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2. Pragmatism and Disunity in Science and Religion

Peirce and Cartwright¹

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Introduction

On a practical level, people are often faced with conflicts between religious and scientific claims, and must somehow decide how to proceed with difficult questions: “Is it okay to let religion and morality constrain science?” or “If biological reductionism threatens some religious beliefs, as many reasonably suspect it does, then should a religious person suspend her beliefs about biological reduction?” or “If someone like Einstein rejects quantum theory, let us say, *solely because* of a religious belief that ‘God does not play dice,’

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then does that make that person a bad scientist? Or does it make that person a good theist?” In the face of such questions, it is not always clear how one ought to view such conflicts. Of course, many people do not really feel conflicts among views they hold in their practical lives, feeling comfortable living according to science in some parts of their lives, and according to religion in other parts of their lives, without being bothered by any tensions. This practice can look a little like cognitive dissonance or intellectually burying one’s head in the sand and simply ignoring conflicts altogether. Alternatively, others unsympathetic to the claims of religion do not see the conflict between science and religion as practically relevant or, frankly, even real. Such a conflict is apparent and felt only by religious people who fail to see that science offers the only real promise for knowledge, and offers that promise in the form of a unified picture of the world without any fundamental conflicts at all.

But the apparent conflicts between science and religion, conceived practically, are not always symptomatic of a failure to achieve some scientific or religious or philosophical unity by subordinating one discipline to another, and the ability of scientific and religious people to live with and even according to both or several worldviews need not be considered some great cognitive or psychological or moral failing. Rather, sometimes the apparent conflicts between science and religion, pragmatically conceived, are indicative of our experience of the world (and the world itself) as fundamentally pluralistic, or “dappled,” as in philosopher of science Nancy Cartwright’s sense in *The Dappled World: A Study of the Boundaries of Science*. Moreover, such conflicts are by no means unique to the classic divide between science and religion, for, as Cartwright argues, science itself (despite its commonly accepted ability to provide a unified picture of the world) actually reveals a pluralistic or dappled structure of the world.

If science cannot provide an overarching picture of unity, but instead provides a pluralistic picture of the world, then given this pluralistic picture of the world, the apparent conflicts between religion and science may not provide any greater distress for our beliefs than the conflicts that inevitably arise among the sciences. We should no more expect a complete unity between science and religion than a unity among all the sciences. When conflicts arise between science and religion, they are often a reflection of the same diversified structure of reality also revealed by the various sciences. Our ways of knowing reality must be varied in accordance with the variability of reality, science with its pluralistic domains and religion with its domains. Whether and how this helps us resolve apparent conflicts in our practical lives remains to be seen.²

We will start by examining the American pragmatist philosopher Charles S. Peirce who argues in favor of keeping science and religion separate because science is theoretical while religion is practical. Then we will move to the contemporary philosopher of science, Cartwright, who argues that all of science should be viewed as practical and, as such, should be viewed pluralistically. Finally, we will discuss whether unity is truly our best practical ideal when considering the relationship between science and religion.

² Murphy argues for the importance of unity as a goal for our knowledge (91). While we will not argue that position here, we nevertheless take our point of departure from Murphy’s suggestion that the science/religion debate should move away from realist/antirealist discussions, which seem to depend on descriptions of knowing as passive and receptive representation.

Peirce's Theory/Practice Distinction Applied to Religion

An early view of the lack of unity between science and religion appears in the writing of Peirce, who draws a distinction between theory and practice, whereby both theory and practice are understood in terms of human practices, but *distinct* human practices. In the practice of science, we advance, test, and examine hypotheses, sometimes quite abstract hypotheses. These hypotheses are held provisionally and have effects mainly on theoretical inquiry itself. Scientific inquiry is considered theoretical because it deals with claims that are held hypothetically and aim at truth in the long run.³ Science is pursued as a community project and requires altruism on the part of the individual, a commitment to truth that he will not likely see in his lifetime (EP1: 285). Theoretical and scientific hypotheses are distinguished from our everyday practical beliefs, which have practical effects on our *action in the present and near future* (EP2: 33). Practical belief aims at immediate action, which regards the individual's own private purposes (which are usually not exclusively truth), and for this reason Peirce conceives practical belief as a problem of *ethics* rather than *science*. Conversely, there is no place for belief in science because belief amounts to accepting some claim as true or at least good enough to base one's actions on: belief, for Peirce, is a willingness to act, and in scientific inquiry we must take everything as merely provisional if we wish to continue to learn over the long run (EP2: 56; EP2: 33).⁴

Peirce situates religion in relation to this theory and practice distinction, with religion falling on the practical side, and science on the theoretical side. According to Peirce, religion is most genuine when it is a part of our practical life rather than our theoretical life.

