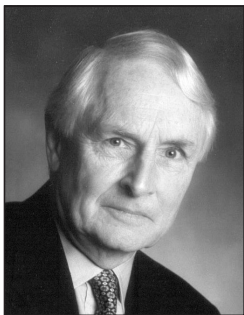


Article

Neuroscience, Evolutionary Psychology, and the Image of God

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Malcolm Jeeves



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Almost daily we read media reports of scientific breakthroughs, often in neuroscience and evolutionary psychology, which, it is claimed, offer new insights into our mysterious human nature. Most of these reports present no direct challenge to widely held traditional Hebrew-Christian understandings of human nature. Others, however, seem directly to confront some of our most deeply held Christian beliefs about our nature. Beliefs reinforced as we sing some of our favorite hymns.

Whilst references to the “image of God” are relatively infrequent in Scripture nevertheless the understandings of humankind which they enshrine are all pervasive. For two millennia, Christian Councils and Confessional Statements have presented different, competing views of what is of the essence of being made in “the image of God.”

Acknowledging the persuasive current impact of neuroscience and neuro-philosophy this paper urges us to remember that biblical warrant and scientific evidence join in reminding us that central to our understanding of what it means to be a person is our psychosomatic unity. We know each other, not as brains ensheathed in bodies, but as embodied persons. We are people who relate to each other as beings created in the image of God. This image is not a separate thing. It is not the possession of an immaterial soul. It is not the capacity to reason. It is not the capacity for moral behavior. It is not the possession of a “God spot” in our brains. It is acknowledging “our human vocation, given and enabled by God, to relate to God as God’s partner in covenant. To join in companionship of the human family and in relation to the whole cosmos in ways that reflect the covenant love of God. This is realized and modeled supremely in Jesus Christ.”¹

A proper understanding of the doctrine of the image of God is an essential groundwork to formulating and understanding a proper Christian response to humanitarian, evangelistic, apologetic, and ecological concerns.

*In
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Malcolm Jeeves is a past president of the Royal Society of Edinburgh, Scotland’s National Academy of Science and Letters, and a Fellow of the Academy of Medical Sciences and of the British Psychological Society. A graduate of Cambridge (B.A., M.A., Ph.D.) in natural sciences, he has received honorary degrees from Edinburgh, St. Andrews, and Stirling Universities. He is emeritus professor of psychology at St. Andrews University and was formally editor-in-chief of the international journal *Neuropsychologia* and a past chairman of the International Neuropsychological Symposium. In 1992 he was honored by the Queen, being made a Commander of the Order of the British Empire for his services to science and psychology in Britain. A neuropsychologist, his major research interest for more than three decades was neural plasticity as evidenced by the behavioral and cognitive functioning of a very small group of patients born without the corpus callosum, the major commissures connecting the two cerebral hemispheres. Throughout his career he has been actively involved in Christian witness amongst students. He was national president of Australian Interoarsity in 1969 and of British Interoarsity in 1976.

This paper is about our current understanding of human nature. More specifically, in the Christian context, it is about answering the question, “In what sense are we made in the image of God?” Nearly two millennia ago, St. Augustine asked the question: “What then am I my God? What is my nature?”² and the same question has become increasingly pressing today as it has moved rapidly from the almost exclusive domain of philosophers and theologians to something approaching center stage in scientific discussions, primarily those of neuroscientists and evolutionary psychologists.

In both fields, there have been exceptionally rapid developments in recent decades. For example, at a 2004 Society for Neuroscience conference there were 27,000 participants. At its inaugural meeting in 1969, there were fewer than one hundred participants. Such has been the exponential growth in the amount of effort and funding devoted to brain research.

Within both the scientific and religious communities, some have speculated about how traditional ways of thinking about human nature may need to change as we digest the impact of discoveries in neuropsychology and evolutionary psychology.

The Nobel laureate David Hubel fifty years ago arguably initiated the fresh impetus of research in neuroscience with his discoveries with Torsten Wiesel of brain cells that selectively responded to bars of light depending on their orientation. He wrote, in 1979, that “fundamental changes in our view of the human brain cannot but have profound effects on our view of ourselves and the world.”³ With the explosive rise in the number of neuroscience researchers, our view of the human brain has changed dramatically in the past two decades. How has this affected our views of ourselves?

It is not only neuroscience that impacts our traditional views of our own nature. Evolutionary psychology is witnessing a similar rapid expansion. The potential of evolutionary psychology has so impressed some of its practitioners that David Buss, for one, sees it as providing the new overarching framework for the whole of psychology.⁴ Not everyone agrees. But there is no doubt that the scene is set for exciting developments in research at the interface of psychology and evolutionary biology.

Developments in brain imaging techniques also have contributed immensely to research at the interface of neuroscience and psychology. These, in turn, have impacted developments in evolutionary psychology, leading to attempts to formulate a so-called “theory of mind” and to identify the mind’s possible neural substrates.

Within both the scientific and religious communities, some have speculated about how traditional ways of

thinking about human nature may need to change as we digest the impact of discoveries in neuropsychology and evolutionary psychology. From the scientific side, another Nobel laureate, Francis Crick, the co-discoverer of the structure of DNA, and who spent much of the latter part of his career studying the neuroscience literature, had no doubt that neuroscience would have a profound impact on our religious beliefs about our nature. He wrote in 1994: “The idea that man has a disembodied soul is as unnecessary as the old idea that there was a Life Force. This is in head-on contradiction to the religious beliefs of billions of human beings alive today.” Crick further posed the question: “How will such a radical change be received?”⁵ Shortly before he died in 2004, he made the further assertion: “In the fullness of time, educated people will believe there is no soul independent of the body, and hence no life after death.”⁶

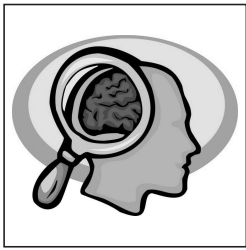
The main focus of Crick’s questioning of religious beliefs was that it had become increasingly difficult to hold a dualistic view of the person viewed as made up of two separate substances, soul and body (or mind and brain). Interestingly, for almost a century, some Old Testament scholars have been querying the supposed biblical foundations for dualist models. Commenting on the tenacity with which many Christians wish to hold on to dualistic views, Lawson Stone wrote:

If the immortality of the soul, and hence, dualism are essential to Christian thought, then the Church should be bracing for an encounter with science far overshadowing debates about creation and evolution.”⁷

Stone himself claims that the Bible does not support belief in dualism. A similar view was spelled out by several of the contributors to the 1988 book *Whatever Happened to the Soul?*⁸

In light of these comments, it behooves us to pause, examine the evidence—both scientific and biblical—and seek to arrive at a view which does justice both to the biblical evidence and to the scientific findings. As Christians, we have the further task of ensuring that whatever we say takes with full seriousness the timely reminder of another biblical scholar, Patrick Miller. Writing about the anthropology of Scripture, he emphasizes that true humanity above all is seen in the face of Jesus. Thus he wrote: “There is an important christological understanding of the answer to the question ‘What is a human being?’” Noting further that “there is an incarnational answer to the anthropological question” he underlines that “whatever we say about the human reality must take into account the face of Jesus Christ.”⁹

This is underlined again when New Testament scholar Joel Green writes: “Humanness ... is realized in and modeled by Jesus Christ.”¹⁰ We shall return to this crucially important theme in closing.



