

# DOXOLOGICAL EXTENDED COGNITION

by *George Adam Holland*

*Abstract.* Many Christian theologians have proposed a universal knowledge of God implanted in all humans. Thomas Aquinas famously stated that all humans have some knowledge of God, confused though it may be. John Calvin developed this proposition in much more detail and concluded that there is a cognitive faculty in humans, the *sensus divinitatis*, committed to giving the cognizer knowledge of God. Independent of such theological concerns, a current movement in cognitive science proposes a radical change to the traditional boundaries drawn around the human mind. Proponents of mental extension, such as Andy Clark, argue that the mind extends well beyond the body and should be approached in a much broader conceptual analysis. This essay arises from the conviction that the Extended Mind (EM) framework offers new insights into developing a cognitive understanding of the *sensus divinitatis*. Drawing in equal parts on current arguments for mental extension and the *sensus divinitatis*, the essay establishes the compatibility between the two arguments and indicates how an integration of the two can yield significant benefits for both mental extension and the *sensus divinitatis*: the basing of the *sensus divinitatis* in a specific cognitive theory that offers explanations of its functions, and the introduction of theism to the EM argument as a potentially useful component in a collaborative cognitive science effort.

*Keywords:* Thomas Aquinas; John Calvin; Andy Clark; cognitive science; complimentary external cognition; Extended Mind; functional analogy; God; interdisciplinarity; philosophic theology; Alvin Plantinga; *sensus divinitatis*; theology

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It is common in theistic thought to suppose a universal acknowledgment of divinity, necessarily given to all humans so that they may be directed

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toward God. Different religions have different stories to tell about how this universality manifests itself, with the Christian religion having a particularly interesting account. In this essay I investigate the Christian (primarily Reformed) account of a universal sense of God in light of a current trend in cognitive science.

In the present academic setting it is fair to say that theology is only loosely associated with the sciences.<sup>1</sup> It certainly is fair to say that theologians in recent years have been less than interested in cognitive science. Historically, theology has dealt rather strongly in understandings of the mind and has contributed and gained much through such involvement. In what follows I note especially the roles of Thomas Aquinas and John Calvin in understanding cognition as an important theological concept. The unique cognitive mechanism Calvin and, more recently, Alvin Plantinga incorporate in their theological and philosophical framework is the *sensus divinitatis*, a "sense of the divine." I assimilate their account of the *sensus divinitatis* in proposing a useful cognitive understanding of this faculty.

The other discipline with which I am concerned here, cognitive science, is in a state of rapid growth. The philosophy of cognitive science is in full stride. One area of growth that is well represented in philosophic scholarship is the concept of decentralized and extended human cognition. Andy Clark's writings on the matter are perhaps the most developed both in empirical analysis and theoretical application. Significant portions of this essay focus on Clark's work, as well as that of others, in relation to the general framework of human cognition that mental extension offers.

The methodological integration of these two components contained herein is straightforward. I use the argument for mental extension as a framework to position the *sensus divinitatis* within, aiming to reinterpret this historical theological concept in modern cognitive scientific terms. This modern cognitive interpretation of the *sensus divinitatis* seeks to generate benefits in both directions: Cognitive scientists will have a developed thought experiment that introduces theistic themes to the Extended Mind, and theologians will have the *sensus divinitatis* based in a specific cognitive framework that offers a possible explanation of its functional capability. The integration of these two components will introduce what I have called doxological extended cognition.

I begin by establishing the theological argument for the *sensus divinitatis* as a cognitive faculty.

#### THE *SENSUS DIVINITATIS* AND EXTERNAL INSTIGATION

*To know in a general and confused way that God exists is implanted in us by nature. (Aquinas [1273] 1975, 1.2.1:1)*

The *sensus divinitatis* is not the focus of substantial amounts of theological scholarship, but it often is cited in historical contexts with a tendency to be

associated with Thomas Aquinas.<sup>2</sup> This is both a correct and an incorrect understanding of Aquinas. He did make the general point that knowledge of God is universal, even unavoidable; but, as Jill LeBlanc points out, it is an error to read Aquinas in exactly the same terms as the later theologian, Calvin: “Aquinas does not think that there is any *sensus divinitatis*, we know God with the same faculties with which we know anything else” (2000, 4).

LeBlanc’s statement identifies Calvin’s claim that there is a special part of the human mind that is committed to sensing divinity, while noting that Aquinas asserts no such view. There is a general sense, though, in which the concept of a sense of the divine can be said to originate in the Christian theological tradition with Aquinas, because he did propose that there is knowledge, of some sort, of God in all humans, and his writing has influenced most Christian theology.<sup>3</sup> Thus, in a broad understanding of a sense of the divine, Aquinas does bear some general responsibility, but he does not develop in detail the cognitive sense of divinity we deal with here. The locus of the theological argument for a universal sense of the divine as developed here originates in Calvin’s *Institutes of the Christian Religion*.