³ Peirce's pragmatic maxim can only be summarized here: it holds that the meaning of a concept lies in its effects. When Peirce applies this maxim to truth he comes up with his famous long run view. For Peirce, truth is the final opinion of inquiry about reality within a potentially unlimited community of free and open inquiry, which can only be established in the long run by rigorous critical inquiry of an entire community stretched across future generations. Peirce defines truth in this way: "The opinion which is fated to be ultimately agreed to by all who investigate, is what we mean by the truth, and the object represented in this opinion is the real" (W3: 273). The citation structure for Peirce's works is explained in the Bibliography. If inquiry were to go on freely forever, then what the community of inquiry would agree to, would be the truth. The community must be scientific because what science offers that other methods of belief formation do not (i.e., fixing belief by irrational tenacity against doubt, or fixing belief by sheer power of cultural or religion authority, or fixing belief by a priori metaphysics, as Peirce discusses them in "The Fixation of Belief"), is an appeal to an external reality independent of human minds which provides the scientific method with a way to detect error, thereby giving us hope for gradual improvement through error correction. We cannot say that science has the truth right now, but we can hope that the different sciences, while increasingly more complex, will progress toward a complete view of the natural world. Peirce defines truth (as a Kantian regulative ideal) in terms of human inquiry as the final opinion of inquiry in the long run, and reality as the object of this final opinion, but this opinion is the result of our rigorous inquiry into a real world that is causally efficacious on our beliefs.

⁴ In practice we are usually interested in applying truths for other ends, whereas science is interested in truth for its own sake. The scientist must make a concerted effort to convert a scientific claim into a belief (EP2: 85). Of course, this is not to say that science is divorced from action completely, since action is indeed required for truth seeking. Peirce's pragmatic maxim applies to science as well as practical beliefs, which means truth claims in science must be applicable, in the sense of some kind of empirical effects, for a scientific hypothesis to be even meaningful (EP2: 86-87; see Cooke 2006; Boyd).

Yet it is absurd to say that religion is a mere belief. You might as well call society a belief, or politics a belief, or civilization a belief. Religion is a life, and can be identified with a belief only provided that belief be a living belief – a thing to be lived rather than said or thought (CP: 439).

For Peirce, religion arises out of sentiment in the individual, but is ultimately realized in the community (CP6: 429). “[L]ike every species of reality,” Peirce writes of religion, “it is essentially a social, a public affair. It is the idea of a whole church, welding all its members together in one organic, systemic perception of the Glory of the Highest” (CP6: 429; see also 6: 443). Ultimately, the aim of religion, according to Peirce, is to influence our action.

On this point, Peirce’s position on science and religion differs from Stephen Jay Gould’s famous nonoverlapping magisteria position (NOMA), which states that science and religion do not conflict because they do not have the same subject matter. The real difference, for Peirce, is not so much that science and religion do not overlap in subject matter (for both religion and science may very well have something to say about the same subject matter, for example, the nature of human action), but the difference in the respective ends of science and religion: one is practical and the other theoretical. Science and religion function very differently in our lives because each has a different goal. Peirce’s emphasis on the practical aspect of religious belief seems in keeping with a common sense view of the difference between science and religion, again where science is more theoretical and religion more practical. According to Bernardo Cantens, Peirce’s view is that religion, unlike science, requires personal commitment, which makes it practical, and requires worshipping and abiding by a moral system, unlike, say, belief in the Big Bang Theory (106). The Big Bang Theory, argues Cantens, is a scientific hypothesis which need not affect our daily practical activities: we hold it as a hypothesis and know that the scientific community will continue to examine it. We do not shape our practical lives around such hypotheses, but around religious beliefs, which are related to beliefs regarding phenomena just as abstract as the Big Bang.

Science and Religion

Given that Peirce identifies science with hypotheses and theory advancing over time (over the long run), on the one hand, and identifies religion with belief and practice, on the other hand, we should not be surprised that he thinks we should keep science and religion separate.⁵ But there are other reasons, according to Peirce, for keeping science and religion separate. One reason is that science studies efficient causes whereas religion examines ideals (CP6: 434). Another reason is that treating religion like science often means overlooking the deep individual sentiment upon which religion is based, and by overlooking the role of sentiment in religion, we distort the nature of religious investigation by thinking we are acting on reasons rather than sentiments (Cantens: 102). Also, in overlooking the importance

⁵ Commentators differ on how severe this split really is. Kelly Parker explains that, for Peirce, both the religious and the scientific believer should recognize the importance of not mixing science and religion. In a similar vein, Cantens argues that Peirce maintains the strong distinction between religion as a practical matter and science as strictly theoretical because practical reasoning blocks the road of inquiry, Peirce’s highest maxim of logic (107). In contrast to these commentators, Douglas Anderson (2004:189), John Shook (353-54), and Richard Trammell (22) argue that Peirce’s distinction between religion as a practical matter and science as theoretical should not be read as such a severe distinction.

of religious sensibility and sentiment, we overlook the only true source of genuine religion (CP6: 433).⁶ According to Peirce, we should trust our instincts and sentiments much more than reason on matters of religion and ethics.

These arguments for the separation of religion and science must be tempered with Peirce's other claims about science. For he also says that reason, in general, and not just religion and ethics, ultimately rests on instinct; and sometimes Peirce even simply equates reason with instinct (EP2: 472). For example, Peirce argues that Galileo's appeal to *il lume natural*, usually thought of as an intuition, is really an appeal to instinct. If religion and practical beliefs as well as scientific hypotheses are ultimately based on instinct, then they are not ultimately different in kind.⁷ But Peirce still holds that science and religion must be kept separate in order not to distort their respective aims and methods and because, from our fallible epistemic positions, we cannot tell which claims, when they do conflict, will be the ones that pan out.⁸ Parker writes that the practice of religion, on the one hand, and the theoretical investigations of science, on the other hand, are not *ultimately* exclusive concerns, but in our immediate human experience they are distinct (198, emphasis added).

