UNCERTAINTY AND GOD: A JAMESIAN PRAGMATIST APPROACH TO UNCERTAINTY AND IGNORANCE IN SCIENCE AND RELIGION

by Arthur Petersen

Abstract.   This article picks up from William James's pragmatism and metaphysics of experience, as expressed in his "radical empiricism," and further develops this Jamesian pragmatist approach to uncertainty and ignorance by connecting it to phenomenological thought. The Jamesian pragmatist approach avoids both a "crude naturalism" and an "absolutist rationalism," and allows for identification of intimations of the sacred in both scientific and religious practices—which all, in their respective ways, try to make sense of a complex world. Analogous to religious practices, emotion and the metaphysics of experience play a central role in science, especially the emotion of wonder. Engaging in scientific or religious practices may create opportunities for individuals to realize that they are co-creators of the world in partnership with God, in full awareness of uncertainty and ignorance and filled with the emotion of wonder.

Keywords: complexity; emotion; ignorance; William James; metaphysics; phenomenology; pragmatism; religion; science; uncertainty; wonder

Science and religion are very different types of human practices. Science is about understanding human and nonhuman nature without invoking God, and religion is about relating to God. In this article, I explore what scientific and religious practices can have in common, when viewed from the perspective of the American philosopher William James (1842–1910). I am specifically interested here in the roles of emotion and the metaphysics of experience in characterizing both types of practices. How do emotion and the metaphysics of experience—and corresponding intimations of the sacred—relate to the irreducible uncertainty and ignorance that characterize both science and religion? And what does this imply for the relationship between uncertainty and God?

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James is a particularly interesting thinker with respect to the role of uncertainty and ignorance in both science and religion. As Paul Jerome Croce (1995) has shown, the young James closely witnessed at Harvard transitions in American intellectual life from scientific and religious beliefs held with certainty to belief based on uncertainty. In science, particularly the implicit probabilism of Charles Darwin's theory of natural selection set the stage for this transition. In religion, the stage for transition was set by liberal Protestant thought.

James saw the building of relations between science and religion as a subtle task: theology should take science seriously, but not become a "crude naturalism" (James [1907] 1995, 116). James pointed out that his pragmatist philosophy, which he himself termed "radical empiricism," could act as mediator between science and religion. According to David Lamberth, "James . . . seeks a philosophy that both can account for the practical successes of the sciences and can value and provide insight into our moral and religious sentiments and experiences, as well as our basic sense of life" (Lamberth 1999, 186). I contend that at the same time, such a philosophy can address intimations of the sacred—including intimations of God—in scientific practices.

In order to elucidate how a Jamesian pragmatist approach could work in the context of current understandings of scientific and religious practices, I make use of David Lamberth's (1999) interpretation of James's metaphysics of experience. I also make connection to recent discussions of interpreting James in the context of science-and-religion. Subsequently, I feature several phenomenological accounts (Lonergan 1957; Miller 1992; Letiche, Lissack, and Schultz 2011; de Knijff 2013) that are consistent with Jamesian pragmatism in relevant respects, and which allow for the development of a more fine-grained approach. I continue the article with applying the developed Jamesian pragmatist approach in analyses of the role of emotion and the metaphysics of experience *vis-à-vis* uncertainty and ignorance in scientific practices (using examples from natural science) and in religious practices (using examples from liturgical ritual). Finally, I briefly summarize an answer to the question on the relationship between uncertainty and God.

James's Pragmatist Approach to the Metaphysics of Experience

For the purpose of introducing James's work from the perspective of what he had to say about metaphysics and religion, I here make use of David Lamberth's (1999) study *William James and the Metaphysics of Experience*. There has been—and still is—a bias in the reception of James toward his work in psychology, which is not surprising given James's background and given his approach to philosophy. James is a founding father of the

discipline of psychology, especially through the publication of his *Principles of Psychology* in 1890. At Harvard University, he had first been appointed as a professor of psychology, from 1889 to 1896, before he was reappointed as a professor of philosophy in 1897. James's metaphysics had reached its initial form already in the mid-1890s and was published in its most elaborated form in *A Pluralistic Universe* in 1909 (James's Hibbert Lectures to Manchester College, Oxford in 1908). Lamberth offers an enriched interpretation of James's most famous work, *The Varieties of Religious Experience*, which was published in 1902 (James's Gifford Lectures to the University of Edinburgh in 1901–1902). He furthermore shows how James's book *Pragmatism*, published in 1907 (James's Lowell Lectures to the Lowell Institute, Boston in 1906), contains important clues on his metaphysics.

Lamberth summarizes James's composite philosophical worldview as follows:

> The components to be distinguished are: (1) the *methodological* thesis (or postulate) of radical empiricism that only, and yet all, experienceable constructions be admitted in philosophy; (2) the *factual* thesis of radical empiricism that relations are themselves a part of experience; (3) the *metaphysical* thesis of pure experience; (4) the *functional* doctrine of direct acquaintance, or immediate knowing; (5) the *functional* account of knowledge about, or conceptual knowing; . . . (6) the *pragmatic* conception of truth . . . [and] (7) the thesis of *pluralistic* panpsychism. (Lamberth 1999, 14)

First, the methodological thesis of radical empiricism implies an opposition to rationalism and a methodological approach that starts with parts instead of the whole of being, and thus emphasizes particularity and concomitant fallibility of conceptual entities. The "radical" flavor of James's empiricism derives from his insistence that no element that is directly experienced may be excluded from constructions. And in practice, says James (who is here benefitting from his background as psychologist), people do not experience the absolute—which is a rationalist construction—but rather "[w]e humans are incurably rooted in the temporal point of view" (James 1909, 40) and—highlighting the pluralism inherent in his radical empiricism—"a disseminated, distributed, or incompletely unified appearance" (James 1909, 44) is the most that may be achieved in experience; an experience, however, that is much fuller and wider than a crude naturalism would have it.

