merits and demerits of ethnography, and of particular styles of ethnography, by pointing to limitations in how the observed phenomena may generalize or be part of larger cultural patterns.

This is all especially the case when it comes to social scientific studies of religion. Schol-

[9] See for instance Thomas 2022.

ars are in general agreement that religion is difficult to operationalize in a way that not only captures scholarly intuitions about what religion is but doesn't bias the respondents' answers/behaviour. This is, in large part, due to the wide variance in forms of religious practice and identity, and underlying ambiguity or artificiality in scholarly conceptions of religion.[10] Studying religion is even more difficult in non-Western and multi-cultural societies featuring large non-Western populations, for the scholarly notion of religion as developed in Western scholarly spheres may not cleanly map on to any particular non-Western practice. Even public-facing studies are often quick to acknowledge the difficulties involved in studying religion. For instance, in a recent report on "Religion Among Asian Americans," the authors include an inset box on "the meaning of 'religion' in East Asia" in which they explain that "in many East Asian languages, there is no single, literal equivalent of the English word 'religion'" (Pew Research Center 2023). The box continues by pointing out that although most East Asian languages do have words which are used to translate "religion," "those words ... refer primarily to *organized* forms of religion... [and] do *not* typically refer to some traditional religious beliefs and practices that are common in these countries." This situation is important for the study because "[t]hese differences might lead Americans of East Asian origin to say they do not identify with any religion or that religion is not very important in their lives, because they do not consider their traditional spiritual practices—or cultural customs that have a spiritual underpinning—to be 'religious' in nature"—while presumably the study's authors *do* consider such practices to fall under the heading of "religion" as understood in the study.

Given the extensive literature critiquing the methods I capture under the heading of fieldwork, I will consider a different set of issues. The first is more philosophical: why think that the correct characterization of the RSR is to be found among scientists or religious folk? In a sense, this is to ask what the method of fieldwork could contribute to an under-

[10]See Finke and Bader 2017 for a wide variety of critiques of social scientific measures of religiosity along with interesting innovations.

standing of the RSR. The second issue concerns the question of whose religion and whose science is being studied. Most public-facing fieldwork studies of the RSR which study scientists study academic scientists embedded in research universities. Yet, as we have seen before, universities employ only a small slice of the total population of scientists, at least in the US. Conclusions about "What Scientists Really Think"—to borrow one of Ecklund's subtitles—then seem on rather unstable grounds. I therefore recommend that the literature study non-elite, non-academic contexts—including industrial and medical spaces—to better understand what "scientists" *really* think.

5.2.1 Perhaps the People Are Wrong

The method of fieldwork proceeds by directly consulting some contemporary target population—typically scientists or religious folk—and taking their views as a description of the RSR. This leaves the method open to the obvious rebuttal: what if the target population is wrong? More facetiously, we might ask why anyone—scholarly or not—should care about the views of the populations studied. Couldn't they just be wrong about the RSR? Especially when the target populations are not experts, it isn't clear why we should think the population should have a good grasp of the truth concerning the RSR.

This objection is parallel to an objection we encountered in Chapter 3. There the focus was on the method of case studies, and the question, inspired by comments from Reeves and Dawes, was whether history was relevant to the RSR. I argued that the employer of the method of case studies could specify how their inductive basis was relevant to present understandings of religion and science, or retreat from offering direct characterizations of the RSR to providing inspiration for ways of being. Employers of the method of fieldwork can employ similar tactics.

Consider what it takes to bring up the objection in the first place. What kinds of assumptions

are being made in asking why we should care about the views of the populations studied since they could be wrong? One of the basic assumptions made here is that the sample population(s) *can* be wrong. That is, the RSR is such that the folks studied could be wrong about how religion and science are related. And this is a point on which proponents of fieldwork could push back.

There are different ways they could do so—not all of them equal. One way to resist the challenge would be to embrace a deflationary account according to which the RSR is nothing but what those studied take it to be. This might be approached in a number of ways. One could argue for a deflationary account of the RSR on the basis of deflationary accounts of religion and of science according to which, again, religion and science are nothing beyond what they are understood to be by the relevant populations. Depending on who those populations happen to be, and whether they appear in the fieldwork, this approach may be more or less convincing. For instance, we might think that scientists' own views of science should be taken as the "correct" account of what science is. We might then think that scientists' views of the RSR should be taken seriously since the scientists at least correctly understand the nature of science. But of course, scientists may well be wrong about religion, and so even if we have a deflationary view, the question still remains: Why think that the scientists are correct about the RSR? A parallel situation could arise for samples of religious experts/elites: Why think they are correct about the RSR when they might be wrong about the nature of science? Perhaps then the only admissible sample population on this view would be those who are both scientists and religious elites—or perhaps philosophers of science and religious studies scholars! This seems, however, less than convincing.

Being deflationary about the RSR, however, doesn't necessitate deflationism about religion and science. One could instead just be deflationary about the relation between religion and science. Perhaps one could think this because they understand questions about the RSR to really be questions about how people *relate* religion and science. That is, if one understands

questions about the RSR as second-order questions—questions about what people think—rather than as first-order questions—questions about religion and science as things-in-the-world—then one could be open to (in fact may be forced to commit to) a deflationary account of the RSR on which there is nothing more to say than what those studied say. I suspect that many who use fieldwork are in fact far more interested in second-order accounts of the RSR. Ecklund, after all, uses the subtitles "What Scientists *Really* Think" (Ecklund 2010) and "What Religious People *Really* Think" (Ecklund and Scheitle 2018). This second-order focus, however, is not always made clear.

A different, less deflationary, response one might have is to argue that questions of the RSR must always be asked relative to a particular context. As a thoroughly social phenomenon, we shouldn't expect there to be a single way in which the RSR looks and which we can characterize independent of some particular population. It is true, one might argue, that the populations studied could be wrong about the RSR in some particular context. But the populations studied are likely very well informed about the RSR in their *own* particular context. And so fieldwork is especially well suited to studying the RSR in various contexts because it is, at least ideally, explicitly sensitive to the limits of the particular sample population investigated.

Finally, a public-facing scholar invested in the method of fieldwork might resist the charge by emphasizing the ultimate purpose of their studies: engagement with issues of public relevance. Both Ecklund and Evans make their public-facing concerns very clear. At the start of *Science vs. Religion*, Ecklund writes, "At its core, [this book is] about the scientists whose voices have been thus far overlooked in the science-and-religion debates and who might have powerful contributions to add to the cause of translating science to a broader public audience, especially a religious audience" (Ecklund 2010, x). Likewise, the very first sentence of *Morals Not Knowledge* reads, "If you are going to disagree with your adversary in a debate in the public sphere, I want you to disagree with them for the right reason" (J. H. Evans

2018, 1). If the goal of the scholar in investigating the RSR is to provide guidelines for intervening on public religion–science encounters, then it seems clear that we should have a grasp on how different publics understand religion, science, and their relationship. In this case, those publics studied can't be "wrong": what we are interested in just is what those publics think. And, in fact, accessing this kind of information is exactly what fieldwork is designed to do.