It is thus a mistake for us to mix religious beliefs with science, because scientific opinions must be just that. They are not vital beliefs. Conversely, if a religion finds itself appealing to postulates and hypotheses it is on the way to becoming the sham religion of the theologians which Peirce rejects. It is because of this difference between the two aspects of experience that the scientific spirit, inhospitable to religion though it must be, is not a threat to it (Parker: 206).

This seems to suggest that, although from a God's eye point of view, science and religion may be unified, we should not attempt to take this point of view. While unity is a goal in science, for Peirce, it is not a good practical goal for our theoretical and practical (including religious) pursuits.

⁶ Peirce argues against letting *theories* of religion or ethics into one's religion or code of morals (see EP2: 32).

⁷ For an excellent discussion on this point, see Anderson: 349-362. In his analysis of Peirce's 1908 essay "A Neglected Argument for the Reality of God," Anderson argues that the same meditation that produces practical belief in God also produces the first stage of theoretical thinking, and that this means that Peirce resolves the theory-practice split by showing that instinct grounds both practical belief and reason (350). Anderson also argues that, for Peirce, science without religion is uninspired and ineffective, while religion without science is tenacious and authoritative and incapable of growth (360).

⁸ Peirce holds that science and religion *cannot ultimately* conflict in the long run: no truth claim, whether in the form of a practical belief or in the form of a theoretical hypothesis can conflict in the long run. The apparent conflicts between science and religion will *disappear in time* when adjustments are made (CP6: 33). Regarding one's attitude toward religion and science, Peirce argues in favor of an attitude he calls the "religion of science," which he describes as "a religion, so true to itself, that it becomes animated by the scientific spirit, confident that all the conquests of science will be triumphs of its own, and accepting all the results of science . . . which may appear for a time to be in conflict with other truths, but which in such cases merely await adjustments which time is sure to effect" (CP6: 433). This would avoid the dogmatism he saw rampant in religious thought during his day and would enable religion to revise itself in the face of scientific truths.

Unity and Conflict

If science and religion do not conflict because we can separate them in practice, then religion and science only conflict when we treat them both theoretically. And, if we can separate our practical life from our theoretical pursuits when it comes to religion and science, then why could we not do this with all conflicts in our beliefs by relegating one to practice and the other to theory, drawing the theory/practice distinction wherever it is convenient? Indeed, separating and compartmentalizing is a way many of us handle all kinds of potential conflicts, such as science vs. religion, and even science vs. science, and certainly science vs. everyday life. A scientist whose field work requires adopting a framework which leaves no room for the supernatural or even the immaterial, such as love or commitment or trust, puts that worldview aside when she goes home at night and maintains her personal relationships with her children or, perhaps, prays for help or inspiration or patience in her life. She may not worry about how these different views fit together, or she might call one view a mere “hypothesis” while another is her genuine (practical) belief. But when we do worry about how our views fit together, when we do look at the views of, say, biological determinism and the presuppositions of a loving and moral relationship, side by side in theory, we might see a problematic conflict. For example, while we might go to a medical doctor for one kind of problem and a psychologist for another and a priest for still another, upon theoretical reflection we might like to see and perhaps even expect to see unity among all these areas of knowledge in theory, even though we do not really need it in practice.

Such conflicts partly motivate the scientific instrumentalist (as opposed to the realist) view in the philosophy of science. For example, science tells me my hands and computer are made up of space, moving particles, and fields of energy, but that in no way helps me move about in my practical everyday life, in no way helps me type on the keyboard at the computer. In my practical life, it helps if I think instead in terms of hands, cups, tables, computers, cars, and roads. Instrumentalists handle conflicts between science and everyday beliefs (as well as the conflicts among the various sciences) by arguing that, on a theoretical level, scientific claims are not true or false; they are just tools which provide a means for prediction and control. Instrumentalism addresses two big problems. First, the fact that science depends on unobservables (for example, neutrinos, dark matter, etc.; things that cannot be empirically supported) is not a problem for the instrumentalist who takes these scientific claims that refer to such unobservable entities merely as useful tools for prediction and control and not as a description of reality. The second problem instrumentalism seems to solve is the one we discuss here, namely, how to handle the conflicts between the sciences and those between science and everyday beliefs. If theories are just tools, then it makes no sense to say that they conflict no more than, say, a pencil conflicts with a garden shovel or a salad fork. Only truth claims can conflict and since science, for the instrumentalist, does not make truth claims about reality, there is no real conflict to worry about.

But while instrumentalism seems to resolve potential conflicts from within science, there are problems with instrumentalism as well.⁹ As contemporary pragmatist Hilary

⁹ One famous problem with the instrumentalist position is that it privileges claims based on direct observation, holding that only these refer to real things, whereas scientific claims which attempt to refer to real but unobservable entities are suspect precisely because they are based on indirect observations (using microscopes,

Putnam and others have argued, instrumentalism leaves unexplained how science can be as successful as it has been at making reliable predictions if it is only an instrument and not an accurate description of reality.¹⁰ Putnam has argued in favor of scientific realism according to which scientific claims are more than mere tools and are really attempts at describing reality because this is the best way to explain science's success. Similarly, for Peirce, we simply must presuppose the reality of any object of inquiry in order to engage in genuine inquiry of any kind. If we do not accept successful empirical inquiry as evidence (albeit fallible evidence) for the truth about claims regarding reality, we slip into skepticism.¹¹ What else can reality mean but that it has empirical and practical effects on our cognition? One might think that a pragmatist would be an instrumentalist when it comes to scientific theories, treating them as tools, but, for Peirce, the concept of reality has to have practical consequences, and one of these is that reality has a real effect on our beliefs (otherwise it is a meaningless notion).¹²