Second, the factual thesis of radical empiricism leads philosophy to consider the relations that connect experiences to be themselves experienced and thus as "real" as anything else in the system. Against rationalist philosophy with its impracticable ideas, James argues that "[e]very examiner of the sensible life *in concreto* must see that relations of every sort, of time, space, difference, likeness, change, rate, cause, or what not, are just as integral members of the sensational flux as terms are" (James 1909, 279).

According to James, it is implausible that all the differentiations of relation could be produced by the mind, rather than be part of the object as any other quality of content.

Third, the metaphysical thesis of pure experience argues against thought/thing and mind/matter dualisms. "Pure experience" is considered by James to be the one primal stuff that exists in the world, and knowing (and consciousness) can then be understood as relations between thought and thing, mind and matter, subject and object, while remaining aware that the words "thought," "thing," and so on only signify aspects of pure experience and should not be taken as dualisms. Pure experience thus serves as a monistic metaphysical substratum.

Fourth, the functional doctrine of direct acquaintance refers to discrete pure experience treated epistemologically, which admits of an immediate cognitive relation between two collectives of pure experience. James offers an example of the particular experience of sitting in a room: in the immediate pure experience the two contexts of an individual's personal biography and the history of the house containing the room conjoin. In this case, the subject has direct acquaintance with the object. Phenomenologically this function of direct acquaintance can be described as knowledge that lacks mediation by concepts. This knowledge is not automatically made valid by its immediacy. There is a fundamental potential indeterminacy that leads to novelty and surprises. All experiences are potentially indeterminate with respect to truth (see below).

Fifth, the functional account of "knowledge about" concerns external relations of conjunction, pure experiences that functionally connect discrete pure experiences. Phenomenologically, "knowledge about" involves discrete experiences leading one to another serially and terminating in a final discrete experience. James's focus on the termini, or endpoints, of this dynamic allows him to explicate the philosophical notion of "representation" as one of "substitution":

> While functions of knowing can be distinguished according both to their starting points and the paths of conjunction they follow, the most important similarity and dissimilarity they have depends on their termini. The fact that two functional chains of intermediaries share the same terminus makes them functionally similar, and that functional similarity, on James's view, allows for substitution: one chain for another. . . . The most important case of substitution in human life, James thinks, is the substitution of conceptual paths for perceptual ones. (Lamberth 1999, 47)

Concepts—even though they are ultimately all fallible (see below)—can thus serve a useful purpose. In James's words: "We come back into the concrete from our journey into these abstractions, with an increase both of vision and power" (James 1909, 217). One should not underestimate the potential useful power of concepts.

Sixth, the pragmatic conception of truth follows from James's radical empiricism. Against the presence of "an absolute mind that makes the partial facts by thinking them" (James 1909, 36), James posits a distributive form of reality which does not need an all-knower to hold the world together. Verification of truth can in principle only be done by referring to an available pure experience, thus by referring to a practice. Even though truth cannot be directly verified, something like "trueness" can be assessed in terms of success: "one must evaluate the concrete success . . . an idea has in serving as *denkmittel* through the world of pure experience" (Lamberth 1999, 53). One cannot do this alone: "On James's view truth and the process of establishing it is social, . . . most basically because reality itself—including the knowers and the known, concepts and objects, and the true and the real—is social in the most fundamental and human senses" (Lamberth 1999, 57). The sociality of pragmatism's understanding of truth takes a central position in James's radical empiricism.

Finally, the thesis of pluralistic panpsychism builds on the lack of need for an all-knowing mind or infinite God to maintain the individuality and specificity of elements in reality. Instead, James proposes a pluralistic and nondualistic version of the claim of panpsychism that all objects have an inner, psychical aspect. In *A Pluralistic Universe*, James writes:

> Pragmatically interpreted, pluralism or the doctrine that it [the universe] is many means only that the sundry parts of reality *may be externally related*. Everything you can think of, however vast or inclusive, has on the pluralistic view a genuinely "external" environment of some sort or amount. (James 1909, 321, emphasis in original)

A corollary is that, while James's philosophy permits of a superhuman consciousness, this cannot be an all-knower in its absolute form but will be an almost all-knower with an external environment and will be finite. Such a God, according to James, may be at odds with rationalist philosophy but is much more congruent with religious experience. A further corollary is that due to the fundamental openness of experience and hence of the world, "James's pluralism is able to leave open theoretical space for real, factual novelty (which comes about all the same), such as that found in new scientific discoveries, new or unexpected experiences (for example, religious experiences), and even the inexhaustible wealth of detail in any given bit of pure experience" (Lamberth 1999, 195). From this fundamental openness, the present article develops as its main theme that wonder can be permanently encountered in both scientific and religious practices.

Lamberth (1999) does not describe James's theory of emotion. For that purpose I rely on Jeremy Carrette (2008), who argues for a three-stage picture of James's theory of emotion, which is consistent with Lamberth's interpretation of James. "Stages" here refer to the development of James's thought. Stage one (James's "organic theory") focuses on the "coarser" or

"standard" emotions. Without doubt the central basis of James's theory of emotion is grounded in the body. Stage two (James's "cognitive theory") deals with the "subtler" or "complex" emotions, which are related to moral, intellectual, spiritual (mental), and aesthetic dimensions of life. Stage three (James's "social theory") refers to the "religious" and "metaphysical" emotions. These three types of emotion (as described by three theories) can occur in combination, that is, a social emotion can have cognitive and organic emotions associated with it.