So the objection that the populations studied by fieldwork methods may be wrong about the RSR, and so are not a good source for understanding the RSR, need not be persuasive. The advocate of fieldwork can acknowledge that some populations may not be representative, but insist that since religion–science relations look different in different contexts, consulting populations in those particular contexts is necessary. On the other hand, they may push back by asserting that since the goal of investigating the RSR is to intervene on public discourse, consulting various publics for their views is exactly what is needed.

5.2.2 Whose Religion? Whose Science?

In this subsection, I return to the question—by now familiar—of whose notions of religion/science are being discussed when characterizing the RSR. This is particularly salient in the case of fieldwork, for the method relies explicitly on the views of the target populations studied and ideally relies solely on those views. Thus, the choice of the target population has immense influence on the characterization of the RSR reached, and exactly who is chosen to be the target population will clearly limit the scope of that characterization. In most cases, however, scholars—both in public-facing and more academic modes—neglect to acknowledge this limitation and speak as if they have identified a general characterization of the RSR, perhaps not to be universalized across the world, but at least universalized across, for instance, the US or UK. This could be warranted if the target populations found in most of

the literature were in fact representative of religious individuals or scientists more broadly. However, as I will argue, this is not the case.

In what follows, I'll first examine an asymmetry between the kinds of religious individuals on the one hand and scientific individuals (or scientists) on the other hand who are often featured in fieldwork studies. I'll then suggest that scholars should take seriously those scientists working outside of academia as well as those working in non-theory-oriented and science-adjacent occupations. By focusing on these other populations of "scientific" individuals, fieldwork can contribute a much richer picture of the RSR as conceived by a more representative portion of, for instance, the US. Finally, I suggest a number of heretofore neglected spaces of potential religion–science interaction which scholars would be well served in investigating.

An Asymmetry

In Ch. 2, I discussed an asymmetry between how religion and science are studied by scholars using the method of conceptual analysis. There, I showed that scholars tend to focus on comparing elite conceptions of science with non-elite/popular conceptions of religion. This kind of asymmetry is also present among fieldwork literature. On the religion side, most work focuses on religious laity rather than religious elites, i.e. those with religious occupations.[11] On the science side, by contrast, the scientific laity—that is, those with general familiarity with the sciences, who might identify as science-minded, but are not scientists themselves—is almost never studied. That said, some general studies do try to get at non-elite views on the science side: the Pew Research Center, for instance, produces work which draws on broader populations (e.g. in the US) irrespective of their careers and backgrounds in either religion or science (see e.g. Pew Research Foundation 2020 and Funk 2015). But in general, the

[11] I use the term "religious elite" instead of the term "clergy" to avoid the largely Christian connotations "clergy" has. Most religious groups have religious elites whom it may be awkward to describe as clergy—for instance, Buddhist monks.

public-facing scholarship (as well as non-public-facing) tends to overfocus on elite scientists and religious laity while neglecting religious elites and scientific laity.

The asymmetry is well illustrated in Ecklund's otherwise-excellent pair of monographs: *Science vs. Religion: What Scientists Really Think* (2010) and *Religion vs. Science: What Religious People Really Think* (2018). In the first study, the sample population is composed of scientists working at "elite research universities."[12] In the second study, the sample populations for interviews are drawn from congregationalists at a variety of religious institutions, while the sample population for a more general survey was drawn from Americans in general (Ecklund and Scheitle 2018, 4). The contrast, then, is rather stark: we have professional scientists compared with religious "amateurs." In this light, the fact that Ecklund's survey in *Religion vs. Science* features "an oversample of adults in science occupations (computer and mathematics; architecture and engineering; life, physical, and social sciences; medical doctors)" (ibid., 53) seems rather odd. Why are those individuals considered "religious people" *rather than* "scientists"? As we'll see below, I'll argue that surveys of those with non-academic science occupations will actually give us a better idea of "what scientists *really* think" than restricting ourselves to elite scientists at R1 institutions.

But is this asymmetry actually problematic? Yes. Science is not just the purview of elite scientists. And religion is not just the purview of the religious laity. In particular, understanding the scientific laity's perspectives of religion may help produce a better understanding of widespread everyday religion–science discourse. Knowing the contours of that everyday discourse better would help scholars know how to intervene to produce the results they wish to see. It would also help the publics scholars wish to reach understand where the general

[12]Ecklund samples the scientists from twenty one universities featured in a 2009 University of Florida "Top American Research Universities" report. This consisted of the following: Columbia University; Cornell University; Duke University; Harvard University; Johns Hopkins University; Massachusetts Institute of Technology; Princeton University; Stanford University; University of Pennsylvania; University of California at Berkeley; University of California, Los Angeles; University of Chicago; University of Illinois, Urbana Champaign; University of Michigan, Ann Arbor; University of Minnesota, Twin Cities; University of North Carolina, Chapel Hill; University of Washington, Seattle; University of Wisconsin, Madison; University of Southern California; Washington University; and Yale University (Ecklund 2010, 157–158).

zeitgeist lies—if, for instance, scientific-minded but non-religious folk in general don't see a conflict between religion and science, then this may be comforting for science-hesitant religious folk and may even help them develop a more ecumenical view of science.

There are reasons, of course, for the asymmetry between what religious and scientific populations are studied. Work focused on religious elites often tends toward the study of theology, and so is perhaps better suited to the historical or philosophical methods rather than fieldwork. On the other hand, we might expect elite scientists to pose the "hardest" cases (if we assume, as Ecklund does, an expectation to find hostility between academic science and religion), and so they receive the most attention. Ecklund is also trying to engage with a large religious public which sees scientific academia as a bastion of secular anti-religiosity (Ecklund 2010, 10).

But if we think scientific elites form a "hard case" worth studying, why not think the same for religious elites? Indeed, popular reporting seems to make a big deal of high-profile preachers, imams, rabbis, etc. who are opposed to various aspects of modern scientific thought. Why not study these religious elites as a body in the way that we study the views of elite scientists?[13] The reasons for the asymmetry in how religious and scientific populations are studied thus seem easily defeasible.

The "Scientists" and Further Spaces of Encounter

Who exactly are the "scientists" in fieldwork studies? Unsurprisingly, as in other parts of the religion-and-science literature, these scientists are almost always academic scientists engaged in research-oriented endeavours. As discussed in the other chapters of this dissertation, as

[13]One complication with studies of religious producers comes from the fact that the producer–lay distinction is not present in all religions. While perhaps most traditions *do* have a hierarchical structure which makes a rather clear distinction between religious producers and the laity (think of most forms of Buddhism, Hinduism, and the Abrahamic religions), not all do. For instance, the Society of Friends arguably doesn't have a clear lay–elite distinction as all members are expected and considered to contribute equally to the production of the same set (or equally valued sets) of religious goods and services.

of May 2023, only about 24% of those with "science occupations" in the US are employed in research-oriented sectors. Of that 24%, only 8.6% are employed at "Colleges, Universities, and Professional Schools" (Bureau of Labor Statistics 2023). The issue these statistics present is especially sharp for fieldwork studies which wish to characterize the views of scientists in general. If the target population is scientists in general, then making use of a sample population drawn from a non-representative group—i.e. academic scientists—is clearly problematic. The picture of "what scientists really think" drawn from such a small sample can only present a very small part of the total picture—and potentially a very distorted one at that.

