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HOW CRITICAL IS REALISM?

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*The author explores the role of critical realism as the dominant epistemology in the science-and-religion dialogue. He presents the historical and philosophical peculiarities of this approach that have lead to its preeminence. Asking whether "science and religion" would benefit from greater epistemological variety, he presents a possible alternative to critical realism: enactionism, as articulated by Francisco Varela, Evan Thompson, and Eleanor Rosch in their book *The Embodied Mind*. Enactionism is not proposed as the replacement for critical realism, but the author wonders how science and religion would look given an enactionist epistemology.*

In 1966 Ian Barbour published *Issues in Science and Religion*. This text inaugurated the contemporary dialogue between religion and science. In its second section, "Religion and the Theories of Science," Barbour compares and contrasts the methodologies of science and theology. He concludes that there are both significant similarities and differences between the ways these two realms of inquiry operate. Some of the differences arise because the two modes of inquiry ask distinctive types of questions about distinctive types of experience. The distinctiveness of experience reflects the underlying fact that science and religion deal with dissimilar aspects of reality.¹ Yet despite this incongruence, Barbour is committed to the idea of a "wider search for coherence and synthesis which leads to a concern for metaphysics."² This wider search is aided by Barbour's epistemology: he identifies himself as a critical realist. What this epistemological perspective entails for the science and religion dialogue is the topic of this paper.

Barbour's advocacy of a critical realist epistemology has had far-reaching implications. Critical realism has become the dominant epistemology in the dialogue between science and religion.³ Why is this the case?

From a sociological perspective, it could be argued that the dominance of critical realism has to do with the status of its advocates within the overall science-and-religion dialogue. Barbour, the "grandfather" of the modern dialogue, strongly espouses it. So too do Arthur Peacocke and John Polkinghorne, two other foundational figures.⁴ The writings of all three of these thinkers form a central portion of an emerging "canon" in the science-and-religion field, thanks in large part to the Science and Religion Course Program. This program, which seeks to promote the teaching of courses in science and religion by offering \$10,000 grants to faculty who teach them, includes these authors in its "Brief Bibliography in Science and Religion," as well as in the bibliographies of many of its "model" courses.

While a sociological analysis of the dominance of critical realism along these lines could be fruitful, here the focus will be on the philosophical sources of critical realism's success. Critical realism apparently offers scholars in science and religion something that other epistemologies do not. What is this? What is it about critical realism that makes it seem the obvious, or best, choice for so many people working at the interface of science and reli-

gion? And what might this dialogue look like if a different epistemology were employed?

To understand the appeal of critical realism as an epistemology, it is necessary to make explicit what is implicit—an underlying commitment to ontological realism. The entities postulated by theologies and scientific theories are not merely instrumental constructs. They are *intended* to be interpreted as actually existing in the world (or beyond it, in the case of some theologies). Of course, it is important to qualify this claim, particularly for science. The entities proposed by science have a dual nature. They are, on the one hand, intended to refer to real entities. At the same time, however, their ontological status is acknowledged to be provisional until such time as their existence is confirmed by experiment.⁵ When, exactly, the existence of theoretical entities is sufficiently confirmed to grant them “actual” existence is a debated issue. For the current discussion, however, the significant point is the *intention*. Scientific realists do not propose entities merely for instrumental purposes. It is assumed that these entities are being proposed because entities “something like them” actually exist in the world.

The case of theology is in some ways more complicated than science, because theology, by and large, is not in the business of proposing the existence of entities. To be sure, theology does speak of entities, but the most important of these, God, is not *proposed* by theology. Rather, the existence of God is an assumption of theology. Many theologians are concerned with explicating the relationship of God and humans or God and the cosmos—or trying to understand the nature of the divine being itself. This last, in particular, makes theological realism somewhat different from scientific realism. Because of the radical difference between God and creation—God is infinite while creation is finite—Thomas Aquinas, following Maimonides, asserted that any attribute proposed of God, while meaningful, is unlike that same attribute applied to ourselves. So, while one may speak of God as love, this love is unlike the love that can be experienced. This creates problems for a realist interpretation of theology. How can any

theological reflections on God be understood to have a referent, if God’s infinity makes God wholly unlike the things postulated of God?

This epistemological conundrum opens the door for critical realism. Theologically, one may not wish to refute in its entirety Thomas’s claim about the discontinuity between God and the world. To do so would make God a being like beings in the world and create problems for understanding God as creator and the world as creation. However, by adopting a critical realist stance, it may be possible to maintain the transcendence of God, while at the same time allowing that some knowledge of the divine can be gained. How is this accomplished?