Given these interpretations of James by Lamberth and Carrette, I now turn to three recent discussions of William James in the pages of *Zygon* (Watts 1997; Taves 2009; Crockett 2012).

While Fraser Watts (1997) interprets James unfavorably as a biological reductionist with respect to emotions (since according to James, feelings arise from the perception of biological changes), he makes use of James's *The Varieties of Religious Experience* ([1902] 2012) to argue that "emotion . . . may be a rather good analogue of religion" (Watts 1997, 248). In assessing the critical reception of *The Varieties of Religious Experience* in theology, Watts identifies the need to account for the role of cognition in the genesis of religious feelings, and he also adds that James's earlier psychological work would allow for such an interpretation of *The Varieties of Religious Experience*: "Though this emphasis is less marked in *The Varieties of Religious Experience* than it might be, James would presumably have had no difficulty in recasting what he said there so as to reflect more adequately his general theoretical position" (Watts 1997, 249). My contention is that Lamberth's interpretation of James does precisely that and therewith meets Watts's concerns: relations to cognitive elements can be—and in most cases will be—involved in people's pure experience. Thus James's notion of religious experience can be seen to be in line with contemporary theories of emotions.

Ann Taves (2009) remarks on the various extant interpretations of James's *The Varieties of Religious Experience*, citing also Lamberth's (1999), that most of these have missed that writing it was a religious act for James:

> [T]hose of us in the academy who have attempted to read it for our own purposes—philosophical, mystical, or scientific—have mostly missed the point. The bigger story, and one that many of his nonacademic readers have grasped, is [the] shift from the other world to this world, from life after death to self-transformation aided by higher powers. (Taves 2009, 430)

Still, I would maintain that Lamberth's interpretation of *The Varieties of Religious Experience* in light of James's metaphysics gives us a philosophically useful interpretation that, while acknowledging the complexities of James's book, can assist us in better characterizing the relationship between science and religion. For example, Lamberth stresses the importance of *A Pluralistic Universe* for interpreting *The Varieties of Religious Experience* and in *A*

Pluralistic Universe one can clearly sense James's personal frustration with his contemporary Church and its theism: "An external creator and his institutions may still be verbally confessed at Church in formulas that linger by their mere inertia, but the life is out of them, we avoid dwelling on them, the sincere heart of us is elsewhere" (James 1909, 30). On the positive side, James is very sympathetic toward those who know "that we inhabit an invisible spiritual environment from which help comes, our souls being mysteriously one with a larger soul whose instruments we are" (James 1909, 308). Indeed, for James it is all about saving experiences and intimacy with God, versus the theistic view of humans being outsiders and mere subjects to God.

Finally, Larry Crockett (2012) laments the minor role played by pragmatism in the half century and more of the science-and-religion dialogue. He returns to James as an "unintentional fountainhead in the history of thought":

> One line of thought from James to Whitehead to Barbour culminates in critical realism; another from James to Dewey to Rorty culminates in a quasi-relativistic neopragmatism. Thus, James's writings issued in exactly the kind of bifurcation he strove to avoid. (Crockett 2012, 393)

This argument is well taken; taking the Jamesian pragmatist approach seriously goes against both positivism and relativism. I here give Crockett's overall assessment of Jamesian pragmatism:

> Pragmatism notably holds out the promise of mitigating the conflicts of the many religions that humanity has embraced. Pragmatism in theology tempers the presumption of the theologian who imagines the mind of God is readily amenable to theological representations; therefore, pragmatism intentionally subverts the dogmatically doctrinal as notably unhelpful to community conversations. Pragmatism in natural science means our concepts are more akin to Darwinian species that have no essentialist definition but are frankly recognized as conceptual species whose pertinence to the problems we wish to solve will have a profound history. Pragmatism should reign in the dialogically inhibiting presumption of both positivist science and dogmatic religion that are the source of much of the historic tension. In general terms, therefore, pragmatism offers the prospect of a robust dialogue that should stimulate both our understanding and our civility. (Crockett 2012, 410–11)

In a manner consistent with Lamberth's interpretation, Crockett engages fruitfully with the whole body of James's work, including his *A Pluralistic Universe*, in the context of object-oriented programming.

Having arrived now at a somewhat fuller picture of Jamesian pragmatism, I endeavor in the following to connect James to a third line of thought, that of phenomenology. Here James cannot be considered the "fountainhead." But the line of phenomenological thought from Heidegger onwards shows remarkable similarities to the

phenomenological implications of James's metaphysics, in particular when we focus on uncertainty and ignorance. In the introduction to James's pragmatist approach given in this section, for the two components of knowing—that is, immediate knowing and conceptual knowing—I already included Lamberth's phenomenological accounts. Immediate knowing (direct acquaintance) lacks mediation by concepts and conceptual knowing (knowledge about) involves the substitution of conceptual paths of conjunction for perceptual ones. Since any bit of pure experience contains an inexhaustible wealth of detail and knowing, according to James's pluralism, and has to leave open space for factual novelty, it is worthwhile to further develop this aspect of uncertainty and ignorance. In the next section, I demonstrate that phenomenological thought is fit for this task.

