

## IMAGED THROUGH THE LENS DARKLY: HUMAN PERSONHOOD AND THE SCIENCES

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In very different senses there both is and is not an *imago Dei*. Scripture affirms that from our very beginning we were destined to bear the impress of the Creator. God made us in his image. Yet for us there is not one image of God but rather images of God, for in refracted ways humans grasp that image. Our understandings of the *imago Dei* result from our interpretations of the diversity of data confronting us. As we shall see, these data include more than the brief claims found in Genesis and the NT.

In what follows we will note the ambiguity of the Biblical concept of the *imago Dei*, reflect on the reasons for the diversity of interpretations, and then explore how recent developments in science and technology—especially the biological sciences and biotechnology—help us to further understand the human who is created in God’s image and to stretch and challenge traditional concepts of that very image.

### I. THE *IMAGO DEI* IN SCRIPTURE

What can be said about the concept of the *imago Dei* in Scripture? Not only is the concept rarely used—in three passages in Genesis and in four in the NT<sup>1</sup>—but its meaning is never fully explicated in the texts.

In Gen 1:26-27; 5:1-2 the image is introduced parallel to human maleness and femaleness. God created humans male and female, granting them sexual identity, differentiatedness, and relatedness. But it would seem that, employed in this manner, the image must extend beyond (though including<sup>2</sup>) the physical, for animals too are created male and female. Does it suggest the rooting of human sexuality in a way different from the rest of creation?

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<sup>1</sup> This does not count references to our being in Christ’s image (Rom 8:29; 1 Cor 15:49; 2 Cor 3:18) nor to Christ as being in God’s image (2 Cor 4:4; Col 1:15). There is disagreement over whether the image of God as found in Jesus Christ is the same as found in created humans.

<sup>2</sup> In Gen 5:3 the use of the term “image” to relate Adam to his son Seth parallels the reference to humans being made in God’s image in 5:1. So seen, that the child bears a physical likeness to the parent suggests that one cannot understand the concept of the *imago Dei* apart from the physical.

In Gen 9:6 the term does not invoke human sexuality but assumes moral dimensions. Possession of the image means that human life is sacred. To kill a human is to forfeit one's own life, for the denial of another's image is a denial of one's own. This value emphasis is reiterated in Jas 3:9, where to curse persons is to fail to properly recognize the image of God in them.

In the NT Paul also emphasizes the image's moral dimension. The new self the Christian is to put on is to be like God in righteousness and holiness (Eph 4:24). In Col 3:10 his command to put on the new self that is renewed in the image of the Creator is embedded in a variety of other ethical commands. In 1 Cor 11:7 the image provides the ground for a moral/cultural prohibition about men praying with their heads covered.

It is apparent that the term *imago Dei* in its Scriptural setting is viewed diversely. The Biblical writers who use it affirm that we cannot be understood apart from the creative act of God, that our relatedness to God is to be seen in our sexual identity, that this likeness bestows unique value on human persons, and that it has moral implications. But what this term really means—wherein the image consists, or how it is to be unpacked ontologically—is left unclear.<sup>3</sup>

This should not surprise us, for Scripture nowhere presents a human psychology, biology, sociology or anthropology. What is in view is not an empirical or a metaphysical analysis of human personhood. Neither does it contain systematic speculation about the nature of human persons, but rather an analysis of the human predicament and its resolution. Humans are to be understood in their failure to relate to God and in their being reconciled to God through redemption. As to the problem at hand, Scripture gives little guidance as to how the concept of the *imago Dei* is to be translated into empirical psychology, philosophical anthropology, or biology.

The absence of a clearly delineated philosophical anthropology or psychology can be illustrated by the writings of Paul. He applies distinctions to the human person, but rarely do these specify distinctive constitutive elements. Instead they refer to the aspects of human existence involved with our spiritual and moral development. For example, he speaks about the flesh and the spirit, but these are essentially moral or spiritual, not ontological or constitutive, concepts. Flesh is the realm of our lives where sin is at work, where to yield to it brings death. Spirit is the realm of life lived by or according to the Spirit of God.