Critical realism asserts that all knowledge is inherently partial and incomplete. As opposed to naïve realism, which says that one directly confronts the “objective” world in one’s perceptions, critical realism views knowledge of the world as mediated. This mediation has a variety of sources. One’s perspective is limited, due to the constraints imposed by one’s locatedness in the world, and by the physical structure of the senses (and by extension, the structure of sense-extending technologies). Perhaps more significant is the claim that all knowledge, scientific and theological alike, is symbolic. Overlooking this symbolic nature leads to literalism in both fields.⁶ The importance of this recognition of the symbolic nature of thought is that since symbols are abstractions, they cannot represent *all* the features of their referent. Thus, in symbolic thought some aspects of the referent are always neglected.⁷ Knowledge of the world is inherently partial, due to constraints of the thought process. These constraints (viz., of locatedness, of our physical senses, and of our symbolic thought) account for critical realism’s claim that all knowledge is partial, but it remains to be shown how this claim of the inherent incompleteness of knowledge helps overcome the problem of reference in theological language about God.

While the attributes one predicates of God cannot be taken literally, symbolic language allows the construction of metaphors. In metaphors, knowledge is applied from an area of

familiarity to a novel or unknown area.⁸ When one speaks of God as love, this is a metaphor. *Human* experience to understand the divine being. Is this simply poetic language? George Lakoff and Mark Johnson argue that it is not: metaphors are not just poetic or rhetorical; rather, they are found in all modes of human knowledge. Significantly, metaphors figure prominently in scientific discovery.⁹ What is the status of knowledge acquired from metaphorical thought? As Janet Soskice asks:

[H]ow can we claim that these metaphorical terms are in some sense descriptive, or as I prefer to say, reality depicting, prior to and without definitive knowledge of reality?¹⁰

Soskice is a critical realist, and in order to answer this question from a realist perspective she turns to theories of reference. In particular, she relies on the work of Saul Kripke and Hilary Putnam. The essence of their theories, according to Soskice, is that “reference depends, in normal speech, as much on context as on content and that reference is an utterance-dependent notion.”¹¹ She then cites the work of Richard Boyd to make the transi-

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tion from metaphor in normal speech to metaphor in science.¹²

Through her use of theories of reference, Soskice tries to establish that metaphors can have a positive cognitive content despite the unknown nature of the entities they are used to describe. Following Kripke, she concludes that this provides for a realist interpretation of metaphorical theoretical terms.¹³ Descriptions of the theoretical entities may be com-

pletely mistaken, but the context in which they are proposed still allows the claim that what they are *intended* to refer to is a real thing. With such an epistemology in place, metaphorical explications of the divine nature can be understood to have real referents even if those explications can never be entirely adequate.

In so far as critical realism recognizes that knowledge of the world is inherently limited, it is an extremely useful epistemology for the science-and-religion dialogue. This utility owes much to the epistemic humility it calls for in both science and theology. Neither science nor religion, on a critical realist interpretation, can provide complete knowledge of the world, because each is a limited enterprise—limited by both its methods and its specific symbol system. For those interested in establishing a fruitful dialogue between science and religion, this has obvious benefits. Since neither field can legitimately claim to be the only path to complete knowledge of the world, a strong polarization of the sides is subverted.

Critical realism also entails a further claim that makes it appealing to those interested in questions at the interface of science and religion. According to Barbour, realists in general (and critical realists in particular) deny the premise that the real is limited to the observable.¹⁴ In place of observability, Barbour proposes intelligibility as the hallmark of reality.¹⁵ This greatly expands the realm of the real, making it much more accommodating to the kinds of non-observable entities dealt with in theology. As long as the theories of theology meet acceptable standards of evaluation, standards that share criteria with those proposed for the evaluation of scientific theories (e.g., fruitfulness, coherence, simplicity, explanatory power), they can be taken to be reality-depicting, according to Barbour’s criteria of intelligibility. This is not simply a clever

way of allowing theology to claim that its language about God has an actual referent. The same move from observability to intelligibility is applied in the realm of science to argue for the existence of theoretical entities that are non-observable both in practice and in principle. Critical realism opens the door for dialogue between science and religion by preventing either side from monopolizing knowledge-claims, and by extending the realm of the real in a way that is conducive to theology. This facilitation of dialogue is, I believe, the primary reason why this epistemology has taken on a central role in the science-and-religion dialogue.