UNCERTAINTY AND IGNORANCE IN PHENOMENOLOGICAL THOUGHT

Uncertainty and ignorance are key in phenomenological descriptions of both science and religion. In science, the complexity of the world overwhelms us humans. In religion, the situation is similar. Building on the phenomenological philosophies of Martin Heidegger ([1927] 1962) and Bernard Lonergan ([1957] 1992), Jerome Miller's (1992) *In the Throe of Wonder: Intimations of the Sacred in a Post-Modern World* delves into the philosophical depth of the experience of the unknown:

> [P]hilosophy requires us to recognize as unknown precisely the familiar which we thought we knew. At the very beginning it situates us in the middle of a whole which we know only as wholly unknown. . . . Because the unknown is not assimilatable into the given, we can become aware of it as unknown only by acknowledging its difference, and the impossibility of homologizing its otherness with what we have heretofore thought of as the already known. (Miller 1992, 3)

Such a philosophy takes James's antiabsolutism very seriously. While concepts may prove to be useful in practice, they should always be considered fallible, especially when one journeys among abstractions.

One of the central concepts of phenomenological thought is "being." In Jamesian terms, I propose that "being" can be understood as "pure experience." By taking a closer phenomenological look at wonder, one can begin to grasp both the fullness of pure experience and its fundamental potential indeterminacy. Lonergan describes the phenomenon of wonder as follows:

> One may wonder just how all-inclusive being is. That wonder may be formulated in a variety of manners. But no matter how it is formulated, no matter whether it can be formulated, it can serve only to show how all-inclusive being is. For the wonder is inquiry. It is the desire to know.

> Anything it can discover or invent, by that very fact is included in the notion of being. (Lonergan [1957] 1992, 375)

Wonder is a motivating force in a variety of practices of inquiry.

Wonder is emotional; wonder provokes "the eros of the mind" (Miller 1992, 8). The emotion of wonder is not limited to deep philosophical or religious wonder, but includes the wonder that drives any kind of inquiry and that may ultimately result in insight and judgment:

> Insight comes as a release to the tension of inquiry. . . . Deep within us all, emergent when the noise of other appetites is stilled, there is a drive to know, to understand, to see why, to discover the reason, to find the cause, to explain. (Lonergan [1957] 1992, 28)

The creative tension caused by wonder, when released, causes the emotion of joy (see also the next section). Following James's theory of emotion, the emotions of wonder and joy have organic, cognitive and—in the case of, for example, religious or metaphysical wonder and joy—social dimensions (including, for example, social relations with the community and with the sacred).

It cannot be planned when the tension of inquiry gets released, since "insight comes suddenly and unexpectedly" (Lonergan [1957] 1992, 29). Similar to the fallibility assumption of pragmatism, Lonergan holds that insight is fallible:

> The formulations of understanding yield concepts, definitions, objects of thought, suppositions, considerations. . . . [S]uch formulations are, of them-selves, just hypotheses: they may be accurate or inaccurate, correct or mis-taken; and to pronounce upon them is the work of reflection and judgment. (Lonergan [1957] 1992, 298–99)

Then—in apparent contrast with pragmatism—Lonergan seems to imply that the faculty of judgment should be able to ultimately deal with the fallibility of insight, by answering the question "But is it so?":

> Judgments are personal commitments to a yes or no; both answers cannot be given to the same question; and under ideal conditions either one of the two answers has to be given. (Lonergan [1957] 1992, 302)

Still, Lonergan does keep open the possibility that no definite answer can be given:

> When there is no preponderance of evidence in favor of either affirmation or denial [of insight], we can only acknowledge our ignorance. But between these extremes there is a series of intermediate positions, and probable judgments are their outcome. (Lonergan [1957] 1992, 324)

So, in between the extremes of certainty and ignorance we have uncertainty and judgment can only be "probable" without having the statistical means at our disposal to determine an objective probability.

We find that Lonergan finally arrives at a pragmatist conclusion on the basis of our knowing: "The ultimate basis of our knowing is not necessity but contingent fact, and the fact is established, not prior to our engagement in knowing, but simultaneously with it" (Lonergan [1957] 1992, 356). One can only find out truth "pragmatically by engaging one in the process" (Lonergan [1957] 1992, 356).

Since Lonergan's analysis of insight and judgment largely neglects wonder about social worlds (remembering also that for James religious and metaphysical emotions are social), I also discuss a phenomenological approach that focuses on social reality. Hugo Letiche et al. (2011) have developed a social complexity theory which systematizes the fundamental tension between "experienced/emergent coherence" and "homologies" (structural principles of similarity in reality with generative power). Their method of systematizing the interrelationship between these two concepts is to consider them as two corners mirrored around the center of a "semiotic square," with two other concepts, those of "attributed/ascribed coherence" and "affordances" (possibilities presented to existence), occupying the other two corners. The distinction between experienced and attributed coherence is the following: "[e]xperienced coherence is direct, context bound and immediate; attributed coherence is categorical, defined, labeled, and mediated" (Letiche et al. 2011, 8–9).

Affordances stand opposed to experienced coherence: "[a]ffordances invite, demand, and assert an attraction on the subject . . . [and] entail circumstance(s) acting on consciousness or world presenting itself as possibilities and opportunities" (Letiche et al. 2011, 9). This should not be interpreted as dualism, but as a dynamic relationship between self (experienced coherence) and world (affordances). Before applying this new terminology to address the question on uncertainty and God, I connect it to Jamesian pragmatism.