This means that for a pragmatic realist like Peirce (at least when it comes to theoretical inquiry), conflict between competing and empirically supported claims *means something*: it means error, and when we detect error, then theoretical inquiry progresses. The instrumentalist does not accept the reality of the subject matter of inquiry and, so, for her, conflict does not really indicate anything at all. For the instrumentalist, it is hard to imagine how we might learn from our mistakes in inquiry in a meaningful way. But something seems wrong here, in Peirce's view. If conflict is an important indication of error for the realist, but conflict is handled in practice by compartmentalizing and separating, as Peirce suggests, then compartmentalizing our practices seems to be essentially ignoring the apparent conflicts. If we do this, then the realist's worry should be that we miss the opportunity to detect error in one or both of the conflicting claims.

telescopes, etc.); they are not based in empiricism. Critics claim that this line cannot be a hard one and we should include indirect observation as observation. For example, should I discount objects as only theoretical entities (and therefore not real) if I have knowledge of them only through a microscope? The instrumentalist would say, yes. But what about a pair of binoculars or a pair of glasses? This issue has long been discussed in the literature. Carnap, whose empiricist philosophy depends on this distinction, was aware of this problem and responds by admitting the notion is relative (455). In general, there have been many criticisms of this distinction in contemporary philosophy of science (see Putnam 1962: 240-51; Hansen: 18).

¹⁰ Putnam writes that scientific realism "is the only philosophy that does not make the success of science a miracle" (73). Of course, there are critics of this view, such as Bas van Fraassen who holds an anti-realist position called "constructive empiricism," and argues that we need not assume that science achieves accurate descriptions of the real world in order to explain the success of science but need only appeal to science achieving empirical adequacy.

¹¹ For this reason, Misak argues that Peirce holds a moral cognitivism (see also Pihlström 2005).

¹² It might be best to view Peirce as rejecting the realist/antirealist debate altogether since he would reject the skepticism that haunts traditional scientific realism (since while science might refer to reality, science changes all the time, and as Larry Laudan has argued, is likely full of erroneous theories right now). But Peirce would also reject the Kantian noumena (skepticism by another name) implied in instrumentalism, which avoids calling an empirically adequate theory true or referring to reality. The long run is an attempt to avoid both problematic positions. But if we have to position Peirce in one of these camps, he is best understood as a realist, albeit a fallible realist.

Here we agree with Peirce. Science describes the real world, religion is practical, and we need not unify all of our beliefs, just as Peirce argues we need not unify theory and practice. Drawing on Cartwright's analysis of the description and the norms of scientific inquiry, we also hold that sometimes what appears to be conflict is, in fact, indicative of real and irreducible ontological difference. This means that sometimes we will find ourselves in a position of having to determine when, on the one hand, conflict is an indication of error, such that more inquiry is needed, and when, on the other hand, it is not really conflict at all, but rather genuine ontological difference. Cartwright's pluralism is not a way of being a temporary fallibilist, in Peirce's sense, whereby we accept many truths for now, until one unified view pans out in the long run. The view here is an ontological pluralism whereby our diverging scientific practices suggest not something temporary about our current state of knowledge, but rather something about the way the world really is.

The Practice of Science: Cartwright's Dappled World

Acknowledging that theory and practice are both practical, Peirce also distinguishes them according to their distinct contexts, one in the context of long term inquiry, the other in the context of immediate action. Like Peirce, Cartwright also thinks of science in terms of human practices, but, unlike Peirce, she makes no theory/practice distinction, and, in fact, she finds all science to be intrinsically practical and action-oriented insofar as it aims at solving real practical problems. Cartwright defines science even more pragmatically (and less idealistically) than does Peirce. As a result of looking at the actual practice of science, what she finds is a set of pluralistic practices that cannot be unified, and from this view of the many practices of science emerges a view of the world as irreducibly pluralistic. Peirce's philosophy suggests separating theoretical and scientific pursuits. Cartwright, viewing all sciences as ultimately practical, argues for even more separation, namely, that the various scientific theories are separated from each other.

As a scientific realist, Cartwright accepts that there is a real external world, which science can understand and describe (against instrumentalism), but she denies that the external world that science uncovers is a unified world. She argues for a metaphysical view of the world that is truly "dappled," and this view is based, in particular, on the failures of physics and economics to come up with a theory of everything (1). She explains that although it is common to describe the progress of physics, such that quantum physics replaced classical physics, we use both quantum physics and classical physics, depending on our needs and purposes (2). If someone says this is just in practice, whereas, in theory we can do everything better and more accurately in classical physics than with quantum physics, she responds, as an empiricist, that she uses practice as her guide (2). What other guide should there be? Empiricism is the method of science and the method Cartwright endorses. But empiricism rarely, if ever, supports a theory that is universal. Usually an empirically supported theory works *only in one part* of the universe rather than throughout it (4). We mistakenly apply the theory universally, but then make all kinds of qualifications. Cartwright calls the view that there are universal laws which hold everywhere, in all domains, "fundamentalism," and, of course, she rejects it (24). In fact, even simple and seemingly fundamental laws of physics like $F = ma$ do not work universally, but rather only under narrow circumstances, only in circumstances where reality fits the idealization (25-26). To illustrate this point, Cartwright considers philosopher of science Otto Neurath's example of