I propose, then, that scholars employing fieldwork turn from academia to a number of much broader, more representative worlds of scientific employment. In what follows, I detail a number of spaces which should receive more attention. Although I focus on the scientific individuals found in these spaces, scholars would be well–served studying the non-scientists in many of these spaces as well.

Industrial Spaces: The industrial sciences are understudied in academic studies of science, and this is no exception among the social studies of science in general. This is surprising because arguably it is the industrial sciences which have the most direct connections with other aspects of society which are of interest to social scientists. Obviously, religion and science do not encounter one another in a vacuum, and no one's view of the RSR is constructed independent of the varied contexts in which they encounter religion and science. Unpacking religion–science interactions in industrial spaces can, then, unveil the complex ways in which religion and science are intertwined along with other controlling, often economic, influences.

By the "industrial sciences" here, I mean a range of contexts including chemical manufacturing plants, microchip factories, biotech firms, and oil refineries. In some of these cases, religion and science might come directly into contact—one can imagine questions about fos-

sil fuels having interesting implications for various forms of creationism. In other cases, the connections might be less direct—say how the religious commitments of geneticists at "ancestry" testing companies shape how they understand their work.

There are a wide range of questions and topics one could investigate in these spaces. How do scientists in different kinds of industrial science spaces conceive of science? Do, say, physicists designing computer chips think of science in the same way as does a biotech in a medical devices firm? One might imagine that in certain industries whose content is far removed from religious doctrines—say cosmetics—religious scientists might comfortably think of science in propositional terms. On the other hand, in industries with a more clear connection to religious doctrines—say commercial genome sequencing labs—religious scientists may conceive of science more as a set of values. How do these different understandings of science—if there are differences—impact the way the scientists view the RSR?

Perhaps surprisingly, there are also specifically religious industrial scientific labs—for instance Scantibodies Laboratory, Inc., based in Santee, California. Created in 1976 by Tom Cantor, a Jew turned young earth creationist Evangelical Christian, Scantibodies Laboratory, Inc. manufactures antibodies, blockers, controls, and plasmas/serums for commercial enterprises. The company logo (see Figure 5.1), found at the top of each of their webpages, reads, "Harnessing God's Elegant Antibody Creation," and their About page plainly states that the proceeds of the company are used to support the Creation and Earth History Museum (discussed below), a radio program called "Friendship with God," and "Jewish People."[14] These are the official views of the company, but we might wonder how the scientists employed there understand their own work and its relation to religion: do all the chemists believe they are working with "God's Elegant Creation"?

[14]An explainer provides the following details: "When Tom was 19, he had a life changing experience by discovering the great happiness and joy the Bible can bring. Because of that experience, he offers hope and security by reaching out to Jewish people. He is driven to help people find that very same peace and security by creating a gift that includes a one hour DVD of his story, that he seeks to give free of charge" (`https://scantibodies.com/about/`, accessed 23 April 2024).

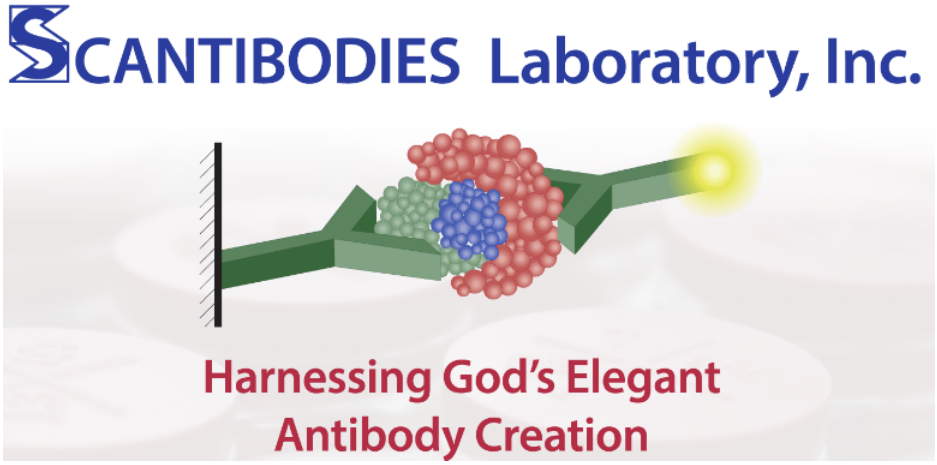

Figure 5.1: The logo of Scantibodies Laboratory, Inc., as found on their homepage, accessed 23 April 2024.

It is not clear how widespread these religious industrial scientific labs are; further research needs to be done on the population of these types if institutions. Perhaps Scantibodies Laboratory, Inc. is a pariah. If, however, these religiously grounded scientific spaces are not just needles in a haystack, then work investigating them would provide a fuller picture of how non-elite scientists understand the RSR.

On the flip side, some fieldwork research has already been done on secular industrial scientific spaces. For instance, Aiwha Ong has studied the confluence of religious and technological influences in the operations of Japanese microchip factories in Malaysia. Her ethnographic work, published in *Spirits of Resistance and Capitalist Discipline* (originally published 1987), showed how the Muslim identities of the factories' many female workers shaped the workplace environment, and how local spiritual traditions structured how local populations understood worker conflict and constrained how the factory operators could discipline their workers (Ong 2010). Ong's study demonstrates how religion and science are often deeply implicated in other power dynamics—like gendered and international economic relations. Ong's audience, however, is other academics—*Spirits* is at times highly technical. However, public-facing work can learn much from the complexity of her analysis and would do well to take her lead in analyzing less-academic spaces.

Medical Spaces: Medical spaces receive little attention in the religion-and-science literature. Yet, one might think that hospitals are sites of great encounter between religion and science, for healing is often a concern of both religious and scientific practice. Further, many medical institutions are owned by explicitly religious institutions. It is even more surprising that the fieldwork literature in particular does not investigate medical spaces as contexts of religion–science interaction given that such spaces are widely investigated by social scientists outside the discipline of religion-and-science (see e.g. Mol 2003).

It is true that John Evans' work often engages with questions related to the medical. But he tends to focus on patients rather than providers, and often considers patients' ideas about various medical interventions in the abstract, when they are already removed from the medical space (J. H. Evans 2018, 145–158).[15] Studying the views of medical practitioners as well as interactions between practitioners and patients could unveil interesting and important dimensions of the RSR.