The analogue for the dynamics of experienced/emergent coherence and affordances in James's pragmatist approach is the double-barreled nature of "pure experience." Experienced/emergent coherence and affordances are related to each other and their relationship is directly experienced in pure experience. Experienced/emergent coherence in Jamesian terms is a combination of "direct acquaintance" and "knowledge about," where the latter is still closely tied to the direct context and thus not too abstract. Attributed coherence corresponds to the more abstract forms of "knowledge about." Affordances and homologies resemble one another in that they both have to do with world and how reality asserts itself, while experienced and attributed coherence resemble one another in that they both have to do with experiences of order, unity, and meaning.

Experienced coherence and affordances are directly perceived ("first order phenomena," the Jamesian pure experience) and refer to individual consciousness and to particular possibility, while attributed coherence and homologies are indirectly perceived ("second order phenomena," further removed from the Jamesian experience) and refer to collective or shared signification and to sameness (Letiche et al. 2011, 9, 20–21).

According to Letiche et al. (2011), "human knowing (probably) falls short of being able to be sure about homologies" (Letiche et al. 2011, 9). This implies deep uncertainty in the cognizance of homologies. For models of God for instance, a Jamesian analysis would urge that these models are not themselves to be conflated with the transcendent. Still, we do need attributed coherence to think about homologies such as God. Letiche et al. (2011) describe the crucial role that is played by homologies:

> Affordances invite perception, action, and sometimes just doing nothing. Homologies are archetypes of structure that tie aspects of experience together via simulacra. . . . Homologies link experience to higher order awareness; neither aggregation level is truer than the other. . . . If we want to think emergence's possibilities, we need higher order principles to do it. (Letiche et al. 2011, 237)

The distinction between attributed coherence and homologies is important for Jamesian thought; higher-level conceptions, such as those of God, can be useful and even significant, as long as there is not an overreliance on them.

So we may experience coherence in intimations of the sacred, and attributed coherence may play a role at the back of our minds, but if we become very specific about for instance models of God then we inevitably get further removed from experience and substantiation in experience becomes virtually impossible. This also holds for James's model of God. Where James criticizes the theistic conception of God on the basis that it does not connect with religious experiences, he portrays God as "intimate soul and reason of the universe" (James 1909, 28), "the indwelling divine" (James 1909, 30) and as "finite, either in power or in knowledge, or in both at once" (James 1909, 311). So in James's model of God, God is not all-powerful and all-knowing, but still this God—whom we can intimate, who is Other, but who is continuous with us—can show us "a world in which all is well, in *spite* of certain forms of death, indeed *because* of certain forms of death" (James 1909, 305, emphasis in original). Individuals can intimate the sacred through pure experience that features affordances and experienced/emergent coherence, while they can collectively share such intimations through attributed coherence, for which it is uncertain how well it captures the underlying homology.

As a final example of phenomenological thought, I mention Hans de Knijff's (2013) study on the fundamental distinction between the natural

sciences and the humanities. De Knijff defends the correlation between "subject knowledge" and "object knowledge," and takes exception—against many popular cognitive scientists—to the Cartesian split between consciousness and body. His description of the "soul," considered as a "medial process that encompasses subject and object, self-creates world and attracts world" (de Knijff, 232, my translation), seems to me to be fully consistent with James's metaphysics.

WONDER AND INTIMATIONS OF THE SACRED IN SCIENTIFIC PRACTICES

Having laid the groundwork for a developed Jamesian pragmatist approach, let us here first consider wonder and intimations of the sacred in scientific practices. For that purpose, I indeed analyze science as a practice instead of a set of beliefs. Thomas Kuhn in his seminal 1962 book *The Structure of Scientific Revolutions* radically criticized then-philosophical views of science. Joseph Rouse (1987, 30–40) shows how radical Kuhn's turn was by providing an interpretation of that book which emphasizes scientific practices at the expense of scientific beliefs. For instance: "Paradigms are not primarily agreed-upon theoretical commitments but exemplary ways of conceptualizing and intervening in particular empirical contexts" (Rouse 1987, 30). Kuhn had replaced representing and observing with "constructing, tinkering, and noticing as exemplars of scientific practice" (Rouse 1987, 40).

Scientific practice is beset with uncertainty and ignorance:

> All paradigms confront obstacles (anomalies) at all times. . . . The recognition of anomalies is . . . an awareness that something significant is not understood or not being dealt with adequately, but it is not yet a clear awareness of what the problem is. . . . How scientists respond to such ambiguous difficulties often depends upon whether the problems they present seem localizable. (Rouse 1987, 32–33)

In the case a crisis ensues because the anomalies do not get resolved, the intelligibility and reliability of many research practices and achievements are placed in doubt:

> [I]t is not that scientists do not know what to believe; scientists are professionally accustomed to uncertainty of *that* sort. It is that they are no longer quite sure how to proceed: What investigations are worth undertaking, which supposed facts are unreliable artefacts, what concepts or models are useful guides for their theoretical or experimental manipulations? (Rouse 1987, 33–34, emphasis in original)

There are even direct parallels that can be drawn to religious conversion: "Changing from one paradigm to another is not like a conversion to new beliefs but is like a conversion to a new form of life" (Rouse 1987, 34).

James's metaphysics of experience, with its emphasis on fallibility and practice, offers an interpretation of such a crisis situation as one where the usability of concepts breaks down and, in phenomenological terms, the attributed coherence of one scientist's concept is pitted against that of another.

As Rouse relates, science is a thoroughly communal activity:

> [T]here are no generally applicable standards of rational acceptability in science. There is only a roughly shared understanding of what can be assumed, what can (or must) be argued for, and what is unacceptable for any given purpose and context. Both purposes and contexts are quite varied and undergo significant transformations over time. They reflect the judgments of a community concerning what is credible and reliable in the context of their ongoing work. (Rouse 1987, 124)

Also when there is no crisis scientists proceed not on the basis of what they believe but on the basis of how they do things.