Ontologically speaking, Paul's analysis of human persons is generally consistent with the Hebraic monistic view. For one thing, Paul does not use *sōma* ("body") in contrast to *psychē* ("soul"). Indeed the infrequency

<sup>3</sup> A further problem concerns whether the fall has had any effect on the *imago Dei*, and if so what that effect might be. The Genesis accounts, 1 Cor 11:7, Jas 3:9, and the rabbinic treatment suggest that it was not marred or lost in the fall (*TDNT*, 2. 392-393). On the other hand Eph 4:24 and Col 3:10 suggest that if the image was not lost completely, at the very least it needs restoration and renewal through our relationship with Christ.

with which Paul uses "soul" (thirteen times) is noteworthy. It suggests the relative unimportance of the "soul" concept for his understanding of persons. And where he does use the term he is speaking not about an ontologically distinguishable part of human persons but about human functions or aspects. For another thing, though Paul affirms that the body will be raised, it is not the body alone that will be raised, to be reunited with the soul. As Christ was raised as a complete person, so we as complete persons are to be raised to eternal life.

Yet there are times when Paul's thought seems dualistic. The analogy of the tent in 2 Cor 5:1-10 suggests a body-soul dichotomy, as does 1 Cor 7:34.

This diversity of views in Paul should not bother us, unless we think that Paul was attempting to construct a philosophy or science of humans. But this was not his task. His anthropology is tacit, underlying his more straightforward theological, salvific and moral concerns.<sup>4</sup>

In short, just as one cannot find a biology or geology worked out in Scripture, so one cannot find a psychology or anthropology there either. This does not mean that there are no statements about the human person. Scripture makes it plain that humans are to be seen from the perspective of God and his purposes. But these insights are not developed into a systematic theory about persons considered in abstraction. Philosophical considerations only tacitly underlie other concerns.

## II. THE *IMAGO DEI* IN THEOLOGY

This ambiguity regarding the meaning of the *imago Dei* has not prevented Christians throughout the centuries from giving content to the concept. One might distinguish four different interpretations.

1. *The ontological or substantive interpretation.* This has been the most widely held position in classical and contemporary theology. Augustine, for example, held that the *imago Dei* refers to the rational soul, and specifically to its unique trinitarian abilities of memory, understanding and will (love).<sup>5</sup> Thomas Aquinas maintained that though the likeness is analogical in that God possesses the characteristics virtually but not formally,<sup>6</sup> the ontological likeness in humans is grounded in the intellectual or rational soul.<sup>7</sup> Calvin repeated the same theme: "The proper

<sup>4</sup> "To know man, therefore, would mean to be known from God. Here goes any anthropology. But because anthropology does not exist except as an act of the new being, it becomes quite understandable why Paul could be so beautifully unconcerned about different anthropological traditions. . . . Paul could take over some Hellenistic views of man into his Rabbinic background, because he was not interested in a systematic view of man but in the salvation of whatever man there is" (S. Laeuchli, "Monism and Dualism in the Pauline Anthropology," *BR* 3 [1958] 26).

<sup>5</sup> Augustine, *De Trinitate* 6.12; 14.6.

<sup>6</sup> Thomas Aquinas, *Summa Theologica* I, Q. 4, Art. 3.

<sup>7</sup> *Ibid.*, Q. 93.

seat of his image is in the soul. . . . The image of God . . . is spiritual."<sup>8</sup> The two main faculties of the soul—understanding and will—“were not totally annihilated and destroyed in him, yet [the image] was so corrupted that whatever remains is frightful deformity.”<sup>9</sup> A. H. Strong identified it with human personality (including the faculties of intellect, affection and will) and holiness (dispositions to act morally), both of which are seated in the soul.<sup>10</sup>

At least two bases can be suggested for the substantive interpretation. (1) Since the *imago Dei* designates the unique feature of human persons it must relate to the essence of man. That which differentiates humans from animals is rationality and the derivative ability to will and act morally. Hence the *imago Dei* must be identified with the ontological basis of human rationality, which, it was held, is the soul. (2) Since God is spirit, that which images him must likewise be spiritual. Hence the *imago Dei* is appropriately found in the soul and not the body.