*Calvin’s Sensus Divinitatis.* In Book 1 of Calvin’s *Institutes*, a chapter is committed to what he calls “The Knowledge of God Naturally Implanted in the Human Mind.” Calvin states in the beginning of this chapter: “There is within the human mind, and indeed by natural instinct, an awareness of divinity. This we take to be beyond controversy. To prevent anyone from taking refuge in the pretence of ignorance, God himself has implanted in all men a certain understanding of his divine majesty” (Calvin [1536] 1960, 1.3:44).

Calvin goes to some length to anticipate criticisms that would be directed at this notion. For example, he thinks it absurd to argue that cunning individuals in positions of power could craft religion to keep people as orderly subjects, arguing that this could be the case only if there actually were a *sensus divinitatis* to begin with. His argument explicitly incorporates all humankind as possessing, at least initially, a sense of the divine. He goes so far as to say that atheists give testimony to a universal sense of the divine:

They all, indeed, look out for hiding places, where they may conceal themselves from the presence of the Lord, and again efface it from their mind; but after all their efforts they remain caught within the net. Though the conviction may occasionally seem to vanish for a moment, it immediately returns, and rushes in with new impetuosity, so that any interval of relief from the gnawings of conscience is not unlike the slumber of the intoxicated or the insane, who have no quiet rest in sleep, but are continually haunted with dire horrific dreams. (Calvin [1536] 2001, 1.3:44)

Calvin argues for a seemingly inescapable sense of the divine that even those who wish to rid themselves of are unable to. For Calvin, however, the *sensus divinitatis* is a cognitive faculty, so there is the possibility for

corruption and malfunction just as in other cognitive faculties, anticipating examples of individuals who do not exhibit any acknowledgment of God whatsoever. My point is that Calvin argues for a sense of God thoroughly fixed in humans and not easily discarded. Is this beyond controversy, as he states? Such a question, while interesting, is not addressed here;<sup>4</sup> rather, I seek to understand how the *sensus divinitatis* could work if it does indeed exist.

An important component of Calvin's development of the *sensus divinitatis* is the conditions in which it functions most appropriately. This part of his argument is of primary interest to those wishing to understand the *sensus divinitatis* within a cognitive model because these conditions grant insight into how the cognitive mechanism functions, including how it may be triggered. Calvin moves on in the *Institutes* to discuss the ability of humans to sense God in all situations:

Since the perfection of blessedness consists in the knowledge of God, he has been pleased, in order that none might be excluded from the means of obtaining felicity, not only to deposit in our minds that seed of religion of which we have already spoken, but so to manifest his perfections in the whole structure of the universe, and daily place himself in our view, *that we cannot open our eyes without being compelled to behold him*. . . . And, first, wherever you turn your eyes, there is no portion of the world, however minute, that does not exhibit at least some sparks of beauty. (Calvin [1536] 2001, 1.5:52; emphasis added)

Calvin finds it particularly useful to cite some of nature's grand spectacles as evidence that God reveals himself to all by appealing to the *sensus divinitatis* through the world itself. Calvin looks to the starry skies to impress this point: "Even the common folk and the most untutored, who have been taught only by the aid of the eyes, cannot be unaware of the excellence of divine art, for it reveals itself in this innumerable and yet distinct and well-ordered variety of the heavenly host" (Calvin [1536] 1960, 1.5:53).

Components of the external world, in this case stars, trigger cognitive functions that direct the cognizer to God. Calvin does not limit the conditions that awaken the *sensus divinitatis* to the external world, but it plays an important role in his account.

To explain how these external features may work in the functioning of the *sensus divinitatis* I turn to a contemporary analysis of Calvin's concept.

*Plantinga's Sensus Divinitatis.* Alvin Plantinga offers a modern interpretation of the *sensus divinitatis* in explicitly cognitive terms in his epistemological literature.<sup>5</sup> His engagement with the *sensus divinitatis* is based in epistemological arguments concerning warrant and Christian belief, but much of what he argues translates into the realm of philosophy of cognition extremely well. His summation of the *sensus divinitatis* is stated in his *Warranted Christian Belief*: "The *sensus divinitatis* is a disposition or set of dispositions to form theistic beliefs in various circumstances, in response

to the sorts of conditions or stimuli that trigger the working of this sense of divinity" (2000, 173).

Plantinga offers this input/output explanation as a summary of the functioning of the *sensus divinitatis*. Humans can be in certain circumstances in which they have specific input into their cognitive mechanisms resulting in the creation, or output, of theistic beliefs: circumstantial input, cognitive process, theistic belief. Plantinga emphasizes that the external world plays an integral role in providing stimuli that trigger the *sensus divinitatis*. "You see the blazing glory of the heavens from a mountainside at 13,000 feet; you think about those unimaginable distances; you find yourself filled with awe and wonder, and you form the belief that God must be great to have created this magnificent heavenly host" (2000, 173). He also cites other circumstances: the timeless crash and roar of the surf; the grandeur of mountains; the Australian outback; the thunder of a waterfall (Plantinga 2000, 174).<sup>6</sup> These features of the external world trigger, at least in Plantinga's case, the working of the *sensus divinitatis*.