The acceptance of critical realism has also been based on contextual factors. The science and “religion” dialogue has been accused of being a misnomer: the dialogue is not between science and religion, but primarily between science (and particular sciences, at that) and Christianity. While this is changing—the Science and Religion Course Program, for example, is explicitly trying to establish a dialogue in Islamic Africa and the Middle East—there have also been attempts to justify this

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bias. Peacocke argues that the bias towards Christianity results from the historical fact that modern science emerged in a predominantly Christian environment. This historical circumstance, combined with the claims to epistemic authority made by both science and Christianity, have resulted, at times, in clashes between science and Christianity—hence the need for

a dialogue.¹⁶ The emphasis on Christianity has had broader repercussions than simply limiting the dialogue to the perspectives of one religion (diverse as Christianity is): it has also limited the dialogue to Western philosophical perspectives. This is important, as critical realism relies heavily on certain assumptions of Western philosophy.

Critical realism proposes that there is a world “out there”: a world separate from and, for the most part, independent of the observer. Realist ontology accords with the intuitive sense of the way the world is—there are “things” in the world. Realist epistemology then argues that knowledge of the world is knowledge of these “things.” Underlying both this ontology and epistemology is a distinction, a separation, between knower and known. The knower is removed from the world that is known. This subject-object dualism has led to all manner of difficulties for Western philosophy. In particular, if knowers are separate from the world, how can reliable knowledge of the world be gained? This subject-object dualism is Descartes’s legacy to Western philosophy, and critical realism is

but one in a long line of attempts to answer this question.¹⁷

Critical realism rests on the idea that objects of the external world are represented in the mind symbolically. These symbols, though inherently limited in their ability to depict “reality,” nonetheless fairly accurately represent the world.¹⁸ This kind of mental representation emerges

from a cognitivist, or computationalist, philosophy of mind, in which the mind is essentially a symbol-processor/manipulator.¹⁹ Because the mind is limited to information-processing tasks, it can be analyzed and discussed independently of its particular physical manifestation and the world in which it finds itself.²⁰ Thus, Descartes’s separation of mind

and body remains alive and well in critical realism.

While critical realism accepts the cognitivist account of the mind, cognitivism has been challenged within cognitive science. Alternative theories of the mind have been proposed that attempt to do away with Cartesian dualism—some more radically than others.²¹ If cognitive science has questioned the validity of a mind separated from the physical world, why has religion-and-science, via critical realism, remained content with cognitivism? For one thing, it fits neatly into a Christian framework: the idea of a mind that is more or less independent of the specifics of the physical world accords easily with traditional Christian notions of the soul. For another, the cognitivist view of the mind does not challenge the idea of an objective, mind-independent world, often associated with science.

The consonance between cognitivism and ideas of the soul evidences the primacy of Christianity in much of science and religion. If the science-and-religion dialogue were dominated by a different religious tradition, specifically one that does not have a notion of the soul, would critical realism have been as likely to become the basic epistemology? It seems reasonable to speculate that a worldview that does not see the person as having an immaterial “essence” would not frame epistemological questions in terms of the problem of knowing an external, independent world. A worldview that does not posit the knower as independent of the world would likely not fixate on Descartes’s and Locke’s question—how can immaterial minds have knowledge of the material world? Without the split between mind and body, subject and object, a realist ontology that posits a world “out there” would not seem intuitively obvious.

The dominance of critical realism in the science-and-religion dialogue, like the dominance of Christianity, has a great deal to do with the historical and cultural context in which the dialogue has, for the most part, taken place. This raises a number of questions. The overarching question is this: Is critical realism the most productive epistemology for

this dialogue? This complex question needs to be broken down in order even to begin to answer it. A few starting questions might be: How is “productivity” to be assessed? What are the boundaries of the dialogue? If it is predominantly Christian, the answers will be very different than if the dialogue is explicitly inter-religious. What are the goals of the dialogue? How these goals are established relates both to the boundaries of the dialogue and to the issue of how productivity is assessed.

Proponents of critical realism could argue that its predominance is itself evidence of its productivity. If a better theory existed, surely it would be the one everyone uses. They could also claim that within a Christian context critical realism is the best choice. If they are to be self-reflexive, however, they must acknowledge that this judgment is predicated upon certain philosophical commitments, the most significant among which, I believe, is the independence between mind and world. If this commitment were set aside, would other epistemologies become at least as productive, if not more so, for the dialogue?