Now, emotion is central in all significant human activities, and I would argue also in the core activities in the practice of science. However, particularly in science there is a suspicion of emotion, even though this has not always been the case. Jack Barbalet (2004, 248–49) and others have shown that in the early days of the scientific revolution passion played a central role in the performance of science. Scientists were explicit that they were overcome by emotional turmoil caused by the puzzlement they experienced, arising from their extraordinary curiosity. In their writing they narrated their surprises and related when they were at a loss in explaining particular phenomena. According to Lorraine Daston and Katherine Park, "[m]using admiration, startled wonder, then bustling curiosity—these were the successive moments of seventeenth-century clichés describing how the passions impelled and guided natural philosophical investigations" (Daston and Park 2001, 303). What was discussed above about the emotions of wonder and joy—and about insight coming as a release to the tension of inquiry—plays a role here too. The emotions of uncertainty and anxious curiosity can only be cured by scientific engagement and finding explanations.

From the late eighteenth century, Francis Bacon's early seventeenth century counterposition—that for science to proceed all emotions must be expelled from all scientific activities, not only from the communication of science—became dominant. However, from analysis of scientific practice, Michael Polanyi has concluded that "[s]cientific passions are no mere psychological by-product, but have a logical function which contributes an indispensable element to science" (Polanyi [1958] 1998, 134). Positive passions affirm that something is precious. According to Polanyi, "[t]he excitement of the scientist making a discovery is an *intellectual* passion, telling that something is *intellectually* precious and, more particularly, that

it is *precious to science*" (Polanyi [1958] 1998, 134, emphasis in original). Emotion serves "as a guide in the assessment of what is of higher and what of lesser interest; what is great in science, and what relatively slight" (Polanyi [1958] 1998, 135). This appreciation "depends ultimately on a sense of intellectual beauty" (Polanyi [1958] 1998, 135). So, indeed emotion plays a central role in scientific practice.

When a correspondence is attained between the values of the scientific thought collective and the particular conditions encountered in research, this "evokes the emotions of joy, delight and pleasure" (Barbalet 2004, 269). Making reference to the work of Joseph De Rivera, Barbalet concludes that this joy "is precipitated as a feeling of self-actualization and of the meaningfulness of one's activities, indeed being" and that "[i]n this regard, joy and wonder are parallel emotions" (Barbalet 2004, 269). Thus the emotion of wonder in science, which may result in the emotion of joy, is a "metaphysical emotion" in sense of James's social theory of emotion (see above) and can lead to intimations of the sacred.

The cognitive referent of metaphysical emotion, the appreciation of beauty for instance, can thus reside in matching scientific values. In physics, an example of such values could be the following: "Scientific values consist in the continual and increasing recognition of the uniformity of nature" (Chandrasekhar 1987, 4). With respect to the motivation of scientists, Chandrasekhar reject[s] "the view that the motivation springs from a conscious or subconscious belief that everything he does will eventually find use in the amenities of daily life" (Chandrasekhar 1987, 12–13). But he "also do[es] not accept the view that scientists are urged on in their work by a 'holy passion' for truth or a 'burning curiosity' to unravel the 'secrets' of nature" (Chandrasekhar 1987, 13). In Chandrasekhar's view, scientists are attracted to elegance in theorizing. He adds:

> What actually does give substance and reality to the efforts of a scientist is his desire to participate actively in the progress of his science to the best of his ability. And if I have to describe in one word what is the prime motive which underlies a scientist's work, I would say *systematization.* (Chandrasekhar 1987, 13)

Only "people who are acquainted with the subject have no difficulty in recognizing or appreciating" the scientist's contribution, just like beauty in art cannot be defined (Chandrasekhar 1987, 13). Chandrasekhar has come to the conclusion that

> The motives of the individual scientists . . . are as varied as the tastes, the temperaments, and the attitudes of the scientists themselves. Besides, their motivations are subject to substantial changes during the lifetimes of the scientists; indeed, it is difficult to discern a common denominator. (Chandrasekhar 1987, 15)

And he asks the following questions:

> After a scientist has reached maturity, what are the reasons for his continued pursuit of science? To what extent are they personal? To what extent are aesthetic criteria, like the perception of order and pattern, form and substance, relevant? Are such aesthetic and personal criteria exclusive? Has a sense of obligation a role? I do not mean obligation with the common meaning of obligation to one's students, one's colleagues, and one's community. I mean, rather, obligation to science itself. And what, indeed, is the content of obligation in the pursuit of science *for* science? (Chandrasekhar 1987, 26, emphasis in original)

These are deep questions. For some scientists, the answers may be related to intimations of the sacred.