*The Collaborative Sensus Divinitatis.* These two accounts form the basis of the theological understanding in this essay of sensing the divine. To summarize this Calvin/Plantinga proposal of the *sensus divinitatis* as a cognitive faculty I make three concluding remarks.

First, most Christian thought—especially Protestant scholarship following Calvin but also Roman Catholic thought heavily influenced by Aquinas—affirms a universal acknowledgment of God in human beings. Calvin's argument forms the genus of the proposal here, associating acknowledgment of God with a cognitive sense of the divine.

Second, Calvin's description of the working of the *sensus divinitatis* incorporates objects and occurrences outside the human body. The *sensus divinitatis* is located in the biological brain but incorporates components outside the biological confines of the body in its triggering. In Calvin's words, "man was created to be a spectator of this formed world, and that eyes were given him, that he might, by looking on so beautiful a picture, be led up to the Author himself" (Calvin [1539] 1979, 14:70).

Third, in cognitive terminology the *sensus divinitatis* can be described as a cognitive disposition, triggered by circumstances, that in turn gives rise to the cognizer's forming theistic beliefs. This account maintains the points that Calvin wished to make and also includes a modified, and more specific, cognitive explanation: that there is a disposition in human cognition to form beliefs about God and that certain stimuli, often formed in the external world, cause the cognizer to form beliefs about God. This dispositional explanation attempts to define the way external stimuli can trigger the *sensus divinitatis* by explaining their input role in the conditional triggering.

This collaborative version of the *sensus divinitatis* is the model of universal theistic knowledge that I incorporate into the Extended Mind thesis

because it relates in a strong and unique way to mental extension while still maintaining the central features of the theological concept. In the following I argue that the Extended Mind thesis is of special interest to the process of understanding the *sensus divinitatis* within current cognitive theory because of its unexpected explanatory similarities. I begin by developing the basic argument for mental extension and then propose a specific version of mental extension as the most appropriate given a broader conceptual approach to human cognition.

#### THE EXTENDED MIND THESIS

*There is a real sense (or so I would argue) in which the notion of the “problem-solving engine” is really the notion of the whole caboodle: the brain and body operating within an environmental setting. (Clark 2001b, 142)*

The cognitive theory of the Extended Mind (henceforth EM) is a strange and difficult idea in the context of traditionally individualistic cognitive science. The EM argument I develop here has a brief history, growing mainly out of an article by Andy Clark and David Chalmers, “The Extended Mind” (1998). The history extends beyond this article, but the form of EM theory with which I engage was first developed and strongly expressed there by Clark and Chalmers.<sup>7</sup>

EM theorists propose a radical answer to the question, What role does the external world play in human cognitive processes? Clark states the general idea of cognitive extension:

... the project of understanding what is distinctive about human thought and reason may depend on a much broader focus than that to which cognitive science has become most accustomed, one that includes not just body, brain and the natural world, but the props and aids (pens, papers, PCs, institutions) in which our biological brains learn, mature and operate. (Clark 2001b, 141)

In terms used by philosophers of cognition, we are surrounded by “mental technologies” that play integral roles in our cognitive life. The EM explanation of the ability humans have to exploit and use such environments (which Clark and others call “mental technologies,” “cognitive tools,” and “cognitive technologies” interchangeably) brings its unique claims to the fore. These cognitive tools become part of a hybrid that, Clark argues, qualifies the combination of external world and brain as a unified cognitive system. That is to say, they are not simply tools but rather actual active components in the complete system that is human cognition.

Philosophers of cognition work to achieve this hybrid through the two main arguments of parity and complementarity.

*Parity.* The parity criterion requires that events and objects in the external world function in the same way as events and objects in the brain to qualify as cognitive. This view sees parts of the world as suited to being

involved in cognitive processes because they perform tasks in ways similar to the brain's ways.<sup>8</sup> A part of the world qualifies itself as cognitive if it performs a function that, if it were to occur in the brain, would be called cognitive. Thus, the parity argument extends the mind on the basis of equivalence.

*Complementarity.* The complementarity argument (CA) holds that it is useful to understand cognitive technologies as affording complementary operations to those that come most naturally to biological brains. This is importantly dissimilar to the parity claim because of its heterogeneity. CA proponents are not looking for "mental" things existing in the world to which we can transfer cognition. The goal of the CA is to incorporate parts of the world that complement biological cognition precisely because they are different from the functions of the brain. CA argues that parts of the world are useful as cognitive technologies specifically because they perform functions that the biological brain does not naturally do well.