a scientist trying to predict where exactly a thousand-dollar bill swept in the wind in Saint Stephen's Square will land (27). The fundamentalist will tell us that there is, *in principle*, a model in mechanics for the action of the wind, though it may be too complicated to construct in order to predict exactly the final location of the bill. Cartwright rejects this view: "The successes of mechanics in situations that it can model accurately do not support it, no matter how precise or surprising they are. They show only that the theory is true in its domain, not that its domain is universal" (27).¹³ The example of the thousand-dollar bill is not an unusual event, but the kind of common, everyday event that cannot be reduced neatly into a completely unified system of scientific knowledge.

Cartwright argues that laws that have empirical support (and can thus be called "true") are almost always qualified with a *ceteris paribus* clause ("all things being equal") – which is something fundamentalists ignore. Laws do not hold everywhere, according to Cartwright, but only under certain ideal conditions. Cartwright rejects the traditional "unity of science" view that entails reductionism, the view that "the laws and concepts of each scientific domain are reducible to those of a more fundamental domain, all arranged in a hierarchy, till we reach physics at the pinnacle" (6). Instead, Cartwright opts for Neurath's picture whereby "the sciences are each tied, both in application and confirmation, to the same material world; their language is the shared language of space-time events. But beyond that there is no system, no fixed relations among them" (6).¹⁴ Her view is a metaphysical nomological pluralism, which she defines as "the doctrine that nature is governed in different domains by different systems of laws not necessarily related to each other in any systematic or uniform way; by a patchwork of laws" (31). Cartwright's view opposes fundamentalism not only because there are no empirical grounds for taking laws as universally true, but also because we need not assume laws are at work everywhere to make sense of the world (33-34, 37).

Pluralism is Good for Science

Neurath thought unity without reduction was still a good regulative ideal, a helpful practical tool for science, but Cartwright thinks that ontological pluralism follows from what successful science already actually does and, thus, is the best guide for the future practice of science. Cartwright thinks that imposing such a regulative ideal of unity on the practices of science can even be bad for science. There is a dangerous consequence of adopting the fundamentalist ideal of unity for science, for example, when it comes to breast cancer research (Cartwright: 17). If we look only at breast cancer in terms of genetics (assuming a unified, reductionist picture of nature), then we miss important environmental and lifestyle

¹³ Cartwright argues that the older language of natures is more helpful than the language of laws, since laws are *ceteris paribus* (28). Her preferred language of "natures" gets at the fact that the behavior of a nature or a feature will "tend" or "try" to cause beyond the strict confines of the *ceteris paribus* conditions (28-29). But a wide-ranging nature is not the same thing as a universally applicable law (29). "To admit that forces tend to cause the prescribed acceleration (and indeed do so in felicitous conditions) is a long way from admitting that $F = ma$, read as a claim of regular association, is universally true" (29).

¹⁴ Not only does Cartwright reject downward reduction but also the possibility of "cross-wise" reduction, the idea that laws apply from an idealized laboratory setting to carry across systems *of very much the same kind*, but different and less controlled settings (25).

influences on breast cancer.¹⁵ Such fundamentalist views on unity and reductionism prevent us from seeing other influences that are really there. One of the upshots of this view is that because there are very few (if any) strict universal laws in the natural sciences, the natural sciences are not so different from the social sciences in dealing in terms of generalizations and associations. Cartwright also takes the social sciences off the hook for not being reducible to the physical sciences; she does not think the natural sciences themselves can be unified or reduced either. The problem of the division between the social and natural sciences is not a problem after all: they need not be unified any more than the natural sciences themselves need or can be unified. Furthermore, their plurality reflects the plurality of the world.

Cartwright's Ontological Pluralism: Implications for Religion and Science

Returning to our discussion of science and religion, Cartwright's rejection of scientific reductionism and the world as dappled sets the conflict (or apparent conflict) between science and religion in a different light. A common reason for rejecting the findings of religion and ethics and aesthetics and even social science as "true" is that such findings refer to entities that are ultimately fictional because they do not reduce to a particular natural science. For example, a biological reductionist might permit psychology's talk about beliefs and desires because those "things" can, it is often thought, be reduced to physiological states in the organism, but this is not thought to be the case with "things" like souls or human dignity or sin. But when this kind of challenge is made to religion, one can make Cartwright's point that many, if not most, of the established scientific theories do not successfully reduce to a more foundational scientific picture either, despite the common belief that they can or should or will someday. We do not and should not reject such scientific theories for being non-reducible, so we should not dismiss or reject religious claims for this reason either.¹⁶ We should not reject, say, claims about free will and moral responsibility, for not being reducible to, say, evolutionary psychology or biology, any more than we should dismiss claims from economics for not being reducible to biology, or claims about relativity for not being reducible to quantum theory.