The importance of understanding the intersection of religion and science in medical spaces, and the ways in which practitioners approach this subject with patients, is already recognized by medical professionals. Most recently, the importance of religious factors to medical treatment was seen during the COVID-19 pandemic, when vocal sectors of Western societies petitioned for specifically religious exemption from COVID vaccinations. Prior to COVID-19, vaccine hesitancy was also prevalent among particular religious communities, for instance among Seventh-day Adventists before 2015 (General Conference of Seventh-day Adventists 2015) and also among New Age spiritual groups in the "industrialized North" (especially Australia; Goldenberg 2021, 59–65). How have these kinds of encounters shaped how medical professionals approach the relation between their work and religion both in their interactions with patients and in their own private lives?

Beyond vaccines, however, it is clear that at least some practitioners are interested in un-

[15] See also J. H. Evans 2002; J. H. Evans 2010; J. H. Evans 2020.

derstanding how patients' religious views may or ought to shape other kinds of treatments their doctors recommend. For instance, there is already a body of literature focused on how patients' religious beliefs may constrain the kinds of implants they agree to (see e.g. Easterbrook and Maddern 2008, Jenkins et al. 2010, Eriksson, Burcharth, and Rosenberg 2013, and D. Goyal, A. Goyal, and Brittberg 2013). This is an important topic especially in the context of patient consent: in the ideal, patients are fully informed about the implications of their treatment(s) in order to provide true consent. Goyal et al.'s study of knee implants is representative. Since some knee implants feature components derived from animal products, especially from pigs, and since some religions specifically prohibit the consumption of pigs (e.g. Islam and Judaism), Goyal et al. ask how doctors should approach discussions of these implants. Their study proceeds by surveying elite literature (e.g. sacred texts) and interviewing "religious scholars"—like rabbis and imams—for details concerning what kinds of animal products members of their religions are permitted to use and consume. On the basis of these elite views, Goyal et al. then make recommendations to practitioners for what kinds of implants they should recommend to their patients of various faith backgrounds.

This is important, for it shows how some medical practioners understand the stakes of medical treatment: It is not just a matter of making their patients' bodies "work" again. Patients' bodies are not just objects of study and repair, as they may be treated from a "purely scientific" lense. They are also *religious* bodies, and it is an important principle of modern health care that patients' rights to religious understandings of their bodies be respected, and part of that discourse plays out in the context of informed consent.

Studies like Goyal et al.'s, however, can be read in another way for another methodological recommendation. Goyal et al. are, in a sense, studying the RSR through fieldwork methods: they interview their "religious scholars" and take the views of these elites as authoritative descriptions of how particular religions relate with particular sciences. As I've suggested above, religious elites are often neglected in the fieldwork literature, and so Goyal et al.'s

contribution is welcome.

However, the kind of information gleaned from texts and elite interviewees is limited in its use. It is certainly useful in informing us how adherents to particular faith groups might ideally act: religious elites establish ideal norms. But these studies do not tell us about how the adherents actually navigate the interactions and choices: Are patients willing to forgo particular kinds of implants, possibly incurring significant economic debt, in order to respect their religious ideals? Are patients likely to take on risky procedures even if they violate their ideal religious commitments? Studying how patients themselves make their decisions can shed significant light on how religion and science are understood and related by medical patients. But this does not mean we should neglect the elites. Finding contrasts between how patients and religious/scientific elites navigate the intersection of healing, religion, and science could help everyone: the elites could shape their recommendations accordingly, while patients might alter their priors. Understanding how coreligionists in similar medical situations made their decisions could also help non-elites make their own decisions.

In the above, I have mainly had in mind medical spaces practicing Western medicine. These are by far the most common kinds of medical spaces in the West, but recent decades have seen a growing number of alternative/integrative medical spaces, i.e. those which feature such practices as homeopathy and acupuncture.[16] And in Asia, Western medical practices exist alongside, sometimes even in the same space as, non-Western medicine. For example, in South Korea, the same individuals regularly visit both Western and Asian medical facilities for treatment of the same conditions.

What Western alternative medicine and Asian medicine have in common is an association

[16]Chiropractic is another form of Western alternative medicine which may prove a fruitful area of investigation given its origins in faith and magical healing (hence the term 'chiropractic,' literally "healing with hands"). How do chiropractors view their work and its relation to religion? What about their patients?

with non-institutionalized spirituality which, especially in the case of Asian medicine, is sometimes understood as religious.[17] Scholars thus might investigate how practitioners of these healing forms understand the relationship between their work and religion, or how they view the relation between medical science in general and religion. Mei Zhan has recently studied the ways in which Traditional Chinese Medicine (TCM) practitioners blend their "traditional" methods with modern technology. By embedding herself among practitioners in Shanghai and San Francisco, Zhan unpacks their "worlding" process, by which they seamlessly integrate spiritually based healing practices with technologies developed based on principles anathema to the ontologies undergirding those same practices (Zhan 2009). More work, particularly public-facing work, could be done on this front.

Museums: Museums are an under-explored space of religion–science interaction. In particular, here I focus on science and natural history museums, and also include under this heading similar spaces like zoos and aquariums. The curators of these kinds of museums play a significant role in how the public encounters science, perhaps especially among younger audiences. How do the expert scientists at these institutions approach the presentation of their exhibits? Does religion enter the picture? How and in what ways? For instance, how do public discourses surrounding evolution shape the presentation of pre-Pleistocene natural history? Working directly at the intersection between institutional science and public education, scientists in museum spaces can provide much insight into how issues of public concern—like religion—shape the image(s) of science presented to the public.

Museums also make use of scientific experts even when they are not employed directly. For instance, an interactive children's science museum may purchase third-party software and programs for their exhibits. The scientists behind these programs may thus shape how religion and science are encountered in the museum space.

[17] Several historical facts contribute to this religionization of Asian medicine in the West, including Orientalist perceptions of "Eastern Wisdom" which originated in nineteenth-century exchanges with China (and India) and which persist today. See e.g. Barnes 2007 and Venit-Shelton 2020.

Furthermore, museums present an interesting space for investigation because they often employ a large number of individuals who are somewhere between scientific experts and non-experts. Many of the day-to-day employees with whom a patron may interact, for instance, are not trained scientists. Instead, they have simply been trained to work in the museum space either as paid employees or as volunteers. Of course, their training may have featured some amount of scientific background (e.g. learning about the habitats, diets, and mating behaviours of the animals on exhibit), but in most cases a degree or research experience in the relevant science is not required or expected of museum workers. Yet, I expect that visitors to a museum will often perceive the museum staff as scientific experts of a kind—or the staff are at least taken to be *representatives* of science. It would thus be very interesting to study this liminal population—not quite scientists, not quite scientific laity. How do they understand the RSR? Do their religious beliefs—if any—shape how they understand their work at the museum? Does it shape how they interact with patrons and present their scientific information?[18]

Finally, beyond the scientific experts, more fieldwork could be done examining museum patrons themselves. How do visitors to science museums understand the RSR? Do they even see religion and science interacting at all in the museum space?