Essential to most CA claims is the view that the external environment allows us to break down complicated cognitive processes into smaller processes that the biological brain is more suited to completing. For example, a large multiplication problem can be broken down into smaller ones easily computed in the brain (479 x 951 is computed by 1 x 9, then 1 x 7, and so forth) and recording the results on paper. These results are then combined to solve the original larger problem. Small patterns are combined to complete larger patterns. The characters on the paper can be viewed as serving as a type of extraneural memory, but pen and paper also do more. They serve as technological means for breaking down a large sequential problem into smaller parts that are more readily and naturally processed. Ed Hutchins writes, "Such tools permit the users to do the tasks that need to be done while doing the kinds of things people are good at: recognizing patterns, modelling simple dynamics of the world, and manipulating objects in the environment" (Hutchins 1995, 155). The things our brains do not do best, such as long sequences of operations and intricate combinations of mental tasks, are achieved more accurately, or made possible, by using cognitive technologies.

Philosophers of cognition argue that these technologies vary from such basics as pen and paper to sophisticated neural implants. Clark and others (such as Deheane et al. 1999) argue that words and linguistic labels themselves are an original type of cognitive technology.<sup>9</sup> This seems especially plausible and helpful to the evolutionary cognitive "bootstrapping" often put forward by cognitive scientists because it offers a theory on why humans can exploit the environment in the unique way that we do. CA is a distinctive argument for cognitive extension because it offers a plausible explanation of how human brains repeatedly create and exploit various species of cognitive technology so as to expand and reshape the space of human reason.

The CA claim can be summarized thus: Humans employ nonbiological elements in novel ways to complement the basic biological modes of cognition in a way that extends the mind beyond the brain. The unique external technologies are significantly different from the biological means (pen and paper are quite different from the way most theories of cognition propose the biological brain works) of cognitive acts. Consequently, it is not a matter of finding parts of the world that match the biological brain (as the parity argument claims) but rather that all parts of the external world have the potential to be cognitive technologies on the basis of the complementarity criteria. Anything that can aid, enhance, or enable a cognitive act on the basis of difference qualifies if it complements the biological brain. The result is a hybrid mind composed of a heterogeneous mix of brain and world. Such a mix constitutes an extended cognitive system whose ability and explanation of human thought and rationality are quite different from the naked brain.

With the foundations of the *sensus divinitatis* and EM established, I now turn to building a relationship between the two. I analyze the *sensus divinitatis* within an EM context to position it within this current trend.

#### COMPATIBILITY

*The world can function as much more than just external memory. It can provide an arena in which special classes of external operations systematically transform the problems posed to individual brains. (Clark 1997, 166)*

The application to theological contexts that I seek to make of the CA relies strongly on categorical, conceptual, and functional analogies. I propose that the role of cognitive technologies in the biological mind's sense of divinity is not directly or literally identical to arguments for cognitive technologies in other categories (such as mathematical, functional, and spatial). Instead, it is my view that the EM arguments concerned with these other categories are conceptually analogous to the *sensus divinitatis*. Further, I argue that the cognitive technologies in each of these categories are functionally analogous. To draw out the analogous relationship I contrast two examples.

In the previous section we looked at how the world can function as a complementary technology to the biological brain. The multiplication example is particularly useful to the analogy argument. With this example in mind, let us take an entirely different situation that draws out how the world can be complementary in the functioning of the *sensus divinitatis*. Instead of a multiplication problem it is a "God problem."

A woman decides that she would like to develop an informed view of the possibility of the existence of God. She commences reading various religious texts and finds them helpful, but no miraculous revelation concerning God's existence transpires. In many of these texts she reads of the

creative nature of God in designing or dreaming the world into existence, so she decides to observe the natural world in light of these texts. On holiday she drives through an Alpine region and takes special note of the colorful wildflowers that grow there in summer. She finds the beauty of the flowers extremely stirring and impressive. Then she goes on a night hike to a mountain summit and is immensely impressed by the stars above her in the sky. She now feels that she has experienced some of the special beauty of nature and the world in general. She finds an internal awakening of sorts taking place and feels a step closer to determining her views on God's existence.<sup>10</sup>

The argument for cognitive technologies complementing the *sensus divinitatis* can be extrapolated from this scenario. Compare it with the previous example. The multiplication problem is too big to be effectively and conveniently solved by pure biological cognitive functions. Enter pen and paper, which enable the breaking down of the problem into easily processed smaller problems, which are then reassembled and processed to solve the larger one. In most situations the God problem—whether such a being exists, what qualities it has, and so forth—is too big to simply ponder for a few minutes and then “solve.”<sup>11</sup> I propose that, just as a large multiplication problem can be more conveniently completed with external aids, a large metaphysical question can rely on and incorporate things outside the biological mind to complete the cognitive process.

I am not arguing for mental extension in the exact same sense for both examples, as I clarify below. I am saying that the wildflowers and the stars can be *functionally analogous*, in a cognitive sense, to the writing on paper of  $1 \times 9$ ,  $1 \times 7$ , and so on in the multiplication problem. What do I mean by functional analogy? I do not claim that pen and paper and the wildflowers and stars are cognitively equivalent; both as processes and cognitive technologies they act quite differently. For the multiplication example pen and paper are clearly cognitive technologies (in the EM context). Wildflowers and stars do not, I grant, appear to explicitly and obviously serve the same purpose of breaking down a problem into smaller components. Despite this appearance I argue that the function of the pen and paper and the function of the wildflowers and stars are analogous in relation to completing biological cognition as understood in the EM argument. In this functionally analogous sense wildflowers and stars are cognitive technologies in their complementarity of the *sensus divinitatis*.