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Human Nature and the Image of God

Francis Crick's focus on the possession of an immaterial and immortal soul as defining human uniqueness from all other creatures and as constituting what it means to be made "in the image of God" is perfectly understandable given the centrality of the idea down two millennia of church history. It also resonates with the wide acceptance today by religious people, New Agers, and humanists who hold varieties of dualistic views. However, we should perhaps pause and remember that as a candidate for what constitutes the "*imago dei*," it is only one of a list championed in the past and still defended today in church catechisms and statements of core beliefs.

The dangers and pitfalls of any superficial treatment of what is meant by the image of God (especially when it is given by a scientist!) is highlighted by reference to larger scholarly works such as Westerman's commentary on Genesis 1-11¹¹ and von Rad's earlier 1956 commentary on Genesis.¹² Both agree that a key starting point for securing a biblical understanding of the *imago dei* is the passage in the opening chapter of Genesis where we read:

Then God said let us make man in our image, after our likeness. And let them have dominion over the fish of the sea and over the birds of the heavens and over the livestock and over all the earth and over every creeping thing that creeps on the earth.

So God made man in his own image, in the image of God he created him; male and female he created them (Gen. 1:26-7).

Westerman concludes his survey of studies of these verses by saying that they will reveal a common trait: "All exegetes from the fathers of the church to the present begin with the presupposition that the text is saying something about people, namely that people bear God's image because they have been created in accordance with it." And he goes on: "The whole question therefore centers around the image of God in the person: what is intended, in what does it consist, what does it mean?" However, Westerman himself believes that "*there can be no question that the text is describing an action, and not the nature of human beings*" (my italics).¹³

He writes: "Most interpretations presume without more ado that the verb 'create' can be understood in itself and apart from the context in which it is set. *But the text is speaking about an action of God, and not about the nature of humanity*" (my italics). He adds: "A false start has been made here which could have been avoided" and he concludes: "What the Old Testament says about the creation of humanity in the image of God has meaning only in its context, namely that of the process of the creation of human beings."¹⁴

This leads him later to make the related comment that God has created all people "to correspond to him" so that something can happen between creator and creature.

Seen from another point of view, the sentence means that the uniqueness of human beings consists in their being God's counterparts. *The relationship to God is not something which is added to human existence; humans are created in such a way that their very existence is intended to be their relationship to God* (my italics).¹⁵

Note here that his conclusions underline and emphasize repeatedly that it is the *capacity for relationships* which is the key to the proper understanding of the *imago dei*. We shall return to this later.

Another biblical scholar, Joel Green, has reminded us that reference to the key passages in the opening chapters of Genesis quickly became the basis for a view of the *imago dei* focusing on the (unique) possession of a soul.¹⁶ However, Green urges us to re-examine a commonly held interpretation of Gen. 2:7 where we read: "And the Lord God formed man of the dust of the ground and breathed into his nostrils the breath of life and man became a living soul." Green has pointed out that this passage has been read as implying that humans were made in the image of God by being given an immortal soul in contradistinction to the animals. He tells us, however, that this proof text is now better understood if we read it as a further comment on what has already been written in Gen. 1:1-27. The word translated "soul" in Gen. 2:7 is a word that has already appeared in Gen. 1:20, 21, 24, and 30 where in every case it refers to animals, thus underlining that humans and animals are souls. They are "living beings" as distinct from inanimate objects that have no life.

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With these preliminary guidelines in mind, we turn now to examine the meanings of the *imago dei* which have received the most enduring attention in the history of theology and which are still affirmed in various Christian traditions today. In each instance, we shall ask whether they are making claims which are open to current scientific evidence and, if they are, what is their status in light of that evidence.

Neuroscience and the Challenge to Dualism

The accumulating evidence from research in neuroscience, like all scientific evidence, has to be critically evaluated and interpreted. There are certainly no knockdown arguments that prove conclusively that mind-brain dualism is wrong and that a more nuanced view of mind-brain interdependence is right. Neuroscience Nobel laureates can be lined up on both sides of the argument for or against dualism. Sir John Eccles presented a neurobiological basis for dualism.¹⁷ Roger Sperry argued against dualism though even he at times leaned toward some form of interactionism.¹⁸ Francis Crick, as we have seen, had no doubt that dualism was, in the light of accumulating scientific evidence, untenable.

The nonspecialist may get the flavor of what neuroscience has revealed about mind-brain links and where it is heading by noting the following key signposts along the way.¹⁹

1. The possibility that what happens in the mind depends upon what happens in the brain goes back for at least two millennia. Physician and anatomist Galen tending the gladiators in the Roman arena had observed that injuries to the brain at times resulted in changes in personality and mental life. Galen's views however were forgotten for many centuries. By the eighteenth and nineteenth centuries, there was a resurgence of attempts to localize particular mental processes to particular areas of the brain. The early phrenologists, for example, Gall and Spurzheim, were not cranks but some of the leading anatomists of their day. Their views gave respectability to the possibility that specific mental abilities might be localized in particular regions of the brain. These claims were reinforced by the reports of the early work of people like Bouillard, a French physician, in 1825; Marc Dax, a neurologist, in 1835; and Paul Broca who in 1861 gave the first clues to speech being located in the left cerebral hemisphere. In the space of less than one hundred years, the possibility that brain events and mind events were systematically related gave way to an increasing recognition of clear links between, for example, brain and language and intellectual functions generally.

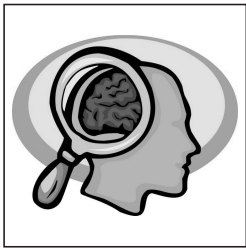
2. There were still, however, strong views by distinguished physicians on the other side of the argument. For example, early nineteenth-century physician Pierre

Flourens, a pioneer in techniques making small lesions in the brains of animals, produced results that could be interpreted as showing that psychological functions are not discreetly localized in particular cerebral areas. This view was championed in modified form a century later by Harvard neuropsychologist Karl Lashley, who put forward his theory of mass action.²⁰ Lashley's own work convinced him that although sensory and motor functions are in some sense localized that did not establish clear-cut, functional localization. His experimental findings, he believed, pointed to the association cortex as substantially equipotential. When studying the effects of lesions on the impairment of learning and memory, he believed that any impairments depended on the extent rather than the locus of the incision. This relationship became known as the law of mass action. Today, as we shall see in a moment, the localizationist view is dominant and well documented, though at times it is presented in the media in such a way that it verges on looking like an updated version of an outmoded form of phrenology. The upshot of many years of careful research points to the conclusion that neural and mental processes are best seen as two aspects of one unified whole.

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3. There was a phase in the history of psychology, noteworthy around the middle of the last century, which is puzzling to many nonpsychologists in that for several decades psychologists seemed inhibited about talking about the mind. Distinguished behaviorist B. F. Skinner so dominated the North American scene with his views that those who dared to speak of mind were, at times, labeled as unscientific. Fortunately there was a strong reaction against this which gave rise to the so-called cognitive revolution following which once again psychologists were allowed to speak about mind, and hence about mind and brain relations.

4. Most historians of the period agree that the possibility of a major step forward in the understanding of the relations of mind and brain was made possible primarily by the confluence of three hitherto largely separate research programs. First, there were developments in experimental psychology made possible by a fractionation of memory



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into its component parts so that each could be studied separately. Second, the onset of the cognitive revolution made it possible once again to be a respectable scientist and to study mind. Thirdly, and perhaps most importantly, new brain imaging techniques revealed how doing specific mental tasks selectively mobilized particular brain regions.