2. *The human moral status before God.* According to Martin Luther, humans were created holy, morally perfect, a perfection that was lost in the fall.<sup>11</sup>

3. *The relational view.* Karl Barth notes that the Genesis account speaks of an “us” who does the making and the male-female distinction of that which was made. For him this suggests that relationship provides the key to understanding the concept.<sup>12</sup> The encounter relationship within the triune God is emulated in the encounter relationship between males and females—indeed, between persons within the entire human community. That is, just as there is an interpersonal (I-Thou) relationship between the persons in the Trinity, so interpersonal (I-Thou) relationships—both vertical (between God and humans) and horizontal (between humans)—are the mark of true humanity.

4. *The functional view.* Socinus and the Remonstrants held that the image meant that humans are given dominion over the earth, to take care of the garden God planted. Because God delegates his power (which is his by virtue of his creation) to humans, our dominion over the earth reflects God’s ultimate lordship.<sup>13</sup>

<sup>8</sup> J. Calvin, *Institutes of the Christian Religion* (Philadelphia: Westminster, 1960), 1. 15.3.

<sup>9</sup> *Ibid.*, 1. 15.4.

<sup>10</sup> A. H. Strong, *Systematic Theology* (Valley Forge: Judson, 1907) 514–515. Though Carl Henry does not use the term “soul,” he similarly locates it in man’s moral responsibility and intelligence; C. F. H. Henry, “Man,” in *Baker’s Dictionary of Theology* (ed. E. F. Harrison; Grand Rapids: Baker, 1960) 340–341.

<sup>11</sup> M. Luther, *Lectures on Genesis Chapters 1–5. Luther’s Works* (St. Louis: Concordia, 1958), 1. 62–63.

<sup>12</sup> K. Barth, *Church Dogmatics* III, 1 (Edinburgh: T. and T. Clark, 1958) 184–186.

<sup>13</sup> More recently see L. Verduin, *Somewhat Less than God: The Biblical View of Man* (Grand Rapids: Eerdmans, 1970) 27.

A variation developed by Gerhard von Rad sees the concept as functioning to insure human dignity. "It is the *gravitas* of man, what is impressive in him, striking the senses but consisting primarily in the inner force which is native to him. This gives us a mysterious point of identity between man and God."<sup>14</sup> This becomes manifest in human sovereignty over the earth. "The decisive thing about man's similarity to God, therefore, is his function in the non-human world."<sup>15</sup>

### III. THE REFRACTING LENS

How does one explain such a diversity of theological understandings of the *imago Dei*? The answer is twofold. First, the Biblical doctrine, as noted above, is substantially ambiguous. Scripture does not define the term; it uses it. Hence whatever meaning is to be ascribed to the concept in its Biblical locus must be derived from its usage. Second, the meanings derived are refracted through the philosophical, theological, scientific and cultural lenses of the interpreters. For example, one cannot understand the ontological emphasis—that the *imago Dei* is the soul implanted in us—apart from philosophical theories about the nature of the human person, theories that were developed in the classical philosophy of Plato and Aristotle and adopted by theologians such as Augustine and Aquinas. The relational emphasis derives from the cultural/philosophical context of the existentialists' rejection of the possibility of ontologically characterizing God and their belief that humans are to be defined not substantively but in terms of their relationships with themselves and others.

This suggests that the Biblical concept of the human person is, to a significant degree, open. What the Bible means by "human" needs to be interpreted. Interpretation will take place in light of the interpreter's theological, philosophical and scientific (including the social sciences) perspectives. In this sense the developments found in these disciplines will help us to both better understand the human person and enrich our understanding of Scripture.

It might be objected that this is a most dangerous thesis, for by it we can make Scripture say whatever we want it to. Are we not back to Bultmannizing, to reading into Scripture both our own existential questions and our human philosophical, cultural and theological perspectives? Rather, do we not want to hold that Scripture is normative, that it is determinative of our anthropology in the same way that it is determinative of our theology?

Our response is that Scripture is normative. But it is also to be understood, and it cannot be understood without being interpreted. One asks not only what the text says, but also what it means. Interpretation cannot be accomplished, however, from a purely neutral standpoint.

<sup>14</sup> *TDNT*, 2. 391.

<sup>15</sup> G. von Rad, *Genesis* (Philadelphia: Westminster, 1972) 60.

Interpreters of Scripture cannot completely bracket their own *Weltanschauung* before undertaking the analysis and clarification of Scripture. Like Eustace in C. S. Lewis' *Voyage of the Dawn Treader*, no matter how many layers of dragonish interpretative standpoints one painfully removes, another lurks underneath. This means that there is both an objective and a subjective dimension to the interpretative experience.