*Sensory Data and the Functional Analogy.* One issue that is raised by this functional analogy is the need for a clear understanding of how wildflowers and stars can be seen to break down into smaller components a larger problem. The problem in the first example is to solve the multiplication. Pen and paper are an explicit breaking down into smaller components of the problem, which is then solved. The problem of God's existence

appears somewhat different, and indeed it is in a number of ways. There are differences of scope, function, and purpose. But there are significant and important similarities as well, the main one being biological cognition that is seeking a common goal: a solution to a complex problem. The agent wishes to know the solution to a multiplication problem, and the woman wishes to know whether or not God exists. Clearly these problems differ in scope, purpose, and significance, but they share fundamental means and goals. In each situation there is a large cognitive process that is not easily and readily completed by strictly biological cognition. Each complementary component ( $1 \times 9$ ,  $1 \times 7$ ; the wildflowers, the stars) of the larger problem serves the same purpose: to break down a large sequential cognitive process into smaller, more readily and naturally processed, parts.

In what sense is looking at wildflowers a breaking down of the God problem? What is described in the God problem is essentially a series of visual stimuli. Alpine wildflowers and stars in the night sky are sensory data for the cognitive agent. Visual stimuli do not, on first appearance, play a direct complementary role in cognition in the way more obvious cognitive tools, such as pen and paper for multiplication, do. Despite this appearance, I propose that as humans look to pens and paper for help in cognition, they can look to other aspects of the world for similar help. The woman wants to solve the God problem, and she looks into the world for potential help. A field of Alpine wildflowers breaks down the larger God problem by helping her to approach and perhaps eventually solve it. The wildflowers complement—that is, aid and enhance—her biological cognition, which finds the God problem complex and difficult. She feels stirred and closer to solving the God problem because she thinks it may be possible that God had some part in those wildflowers and the role they played in her thoughts.

It may be objected that perceiving wildflowers is a datum that, collected with other data, may lead one to inference, or to trigger an experience. Following this objection, does some distinction need to be kept between knowledge as gained from experience (what we may call data) and using the external world as part of our cognitive processes? As I try to demonstrate in the following argument, the functional analogy proposes that the experience of using cognitive technologies, and the possible knowledge that is gained, can be the method of mental extension for the *sensus divinitatis*. Sense experience is the way extension occurs in this example, but, as the functional analogy will argue, any variety of events and observations can serve a function analogous to that of pen and paper in the multiplication example.

*Categorical Distinctions.* Did the woman sit at her desk, decide to solve the God problem, and immediately retrieve a wildflower from her desk drawer? Obviously not. The multiplication problem and the God

problem require different technologies to suit their distinct cognitive categories. Human cognition uses external technologies in very distinct ways, I propose, for each of these categories.

It could be argued that such a distinction is unnecessary. It is entirely possible that people could approach the God problem in a very similar way to the multiplication problem and thereby avoid the need for arguments from analogy. Upon asking the God problem, they could find themselves unable to form conclusive views in their head because the problem seems too large and complex. They might then proceed to break the problem down in the following way:

Problem: Does God exist?

P1 – Things are in the process of change.

P2 – Change is the result of outside factors.

P3 – The world is a series of changes brought about by agents of change.

P4 – There had to be a first agent of change or things could have never been set into motion.

C – There is a first cause, which is God.

This is possible, but unlikely. It seems much more likely that people become convinced of the existence of God through a varied collection of events and observations. Thus, my argument is analogical instead of directly correlative. Different cognitive categories use distinct cognitive technologies in very different, but analogous, ways. Mental extension occurs in both the multiplication problem and the God problem through diverse cognitive technologies because each is suited to the technologies relevant to the type of cognition.

In the following sections I acknowledge and seek to deal with issues this analogical account presents. First, however, I want to note that if we incorporate into this analogical argument the Calvin/Plantinga *sensus divinitatis*, we are a step closer to understanding how the argument applies. The *sensus divinitatis* proposes that God created the world in part to trigger a cognitive mechanism in humans that would create a sense of divinity and, in theory, direct them toward their creator. The nagging question for philosophers of cognition interested in this mechanism is how this process works in specifics. The devil is in the details, as they say.<sup>12</sup>

*The Complemented Sensus Divinitatis.* If we view the cognitive process surrounding the God problem as fundamentally similar to other acts of cognition that allow and require cognitive technologies we find possible answers to issues raised above. This fundamental similarity stems directly from the fact that the *sensus divinitatis* is a cognitive process.<sup>13</sup> Theologians may argue that other faculties are involved in its function, but it is centrally a cognitive process. Anchored in this fundamental cognitive similarity is the thrust of the analogical argument: The biological brain incorporates

components of the world in complementary functions in a *variety* of ways that are relevant to the context and category of the cognitive process. Calvin and Plantinga offer insight into components incorporated into the *sensus divinitatis*: “Calvin’s idea is that the workings of the *sensus divinitatis* is triggered or occasioned by a wide variety of circumstances. . . . ‘There is no spot in the universe wherein you cannot discern at least some sparks of his glory’” (Plantinga 2000, 174). The entire world is a potentially influential component for the *sensus divinitatis*. This is strikingly similar to the CA, which allows anything to qualify if it serves a heterogenous Complementary function.