In the above, I have assumed that the museums were more-or-less secular spaces. However, there are also religiously affiliated science museums. These are museums owned and operated by members of particular faiths. Often, they are sponsored by particular institutions and backed by religious elites. There is a wide range in how much religion and how much science is present in these museums.

[18]These same kinds of questions could also be asked of employees of national park services, where park rangers may often encounter visitors whose religious background prime them to characterize the park space in a very different way from how the rangers are trained to present them. For instance, rangers at the Grand Canyon may come into contact with Christian young-earth creationist tourist groups coming from around the world. Likewise, curators of sites like Stonehenge may interact with neo-pagans who view the site as sacred (Blain and Wallis 2007, Ch. 3).

For instance, in Southern California, one can find the Creation and Earth History Museum in Santee, just outside of San Diego. The museum is currently owned by the Life & Light Foundation Ministries, a nonprofit created by Tom and Cheryl Cantor, although it was founded by the Institute for Creation Research—a major player in global creation science discourses. The museum itself occupies a lot owned by the biotech company Scantibodies Laboratory, Inc. (owned by the Cantors themselves), the profits of which partly support the museum (`https://scantibodies.com/about/`, accessed 23 April 2024).[19] The exhibits present a walk-through of earth's history from a literal Christian biblical perspective, starting with God's creation of light, through the creation of the second law of thermodynamics via Adam's fall, to dinosaurs on Noah's ark, to the construction of the pyramids, to the modern era with the use of Darwinian evolutionary theory to support the Nazis' Final Solution. In the last ten years, new wings have been added to hold a life-sized Tabernacle model and an extensive exhibit on human anatomy.[20] At the Creation and Earth History Museum, both the science and the religion are quite clearly present and, in Barbour's parlance, thoroughly integrated.

Alternatively, some 100 miles up the coast in West Los Angeles, one can find the Bhagavad Gita Museum. Attached to a temple on the right and a vegetarian restaurant on the left, one enters the museum by walking through an alleyway whose walls are lined with colourful posters telling the story of A.C. Bhaktivedanta Swami Prabhupada (1896–1977), the founder of the International Society for Kṛṣṇa Consciousness (ISKCON). On the left are biographical details—Prabhupada's arrival in New York in 1965 with $7 in his pocket and hundreds of copies of his translation of the Bhagavad Gita, the formal creation of ISKCON in 1966, and his fateful move to Haight-Ashbury in 1967. On the right are details about the worldview of the Hare Kṛṣṇas; here the language is especially instructive: several posters mention the "science of Krishna consciousness." Inside the museum, one walks through a dark hallway on

[19]See above for more details on Scantibodies Laboratory, Inc.

[20]One can take a digital tour of the museum on their website. The descriptions I give here are from visits made in 2018 and 2019.

either side of which are glass-encased dioramas (featuring handmade and often quite realistic figures) depicting scenes from the Bhagavad Gita and more "everyday" human interactions. These dioramas light up as one progresses through the museum and a recording narrates how the scenes relate to the moral and metaphysical nature of the world—for instance the origins of the universe and the fundamental status of the soul.[21] The relation with science is made quite explicit: modern Western science fails to capture the true nature of reality—that can only be accessed via the "spiritual science" of Hare Kṛṣṇa.[22]

At both of these museums, we might ask the same questions we would ask at secular museums: how do the scientific advisors of the museums (perhaps serving on the education team) conceive the RSR? How do the museum's public-facing staff, those tasked with interfacing between the material and the patrons, understand the RSR? And how do the patrons understand religion, science, and their interaction in the museum space?

To this point, although the museum studies literature is alive and well, little work has been done specifically on the intersection between such spaces—whether secular or religiously affiliated—and religion and science. One significant exception is Kathleen Oberlin's recent monograph on the Creation Museum in Petersburg, Kentucky. This museum, built in 2007, is owned and operated by the hugely influential Christian Fundamentalist group Answers in Genesis (AiG), which itself is run by Ken Ham, a prominent global voice in creation science. Why study a museum, let alone a religiously affiliated one? Oberlin explains:

> The case of the Creation Museum provides an opportunity to examine an attempt by a social movement not only to foster social change but also to investigate the places where that social change occurs, and how the locations they create matter. I explore how the Creation Museum is an unexpected social movement site, but

[21] The descriptions I give here are based on a visit made in 2022.

[22] Incidentally, this description fits quite well with Zeller's characterization, based on the group's theological work, of the Hare Kṛṣṇas' approach to science as one of "replacement"—they believe that their religion should be read as a science to replace mainstream science (Zeller 2010, esp. Part II).

> one that becomes understandable if we analyze how creationists used it to physically ground their claims, better positioning them to secure cultural authority over time. My focus is on AiG and the Creation Museum because they reflect an attempt to target a public mouthpiece of the scientific establishment: the natural history museum, one of science's premier long-standing cultural institutions... linking scientific practices to religious and sociocultural political claims based on the literal interpretation of the Bible, AiG attempts to inculcate creation science to families and communities that feel as though they had been forced unnecessarily to reject mainstream science due to its secularity. Sites such as the Creation Museum seek to solidify supporters' commitments while reaching a leery yet primed broader audience who feel their perspectives are often marginalized. By empirically unpacking AiG's efforts, we gain insight into why some religious members of the public feel sidelined in society and how a group like AiG may offer alternative solutions that resonate with the disenchanted members of the public even if they do not fully support that group. (Oberlin 2020, 4)

Comparative studies with secular museums could also prove fruitful for better understanding the contemporary dynamics of RSR discourse.

5.3 For Whom Is Fieldwork Useful?

Studies of the RSR via fieldwork methods have the potential to be useful to a wide range of public audiences. In what follows, I briefly outline several groups I think would find fieldwork especially useful and why.

In general, who would find fieldwork studies useful? A wide range of readers with a relatively wide range of interests in the RSR. Religious folk who care about how they will be treated

in scientific workspaces—perhaps especially students. But also educators who are interested in increasing STEM participation: understanding how publics perceive science, and how religious groups in particular perceive science, is of clear import, especially in a nation like the US where the majority of citizens identify as part of a religious group and even think of religion as important in their lives (Gallup 2023). Unpacking those understandings and the reasons behind them can help with STEM messaging. It can also help folks be more realistic/well informed; a talking point in STEM-positive political discourse is that religious conservatives are anti-science. Is this the case? It doesn't actually seem like it. Instead, as Evans' work has tried to show, they are against particular kinds of science, or particular claims which they feel challenge the dignity of human life. If we take that seriously, this can change how we talk about science and lead us to not isolate a large swathe of the American public from inclusion in what is taken by many, especially by many intellectuals, to be our highest epistemic good. In an era of high political polarization, in which religion and science are politicized and pitted against each other, a clear understanding of how sectors of the public really understand religion, science, and their relation could not be more important.