5. Before the rapid advances in brain imaging techniques, the most effective way of studying mind-brain relationships or behavior-brain relationships was an approach often labeled as a "bottom-up" approach. This referred to the fact that the experimental procedure was to make changes in selective neurological and/or biochemical substrates of the brain and then to observe how behavior or cognitive capacities were changed as a result of these neural manipulations. It was not even necessary to produce surgical lesions, since, following on the pioneering work of Hubel and Wiesel referred to earlier, there was a rapid expansion in methods which depended upon implanting very small electrodes in columns of cells in the brain. Researchers then monitored the activity in those cells, as the subjects, usually animals, were presented with a variety of sensory stimuli.

Here is a research example. Twenty years ago, David Perrett and his colleagues at St. Andrews used single cell recording techniques to map regions in monkeys' brains that responded selectively to the sight of human faces.²¹ Every new study seemed to tighten the links between what the monkey was seeing and how the cells of the brain were responding. There was a remarkable specificity in the cells' responses to facial stimuli. Among other things, Perrett found, for example, that changing the view of a face in its horizontal orientation from side profile to full face and back had a dramatic effect on the level of activity of face responsive neurons. All this suggested to Perrett that one of the key functions of these neurons may be to determine the direction of another's gaze. He proposed that the information provided by the eyes, the face, and the body was selectively processed by different columns of neurons, all part of a processing hierarchy for attention direction or social attention. Other researchers demonstrated this was a part of a larger system.²²

6. Links between brain and mind are not confined to perception and cognition but also to the understanding of differences in human personality and behavior. This also has a long and checkered history, and most who tell the story start with the account of how railroad foreman Phineas Gage, while working on the New England railroad, accidentally suffered damage to the frontal part of his brain and thereafter was a changed person.²³

A dramatic example of a similar change was reported very recently describing how a schoolteacher had begun collecting sex magazines, visiting pornographic web sites, and focusing his attention on images of children and adolescents. This was something which, according to him, he simply could not stop himself doing. He was arrested for child molestation, convicted, and underwent a rehabilitation program which was unsuccessful. The day before his final sentencing he went voluntarily to the hospital emergency department complaining of a severe headache. He was distraught and contemplating suicide and was aware that he could not control his impulses so much so that he propositioned the nurses in the hospital. An MRI scan of his brain revealed a large tumor pressing on his right frontal lobe. The surgeons removed it and the lewd behavior and pedophilia faded away. Sadly, after one year he began to manifest pedophilia afresh. New MRI scans showed that the tumor was beginning to regrow. It was removed and once again his urges subsided.²⁴ This case, not surprisingly, received wide publicity and comment. One thing, however, is clear. It demonstrated the remarkably tight links between what is happening in the brain and the manifested behavior.

7. So far we have concentrated on "bottom-up" effects. More recently with the use of more sophisticated brain imaging techniques there has been a rapid increase in research reports pointing to the importance of what are sometimes called "top-down" effects, referring to cognition producing localized changes in the brain.

Let us consider two examples. First, Maguire and his colleagues noted that licensed London taxi drivers are renowned

for their extensive and detailed navigation experience and skills. When studying structural MRI's of the brains of a group of taxi drivers and of matched controls, they discovered that, as a result of two years of intensive training in navigation, the anterior hippocampi of the taxi drivers were significantly larger. Moreover, the volume of grey matter in the right hippocampus correlated significantly with the amount of time spent as a taxi driver. The researchers concluded: "It seems that there is a capacity for local plastic changes in the structure of the healthy adult human brain in response to environmental demands."²⁵

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The second example is a study by O'Craven and Kanwisher that beautifully illustrates how the mind can selectively mobilize specific brain systems. They asked volunteers to look at pictures of faces or houses or to imagine these pictures. They demonstrated how imagining faces or houses selectively activated the same areas of the brain as when the subjects were seeing the pictures of faces or houses. Specifically, seeing or thinking about faces activated the fusiform face area, while seeing or thinking about houses activated the parahippocampal place area. The experimenters showed that they could actually "read the minds" of their subjects by observing their brain activity. They could tell whether the subjects were thinking about faces or houses by measuring activity in respective brain areas.²⁶

The picture emerging from the science briefly reviewed points to the intimate relationships among mind, brain, and behavior. We described some of these as "bottom-up" and some as "top-down." There is now an emerging consensus about how to portray these intimate relationships. For example, neurologist Antonio Damasio wrote:

The distinction between diseases of brain and mind and between neurological problems and psychological/psychiatric ones, is an unfortunate cultural inheritance that permeates society and medicine. It reflects a basic ignorance of the relation between brain and mind.²⁷

Robert Kendell, a recent Past President of the Royal College of Psychiatrists in Britain, wrote:

Not only is the distinction between mental and physical ill founded and incompatible with contemporary understanding of disease, it is also damaging for the long-term interests of patients themselves.²⁸

Modeling "Soul-Body" and "Mind-Brain" Relationships

It is one thing to observe this consistent pattern of the intimate links between mind and brain but it remains an enduring problem to know how most appropriately to conceptualize it. Some talk about a relationship of *identity*, some of *interaction*, some of *interdependence*. Interdependence has the virtue of not going beyond the available evidence. Given this interdependence how can we take proper account of the primacy of self-conscious human agency in modeling the relationship of mind and matter? We may project this concept of human agency on to the outside world in terms of an image of brain events, or we may take the standpoint of the agent herself experiencing mental events. Many have suggested that these two are best seen as complementary descriptions and it is a distortion of reality to say that they are "nothing but" the one or "nothing but" the other. There is an intrinsic duality about the reality we have to deal with but this does not need to be seen as dualism of substances. We may regard mental activity and correlated brain activity as inner and outer aspects of one complex set of events that together constitute conscious human agency. Two accounts can be written about such a complex set of events, the mental story and the brain story, and these demonstrate logical complementarity. In this way, the irreducible duality of human nature is given full weight, but it is a duality of aspect rather than a duality of substance.

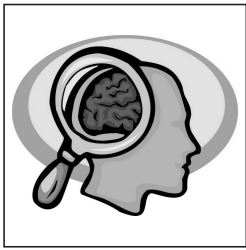
Scientists writing about issues that have occupied the minds of great philosophers from the past is fraught with hazards. With the permission of Professor Nancy Cartwright, I have read philosopher Sir Stuart Hampshire's shortly to be published monograph, *Spinoza and Spinozism*, which is full of insights on mind-brain relations.²⁹ The following quotations from Hampshire's posthumous monograph resonate strongly with some of the analyses offered above.

On the "naturalness" of dualism, he has written:

It must be admitted that Descartes' metaphysics does correspond fairly closely, although not exactly, with the intuitions about mind-body relations that are incorporated in our ordinary day-to-day language. We do indeed think of the mind as its own place and we do indeed think of thoughts of all kinds, of their causes and effects, as constituting an order which is irreducibly distinct from the order of physical objects in space.