As already argued, the wildflowers and stars are analogous, in the CA context, to sequences of multiplication written on paper. What should we make of the significant differences between the functions themselves? In a theistic context it is simple to account for why different cognitive processes involve different external technologies. The *sensus divinitatis* was, quite appropriately, *designed* to respond to technologies other than mathematical functions. That is to say, God designed and intended human cognition to incorporate external components in different ways for varied cognitive functions. Alpine flowers would complement mathematical problems only in odd circumstances, and vice versa. Thus, if God designed humans to use the world cognitively on a broader level, it would be consistent if God allowed and even designed human cognition to employ different technologies for different functions. In this way the two examples are, suitably, not identical.

*The Question of Intent.* Further comparison of the two examples flushes out more detail on some complex issues implicit in each. The woman is seeking to answer the God problem, just as the agent is seeking to answer the multiplication problem. One obvious difference between the two is that in the multiplication problem pen and paper are *intended* to be cognitive technologies. In the God problem the stars and wildflowers are not actively and specifically sought as cognitive technologies. The agent is active in one situation and passive in another.

This question of agent intention is complex and leads directly into discussion of free will in the theological context. The exclusion of free will from this essay is a principled restraint; it would not reap benefits without involving extensive arguments that would significantly change the focus of the paper. I do wish to note one brief point to establish parameters around this issue. If we exclude theistic intention<sup>14</sup> we are left with the question, Can cognition be independent of agent intention? If we hold the view that cognition can be independent of intention (for example, stars complement cognition that is not intentionally being conducted), it can appear that the analogous argument is made superficial by allowing anything and everything into the Complementary status at any given time.

Potentially anything in the world can influence the *sensus divinitatis*, as Calvin and Plantinga state. Does this make the argument superficial in that everything in the world can be functionally analogous in the Complementarity sense? I contend that everything can be, but not necessarily is, at any given moment. The cognitive technologies would have to specifically complement the particular cognitive mechanism that is the *sensus divinitatis*. Different persons would employ different cognitive technologies in varying degrees and manners. For some agents stars and wildflowers will never serve a complementary purpose. Instead, a book or person may complement the *sensus divinitatis*. In other cases the *sensus divinitatis* may never be influenced by cognitive technologies (or anything else, for that matter). The claim put forward here is that in individual situations specific parts of the world can complement the *sensus divinitatis* in a way that is functionally analogous to pen and paper. Whether and how they do is contingent on a variety of issues specific to each situation. Thus, although everything can be, not everything necessarily is complementary at any given moment.

*Cognitive Bloat.* Another issue related to the God problem is discussed in EM literature and often is called cognitive bloat. This critique of EM runs along the following lines: If an individual's mind extends into the world with cognitive acts, where do we draw boundaries around the individual?<sup>15</sup> Extreme mental extension, often called network extension, seems to hopelessly expand the individual's mind beyond most common-sense and philosophical theories of the self: the person becomes cognitively bloated. The driving force of the cognitive-bloat problem is that there needs to be a limit to the extension of cognition if we are to avoid an absurd inflation of the personal mind. For example, a set of encyclopedias in your garage that are gathering dust but once were scoured in some detail can be called part of your mind if the limits of Extension are pushed. An example such as this demonstrates the need for some principled and practical limitations to mental extension. I want to introduce here a concise and tightly structured set of limitations as a way to analyze how wildflowers and stars can serve as cognitive technologies without expanding mind and self to absurd proportions (such as into huge fields of wildflowers or light from stars millions of light years away).

The first condition we need to require is *accessibility*. If something is to function as a cognitive technology, it must do so by being available to the cognizer. Pen and paper can complement biological cognition only if they are physically available to the person. And if a person cannot view the stars from a mountaintop he or she cannot access them in the relevant way.

Implicit in the accessibility condition is the similar constraint of *temporality*. One obvious reason the encyclopedias go against common sense is that they are not currently being used as a cognitive technology. Thus, the

temporal condition: For cognitive technologies to qualify for mental extension they must be functionally involved in the cognitive process during the biological cognitive function. This introduces an important restriction that will prevent unnecessary cognitive bloat.

These two conditions put severe limits on what qualifies as mentally extended: It must be accessible during the biological cognitive process. Thus, the encyclopedias are part of the mind only if they are physically accessed during a cognitive function in which they can complement.<sup>16</sup> In the case of Alpine flowers and stars, the woman must be present to receive visual stimuli in a Complementary way.