Apologists: As with all other methods, apologists may find fieldwork useful in defending their particular religious (or non-religious) tradition. Apologists would surely be interested if studies of scientists can show that a majority see no tension between science and the apologist's religion. Likewise, studies of adherents to their particular religions may also be relevant, as such studies may show the apologist where their coreligionists might "fail" (according to the apologist), and therefore what kinds of arguments are needed. For instance, an apologist who believes their religion to be compatible with science may be helped by knowing that a significant portion of their coreligionists do not think the same—and may be especially helped by knowing other demographic features of that population (e.g. whether they are best reached through the pulpit or radio or social media).

Of course, fieldwork-derived results can also be useful for apologists in a more offensive

mode: showing that an opponent's religious elites take issue with core claims in science may be a way to delegitimize the opponent. And conversely, showing that one's own religion has comparatively high representation among practicing scientists could lend credibility to one's own tradition.

This said, how fieldwork data is interpreted and used will depend on broader valuations of science. In much of contemporary American culture, science is accepted as an overall positive thing: it is typically good to be associated or compatible with science. But in some circles, this may not be the case: perhaps science is overly associated with materialistic and immoral norms. This could be the case among certain non-Western populations where the cultural conception of science, or particular sciences, may be tinged with a negative—sometimes colonial—past. In these cases, fieldwork showing non-affiliation between one's religion and science could instead be understood as a boon for one's religion.

Science Policymakers: Policymakers have much to gain from fieldwork studies of the RSR, for fieldwork involves the most direct study of a policymaker's constituents. For those wishing to push forward science-related policy, understanding how particular publics conceive of the RSR will clearly be important. For instance, suppose a lawmaker would like to pass legislation to provide additional funding for stem cell research. Understanding what, say, local Muslim communities think is at stake in doing such research can help inform the kind of messaging used and also guide how conversations with local elites play out. Fieldwork might uncover, say, that local opposition to stem cell research is motivated by misconceptions about how that research is done—perhaps by harvesting embryos from unwilling patients. In that case, messaging focused on resolving those misconceptions may be the most effective means to garner support. On the other hand, fieldwork might instead show that moral concern about stem cell research has to do with the implications of such work rather than with the process by which it's done. In that case, messaging focused on sharing facts will likely be less effective; instead, highlighting Muslim scientists involved in the research (if there are

any) may prove more useful.

As said before, in a time when science and religion are themselves highly politicized (at least in the US), having a firm grasp on just how populations understand the RSR is surely especially valuable for policymakers. Finding common ground with constituents of various religious and scientific backgrounds, and understanding where opposition and support comes from are clearly desirable for those who wish to enact political change around science—or, for that matter, religion.

Religious Students/Aspiring Scientists: While not all aspiring scientists are students, many of them are. Regardless, religious individuals who are contemplating entering a scientific field may wonder how members of their religious backgrounds may be treated in the scientific community. Will I be accepted in the workplace? Will I be mistreated because of my religious beliefs or practices? Scholars in the religion-and-science literature often note that undergraduate students have these kinds of concerns (see e.g. Ecklund and Scheitle 2018, 2).

For these students, fieldwork on graduate student experiences could be invaluable. A legitimate concern a possible graduate student may have, for instance, is whether their advisor(s) will allow them to observe religious holidays which might forbid working on experiments at particular times: for instance, an Orthodox Jew may have a religious obligation not to work or use laboratory equipment on Saturdays. Negative stories about experiences in graduate school are not uncommon (see e.g. Ecklund, Mehta, and Bolger 2019, 46–49). But these negative experiences may also be amplified simply because they are negative, and positive experiences tend not to be reported as often. More studies on the frequency and contexts of these negative encounters would be incredibly helpful to aspiring academic scientists, whether they are thinking about applying for graduate school or are already enrolled in a program.

However, not all students who go on to become scientists, or work in scientific spaces, go through graduate school; others simply go directly into industrial or other spaces. Such individuals will have the same kinds of questions: will I be accepted in the workplace? Will I be mistreated because of my religious beliefs or practices? These concerns can range from social misgivings concerning how colleagues may talk about particular religious beliefs to more structural worries concerning how a workplace's rules may exclude particular rituals. For instance, a devout Muslim may wonder if their obligation to pray five times per day will generate tension in the workplace and/or conflict with workplace regulations. Of course, workplaces may be required by law (in some countries) to respect these kinds of religious rites. However, there is a clear difference between required accommodation and respectful acceptance, and potential workers may be interested in how these tensions are dealt with generally in particular industries as well as how they are navigated by particular coreligionists.

5.4 Conclusion

In this chapter, I have examined the method of fieldwork as used to characterize the RSR. Broadly construed, the method of fieldwork extracts the characterization of the RSR from empirical studies of a contemporary target population, often scientists or religious folk. The particular way in which these groups are studied can vary: the main forms in the literature are surveys, interviews, and ethnographies. Although much of the literature using fieldwork is scholar-oriented, some authors—like Elaine Howard Ecklund and John Evans—do produce public-facing work presenting their empirical studies.

I discussed two issues, or possible critiques, facing this public-facing use of fieldwork. First, I examined an objection which challenged the relevancy of consulting scientists or religious folk about the RSR: why expect these groups to have special insight into the way religion

and science are related? I argued that the employer of fieldwork could respond by offering deflationary accounts of religion, science, and/or the RSR according to which they are nothing more than what those populations studied make of them. However, if this kind of deflationary approach is unpalatable, I suggested that the public-facing employer of fieldwork could instead argue that the whole point of public-facing accounts of the RSR is to engage with real-world contexts where how the populations studied understand religion, science, and their relationship is of central importance—and thus fieldwork methods are in fact eminently relevant to this kind of public-facing work.

The second issue I discussed centered around what populations extant fieldwork literature has studied. In most cases, the literature has focused upon elite scientists embedded in R1 research institutions and lay religious folk. I argued that there were no in-principle reasons for this focus and that in fact the literature would be better served by expanding beyond these populations—to include both non-elite scientists and religious experts. On the science side in particular, I recommended several spaces whose scientific experts should receive more attention from fieldwork scholars: industrial science, medical science, and (science) museums. Attending to scientists working in these other contexts and their views on the RSR will produce a more complete picture of how what "scientists really think" about religion—and perhaps also what "religious people really think" about science.

This chapter concluded with a brief discussion of what kinds of public audiences may find fieldwork studies especially relevant. In particular, I suggested that those concerned with the social aspects of the RSR and how they may fit into the social world structured (at least in part) by public conceptions of the RSR would find fieldwork studies eminently relevant. Examples of these groups are religious undergraduates interested in becoming professional scientists, and science policymakers who want to push particular kinds of science legislation among publics who may be hostile to particular forms of scientific activity.

Chapter 6

Conclusion

As she searches the shelves, our undergrad pauses for a moment. "Just what am I looking for here? What do I want to learn from these books?"

When we met her in the introduction, our biologist-to-be was worried: could she be religious—perhaps *devoutly* religious—and a biologist? Perhaps she had heard of some kind of general conflict between religion and science, or maybe of some particular tension between her religion and biology. But what exactly is she worried about?