Of our psychophysical unity, he writes:

The intimately linked psychophysical nature of the activity of perceiving is gradually investigated by empirical psychologists, and the philosophical myth of perception as the implanting of ideas in the mind is now dismissed. *We are ready to accept the double aspect theory of reality ... (my italics).*



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Later on this same theme, he writes:

In finding a way round Descartes' hopeless division of reality into two quasi-substances, thought and extension, hopeless because of the problems of linkage and intersection, the evident escape was to categorize Thought and Extension as universal attributes of reality, rather than as divisions in reality. Activities and actions are attributed to things in nature, and all activities have two aspects: first, the sense or meaning or purpose that animate them as activities or actions; secondly the aspect of physical bodily movement or change that is involved in the activity or action.

Hampshire also endorses Spinoza's critique of some models of mind and brain. It is salutary to remember that Spinoza's views long predated any detailed scientific knowledge of how the brain works. For example, Hampshire writes:

This is part of Spinoza's meaning when he writes that the mind must not be thought to be lodged in the body like a pilot in his ship. The connection between the two aspects of personality—between the person reflecting on his physical activities and states and the person pursuing these activities is as close as any connection can be.

Though not setting out directly to address the issue of the Christian view of the soul, it is interesting that Hampshire has written:

It no longer seems so important to distinguish exactly and consistently between the powers of a person as embodied in his brain and the powers of a person as a thinking being. It becomes important, if one is concerned with the mind as being the immortal soul required by many Christian churches, or with some part of the mind being identified with the immortal soul, to be liberated at death from the perishing body.

Finally, a telling quote about the complementarity of the two aspects of reality that he has repeatedly emphasized. He writes:

When you think of the relation of ideas to *ideatum*, of thought to body and brain, you interpret it as parallel to the relation of music to score. You can

either start with the music and expect the score, or start with the score and expect the music. So with the relation of thought to body and brain. Neither is more fundamental than the other. Yet there is a tendency to think of the body and brain as the substrate, or ground, upon which thought is based. This cannot be right, because the two attributes are complementary and completely equal and co-extensive within the one substance, and neither of them can be reduced to the other or causally related to the other.

In other words, reductionism will not do, and neither will substance dualism.

In his recent essay, Harvard physiologist and sleep researcher J. Allan Hobson speculates about how the distinguished Nobel laureate physiologist Sir John Eccles managed to continue to maintain his dualist view regarding the mind-brain relationships analogous to that of the pianist playing a piano, similar to the view of the pilot and the ship criticized by Spinoza so long ago. Hobson believes that, on the one hand, Eccles had not come to terms with the accumulating evidence from sleep research, which showed that "it was clear that the mind was not separated from the body in sleep, as Eccles had claimed ten years earlier."³⁰ Hobson claims that "all available evidence is that consciousness, including what we might call spirit or soul is a brain function."³¹ He concedes, however, that "presumably, diehard dualists, like Eccles, could still retreat to the position of Rene Descartes, insisting that the relationship of mind and brain we observe in every instance is best understood as two perfectly synchronized watches, set in parallel motion by God and evidencing God's remarkable creative process."³² Hobson adds: "The problem is that no evidence whatsoever exists to favor this hypothesis over the integrationist view that mind and brain are two levels of a uniform system."³³ And, we might add, in the light of the comments of the biblical scholars cited above, there is little or no biblical warrant for postulating a soul-body or mind-brain dualism.

Another area of neuroscience upon which Eccles leaned heavily in his defense of dualism was the widely publicized work of neurophysiologist Libet. Libet's work first

appeared more than twenty years ago. Today assessments of how best to understand and interpret Libet's findings lend little support to Eccles' views. Gomes recently reviewed Libet's findings and concluded that efforts by authors like Trevena and Miller to rescue a dualist interactionist explanation were unsuccessful.³⁴

The Persistence of Pervasive Dualism in Philosophical and Theological Circles

The notion that humans possessed a soul was typical of the thinking of major figures from the past such as Plato, Aristotle, Origen, Nemesius, Augustine (who held a modified Platonic view), and Descartes. Until relatively recently in the Western world, the dominant cultural influences have been the religious ones. However, such views were not universal. In the late Middle Ages, St. Thomas Aquinas made an impressive synthesis of Christian and Aristotelian ideas which has since become Catholic orthodoxy. Stevenson writes that Aristotle (and those who followed him) believed that "the human soul or mind should be understood not as a thing, but as a way of functioning, or, more precisely, a distinctive cluster of faculties including reasoning, which are fundamental to the human way of living and functioning."³⁵ Stevenson reminds us how Aristotle wrote: "It is surely better not to say that the soul pities, learns, or thinks, but that the man does these with his soul" (*de Anima* 408b15). Thought of in this way, it does not make sense to talk of a soul or mind existing without a body for, says Stevenson: "If there is nobody (or at any rate no living body), then there can be no way that the body is functioning, for it is not functioning at all."³⁶

However, as Stevenson further points out, Aristotle curiously suggests that "there is something especially different about the human intellect, namely our faculty for purely theoretical thought." This faculty, this kind of functioning, can exist separately from the body "as the everlasting can from the perishable" (*de Anima* 413b26). Stevenson continues: "Some of Aristotle's Islamic and Christian successors were happy to exploit this apparent backtracking in his philosophy of mind." Under Aristotle's influence, "Aquinas thus retained an element of Platonism arguing that the soul has a separate existence until the resurrection, and that this helps to solve the problem of maintaining personal identity but at the cost of incurring all the problems associated with dualism."³⁷

Similar strongly dualistic views are found in the writings of some of the Protestant reformers such as John Calvin who writes:

It would be foolish to seek a definition of "soul" from the philosophers. Of them hardly one, except Plato, has rightly affirmed its immortal substance ... Indeed, from Scripture, we have already taught that the soul is an incorporeal substance ...³⁸

In the light of the science that we have briefly reviewed, what are we to make of these widespread dualist views so pervasive in the Christian church? "The theologians of the early church began to use ideas from Greek philosophy," noted Leslie Stevenson, "and the concept of immaterial and immortal soul found its way into Christian thinking and has tended to stay there ever since."³⁹

There is an intrinsic duality about the reality we have to deal with but that does not need to be seen as dualism of substances. It is, in short, wiser to return to the biblical view, the holistic view of the human person.

The views of both Catholic and Protestant divines are kept alive today by scholars such as John Cooper, who writes:

Against the objection that Scripture is monistic, our study has demonstrated that the biblical view of human nature is both holistic ... and dualistic—asserting that persons are held in existence without fleshly bodies until the resurrection ... The monisms are incapable of allowing for this intermediate state.⁴⁰

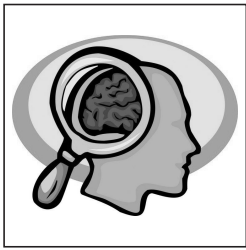
Such views have, however, to be put alongside those of other biblical scholars. Joel Green writes:

From a neuroscientific perspective, it is now unnecessary to postulate a second, metaphysical entity, such as the soul or spirit, to account for human capacities and distinctives.

The dominant view of the human person in the New Testament is that of ontological monism, such notions as "escape from the body" or "disembodied soul" falling outside the parameters of New Testament thought.⁴¹

More recently, and directly addressing Cooper's appeal to the soul as being necessary for an intermediate state, Green writes:

Among persons holding to some form of anthropological dualism, a crucial piece of evidence has been the presumption of the centrality to biblical eschatology of the disembodied intermediate state. I demonstrate the fallacy of this presumption and suggest that an eschatology, in which a disembodied, inter-



Evidence for reasoning and thinking abilities in nonhuman primates is available. While rudimentary, today they are seen to overlap with similar abilities in developing small children. It therefore becomes increasingly difficult to seek to anchor a belief in the uniqueness of humans created in the image of God in terms of reasoning.