¹⁵ Cartwright explains that endogenous estrogen levels are affected by lifestyle and thought to be a major determining factor in the occurrence of breast cancer, therefore, we might emphasize prevention as much as we do genetic aspects (17). John Dupré (2008) offers the example of ADD to make a similar point. Referring to ADD as the syndrome describing children's difficulty paying attention in school and the treatment of this with psychotropic drugs (like Ritalin), Dupré argues that "it is evident that there is some kind of mismatch between the dispositions of the problem child and the social context in which that individual is placed. Such a mismatch could, on the face of it, be addressed by changes to the child, to the environment, or both" (54).

¹⁶ Of course, none of this implies that Cartwright would accept religious ways of knowing; that is not our point here. Our point is that Cartwright's philosophy leaves room for it. Perhaps this is just the kind of thing critics launch against pluralism. On this point, Dupré argues that part of the motivation for what he calls a myth of the unity of the sciences is that unity distributes epistemic warrant (2008: 52-53). Opponents to pluralism will wonder what is to keep out all the pseudo-sciences once pluralism is accepted. In his own defense of pluralism, Dupré responds to this issue arguing that while there is no *a priori* criterion, as naturalists we should use the *a posteriori* method and the familiar virtues such as understanding, explanation, prediction and control (2008: 55). Dupré himself might argue against allowing religion or theology in because it does not have these virtues sufficiently enough.

Explanatory Pluralism

An important consequence of Cartwright's position, when applied to the issue of conflicts between science and religion, might be not to see them as conflicts at all. Michael Esfeld argues that Cartwright does not tell us how the different theories relate to one another or whether they can be translated into one another, and wonders whether her view results in a relativism to which the familiar objection from Donald Davidson's "On the Very Idea of a Conceptual Scheme" can then be raised (344). Cartwright's "Reply" (following Esfeld's essay) responds that she is not arguing that different theories "carve out different aspects, where 'aspects' are false, but useful representations of the world." Instead Cartwright argues, "different theories study different sets of features, all of which are supposed to be genuine, often interacting, features of one and the same reality" (338). Applied to the relationship between science and religion, then, perhaps this could mean that religion and science get at different features of reality and that the two do not necessarily conflict.¹⁷ Perhaps we see conflict when really we should accept irreducible ontological difference because religion is descriptive of a different set of features of reality than science in the same way that quantum physics describes a different set of features of reality than Newtonian mechanics or behaviorist psychology.

This position would look like a version of Gould's NOMA position whereby religion and science do not conflict because they each make claims about different subject matters: one refers to facts in the world, the other to value and meaning. Appealing to Cartwright's points might legitimate the NOMA position insofar as Cartwright can explain how science and religion deal with different domains, but not because one deals with facts and the other values, as Gould says, but rather because our best scientific methods suggest that reality is really divided into different domains and so religion and science can be said to consider different domains of reality just as the different sciences do.

We must recognize, however, that in addition to being a practice, religion is also a belief system that is usually a *unifying* belief system, and, of course, this poses a problem for the NOMA position. Richard Dawkins claims that Gould's NOMA position fails to recognize that religion enters into the domain of facts and the empirical description of the world, and so inevitably conflicts with the findings of science. Dawkins gives examples of such religious claims as the virgin birth and the resurrection, which enter into descriptions of the facts of history and the empirical world.¹⁸ But in our discussion the problem is really that religion

¹⁷ This is not to say that Esfeld's point is not important or that Cartwright satisfactorily addresses his point. The concern seems to be that when we look at different theories side-by-side, there do seem to be conflicts, perhaps not logical conflicts or conflicts in terms of translation, but there are often practical conflicts. So, while Cartwright is not interested and does not think one ought to be interested in providing a unified theory subsuming all practical theories, there are practical needs to unify some theories that do not seem to be able to be unified as of yet. What pluralists can say to this kind of objection, however, is that when we do attempt to unify or reduce two theories, we often get a new theory, thus adding rather than reducing theories, as the newer, unifying theory has its own unique approach to the unique phenomenon and does not do justice to the other two phenomena it was trying to explain (see, for example, Suppes: 3-16).

¹⁸ Dawkins, commenting on Pope John Paul II's "Message to the Pontifical Academy" on evolution, writes: "More generally, it is completely unrealistic to claim, as Gould and many others do, that religion keeps itself away from science's turf, restricting itself to morals and values. A universe with a supernatural presence would

offers an explanation of everything (it tries to say something about all the domains of reality), so, in contrast to Dawkins, our concern is not that religion makes factual claims, but that religious views too often offer a top down reductionism, i.e., by reducing everything to God's purpose and plan, or by presenting a view of God as the ultimate immaterial cause of the material world. If religion is essentially a unifying belief system, then perhaps we cannot fit it neatly into Cartwright's model whereby we relegate religious beliefs to only one feature of reality, offering only one kind of explanation of one kind of phenomena. Again, people often try to extend the *scientific picture* to everything too (e.g., applying evolution to moral questions; physiology to questions of meaning and purpose; or physics to questions regarding the ultimate explanations for the universe). But this is not essential to science, and this is precisely Cartwright's point, namely, that in practice, the practicing scientist is not the one (*qua* practicing scientist) extending her model to other types of phenomena. Such reduction is just the kind of fundamentalism Cartwright rejects and believes science would be better off without. So, if the various sciences can proceed without attempting to explain everything, then why cannot religion?