Objectivity and subjectivity in the epistemological realm need not be incompatible or mutually exclusive.<sup>16</sup> There are objective controls to our interpretation of Scripture, not the least being the text itself and the community of interpreters. This means that not anything goes, that interpretation must connect with and make sense of the text, that it must be a sense that is reasonably communicated and justified to the community of scholars and interpreters. At the same time, presuppositions about method, the nature of logic and human experience, and non-Biblical facts and theories bear upon our interpretation. Without these we would not be the particular human interpreters we are and could not ask what the text means for us.

#### IV. SCIENTIFIC CONTRIBUTIONS TO THE *IMAGO DEI*

If this analysis is correct, then attention must be paid to the refracting lenses through which the *imago Dei* is interpreted. In the remainder of this paper we will concentrate on some of the ways in which the developments of modern science and technology both help us to understand the concept of the *imago Dei* and challenge traditional interpretations of the human person.

Specifically we have identified five areas of research that have relevance to this task. In each of these areas we will discuss the insights generated by scientific research and the resulting technology and note their possible implications for our understanding of human nature. Our aim is not to resolve the ontological and moral issues these occasion but to raise questions (seen against the background of galloping scientific advances) for the Christian community to grapple with.

1. *Brain and mind.* Recent studies of the brain's structure permit a much more detailed understanding of how the brain develops. Its development is preprogramed in great detail. Cells divide and then migrate to their eventual location, whereas unneeded cells are programed to die. Genetically the brain is more different from the other parts of the body than we had realized. All the cells in the body have the same genes, but only a small fraction are used (or transcribed) in any specific tissue. The number of genes transcribed in the brain, however, is three to five times greater than in other parts of the body.

We are also better able to understand how the brain functions. The neurons send out extensions (axons) along pathways marked by bio-

<sup>16</sup> A. Holmes, *Contours of a World View* (Grand Rapids: Eerdmans, 1983) 148-149.

chemical signals. Cells communicate with each other through “gap junctions” and by neurotransmitters across synapses. There are genes for receptors that recognize the neurotransmitters and other genes for channels that regulate the flow of ions, thus maintaining the changes in excitability that accompany the nervous impulses. Any of these functions can be altered by genetic mutations.

In an effort to combine cognitive and neurobiological approaches, a recent study of the way humans process words used PET scans (a brain-imaging procedure) to measure changes in regional cerebral blood flow.<sup>17</sup> The three states involved (listening to words, repeating them, giving equivalent words) were studied in a stepwise manner. The results favored the idea of separate brain areas involved in each level of processing and suggested a model for the network whereby these levels are interconnected. That is, the brain is modular, leaving it to be discovered how the modular products are coordinated to provide unified output.

Efforts to explain how the brain works have invoked computer simulations of neural networks. Some artificial-intelligence theorists have claimed that computer simulation makes it possible to understand how complex mental phenomena emerge from the basic neural structures. Indeed some go further to argue that mental phenomena refer merely to complex patterns of brain functioning and that these ultimately can be reduced to the fundamental level of random electrochemical events. The higher level is interpreted as having a meaning because it has complex information-bearing and interpretative patterns, but these patterns ultimately supervene on elemental randomness.

All this has been taken to suggest that the mind has a biological basis, both in terms of its structure and function. The mind is not separate or separable from the physiological, as suggested in the classical ontological interpretation of the *imago Dei*, where human rationality was a function of a separable spiritual soul. Rather, it is to be understood and explained in terms of the physiological. As put in a recent film series on the mind, “the mind is what the brain does.”

Some have responded that this is too strong a claim. For example, regarding appeals to artificial intelligence, the question remains whether we have actually replicated the workings of the mind or merely simulated them. Furthermore the understanding of data requires an agent, which is absent in reductionistic accounts of human mental phenomena.

Clearly all interpretations of mind/brain phenomena employ both methods and models. When confronted with complex phenomena, reductionistic research methods must be used. But do the interpretations that arise represent the total reality? Does the success of reductionistic methods in explaining the phenomena provide grounds for making reductionistic metaphysical claims, or is it possible to use reductionistic methods while resisting a reductionistic metaphysics?