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mediate state plays the central role, is poorly supported by the biblical evidence.⁴²

All of the evidence that we have looked at can be seen as indicating that it is a distortion of the reality that we study to say that the account given in mental categories, and the account given in neural categories, are competitors, rather they should be seen as complementary descriptions. It is wrong to say that “nothing but” the one or “nothing but” the other will suffice. There is an intrinsic duality about the reality we have to deal with but that does not need to be seen as dualism of substances. It is, in short, wiser to return to the biblical view, the holistic view of the human person.

The *Imago Dei* as the Capacity to Reason

The following is an extract from a catechism of the Catholic Church:

God ... can be known ... by the natural light of reason ... Man has this capacity because he is created “in the image of God.”⁴³

This Catholic view is firmly embedded in the works of Descartes, who wrote:

The human mind, by virtue of its rationality, provides evidence both of a kind of image of God and at the same time a criterion of radical discontinuity from the rest of creation. The animals are merely machines, and it is said that some of the enlightened believe that their cries of pain are no more than the squeaks of unlubricated machinery.⁴⁴

How do such views stand in the light of research into the cognitive capacities of animals and more especially of nonhuman primates? We mentioned earlier the rapid development of evolutionary psychology, and there is now a large body of evidence pointing to the conclusion that animals also think. There is, for example, an expanding research literature discussing whether or not chimpanzees have a “theory of mind.” For example, read the two volumes on so-called Machiavellian Intelligence.⁴⁵ Further evidence of behavior which, if it were seen in humans, would be described as imagination and as involving inventiveness and means-end reasoning is now available.⁴⁶ Studies at

the interface with neuroscience indicate how these emerging capacities may be related to the development of the brain.⁴⁷ In each instance, any attempt to set down a clear demarcation between the reasoning abilities of nonhuman primates and humans is found to have become blurred.

This, of course, is not to deny that there are distinctive capacities in humans which have led to the explosive development of learning, philosophy, literature, music, art, science, and so on. No one is claiming that. The point is simply that evidence for reasoning and thinking abilities in nonhuman primates is available. While rudimentary, today they are seen to overlap with similar abilities in developing small children. It therefore becomes increasingly difficult to seek to anchor a belief in the uniqueness of humans created in the image of God in terms of reasoning.

More than three centuries later, we today can find reassuring comments from Christian thinkers and leaders in the past. Blaise Pascal, for example, wrote:

It is dangerous to show a man too clearly how much he resembles the beast, without at the same time showing him his greatness, it is also dangerous to allow him too clear a vision of his greatness without his baseness. It is even more dangerous to leave him in ignorance of both.⁴⁸

The *Imago Dei* as the Capacity for Moral Behavior and Moral Agency

The illustrious North American theologian Jonathan Edwards wrote: “... *herein does very much consist that image of God wherein he made man ... viz in those faculties and principles of nature whereby he is capable of moral agency*” (my italics).⁴⁹ If Edwards was claiming that this capacity was unique to humans, then we may ask, “How does such a claim stand today in light of developments in evolutionary psychology?”

Over the past three decades, evidence has been steadily accumulating of behavior which, if we were to witness it in humans, we would attribute to the possession of a moral sense and moral agency. Thus, for example, Frans de Waal has written: “Aiding others at

the cost or risk to oneself is widespread in the animal kingdom."⁵⁰ He adds: "The fact that the human moral sense goes so far back in evolutionary history that other species show signs of it plants morality firmly near the center of our much maligned nature."⁵¹ Clearly self-giving is found not just in God's human work.

Some fear that another claim to human uniqueness is gone. But just because two behaviors are superficially similar is no reason to assume that the underlying mechanisms and thinking patterns are identical. Self-giving, self-sacrificing behavior appears in different animals. But that in itself tells us nothing about what underlies those behaviors. Self-giving behavior, for example, may occur with or without self-awareness.

Is there any evidence in Scripture to support the view that the image of God in humans is to be defined in terms of a unique capacity for moral behavior and moral agency? If there is, we await its identification.

It seems that there are good arguments for believing that some aspects of self-giving and self-limiting behavior have developed over our evolutionary history and become more pronounced among nonhuman primates. For those of us who begin from theistic presuppositions, it means we can see embedded within creation the seeds, development, and fruits of self-giving behavior. We do not need to deny the emergence of self-giving altruism in primates in order to defend the unique self-emptying sacrifice of Christ. That, we believe, was a unique and ultimate act that sets Christ apart from all others in heaven and on earth.

De Waal and other leaders in the field are at pains to point out the dangers of sloppy thinking in this area. For example, de Waal writes:

Even if animals other than ourselves act in ways tantamount to moral behavior, their behavior does not necessarily rest on deliberations of the kind we engage in. It is hard to believe that animals weigh their own interests against the rights of others, that they develop a vision of the greater good of society, or that they feel lifelong guilt about something they should not have done.⁵²

In order to defend the uniqueness of the developed human capacities for moral agency, it is not necessary to deny evidence of their emergence in animals and, in particular, in nonhuman primates. However, the more important question for Christians is, "Is there any evidence in Scripture to support the view that the image of God in humans is to be defined in terms of a unique capacity for moral behavior and moral agency?" If there is, we await its identification.

The *Imago Dei* as a Unique Capacity to Apprehend the Transcendent and the Numinous

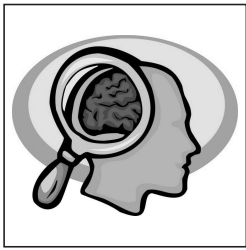
At times the image of God in humans has been linked to evidence for our capacity for appreciating and interacting with the transcendent and the numinous. For example, one volume of *Systematic Christian Dogmatics*, published a century ago, contained this assertion:

*The image of God in man is thus nothing but his destiny to become a child of God in the kingdom of God, or the capacity necessary for the realization of this destiny. This reflects the move beyond the traditional faculties (cognitive, conative) to the capacity for the religious, the numinous, for which Otto is, of course, famous (my italics).*⁵³

Related to any claim that the *imago dei* is to be seen in the possession of an inbuilt capacity to be in touch with the transcendent, there are today strong claims being made that just such evidence comes from the expanding field of neurotheology. The past two decades have seen a dramatic resurgence of interest in understanding the human capacity for appreciating the transcendent, the religious, and the numinous.

Hobson, in the article on Eccles mentioned above, reminds us how the seventeenth-century natural scientist, philosopher, and mystic, Emanuel Swedenborg, learned to intensify his dreams by sleep deprivation. Hobson wrote:

The natural result of sleep deprivation is called a "REM rebound." After losing REM sleep, we normally pay back the debt by longer, and stronger, REM periods. Dreaming duration and intensity then increase. In due course, Swedenborg experienced one of these rebounds, in which he said he met God's angels in person and received from them instructions for the founding of the Church of the New Jerusalem. Interpreted through the lens of modern neuroscience, the Swedenborg story confirms that no *vis externa* is necessary to account for this apparently miraculous revelation. It is sufficient to tilt the brain's own REM sleep system in the direction of hallucinatory overdrive in which people can meet whomever they want and accomplish whatever bit of carnal or spiritual business appeals to them.⁵⁴



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Using the latest brain imaging techniques, attempts have been made to identify the part or parts of our brains most active when we are meditating, praying, or seeking to be in touch with the transcendent. ... [B]y locating the "God spot" in the brain, it [does not] support the claim that this is the true meaning of the image of God in humans. There is no biblical warrant for such a view.