Perhaps Cartwright's view suggests a dappled theology with a multidisciplinary approach reflecting the dappled world for which she argues. Such a theology should be multidisciplinary not because we need multiple methods to get at one unified reality, but because we need multiple methods to study the many features of God's hand and our role in a dappled universe.¹⁹ If we think our religious view is truly unifying, unifying the natural, material world with the spiritual, mental, and purposeful world, then our pragmatic perspective forces us to ask why it is not unified in practice, that is, why we still seek and should seek biological explanations for biological phenomena, and economic explanations for economic phenomena, etc.

Is Complete Unity Practical?

Cartwright rejects the unity of explanations because such unity goes beyond the evidence. A unified picture of the sciences cannot be a scientific one; rather than evidence, such unity *wrongly rests on a faith* (17). But what about a unity for science and religion that was not empirical? Here we are considering the relationship *between* science and religion, and so we can surely consider other kinds of knowledge beyond scientific knowledge, and unifying religion and science was never going to be scientific anyway. Might there be any other reason

be a fundamentally and qualitatively different kind of universe from one without. The difference is, inescapably, a scientific difference. Religions make existence claims, and this means scientific claims" (399).

¹⁹ "The Order Project" is a project co-directed by Nancy Cartwright and Eric Watkins, between the Centre for Philosophy of Natural and Social Science at the London School of Economics and the Philosophy Department at the University of California at San Diego, the purpose of which is to unpack the theological implications for a pluralistic universe rather than the traditional view of the universe (no longer supported by science) as unified and orderly. See also Pihlström (2013) for a rich discussion of pragmatic pluralism and its importance for debates in the philosophy of religion. Pihlström's pluralism is also motivated by practice. He follows William James's pragmatism in that he thinks metaphysical positions should be evaluated ethically (2013: 10). Pihlström argues that a genuine philosophy of religion should include a plurality of philosophical perspectives, such as James's pragmatist perspective and Kant's transcendental perspective (2013: 11).

we should look for unity (even though we cannot have a unity supported in empiricism), perhaps a more speculative, faith-based, or reason-based unified theory?

Even if we are not discouraged by Cartwright's argument against unity and we still strive for unity (even if it is not empirical), her view forces us to ask whether unity is a *good practical ideal* for inquiry of any kind. There is often a practical need to unify several competing claims or theories, and Cartwright must recognize this point. But a *completely* unified picture does not seem to be required or even useful for the practice of science, on Cartwright's view, or our everyday lives, as Peirce argues. Extending Cartwright's and Peirce's lessons here, we might ask what function *any* unifying theory serves (be it metaphysical or theological or materialist). Even if we do not accept ultimate disunity (perhaps because, following Kant, if you can ask the question, "can quantum theory and relativity be reconciled?" then there must be something in common, either a common language or a common logic unifying them in the mind), still we must recognize that *practically speaking, functionally*, there simply is disunity.²⁰ Putnam argues against the reductionist view when he claims that no one really believes in ontological reductionism, so we could ask here whether anyone really believes in unifying theories either, where believes (in the pragmatist sense) means willingness to act on the belief? Do unifying theories ever really come in handy in actual practice? (2008: 62).

Beyond arguing that unity is not an accurate description of the practice of science, Cartwright, we may recall, argues that unity can be a dangerous ideal for science. The danger that Cartwright mentions with breast cancer might be a danger with *all* unifying theories, not just materialist reductions. For example, such a unifying theory might be found in a religious belief that God created nature, and thus that nature is good, with the possible dangerous consequence of a belief that human disease is also good and does not require medical science to eradicate it. Cartwright's lesson from science extended to religious explanation is valuable. There is a danger in adopting any unifying theory if it blinds us to different ways of knowing, if unity effectively reduces or eliminates genuine and important differences. Rather than forcing science and religion together, we should recognize them as reflective of different and practically irreducible dimensions of the world, and therefore should reach for one or the other according to the given practical situation. This would be better for our practical lives than any attempt to unify all kinds of knowledge. If we attempt to understand and explain a phenomenon, but we are too attached to a unifying theory, we might miss an honest appreciation of our experience of the phenomenon itself. Unifying theories do not have to be held dogmatically, of course, but they can and very often do function dogmatically,

²⁰ If there is no real logical incommensurability between theories, one might wonder whether accepting the plurality of empirically supported theories *functions in practice* as accepting a variety of incommensurable Kuhnian paradigms, precisely because each theory cannot be extended outside its domain (a common criticism of pluralism is that it leads to relativism; see, for example, Richardson: 5). But, in contrast to Kuhn's account of science, whereby we work and practice in only one paradigm at a time, considering the many practices of science and religion forces us to recognize that we are actually socialized and trained into accepting several different belief systems or practices at once. This is appropriate in many cases because the different sciences and different practices are empirically supported. But the view we advance here, again, following Cartwright, is not a relativism since we are not considering different theories regarding the same phenomena, but rather, to use Cartwright's phrase, different theories for different features of reality. This is an ontological pluralism first, and not an epistemological pluralism motivated out of our own fallibility.

sharing the dangerous consequence of blinding the inquirer to other possibilities. Cartwright's position of ontological pluralism cautions us not to treat every difference as a conflict, as something to overcome by reduction or unification. Different kinds of reality require different theories and explanations.