Understanding what in particular worries our undergraduate is the first step in helping her understand what books there in the library will be helpful. Perhaps she is worried about workplace discrimination: will her colleagues make fun of her? Will her PI support her? Or maybe her worry is more theoretical—how can she respond to skeptical friends or think through claims she sees on social media? Or maybe she wants to know how she can convince her parents to let her major in biology. Perhaps it's some combination of all these concerns. Or perhaps she isn't even quite sure from where exactly her worry stems.

But she is there in the library all the same, and there are hundreds, perhaps thousands, of

books on the bookshelves. And she only has so much time. So where should she start? Some of those books will be relevant to her concerns—or so she hopes. But not all of them will be—or at least some will be less relevant than others.

Of course, our undergraduate is not the only person who might visit the shelves. In the Introduction we met future versions of our undergrad—as a graduate student and as a distinguished biologist—and others she encountered—a professor on a graduate school admissions committee, a potential employer. And throughout this dissertation we have encountered other members of the public who may also be interested in the books on the shelves, from school board members to apologists to policymakers. Each group, each person, has their own interests in visiting the library, in seeing what scholars have to say about the RSR. Where should they begin?

In this dissertation, I have suggested that answers to that question will depend on who exactly is standing before the shelves. It will depend on the practical reasons why the reader is seeking guidance. And this dissertation has tried to provide a framework and guide to help those readers determine where to start in exploring the vast religion-and-science literature.

Of course, public consumers of the literature were not the only, in fact, not even the primary, readers I had in mind. This is a dissertation after all. What, then, do I hope scholars to have gained in reading this work? There are three main takeaways. And although the dissertation has centered the aims and work of public-facing scholars, these lessons are equally relevant for scholars without such public aims.

The first takeaway is that it is useful to reflect on the methods used in religion-and-science. In Chapter 1, I developed a typology of the religion-and-science literature based on the methods used by scholars to characterize the RSR. This kind of methods-oriented typology has not been explored before in the literature, where one only finds conclusion-oriented typologies.

But focusing on methods rather than conclusions can be deeply informative. By calling attention directly to the arguments used to support particular conclusions—whatever they may be—we can focus on the quality of those arguments rather than on whether we prima facie agree or disagree with the conclusion. Doing so can better enable contributors to the literature to effectively engage with one another, rather than simply talk past each other by proposing alternative conclusions. Further, thinking through a methods-oriented lens can help scholars better understand how their own work fits into the broader literature.

Although there may be other methods in the literature, or other ways of typologizing the methodologies at work in attempts to characterize the RSR, I have focused on four methods which I understand to dominate the literature: conceptual analysis, case studies, deconstruction, and fieldwork. After laying out the typology in Chapter 1, each subsequent chapter analyzed one of the four methods, offering critiques of the methods as found in contemporary twenty-first century public-facing scholarship, and proposing ways in which their application could be improved.

The analysis found in Chapters 2-5 encompasses the second major takeaway: that scholars will have a sense of the issues each method faces and how they might be avoided and the methods improved. The methods are quite different from each other. They thus face rather different kinds of objections. The method of conceptual analysis, for instance, often slips into essentializing religion and science beyond proper warrant. The method of case studies, however, does not run into this issue—but many scholars using this historical method fall into a parallel danger of fallacious synecdoche, taking a part of religion or science for the whole.

Each chapter has considered issues that have already surfaced in the literature as well as novel ones. Ultimately, each method can overcome the challenges it faces. And no single method emerges as dominant, better than all other methods in all circumstances. Instead, I have tried to illustrate how the different methods may be more or less relevant to different

readers based on those readers' interests in the RSR.

The third takeaway comes from a critique I offered of each method. Scholars, I have argued, have failed to adequately address the questions, "Whose religion?" and "Whose science?" I have focused especially on the latter question and, in particular, have argued that instances of each method have largely neglected lay perspectives of science. This is especially strange given that the scholarship examined in this dissertation is public-facing—why would it not take seriously the publics' views on science?

But even for non-public-facing scholars, it is important to pay attention to the notion(s) of science being employed when building an argument about the RSR. Scholars across the board, I have argued, have ignored what I have called non-theory-oriented science (NTOS). NTOS includes such disciplines as cosmetic chemistry, electrical engineering, food science, and medicine. These sciences tend to focus on production, on testing the efficacy of particular systems, and on practical application, rather than on testing or developing theories about how the world works. Further, these are the kinds of sciences practiced by the vast majority of working scientists. When scholars wish to make grand claims about religion and science, and they ignore the NTOSs, then they are very likely to fall short, for they consider only a small minority of actual science.

Finally, returning to the lay-vs-elite issue, I have suggested that scholars across the board consider non-manuscript, non-elite sources. These include works written by lay members of particular religious traditions, notebooks from non-elite scientists, movies, blogs, TikTok posts, fliers, newspaper columns, and campus sermons. Such media are perhaps the most widely consumed sources of religion–science interaction, and thus are excellent sites for understanding public conceptions of religion and of science. Yet scholarship has, for the most part, neglected these other forms of media. In unpacking the questions, "Whose religion?" and "Whose science?", I have thus argued that scholars would be well served turning their attention to these non-book sources.

This dissertation joins a small, but growing, literature of what one might call the philosophy of religion-and-science. Rather than offering first-order contributions on the nature of religion and science, the state of the RSR, theological views of scientific theories, scientifically-informed theologies, or other such things, philosophy of religion-and-science offers assessments of those contributions. That is, just as the philosophy of science looks to the scope and limits of the sciences, in general or in particular, the philosophy of religion-and-science deals with the bounds and nature of religion-and-science.

Work which we might clarify as"philosophy of religion-and-science" is not new per se. However, it has not, to my knowledge, been identified or pursued as a discipline in itself. Instead, work discussing the limits of theorizing about and within religion-and-science often appears in the introductions of larger works, or as brief asides. J. H. Brooke and G. N. Cantor 2000's chapter on the use of the historical approach, for instance, can be understood as a piece of philosophy of religion-and-science. There are, however a handful of more extended studies in this vein. Reeves' *Against Methods in Science and Religion* (2019) is a good example. I should clarify that although his project and mine sound similar, they are quite different. Reeves' argument is that scholars of religion and science should stop thinking of religion and science in terms of methodology: developments in philosophy of science, he argues, have demonstrated the futility of reducing science to a particular scientific method. My focus on methodology, however, is different: I have been concerned not with what scholars say about methods but rather with scholars' own methods. That is, while Reeves is concerned with methods as they appear in scholars' theories of religion-and-science, I have focused on the scholars' methodology.

Much future work is to be done in the philosophy of religion-and-science. Given the great size of the literature and the grand scope of many of its contributions, it is high time that more extensive studies of the discipline itself be undertaken.