Using the latest brain imaging techniques, attempts have been made to identify the part or parts of our brains most active when we are meditating, praying, or seeking to be in touch with the transcendent. Some dramatic results have been published and have gained wide media exposure. However, it needs to be remembered that such attempts to link differentially certain parts of the brain to the transcendent has a long history. In much of the early work, interest was focused on what appeared to be an above-average manifestation of visions in those who were suffering from some forms of epilepsy. This in turn led to the idea that it was in these parts of the brain, the temporal lobes, that the capacity for being in touch with the transcendent is localized. Work in this area has been the focus of researchers such as Persinger.⁵⁵ Although in his early writings, he wrote as if to identify a brain area that was active was to "explain away" the phenomenon, it would appear that in his more recent statements, he is anxious to distance himself from such a view and to point out that his interest is strictly scientific and not taking sides in the science and religion debates.

In one of the earliest volumes on this topic which had the provocative title *Where God Lives in the Human Brain*, Carol Albright and James Ashbrook believed that they had begun to identify the elusive "God spot," and suggested that it is possible that we are indeed hardwired to seek God. For example, they wrote: "All that may be new here is an analysis that finds in the human brain a mirror of these imagines Dei – all these images of God – and thus may suggest further ways of comprehending them" (my italics).⁵⁶ The point about this quotation is that it takes us back directly to our central topic, namely, that this may be seen as the physical embodiment of the image of God in humans.

A more recent advocate of the temporal lobe as the elusive "God spot" is writer and researcher Willoughby Britton. Reporting on Britton's work, Julia Keller wrote that "the temporal lobe, Britton said, is considered 'the God module,' the part of the brain that connects with the transcendent."⁵⁷

Others look elsewhere in the brain. Osamu Muramoto, a research neurologist, describes his interest in what might lead one to become hyper religious. He writes:

Hyperreligiosity may stem from increased activity in the medial prefrontal cortex of the brain ... my theory is that the medial prefrontal cortex plays the role of the conductor of an orchestra in religiosity.⁵⁸

Others are more cautious in their interpretations. For example, Mario Beauregard who works in the departments of radiology and psychology at the Universite de Montreal is reported by Christopher Stawski as saying:

Obviously, the external reality of God can neither be confirmed nor disconfirmed by delineating neural correlates of religious/spiritual/mystical experiences. In other words, the neuroscientific study of what happens to the brain during these experiences does not tell us anything new about God.⁵⁹

Neither, I believe, does it lend any support to a view that by locating the "God spot" in the brain it supports the claim that this is the true meaning of the image of God in humans. There is no biblical warrant for such a view.

A similar point was made emphatically by the distinguished Jewish physician Jerome Groopman, who was concerned about some of the motivations for neurotheology. He wrote: "Why do we have this strange attempt, clothed in the rubric 'neurotheology,' to objectify faith with the bells and whistles of technology?"⁶⁰ And he goes on: "Man is a proper subject for study in the world of science. God is not."⁶¹ While acknowledging that we cannot dismiss the possibility that we are intrinsically wired for spirituality, Groopman wisely notes that "as has been the case with all attempts to 'prove' the presence or intent of God, SPECT (brain) scans and cerebral anatomy fall far short of doing so."⁶² And he concludes: "Indeed to believe that science is a way to decipher the divine, that technology can capture God's photograph, is to deify man's handiwork. And that, both religious mystics and scholars agree, is the essence of idolatry."⁶³

Earlier we mentioned the high profile neurologist V. S. Ramachandran. Most recently he has put us further in his debt by offering a balanced assessment of how to evaluate the many claims being made today of the power of neuroscience to "explain everything." In his new book *A Brief Tour of Human Con-*

sciousness: From Impostor Poodles to Purple Numbers, he discusses the cognitive, neurological, and evolutionary basis for our appreciation of visual art.⁶⁴ In an interview with him in *The Psychologist*, the interviewer asks:

But isn't the biological grounding of that (the craving for transcendence)—by saying it's stimulation of the temporal lobe—diminishing to the value of the experience?

Ramachandran replies:

No. It only takes care of two of the three questions we need to ask as scientists. It takes care of what it is, of what produces it. It takes care of the biological anchor. But it doesn't say why the function is: why does it help the organism? ... with transcendence, I can't tell you why ... There's something going on that we don't really understand.⁶⁵

There are no faith shattering stakes in the beginnings of a better understanding of the neurological and evolutionary origins of a capacity for transcendence. Neither is there scriptural warrant for claiming that such a capacity is what is meant by the *imago dei*.

The *Imago Dei* as a Unique Capacity for Personal Relatedness

To focus on the capacity for personal relatedness is another way of describing what in the past has been alluded to in discussions of the societal nature of the divine image. Sinclair Ferguson, referred to earlier, has pointed out that some of the leading theologians of the last century such as Brunner and Barth both emphasized that the image of God is not the possession of the isolated individual but of the person in community. Barth developed the idea characteristically in a Christocentric manner. More recently theologian Colin Gunton has stated quite explicitly that “*to be a person to be made in the image of God it is in our relatedness to others that our being human consists*” (my italics).⁶⁶

It is interesting that a similar focus on relatedness is found today in the writings of neuropsychologists and evolutionary psychologists. Warren Brown, for example, has written: “A theory of mind is involved in extending our relatedness both to others and to ourselves.”⁶⁷ And evolutionary psychologists Byrne and Cork have written that “learning in social contexts may be constrained by neocortical size” and that “neocortical expansion has been driven by social challenges among the primates.”⁶⁸

But the capacity for relatedness is not some capacity free-floating above the head or out there in space. The evidence from neuroscience and evolutionary psychology both point to the beginnings of an understanding of the neural substrates required to be functioning normally for the possession of a full capacity for personal interrelatedness. To give one example, one of the most significant

neuroscience discoveries in the last decade was the identification of a small specialized group of neurons in the frontal part the brain. These “mirror neurons,” discovered by Giacomo Rizzolatti and his colleagues, seemed to be part of the essential substrate for interpersonal interactions.⁶⁹ Ramachandran has predicted:

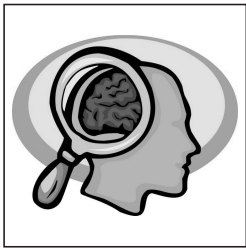
Mirror neurons will do for psychology what DNA did for biology: they will provide a unifying framework and help explain a host of mental abilities that have hitherto remained mysterious and inaccessible to experiments ... and thus I regard Rizzolatti's discovery as the most important unreported story of the last decade.⁷⁰

The capacity for relatedness, if this is to be seen as the key to understanding the imago dei, is itself dependent upon our wholeness as persons and intimately dependent upon our biology. It is an embodied capacity.