For being able to intimate the sacred it is not necessary to hit on what will be accepted as true by the scientific community. Chandrasekhar (1987, 21–23) illustrates this with two episodes in Werner Heisenberg's career. After the laws of quantum mechanics had come to a sharp focus in his mind, Heisenberg relates:

> I was far too excited to sleep, and so, as a new day dawned, I made for the southern tip of the island, where I had been longing to climb a rock jutting out into the sea. I now did so without too much trouble, and waited for the sun to rise. (Werner Heisenberg 1971, 61)

Some thirty years later Heisenberg's ideas on particle physics were rejected, but he had experienced similar excited emotions, which he explicitly connected with the sacred:

> That these interrelationships display, in all their mathematical abstraction, an incredible degree of simplicity, is a gift we can only accept humbly. Not even Plato could have believed them to be so beautiful. For these interrelationships cannot be invented; they have been there since the creation of the world. (quoted in Elisabeth Heisenberg 1984, 144)

And Heisenberg's wife, Elisabeth Heisenberg, relates:

> With smiling certainty, he once said to me: "I was lucky enough to look over the good Lord's shoulder while He was at work." That was enough for him, more than enough! It gave him great joy, and the strength to meet the hostilities and misunderstandings he was subjected to in the world time and again with equanimity, and not to be led astray. (Heisenberg 1984, 157)

Many examples—and counterexamples—can be given of intimations of the sacred in relation to design in nature. It will be difficult to find a pattern, however. A pragmatist approach will immediately give up on claiming to grasp the complexity of nature in terms of an argument for design. As James already wrote in 1907 about this argument: "[God's] designs have grown so fast as to be incomprehensible to us humans" (James [1907] 1995, 43). We don't really know what we mean when we talk about design. However,

talk about design in nature *can* intimate the sacred: "'Design,' worthless though it be as a mere rationalistic principle set above or behind things for our admiration, becomes, if our faith concretes it into something theistic, a term of *promise*" (James [1907] 1995, 44, emphasis in original). This shows that James could support a position of "design without fixity," which takes seriously the emergence of complex designs from natural processes, rejects both crude naturalism and an absolute designer-God with a fixed plan, and supports faith in a more open and uncertain role in creation for a loving God who is not all-powerful and all-knowing in the traditional philosophical senses (see the last section).

Stephen Jay Gould ([1990] 2000), in his history of paleontological discovery and interpretation in the Burgess Shale, describes "wonder" as having two aspects: "[wonder] at the beauty of the organisms themselves, and at the new view of life that they have inspired" (Gould [1990] 2000, 14). In the community of paleontologists, Gould finds a "joint love for knowledge about the history of our wonderful life" (Gould [1990] 2000, 19). But he is not overwhelmed by a notion of design:

> Wind back the tape of life to the early days of the Burgess Shale; let it play again from an identical starting point, and the chance becomes vanishingly small that anything like human intelligence would grace the replay. (Gould [1990] 2000, 13–14)

In contrast with Gould, in the context of physics and astronomy a couple of centuries earlier, Isaac Newton wrote in his *Principia*:

> This most elegant system of the sun, planets, and comets could not have arisen without the design and dominion of an intelligent and powerful being. . . . He rules all things, not as the world soul but as the lord of all. (Newton [1713] 1999, 940)

Here we have hit on the theism that was so strongly opposed by James.

Concerning the issue of theism and design, let us take a brief look at a contemporary philosopher, Alvin Plantinga, who asks whether science offers positive support for theistic (Christian) belief (Plantinga 2011, 193–264). Plantinga first notes the striking fact that several of the basic physical constants must fall within very narrow limits for intelligent life to develop. Depending on one's beliefs, the coincidences can evoke different emotions (or, depending on one's emotions, this can evoke different beliefs). One possible reaction—and this is Plantinga's view—is "to see them as substantiating the theistic claim that the universe has been created by a personal God and as offering the material for a properly restrained theistic argument" (Plantinga 2011, 197). Plantinga proceeds to biological arguments that can evoke the belief in design. With respect to "intelligent design," Plantinga's impression is that the arguments for it are reasonably powerful, but he concludes that "it is unclear that the difference in probability [for

the presence of protein machines based on assuming either unguided or guided evolution] is sufficient to constitute serious support for the existence of an intelligent designer." While probabilistic reasoning may not be able on its own to support guided evolution, Plantinga holds that there are other warrants for that theistic belief.

Plantinga's (2011, 265–303) approach to the deep concord between science and (Christian) religion offers interesting entry points into describing the role of emotion in science and religion. Plantinga's view that science will be successful only if the laws of nature are not too complex, or deep, or otherwise beyond us, fits well with theistic religion and its doctrine of man as the image of God. Furthermore, he argues with respect to mathematical objects, such as numbers and sets, that they fit very neatly into a theistic way of looking at the world. "Science is at bottom an attempt to learn important truths about ourselves and our world" (Plantinga 2011, 267) and "there is a match between our cognitive or intellectual faculties and reality, thought of as including whatever exists, a match that enables us to know something, indeed a great deal, about the world—and also about ourselves and God himself" (Plantinga 2011, 269). Some atheist thinkers would consider this just "blind luck," while others would account for natural emergence of order and complexity probabilistically.

But what do we make of this from a pragmatist perspective? For this I first turn to Mikael Leidenhag (2013), with whom I agree that the inference made by religious naturalists (e.g., Stuart Kauffman 2007; Gordon D. Kaufman 2007) from the scientific concept of emergence to the religious significance of nature (or some aspect of nature)—for example, as a religious object worthy of worship or devotion—is problematic if it entails the ontological thesis that there are independently existing religious aspects of the natural order, labeled "God" or "creativity" (Leidenhag 2013, 974). But I do think that religious naturalists rightly emphasize the existential value of uncertainty and ignorance with respect to the complexity of the cosmological and evolutionary process. Humans here encounter many unresolvable mysteries, which call for the emotion of wonder and an ethic of respect for life. I prefer not to follow Leidenhag's proposal, which makes reference to "pragmatism," to view the propositions of scientific naturalism as "attitude-promoting propositions," that is, as propositions which we come to adopt since they promote an attitude that is "pragmatically beneficial" (Leidenhag 2013, 975), but instead to entertain another pragmatist possibility. I am referring to James's metaphysics of experience. The wonder generated by the realization of uncertainty and ignorance *vis-à-vis* nature can be a genuine experience that intimates the sacred and that has real meaning for people—it can mean the world to them and affect their behavior (and thus have practical implications) irrespective of whether the resulting attitudes are "beneficial."