Francisco Varela, Evan Thompson, and Eleanor Rosch have constructed an alternative to critical realism’s view of the mind. Their alternative, called enactionism, is proposed over and against the two main strands of Western epistemology—realism and idealism. Both of these traditions are based on the shared assumption of mental representation. In the former case, representation is used to recover an external world, while in the later it is used to project the internal world of the mind onto the exterior world.²² Varela *et al.* believe that they can side-step many of the epistemological questions endemic to Western philosophy by rejecting altogether the idea of cognition as representation. Instead, cognition is seen as “embodied action.” By this they highlight two things. First, cognition cannot, as in cognitivism, be discussed in abstraction from its physical manifestation. Cognition is intimately related to the kinds of experiences available to the particular kinds of physical beings that humans are. This includes not only human biology, but also psychologi-

cal and cultural contexts. Second, cognition is a form of action. That is, sensory and motor processes are inseparable: cognition is a lived process.²³

For Varela *et al.*, the view of mind is based on an underlying Buddhist philosophy. This philosophy, articulated most fully by Nagarjuna, argues that nothing has independent existence; all being arises co-dependently.²⁴ This idea of interdependence finds a modern counterpart in ecology, but in the Buddhist context it takes on metaphysical significance. The claim is not simply that all things are related to other things, but that this relationality precludes the idea of any "thing" having truly independent existence. This ontology is the basis for the rejection by Varela *et al.* of the dualism inherent in cognitivism. Knower and known are not separated but are, in fact, intimately related. Thus, the epistemology implied by their "enactionist" philosophy of mind is very different from critical realism. Knowledge is not preexistent, but is "enacted in particular situations."²⁵

Critical realism, it must be noted, also denies a simplistic idea of preexisting knowledge—that is, facts about the world that exist independent of the knower. This is the view it ascribes to naïve realism. Critical realism acknowledges that human knowers play some role in knowledge "construction," hence the provisional status it accords to human knowledge. The "constructive" role of the knower, however, is a rather modest one. Peacocke argues that the human role in the generation of knowledge is limited by subjecting knowledge-claims to critical evaluation.²⁶ This process, on a realist account, can bring theories into better and better accord with the way things "actually" are. It is important for critical realists to limit the human contribution in this way. Peacocke sees the strong program in the sociology of knowledge as an example

of what happens when the human input to knowledge-claims goes unchecked. He sees such programs as undermining fruitful dialogue between science and religion, because all truth claims degenerate into ideological commitments. The end result is that the science-and-religion dialogue would become nothing more than "a purely sociological inquiry or exercise in the history of ideas."²⁷

The sociology of knowledge claims that theories about the world are heavily influenced by socio-cultural factors, but it does not make the more radical claim that the world "itself" is altered in any direct sense by the way one knows it. Enactionism, on the other hand, does make this more radical claim.

Does enactionism run into the same problem because of its emphasis on the role of the knower? It seems that it does not. The sociology of knowledge rejects the idea that one can have "objective" knowledge, because it rejects the idea that one can have unmediated access to the world "out there." In this claim, enactionism is similar to critical realism. But whereas critical realism, based on an underlying realist ontology, claims that there is a world "out there" that knowledge can come closer and closer to approximating, the strong program of the sociology of knowledge rejects this progressionist vision of science. One's theories always are, and always will be, heavily reflective of one's own socio-cultural biases.²⁸

Both critical realism and the sociology of knowledge share a Western philosophical perspective in which there is a one-way divide between epistemology and ontology—while ontology may influence epistemology, epistemology does not affect ontology. The sociology of knowledge claims that *theories about the world* are heavily influenced by socio-cultural factors, but it does not make the more radical claim that the world "itself" is altered

in any direct sense by the way one knows it. Enactionism, on the other hand, does make this more radical claim. The coupling that takes place between knower and known means that there is “no fixed, permanent substrate or foundation” to the world; there is no objective world for theories to be about in isolation from those who hold the theories.²⁹ Note that the claim here is not that there is no “objective” world, but rather that such a world must include human knowers in their activity as knowers. “Objectivity,” in the sense of “the world as it is in itself,” is redefined in a way that removes the subject-object split.