It is already evident from further research that these mirror neurons are part of a wider network upon which the capacity for personal relatedness depends. The evidence for this comes from ongoing studies of the brains of autistic individuals. It is widely known that one of the difficulties experienced in some forms of autism is the capacity to relate to other people. It is already evident that in certain autistic individuals the brain is functioning abnormally as compared with controls when they are performing tasks, which are normally known to mobilize the so-called mirror neurons. It will be some time before the full details have been worked out experimentally and they will undoubtedly turn out to be far more complicated than at the moment we suspect. However, the important point here is that the capacity for relatedness, if this is to be seen as the key to understanding the *imago dei*, is itself dependent upon our wholeness as persons and intimately dependent upon our biology. It is an embodied capacity.

The Way Ahead

Writing about “The Image of God,” Sinclair Ferguson notes that “specific references to man as the image or likeness of God are infrequent in Scripture” ... but that ... “while statistically the phrase is infrequent, the interpretation of man which it enshrines is all pervasive.”⁷¹ He reminds us that



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As scientists who are Christians, we believe that using the talents God has given us, we have been enabled to discover more and more about the wonders of his creation. We also believe that ultimately the truth that we discover in this way will not contradict nor conflict with the truth that has been revealed in Scripture.

a wide variety of interpretations of the *imago dei* is found in the history of theology and that it is a human being as a human being and not some element of his or her constitution or make-up which constitutes the divine image. A proper understanding of the doctrine of the image of God, he says, is an essential groundwork to formulating and understanding a proper Christian response to wider concerns such as ecological, humanitarian, evangelistic, and apologetic concerns. He emphasizes that humankind is always to be approached in his totality and not in terms of his parts.

With Ferguson's guidelines in mind—especially that while the references to the image or likeness of God are relatively infrequent in Scripture, nevertheless the interpretation of humans which it enshrines is all pervasive—we have reviewed some of the interpretations which, down the centuries, have been accepted as being central to a proper understanding of the meaning of the image of God in humans.

On the one hand, we have discovered—perhaps surprisingly to some—that many biblical scholars and theologians have urged us to remember the views of the distinguished North American theologian Jonathan Edwards. In his recent biography of Edwards, George Marsden wrote:

Edwards regarded Scripture alone as truly authoritative, so earlier interpreters could be revised. The project of understanding Scripture's true meaning was an ongoing progressive enterprise to which Edwards hoped to contribute.⁷²

This is indeed a timely reminder. It is Scripture that is authoritative not the interpretation given by a particular group of Christians at a particular time. As scientists who are Christians, we believe that using the talents God has given us, we have been enabled to discover more and more about the wonders of his creation. We also believe that ultimately the truth that we discover in this way will not contradict nor conflict with the truth that has been revealed in Scripture. However, as the history of the interactions of science and faith have amply illustrated, from time to time, the discoveries we make from within science prompt us to re-examine some of our earlier interpretations of

Scripture. As always we need to listen carefully to what God is telling us through science in order to interpret and understand Scripture properly.

Relating this to our specific topic of current concern, namely our understanding of the image of God, we have noted that it has been the very rapid developments in neuroscience and evolutionary psychology that have proved to be most relevant to our understanding of human nature, and these which therefore have shed new light upon our understanding of ourselves. As a result of this new knowledge, we have learned to recognize certain things:

1. A holistic model of the human person does most justice to the scientific understanding of ourselves. Dualisms of parts or substances will not do. There is no scientific evidence for them, and there is no biblical warrant for them. Our unity is central. We know each other, not as brains ensheathed in bodies, but as embodied persons. We are people who relate to each other as beings created in the image of God. This image is not a separate thing. It is not the possession of an immaterial soul. It is not the capacity to reason. It is not the capacity for moral behavior. It is not the possession of a "God spot" in our brains.
2. The various capacities claimed in the past to discriminate uniquely humans from animals have now been seen to be present in rudimentary forms in animals.
3. Believing that all truth comes from God, we can, as Christians who are scientists, marvel at what we discover and be relaxed about the increasing wonders revealed every day about the most intimate details of human nature. What we already know will seem small in the light of what will be revealed in the coming decades, which will add even further to our conviction that we are indeed "fearfully and wonderfully made."
4. We are seeing that the contemporary focus of theological thinking is to see the *imago dei* as evidenced in our capacity for relatedness: to our Creator, to one another, and to the creation of which we have been made responsible stewards. To understand and accept this has enabled us to recognize the need to show greater compassion to those struggling to make and then maintain normal interpersonal relations. Above all,

Scripture teaches that we have a special calling and destiny—a calling to a personal relationship of love and obedience to our Creator and a destiny to fulfil his invitation and command to be faithful stewards of his creation.

But as Christians we cannot leave it there. As biblical scholars and theologians are reminding us today, any attempt to interpret and understand the *imago dei* without reference to the Lord Jesus Christ falls far short of what Scripture teaches. It is in him and him alone that we have the clearest vision of what the *imago dei* is and how it is to be understood. For example, Old Testament scholar Patrick Miller, after reviewing the evidence from the Psalms concerning what it means to be a human being and then comparing this with the book of Hebrews, has written:

The writer to the Hebrews hears in the Psalms the word that whatever we say about the human reality must take into account the face of Jesus Christ. The New Testament underscores this in spades when it makes Psalm 22, the model lament, the interpretive key to understanding the passion and death and resurrection of Jesus Christ.⁷³

He later goes on: “The Hebrews writer says the critical words ‘But we do see Jesus.’” *“We do see Jesus, who for a little while was made lower than the angels, crowned with glory and honor because of the suffering of his death, so that by the grace of God he might taste death for everyone”* (Heb. 2:9).

And he later continues:

Whatever therefore is to be said about the human cannot be confined to general statements about humanity apart from God. It cannot be said apart from the discovery that in Jesus Christ we see who we are and we also see God for us. And what he said about the human cannot be said as a general statement that assumes that what we see now is all there is to see. The answer to the question about who we are is finally eschatological, where tears are no longer part of the human reality, where joy is the order of eternity, and where our transience disappears in the disappearance of death. We cannot see that yet. But we do see Jesus. That will have to do. I think it is enough.⁷⁴

And for me it is certainly enough.

A similar note is sounded by New Testament scholar Joel Green who writes:

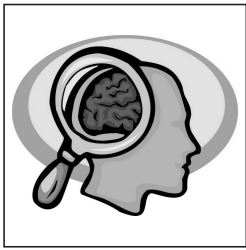
The image is not located in any of these (possession of a soul, etc.) but in our human vocation, given and enabled by God, to relate to God as God’s partner in covenant. To join in companionship of the human family and in relation to the whole cosmos in ways that reflect the covenant love of God. This is realized and modeled supremely in Jesus Christ.⁷⁵

Some Implications for Faith and Practice

Lest it be felt that consideration of how best to understand the *imago dei* is a purely academic exercise, it is, at this stage, timely yet again to recall the words of Ferguson. He reminded us that a proper understanding of the doctrine of the image of God is an essential groundwork to formulating and understanding a proper Christian response to wider concerns. These included humanitarian, evangelistic, apologetic, and ecological concerns. For Ferguson, all of this was predicated on the assumption that “humankind is always to be approached in his totality and not in terms of his parts.”⁷⁶

As regards humanitarian concerns, we have noted that our spirituality is embodied. This is well illustrated in studies of the brain processes involved in prayer, meditation, and reflection on the transcendent. As with most biological processes, it reminds us once again to keep in mind their variability within any large population and thus the need to recognize our differences. It is entirely possible that in due course some of the findings from neurotheology will provide further pointers to why some people are plagued with bizarre religious thoughts and hallucinations. A better understanding of this may in turn make it possible to bring relief to some of our brethren by the use of appropriate psychotropic drugs. A similar thing already has occurred as we have at last begun to understand and accept that the onset of depression in some of our Christian friends has nothing whatever to do with spiritual disobedience but rather with disordered biochemistry. In short, further research may foster greater understanding and lead to greater compassion within our Christian communities.