To what extent does the agent's mind extend into these technologies? In the context of cognitive bloat this is an extremely difficult question to answer satisfactorily. Whether the mind extends into technologies in a literal and identifiable way is an interesting question (and worth developing and exploring in both cognitive and theological scholarship) but is not my focus here. I emphasize the broader context—Clark's call to expand our analysis of cognition to incorporate in a greater way our cognitive environment. The specific arguments for this incorporation face genuine difficulties, such as cognitive bloat, but I do not deal piecemeal here with each objection. Rather, I have sought to sketch a basic response to demonstrate that the objections, although serious, are not debilitating.

As I have sought to demonstrate, the argument for mental extension is similar to theological arguments for the *sensus divinitatis*. The argument challenges theologians with contemporary cognitive proposals as well as secular philosophers of cognition with a theological layer that is new to the EM argument. It asks those on both sides of the integration to view the world and human minds as complementary—not by chance, per Clark, but by design. Although it was surely not the sole purpose of the way the world was created, it was, I argue, designed with cognitive technologies as an important potential feature. Fraser Watts makes this point in specific reference to biological cognition in his *Theology and Psychology*:

From a theological point of view the physical brain must be seen as part of God's creation. Like everything else in creation it should be seen as existing within the life of God and being dependent on him. When God seeks to reveal himself to people, it would be bizarre to suppose that he would wish, or need to bypass this aspect of his creation in order to do so. (Watts 2002, 79)

I wish to make the same point about creation in general by establishing that it is possible, and I argue plausible, that God reveals himself to humans in a cognitive sense through human cognitive collaboration with the world. God created mind and world to be cognitively complementary in a variety of ways, including ways that direct the cognizers to their creator. This allows for other complementarity, as described in the multiplication example, that does not appear to have a divine purpose, while also allowing for cognitive complementarity that is directed at the God problem.

The *sensus divinitatis* and the world were designed to function together in cognitive processes using a variety of cognitive technologies relevant to the context.

#### MUTUAL BENEFITS

*How should we study the embodied, embedded mind? The problem becomes acute once we realise that nature's solutions will often confound our guiding images and flout the neat demarcations (of body, brain, and world) that structure our thinking. (Clark 1997, 87)*

In this essay I mean to generate benefits for both theology and cognitive science. It often is the case in integrative processes that one component is the main beneficiary. Theology is clearly the main focus here, but it has been an implicit attempt until this point to develop benefits for EM. It may be that theism is intentionally absent from most cognitive science because of a lack of obvious relevance from such an endeavor.

The benefits to philosophy of cognition, and specifically EM, that I see are expressed by Clark in his *Mindware*: “The payoff, however, could be spectacular . . . a new kind of cognitive scientific collaboration involving neuroscience, physiology and social, cultural, and technological studies in about equal measure” (Clark 2001a, 153–54). He is pointing toward the “cash value” of emphasizing analysis of extended cognitive systems instead of focusing on traditional individualistic and biologically limited cognition. The atheistic philosopher or cognitive scientist may rightly ask what place theology has in the study of human cognition because the benefits of such a collaboration are not necessarily immediately evident.

If theology “in about equal measure” is added to this broad collection, at the absolute minimum a discipline that can offer alternative explanations and useful thought experiments is now included in the mixture. Metaphysical questions regarding cognition can be answered in significantly different and challenging ways, which could be beneficial in widening scholarship, research, and discussion. One may object that Clark specifies “in equal measure” as an important qualifying condition and that theology does not meet such a condition. This essay is an attempt to demonstrate otherwise.<sup>17</sup>

Are there benefits for theology, and specifically the *sensus divinitatis*? For the *sensus divinitatis* there is the benefit of placing this theological concept within a cognitive theory and thereby understanding it within the discipline about which it makes claims. Placing this concept within a wider framework allows for a broader understanding of its functioning and offers a possible explanation of how it functions in some philosophic detail. This is also an attempt to return theological significance to the understanding of cognition, in keeping with Aquinas, Calvin, and other theologians (as well as Christian philosophers such as Plantinga).

In broader terms, it is obvious that theology benefits from engagement with other disciplines. Theology becomes easily isolated if genuine effort is not put into engaging with a variety of disciplines, including those seemingly far removed. Just as EM can make some sense of the *sensus divinitatis*'s claims, science in general can deepen theological scholarship. Such a deepening returns us to the perspective many Christian theologians have had in viewing various concepts as not strictly scientific but also theological. Just as Aquinas and Calvin thought of cognition as a theological concept, current theologians (and theistic philosophers) have the challenge of reinterpreting scientific concepts in theological terms. Cognition undoubtedly is philosophic and scientific, but it can also quite justifiably be theological. The burden of proof for this cause is squarely on the shoulders of theologians, because theology seems much less relevant to our current scientific setting than it was to Calvin's or Aquinas's. This is not to say that such a burden of proof is impossible to shoulder or unlikely to be realized. In fact, the current environment provides rich and promising opportunities unavailable to Aquinas or Calvin.