By shifting away from a worldview based on the assumptions of Western philosophy, enactionism avoids Peacocke’s fear that a thoroughgoing involvement of the knower in the production of knowledge implies a loss of objectivity. It does, however, require that objectivity as it is postulated in Western thought be reconsidered. What does this mean for the science and religion dialogue? Could enactionism be as productive for meaningful dialogue as critical realism? Given Barbour’s claim that scientists generally are realist in their view of science,³⁰ a theory that challenges realist ontology could undermine the credibility of the dialogue among the scientific community. A review of the literature on realism in the philosophy of science, however, seems to question whether scientists can so easily be identified as realists.³¹ If this is the case, enactionism should not be rejected simply because it challenges traditional notions of “objectivity” based on realism. In fact, enactionism’s view of the process of cognition as a coupling of knower and known, and its emphasis on the influence of biological, psychological, and cultural contexts on this coupling, make it necessary to take all facets of human experience seriously. Thus, not only does enactionism support the idea of dialogue between science and religion, it would expand this to include other areas of human endeavor, such as art.

An enactionist approach might also be more inviting to religions other than Christianity, Judaism, and Islam—religions, that is, that do not share a Western understanding of

personhood. I have challenged the dominance of critical realism in so far as its adoption has been the result of structural similarities to a particular religious tradition, namely Christianity. To be fair, it must be asked whether enactionism, with its roots in Buddhism, would appeal mainly to Buddhists. If so, this would cast doubt on the idea that it would be more appropriate to a variety of religions than critical realism is.

In an attempt to bring theological ideas of what the person is into harmony with modern science, many Christian theologians have emphasized that the Bible presents humans as psychosomatic unities—both body and soul. This can be understood to mean simply that I am a soul residing inside a body. However, it can also be given a more integrative interpretation in which body and soul are intertwined, and “I” am not myself without both. The latter is the view of those who wish to bring theological anthropology more in line with science. This view of the person would not, I believe, have the difficulties with enactionism that the former might. If this is the case, then at least those Christians holding the more integrative view who are engaged in the science-and-religion dialogue should not feel alienated by enactionism.

These brief reflections on the possibilities of enactionism for the science-and-religion dialogue are not intended to argue that it is the best approach. Rather, the point is to question the dominance of critical realism, in part by exploring a different epistemology. Realism in general, much less critical realism in particular, has not achieved normative status in philosophy. Thus, its dominance in the field of science and religion seems somewhat peculiar. For those who go far enough to call it a “dogma,” critical realism’s prevalence seems incongruous with its own spirit of holding all theories as tentative.³² That is not to say, however, that critical realism should be rejected outright. It has worked fairly well for the science-and-religion dialogue. From the religious side, its view of the mind and insistence that it is intelligibility, not observability, that is the determining factor in ascribing “reality,” allow for a smooth integration with

Christian theology. The emphasis on intelligibility also makes sense from the perspective of science—especially physics, which has been one of the most significant participants in the dialogue from the science side. As the dialogue becomes more diverse religiously, however, new resources, like enactmentism, will come to the attention of Western scholars and could take the dialogue in new and exciting directions. This should not come at the expense of critical realism. Having multiple epistemologies active in the science-and-religion dialogue would, I believe, be more fruitful than having the dialogue dominated by a single perspective, whatever it may be.

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2. *Ibid.*, p. 268.
3. Gregersen and van Huyssteen, p. 8.
4. *Ibid.*, pp. 2, 52.
5. Hacking, pp. 256-59.
6. Barbour, *op. cit.*, p. 157.
7. *Ibid.*, pp. 156-7.
8. Lakoff and Johnson, pp. 45ff.
9. *Ibid.*, p. 123.
10. Soskice, p. 177.
11. *Ibid.*, p. 178.
12. *Ibid.*
13. *Ibid.*

14. Barbour, op. cit., p. 168.
15. Ibid., p. 170.
16. Peacocke, *Theology for a Scientific Age*, pp. 3-6.
17. Ramsperger, p. 261.
18. Robbins, pp. 656-7.
19. Andresen.
20. Robbins, p. 657.
21. See, e.g., Varela et al.
22. Ibid., p. 172.
- 23 Ibid., pp. 172-73.
- 24 Ibid., pp. 217ff.
- 25 Ibid., p. 179.
- 26 Peacocke, pp. 19-20.
27. Ibid., p. 19.
28. See, e.g., Knorr-Cetina.
29. Verala et al., p. 217.
30. Barbour, *Religion and Science*, p. 177.
31. See, e.g., Fine.
32. Robbins, p. 656.

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He lives in Waltham, Massachusetts, with his wife Jessica and their son Jasper, and works as an organic landscaper and gardener. He hopes to combine teaching, activism, and farming in his career.

The New England Center for Faith and Science Exchange awarded Mr. Maslowe a year-2001 Publication Prize for this essay.

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