My own particular project has been quite limited and scope in thus can be expanded in a number of ways. For instance, I have only looked at that part of the religion-and-science literature which tries to characterize the RSR. But not all scholars in the discipline aim to do such a thing, either in the grand terms of Religion and Science writ-large, or even on the smaller terms of specific religions and specific sciences. There is other scholarship which considers how the sciences might inform particular theologies, or how particular theologies might inform the sciences. There is literature applying the sciences to the study of religion—cognitive science of religion and anthropology of religion. And there is also a massive amount of literature produced by natural scientists, theologians, and non-academics with which I have not engaged almost at all. Beyond all this, there is also the glaring omission in this dissertation of non-manuscript sources. There is an immense amount of religion-and-science literature to be analyzed in the form of movies, blog posts, newspaper articles, Tweets, advertisements, YouTube videos, and a wide array of other media.

I expect that my own typology of methods can be applied with similar fruits to these other literatures—but that is something that is further work must show. It would be interesting if natural scientists employed different kinds of methods, or if non-academics did. Likewise, it would be interesting to explore whether certain of the methods in my fourfold typology are preferred by members of particular disciplines. While it is expected that philosophers will likely use conceptual analysis, historians case studies or deconstruction, and social scientists fieldwork, what of natural scientists? Is there a difference in method preference between biologists and physicists? Likewise, do certain media formats lend themselves better or worse to particular methods? And are these other literatures more or less likely to discuss the non-theory-oriented sciences?

Further, while I have advocated that scholars expand their notion of science to include the non-theory-oriented sciences, I have not discussed a similar expansion of the notion of religion. This is not because scholars conceive of religion in as expansive a manner as they

might. As I have argued, scholars need to pay more attention to religion from the perspective of lay practitioners rather than from elite perspectives—just as they should pay attention to both normal-achieving scientists and scientifically-educated publics. But scholars should also pay attention to new religious movements (NRMs). NRMs, in virtue of being *new*, emerge in a context that all but demands that they address science. The deep interaction between NRMs and science can be seen in the history and sometimes even name of many NRMs: think of the Latter Day Saints and Egyptology, Scientology and psychoanalysis, the Unification Church (which aims to unify science and religion), or Happy Science (Kōfuku no kagaku). Scholars in the mainstream of religion-and-science almost never discuss NRMs, although there has been some work in this area in religious studies (e.g. Zeller 2010). Yet, NRMs may shed significant light not only on how religion and science *can* relate in the modern world but also on how contemporary publics conceive of their relation. Stefano Bigliardi has made a start in the direction of incorporating NRMs into traditional analyses of the RSR (Bigliardi 2023), but much more work is needed.[1]

In the future, I may return to these topics and explore what else a methods-focused lens may reveal about this vast literature on religion-and-science. But I have had only so much time and space. For now, I simply hope that this dissertation can be a starting point for further work on methods in religion-and-science.

[1]Bigliardi and I have argued for the virtues of studying NRMs and science in Bigliardi and Chin 2024.

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Appendix A

The Exemplars

In this Appendix, I list the works treated as exemplars of twenty-first century public-facing scholarship in this dissertation. For each source, I briefly explain how it qualifies as public-facing. Sources are listed alphabetically by author.

Science vs. Religion: What Scientists Really Think (2010), by Elaine Howard Ecklund. The first chapter indicates that the target audience includes non-academic "Americans of faith" (10). The book was also featured in *Publishers Weekly* and reviewed in popular outlets such as *The Washington Post* and the *New York Journal of Books*.

Religion vs. Science: What Religious People Really Think (2018), by Elaine Howard Ecklund and Christopher P. Scheitle. The first chapter explains, "Our message to people of faith is this: Myths are a problem for faith communities" (3). The book was also featured in *Publishers Weekly*.

Morals Not Knowledge (2018), by John Evans. Evans' public-facing goals are explicit right from the start; the book opens with, "If you are going to disagree with your adversary in a

debate in the public sphere, I want you to disagree with them for the right reason" (1).

Science and Religion: An Impossible Dialogue (2016), by Yves Gingras (trans. Peter Keating). Gingras' language and the way that he positions himself in contrast to existing scholarship seems to be to indicate that he has a more general audience in mind than just scholars.

The Territories of Science and Religion (2010), by Peter Harrison. This book is based on Harrison's 2011 Gifford lectures, which are themselves aimed at a public audience. Further, the book is reviewed in popular media such as the *Los Angeles Review of Books* and the *Times Literary Supplement*, blurbs from which are found on the back cover of the book.

Priest of Nature: The Religious Worlds of Isaac Newton (2017), by Rob Iliffe. The book was reviewed in several popular venues including *Choice* and the *Wall Street Journal*, and also featured in the *Publishers Weekly*.

Summer of the Gods: The Scopes Trial and America's Continuing Debate Over Science and Religion (2006) by Edward J. Larson. The book is written for non-scholars and won the Pulitzer Prize in History in 1998 (it was originally published in 1997, but was republished with a new afterward in 2006). It was widely reviewed in popular venues like the *Boston Globe* and the *New York Times*.

Buddhism and Science: A Guide for the Perplexed (2008) by Donald Lopez Jr. This book is meant to be, as its subtitle indicates, "a guide for the perplexed." From Lopez's language, the "perplexed" seem to include non-academics, especially Buddhists—thus the Preface concludes by explaining that the book aims "to understand why we yearn for the teachings of an itinerant mendicant in Iron Age India, even one of such profound insight, to somehow anticipate the formulae of Einstein" (xiii).

Galileo Goes to Jail and Other Myths about Science and Religion (2010), edited by Ronald Numbers. This volume is explicitly public-facing, intended for non-scholars (especially stu-

dents). It is widely reviewed in popular venues like the *Daily Telegraph* and the *Vancouver Sun*.

Kepler's Witch (2004) by James A. Connor. The general informal, conversational style indicate that Connor is writing at least in part for non-academics. The Forward and Introduction also make clear that Connor has non-academic audiences in mind. For instance, in the Introduction, he explains his decision to use letters to tell the story of Kepler's life: "The best part about studying letters is that you find that great people in history are no longer legendary figures, but ordinary human beings caught in mundane torments" (6).

Where the Conflict Really Lies () by Alvin Plantinga. Plantinga writes for both a public and scholarly audience, as made clear in the Introduction where he states, "This book is not intended merely for specialists in philosophy. I hope that students with a course or two in philosophy or for that matter anyone with an interest in the subject will find it intelligible and interesting" (xv).

Michael Ruse's entry in *Three Views on Christianity and Science* (2021) edited by Paul Coplan and Christopher Reese. The book is published by Zondervan Press as part of its *Counterpoints: Bible and Theology* series, which is aimed at Christian non-scholars.

For the Glory of God: How Monotheism Led to Reformations, Science, Witch-Hunts, and the End of Slavery (2004) by Rodney Stark. The language and style make it clear that Stark is writing with a non-academic audience in mind; he explains, for instance that "it is now convention to use B.C.E. (Before the Common Era) rather than B.C." (5). The book was also reviewed in popular outlets like *Christianity Today Magazine* and the *National Review*.