Yet despite the practical problems with completely unifying theories, local unity is not to be disregarded. For example, Richardson, argues that in rejecting unity as a goal in science we do not want to overemphasize pluralism at the expense of not seeing the fruitfulness of multidisciplinary research or suggest that we do not want different sciences to "talk with one another" (5). The concern is that without the hope that there is some connection there, without unity as a regulative, we would not search for connections that might be there, and we would not eliminate conflicting and erroneous beliefs. For our purposes here, in discussing the best ideal for our practical lives, we must point out that unity (albeit not a complete unity) can serve a practical purpose, since sometimes different beliefs and theoretical explanations end up conflicting in practice and we are at a loss as to which course of action to take. We may not know whether the practical conflict is only apparent and requires us to recognize different kinds of realities or whether there is a practical conflict because one belief is wrong. As Akeel Bilgrami claims, beliefs are essentially normative: they are not mere dispositions (that is, something we are caused to have), but commitments. A similar view is found in Peirce and the other American pragmatists who define belief as habit or as willingness to act: beliefs are future and action oriented. Conflicting beliefs might then function as conflicting commitments similar to moral dilemmas. In our discussion, we might say, for example, I am committed to the findings of biology, chemistry, and physiology, and yet I am committed to a religious notion of free will, moral accountability, and genuine loving relationships between persons. But what kind of account do I look for when a friend is suddenly diagnosed with clinical depression but has also experienced a recent death of a close family member? Can I accept both accounts? Must I choose only one? While there are problems with completely unifying theories, as we have discussed, unifying theories can become helpful *in practice* in situations when you must decide between competing explanations by offering a criterion to judge which explanation trumps others.

Still, when it comes to our moral norms, it has long been argued by many that it is not always helpful to reduce, unify or hierarchically organize our moral norms, despite the difficulties of moral dilemmas. Virtue ethicists, following Aristotle, for example, argue that values such as justice, generosity, autonomy, and charity are all intrinsic values and cannot be hierarchically ordered, but must be weighed differently depending on the individual case. This tradition argues that doing the right thing depends on practical wisdom, which weighs appropriately the many different values at stake in the unique situation.

Similarly, when it comes to our practical *beliefs*, we are often forced to make difficult decisions regarding various and sometimes competing scientific, common sense, moral and religious explanations, weighing the values of, say, empirical support in the narrow sense, religious support, explanatory value, all while trying to do justice to the kind of phenomenon that is truly at hand. Here we follow Dupré's view that once we accept scientific pluralism,

there is not just one criterion to judge a science to be legitimate, but many.²¹ So, when researchers in one field make a claim which seems to conflict with what others say in another field, and this poses a genuine conflict for our practical lives, then we will have to weigh our plurality of values (the various kinds of scientific support, the various kinds of religious support and our own personal experiential support, etc.). Following Cartwright, we sometimes might have to consider the conflict between two claims as really only claims getting at two different features of reality. Other times religious beliefs will have to be revised in light of science, and still other times scientific beliefs will have to be revised in light of religious ones. One typically sees the latter as forms of dogmatism, and often they are, but they need not be, and, of course, Cartwright's point is that there is dogmatism or "fundamentalism" in science as well. When and how do we decide that an apparent conflict indicates an error, and when such a conflict is not really a conflict at all, but really just different features of reality (to use Cartwright's phrase) or nonoverlapping magisteria (to use Gould's phrase)? This remains a difficulty in our practical inquiries. However, whatever the case, Cartwright's view at least frees us from seeing each difference as a conflict, and frees us to see that sometimes apparently new conflicts, if they have enough evidence, can be considered both right and simply part of a real world which is dappled.

We need not think unity is the appropriate ideal needed in these cases of practical conflict. Instead, we might consider the appropriate ideal to be simply reality itself, which is sometimes connected in a systematic and causal way, and sometimes not. Reality cannot conflict or contradict (though our fallible knowledge of it can, of course) but reality need not be nice and neat and orderly either, ready for our deductive or systematic demands. In general, since there is no successful theory of everything and so we do not know when to look for unity and when to accept difference, *we must* weigh the varying values to decide whether to accept pluralism and recognize different explanations for different kinds of phenomena or whether to accept local unity that would require recognizing that one explanation gets it right and the other does not (*or* that both are incomplete). When it comes to science and religion, this requirement is not necessarily different in kind from what we are required to do with the various sciences. It turns out that a complete unified theory is not needed for our practical lives, even though resolving conflicts is, and, of course, a completely unified theory is not forthcoming.

²¹ According to Dupré, the unity of science ideal can do a lot of normative work, even though he rejects that unity. For example, many hold that if psychology can be unified with (i.e., is reducible to) biology, then it is a legitimate science. But, like Cartwright, Dupré (1995) argues for the pluralist view of science, and that we simply have no neat criterion to judge beliefs to be scientific. Instead we have a set of epistemic virtues such as "sensitivity to empirical fact, plausible background assumptions, coherence with other things we know, exposure to criticism from the widest variety of sources" (1995: 243). We just have to do our best to weigh all these according to the case at hand when judging something to be a legitimate scientific theory or not. Here we are extending Dupré's view to our discussion of science and religion (though Dupré might not approve of setting religious and scientific views on a par). In doing so, we want to say that we are, in practice, often forced to make difficult decisions about competing scientific, moral, religious, and common sense explanations without having one neat criterion to apply. Instead we must weigh values of, say, empirical support in the narrow sense, personal experiential support, explanatory value, and other epistemic values.

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