#### CONCLUSION

*Things are rarely what they seem. But over time, we all learn to live with the strangeness, and it usually becomes the mundane orthodoxy of the next generation. (Lepore and Pylyshyn 1999, 24)*

This essay arose from the conviction that there are valuable benefits in integrating EM and the *sensus divinitatis*. Are the benefits compelling? I do not want to overstate my case, so let me temper it with some healthy criticism. EM does not need the *sensus divinitatis* to argue its position; Andy Clark is not actively looking for allies. However, the *sensus divinitatis* can add an alternative account to why EM occurs. My hope is that it is a modestly challenging and relevant account.

Extended cognition is still not held as highly plausible in the contemporary philosophic or cognitive science community, and it could be argued that introducing such a complicated premise as God into the argument can only serve to weaken it. If we accept the challenge Clark has given us to widen our parameters when thinking about human cognition, theistic themes do not weaken the philosophic arguments. At worst, they may prove to be irrelevant and useless. As any atheistic philosopher of cognitive science will tell you, though, EM lives or dies whether God, or the *sensus divinitatis*, exists or not.

Likewise, the *sensus divinitatis* can be integrated into a variety of other cognitive theories. Neither EM nor the *sensus divinitatis* is in dire need of the other—although, given the compatibility I have argued for, they do seem to be philosophic relatives despite their temporal and conceptual distances. Interestingly, the *sensus divinitatis* can be a prime and compelling

example of EM because it demonstrates how the human mind is more effectively understood by incorporating external components in the system that constitutes cognition. The *sensus divinitatis* can be an exemplar because it needs the world to sense divinity. Just as the naked brain finds complex multiplication difficult, it also lacks in sensing divinity on its own. My hope is simply that cognitive science and theology benefit, in some way, from this attempt at creating doxological extended cognition.

## NOTES

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1. For an excellent analysis of the relationship see Duce 1998, 7.
2. Historical sources for the Christian notion of *sensus divinitatis* are numerous. The prime source seems to be the Stoic conception of prolepsis, which is strongly associated with Cicero's *De natura deorum* (to whom Calvin actually refers in Chapter 3 of the *Institutes*). The ideas of the Stoics were indebted to Platonism, which was famously revived by the Cambridge Platonists in the seventeenth century. Theological scholarship mirrored these developments, with intense scholarship occurring around the Reformation. For discussion of the relationship between theology and philosophy at this time see Brown 1990, 151–54.
3. Aquinas, *Summa Theologiae* I, q. 2, a. 1, ad 1. The apostle Paul makes a subtle point in this direction in Romans 1, and, as noted, Christianity owes much to the Stoics in this area.
4. I strongly suspect that it was not beyond controversy either in Calvin's day or in ours. However, I do not attempt here a full defense and argument for the *sensus divinitatis*.
5. See specifically his Warrant trilogy, *Warrant the Current Debate* (Plantinga 1993a); *Warrant and Proper Function* (1993b); and *Warranted Christian Belief* (2000).
6. Plantinga also cites internal examples, such as doing something wrong or cheap and thankfulness in a person's soul for life (Plantinga 2000, 174).
7. Cognitive scientists and anthropologists, such as Ed Hutchins, have also had direct influences on the development of EM. In the present essay, however, I do not emphasize empirical or sociological investigations.
8. The prime example of this is the Tetris case in Clark and Chalmers 1998, 10–11.
9. For specific discussion see Clark and Thornton 1997; more generally see Dennett 1996.
10. This is not to imply that nature always serves this purpose. Many look at nature and find no relevance to theistic matters. Concerning the *sensus divinitatis*, some persons may find instigation not in nature but in a variety of other things.
11. I am sure that, just as there are persons who can complete complicated multiplication problems with no external help, there are persons who form views on God in such a direct way. However, experience tells me that people of both varieties are rare.
12. This is not to say that Calvin's or in particular Plantinga's accounts of the *sensus divinitatis*'s functions are cognitively undeveloped. It is from the specific approach of cognitive science or philosophy of cognition that more detail is sought so as to complete a fuller account of the *sensus divinitatis*. The looked-for "details" are not neuropsychological or evolutionary biology details; I am seeking philosophic details on what allows the *sensus divinitatis* to function, not attempting to place the *sensus divinitatis* within specific neuroscientific research, such as that on the limbic system.
13. Theologians seem to include the soul, spirit (often "Holy Spirit"), and body in the *sensus divinitatis*. I leave these potential inclusions as independent matters, noting simply that the function is centrally cognitive in all accounts.
14. By theistic intention I mean the intention and action of a supernatural agent expressed in humans in a way that precludes human action and intention that is based in human free will.
15. This assumes that the conception of individual self revolves in some way around the person's mind.

16. I am not suggesting that these limitations are exhaustive; they are not. They form the basis of what can be developed into a larger limitation structure, and they serve our basic practical and principled purposes here.

17. There also may be those who do not hold Clark's grand collaborative view and wish to restrict the study of cognitive science to certain disciplines. It is my opinion that such a view is unhelpful to the wider academic community.

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