WONDER AND INTIMATIONS OF THE SACRED IN RELIGIOUS PRACTICES

The emotion of wonder and the metaphysics of experience are also associated with intimations of the sacred in religious practices. Let me start with an example from the Judeo-Christian tradition of the recitation or singing of Psalms. I here pick in particular a Psalm that explicitly stresses wonder (Psalm 139). The first verses read as follows:

> O LORD, thou hast searched me out and known me : thou knowest my down-sitting and mine up-rising, thou understandest my thoughts long before.
> Thou art about my path, and about my bed : and spiest out all my ways.
> For lo, there is not a word in my tongue : but thou, O LORD, knowest it altogether.
> Thou hast fashioned me behind and before : and laid thine hand upon me.
> Such knowledge is too wonderful and excellent for me : I cannot attain unto it.
> (Psalm 139:1–6, Coverdale's translation, Book of Common Prayer)

When such a Psalm makes part of a liturgical ritual, such as evensong or any other form of worship or prayer, the narrative (in older Bible versions, such as the one used above, or in newer Bible versions) can evoke the emotion of wonder in the worshipper, which it can obviously also do—but often to a lesser extent—in the private reader. Liturgical ritual can lead people to 'creep into God': "'[C]reeping into God' is [for most people] something we must learn. It involves a momentary withdrawal from the natural world so as to project our thoughts beyond it. That is why special phrases, liturgies and hallowed language are necessary: they are the guarantee that we are addressing [an] . . . Other, and not just talking somewhat pompously to ourselves" (Roger Scruton 2012, 8–9). For different people in different cultures and religions there are different ways for the "numinous" (Otto [1917] 1923)—the nonrational (not irrational) dimension of the "holy" Other—to be experienced. Celia Deane-Drummond (2006) gives the example of the importance of silence in liturgy (e.g., in the Eucharist), since "silence acts like a matrix within which the Word is embedded and through which a theology of wonder arises" (Deane-Drummond 2006, 140). The emotion of wonder may be triggered by becoming aware of the breaking in of the reign of God.

Many more examples may be given, also of other than Christian religions, but the matter that concerns me here is to illustrate that the relationships between emotions, the metaphysics of experience and intimations of the sacred in religion can be understood from a Jamesian pragmatist perspective.

It is important to note that according to James there is no general religious emotion:

> There is religious fear, religious love, religious awe, religious joy, and so forth. But religious love is only man's natural emotion of love directed to a religious object; religious fear is only the ordinary fear of commerce, so to speak, the common quaking of the human breast, in so far as the notion of divine retribution may arouse it; religious awe is the same organic thrill which we feel in a forest at twilight, or in a mountain gorge; only this time it comes over us at the thought of our supernatural relations; and similarly of all the various sentiments which may be called into play in the lives of religious persons. (James [1902] 2012, 30)

As was argued by Carrette (see above), religious emotion has an organic basis, a cognitive structure and a social dimension, "insofar as the religious object is shaped in the religious context" (Carrette 2008, 429).

The social dimension is crucial for religious emotion and corresponding metaphysical experiences and intimations of the sacred. Therefore religion cannot be confined to the subjective and private domain of personal experience. While many writers in the tradition of pragmatist philosophy (e.g., Rorty 1997, 85) have interpreted James as having "privatized" religion, and as thus having resolved the tension between science and religion as one between "cooperative endeavors" and "private projects," others (e.g., Lamberth 1999; Miedema 2002; Carrette 2008) would disagree. James's self-assessed "crasser," or "piecemeal" (as opposed to universalistic) supernaturalism (James [1902] 2012, 394) includes an inalienable social dimension. And even though James seems to give primacy to personal religious experience over the institutional side of religion, I would argue that religious institutions (such as liturgical ritual) can be regarded as "human systems evolving in consequence of human needs" (James [1907] 1995, 61).

The sense of wonder—in both religion and science—should not be considered as merely a cognitive affair, but as involving the whole person engaged with a community. This sense of wonder is a precious gift that can be learned—and should preferably not be unlearned—through education, the primary aim of which, following Miedema, is "directed to the development of the whole person, that is, that all domains of human potentiality and ability—be they cognitive, creative, moral, religious, expressive, or the like—should be taken into account" (Miedema 2002, 87).

UNCERTAINTY AND GOD

William James offers an alternative to those who are "neither tough [naturalistic] nor tender [monistic] in an extreme and radical sense":

> Between the two extremes of crude naturalism on the one hand and transcendental absolutism on the other, you may find that what I take the liberty of calling the pragmatistic or melioristic type of theism is exactly what you require. (James [1907] 1995, 116)

The universe is still in the making. One of the ways humans can realize that they make the universe is by engaging in science and/or religion. What those who take up the challenge offered by James will experience is that they can share their uncertainty and ignorance with their God—who they can intimate and connect with in a social relation—and share their suffering.

Theologically, James inspires readings of "omnipotence" and "omniscience" in which God chooses to be vulnerable and thinks also through feeling with us (cf. Anastasia Scrutton 2011)—while being both Other and our inner deep source of hope. Practically, engaging in scientific or religious practices may create opportunities for individuals to realize that they are co-creators of the world in partnership with God (who looks to the world for its cooperation), in full awareness of uncertainty and ignorance and filled with the emotion of wonder.

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