<sup>17</sup> S. E. Petersen *et al.*, “Positron Emission Tomographic Studies of the Cortical Anatomy of Single-word Processing,” *Nature* 331 (1988) 585-589.

Research on human behavior further adds to the picture. We are now able better to explain not only physiological disorders of the mind—such as mental retardation and psychotic disorders—but also what are commonly referred to as behavioral disorders. Such explanations provide evidence that some persons have less control over their behavior than traditionally assumed. It is generally accepted that schizophrenia is more an organic than a functional psychosis. And manic-depressive psychosis in some families is linked to a gene on chromosome 11 and in others to a gene on the X chromosome. Gradually what is happening is that we are interpreting behavior, which in the past was linked with the mind rather than the physiological organism, as organically derived. For example, there appear to be at least two familial types of alcoholism: (1) a more severe form that is highly genetic and not easily modified by the environment, and (2) a milder form that is strongly conditioned by the environment of rearing.<sup>18</sup> Another recent study of another aspect of behavior found evidence that extreme shyness in children may depend in large part on an inherited variation in threshold of arousal.<sup>19</sup>

If we can account for behavior such as alcoholism and shyness in the same way we account for epilepsy or mental retardation—that is, in terms of genetic and environmental factors—can we say the same for all deviations from normal behavioral patterns? Could we generalize to argue that all behavior is physiologically rooted, with genetics playing a significant role?

Might this begin to challenge the grounds on which we hold persons responsible for their moral behavior? With more sophisticated methods for imaging the brain as it responds to specific functional tests, there may be evidence in some individuals for a specific physiological disability or defect in moral abilities. In tracing our behavior to the electrochemical structure of the brain, and thus to our genetic inheritance, we could surmise that for some persons certain types of moral behavior are caused by biological factors rather than by anything like an independent will. On a restricted level this is unproblematic, in the same way that we excuse immoral behavior when it can be shown that it was externally compelled. But can this observation be generalized to provide a physiological basis for all moral behavior? If not, what precludes it? If there is a precluding factor, why is it present in some cases and not in others? If it can be generalized, might the very concept of the will be understood in terms of high levels of complex organic responses both to lower levels and to environmental stimulants? If so, what impact would this have for theories of moral accountability?

These developments challenge our understanding of the relationship between brain and mind. One might suggest at least three different

<sup>18</sup> C. R. Cloninger, "Neurogenetic Adaptive Mechanisms in Alcoholism," *Science* 236 (1987) 410-416.

<sup>19</sup> J. Kagan *et al.*, "Biological Bases of Childhood Shyness," *Science* 240 (1988) 167-171.



models of their relationship. (1) The mind is qualitatively distinct from the brain. During our earthly sojourn they are causally connected so that the brain is the tool by which the mind interacts with the physical world. (2) The mind is a more complex level of the organism's operations. It is the operations of the central nervous system interpreted as processing information at higher, symbolic levels. (3) The mind is merely a (handy) way of talking about brain activity. Mental language does not describe anything other than processes found in the central nervous system.

We have not the space here to conduct a detailed investigation of these models and the evidence that might be given to support each.<sup>20</sup> But recent discussions having to do with levels of analysis and levels of organization have interesting implications for the mind/brain problem. There was a time when it was difficult to understand how living systems (at a higher level) could be explained in terms of physics and chemistry (at a more basic level). In the early 1950s the chemical components and the helical structure of DNA were well known, but the physical and chemical data by themselves were not sufficient. The breakthrough came when Watson and Crick asked what biological function genes had to perform. They showed that genes can be replicated exactly and can carry information, but only if the components of the double helix are organized in a specific manner. Phenomena can be explained from the bottom up if the questions are posed from the top down.

We are now beginning to understand how the brain and its functions can be explained in terms of its organic components. In particular, computer simulations and study of the electrophysiological and biochemical events in the brain help us to understand how information can be stored and retrieved.

The critical question is whether this same understanding used in biochemical analysis can apply to mind-brain relationships. It would seem, following the Watson-Crick example, that the fundamental breakthrough in our understanding of the mind-brain relation will occur only when we ask the right questions. One attempt at this is the much debated (and disputed) Turing test, according to which the failure of a neutral third party to be able to discriminate between the behavioral responses of machines and humans in matters of meaningful, responsive communication indicates that at the very least model (1) above is inappropriate. Another perhaps more useful approach might be to ask how the brain would have to be organized to make personhood possible. In any case, definitive explanations would require that the intermediaries would have to be discovered and shown to be physiologically capable of bearing the explanatory and interpretative load required to explain truly higher-level mental phenomena.