But what about pastoral care and counseling without a soul? Stuart Palmer has argued that any dualistic conception of “soul” is unnecessary for the existence and vitality of the field of pastoral counseling. He believes this view is supported not only by consideration of the evidence from neuroscience but also is backed by a serious consideration of the implications and benefits of a Trinitarian theology.⁷⁷ It is not only some scientists who are reductionists. It is possible in offering pastoral care, traditionally described as “soul care,” to bring in hidden assumptions about the basic make-up of persons wherein concentration on the “soul” is everything. Indeed some act as if expressions of spirituality are reducible without remainder to psychological phenomena. Others believe that the psychological dynamics of life can be reduced without remainder to spiritual explanations. Palmer has argued that neither does justice to the relevant evidence. People are physical beings, vulnerable to changes in their biology, including such changes as those in concentrations of neurotransmitters and, at times, associated depression.



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People are social beings. We need horizontal relationships. We need community support. People are made by God and for God. Though finite creatures, we are invited into a vertical relationship with the infinite divine Creator. Therein lies part of the relevance of a fully Trinitarian theology.

Likewise we have gained a better understanding of some of the agonies that devout Christians pass through as they struggle with the effects of Alzheimer's disease upon their Christian life and discipleship.⁷⁸ This further underlines the intimate interdependence of all aspects of our complex natures. People are social beings. We need horizontal relationships. We need community support. People are made by God and for God. Though finite creatures, we are invited into a vertical relationship with the infinite divine Creator. Therein lies part of the relevance of a fully Trinitarian theology.

In similar vein, when considering specifically the implications of advances in neuroscience for Christian counseling, Virginia Holeman has noted:

The view of personhood that takes the tightening in mind-brain links seriously leads to a particular understanding of the metapurpose of Christian counseling with specific attention to the role of the Holy Spirit in general and the counseling relationship in particular.⁷⁹

For Holeman, it is the capacity for relationships, central to the understanding of the *imago dei* which is all-important. She writes:

It is not the external strategies that define Christian counseling, but the agency of the kingdom of God in the lives of counselors who seek to bring this healing reality to bear upon the lives of clients. The person of the therapist-in-relation-to-God brings the Christian into Christian counseling. In effect, Christian counseling is less about technique and more about relationality.⁸⁰

As regards apologetic concerns, the brief look at the way that research in neuroscience and evolutionary psychology are progressing has alerted us to the need to come to a better understanding of the habitual ways of thinking about human nature widely shared by our neuroscientist and psychologist colleagues. We shall be especially sensitive to the need not to create unnecessary hurdles for them to jump over as they seriously consider the claims of Christ. We shall not, for example, demand, without any scriptural warrant, that they must believe that each of us is a package made up of soul and

body stuck together in some ill-defined way rather than recognizing ourselves as psychophysical unities. We shall also certainly be careful how we use our "soul talk."

As regards evangelism, we are greatly helped by the writings of missiologist Michael Rynkiewich.⁸¹ While remembering that "soul talk" remains an essential part of our Christian heritage, we need to work hard to endow it with a fully biblical meaning rather than one that owes more to the pervasive influence of western philosophy and theology than to Eastern Orthodox theology with its emphasis on relationships. It remains the case that many of our favorite hymns embody a tacit belief in "the soul" as some separate part of us. It is my "soul" that is saved as I personally receive Christ as Savior and Lord. It is my "soul" that with all the other redeemed souls will gather round the throne of grace in heaven to continue our praise and worship. Thus it was for centuries "the saving of souls" that motivated our illustrious forebears, those wonderful pioneering missionaries of past generations.

Rynkiewich alerts us to the fact that "a dualism that allows missionaries to separate evangelism and social justice is contrary to the *missio dei*."⁸² He further reminds us that we are so imbued with the premises of western ideology about persons that it is only by listening to missionaries that we are forced to remember that other cultures have other assumptions. And personhood is conceptualized differently in other cultures. He asks the question:

Is there, for example, the same autonomous individual in all cultures who can make a decision and come forward alone to register that decision or must conversion be conceived in a different way? Rather would conversion be the giving of oneself to receive from God in order to establish a new relationship or is it just the acquisition of some new knowledge.⁸³

Some missiologists, he notes, "have argued that the real issue is relationship, not knowledge, not scholarship." Rynkiewich urges us to remember that "our mission is not to convince the world that we have the truth with regard to the construction of personhood, but to introduce Christ as a person seeking relationship, to invite people to

receive God's grace, and to enter into a new community through the Holy Spirit."⁸⁴

Rynkiewich writes further, and to some somewhat provocatively, that perhaps "many Protestant missionaries seem to think that the job is to impart words, knowledge, and creed." But this he says "is a pale reflection of 'the word became flesh and lived among us.'" Rather he emphasizes that "the incarnation involved God coming to humans in a recognizable form so that those who embraced the message may 'have fellowship with us; and truly our fellowship is with the Father and with his Son Jesus Christ.'"⁸⁵ Are we in danger, he wonders, of reifying and deifying our own culture? There is much provocative food for thought here.

Finally, Ferguson also drew attention to implications of our understanding of the *imago Dei* for our current ecological concerns. In recent decades, there has been increasing involvement by Christians in expressing and meeting such concerns. This is certainly a proper response to the understanding of the *imago dei* focused on by many and spelled out so clearly by Colin Gunton. Gunton writes:

To be in the image of God is at once to be created as a particular kind of being—a person—and to be called to realize a certain destiny. The shape of the destiny is to be found in God-given forms of human community and of human responsibility to the universe.⁸⁶

Noting that "human difference from the rest of the creation does not lie in some absolute ontological distinction, but in an asymmetry of relation, and therefore a relative difference," Gunton reminds us that "as created beings, human persons are bound up closely with the fate of the rest of the material universe, as stewards rather than absolute lords."⁸⁷

This understanding of the essence of what it means to be made in the image of God leaves us with two questions that we all must answer: (1) Have we responded to our calling and accepted the personal relationship into which we are invited by God through Jesus Christ? and (2) Are we fulfilling our destiny as faithful stewards of his creation? ◆

Acknowledgments

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Recommended Readings

In the descriptions of "bottom-up" effects and "top-down" effects given in this paper, it was possible, in the space available, to give very few examples. For the reader interested in further details of both "bottom-up" effects and "top-down" effects, examples from the current neuroscience literature, from the molecular level up to the level of neural networks and whole systems, is available in more extensive reviews I have given recently in several places. The following are the most easily accessible.

"Mind Reading and Soul Searching in the 21st century: The Scientific Evidence," chap. 2 in *What about the Soul?* ed. Joel Green (Nashville, TN: Abingdon Press, 2004).

"Human Nature without a Soul?" *European Review* 12, no. 1 (2003): 45–64.

For the reader interested in recent writings by biblical scholars on some of the supposedly more problematic passages of Scripture traditionally interpreted in a dualistic way, there is a series of chapters by Old Testament and New Testament biblical scholars in *What about the Soul?*

Notes

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