<sup>20</sup> For an extensive discussion see D. G. Jones, *Our Fragile Brains: A Christian Perspective on Brain Research* (Downers Grove: InterVarsity, 1981).

2. *Sexuality*. In our earlier discussion of the *imago Dei* concept we pointed to the importance of human sexuality. This topic is also the focus of much research and theoretical discussion.

The development of sexuality is a gradual process that begins in the fetus and continues in postnatal life. The sex of the fetus cannot be distinguished before six to seven weeks of development. The early bipotential gonad has the capability of becoming either an ovary or testis, and it later differentiates under the influence of a testis-determining factor (TDF). The external genitalia also undergo a transition from a neutral state, but in the absence of male hormones or the cellular receptors for male hormones the default developmental pattern is female.

The biological factors that control the development of maleness and femaleness are now understood much more clearly. Persons with a 45,X or 46,XX or 47,XXX chromosome pattern are almost always female. When a male is found with these patterns, a small portion of the Y chromosome is found attached to one of the other chromosomes. Recently a gene for the TDF factor has been located near the tip of the short arm of the Y chromosome and the gene has been cloned.<sup>21</sup>

The implications of this are interesting. For example, early sexual development is not always clearly male or female. A number of different anomalies of sexual development are encountered in medical practice. In rare instances the genitalia and other features are so ambiguous that a decision must be made and action taken to determine whether the child should become a male or female. The discovery of the gene for the TDF factor will permit a much more accurate diagnosis in some of the cases of anomalous sexual development.

The presence of this gene also suggests that at least one of the steps in the development of human sexual determination is not all that different from that found in other higher-order mammals. A fragment from the human TDF gene recognizes a DNA segment from males in the great apes and a number of other species.

Two of the Genesis *imago Dei* accounts suggest that human sexuality is a gift from God. The above shows that the endowment is both physical and psychosocial. This means that an existentialist account of the *imago Dei*, such as Barth's, must root the relatedness between the sexes in more than existential encounter.

Further, to what extent is sexuality a gift that was distinctly bestowed on humans? If it is distinctive, wherein is its distinctness, and what does the discovery of the genetic basis imply about that distinctness? Does the analysis of sexual behavior and determination in animals have any bearing on understanding human sexuality beyond the physiological aspects?

<sup>21</sup> The basic paper is by D. C. Page *et al.*, "The Sex-determining Region of the Human Y Chromosome Encodes a Finger Protein," *Cell* 51 (1987) 1091-1104. A review can be found in *Science* 239 (1988) 21-23.

Finally, what is the relation of moral judgments about human sexuality and any genetic and physiological analysis of its determinants? Are sexual practices or orientations fully controllable by the will, or are there inborn tendencies that would be difficult to alter because of the inherent biological structure of the person? Human sexuality can be the locus of much misunderstanding, tension, and questionable moral judgment. In specific cases of sexual problems or deviancy from a norm, should there be intervention? What form might this intervention take? Must we begin to reassess the ways in which we link morality and sexuality? This is significant, since a good deal of the Christian social ethic involves moral judgments about sexual orientation, desires, choices and behavior.

3. *Embryonic manipulation.* The topics of greatest public concern can change surprisingly rapidly. A few years ago the possibility of human cloning triggered much discussion and apprehension. There still is no evidence, however, that this would be technically possible, that the nuclear DNA from any adult human tissue when transferred into an ovum could initiate and guide development. The major problem is that gene expression in adult cells has become differentiated to carry out the functions of the many adult cell types. Even if human cloning were possible, it is very doubtful that it would be used. This option has become quite unattractive with the present availability of techniques for *in vitro* fertilization.

The techniques of *in vitro* fertilization and embryo transfer, however, also have implications for the *imago Dei*, and vice versa. Research relating to and employment of these technologies have been justified as part of an effort to treat infertility, a very serious problem for the couples involved. Furthermore research on the embryos themselves could enable us to greatly advance our understanding of early fetal development and advance life-saving and life-improving medical technology.

But many have questioned the morality of working with and conducting research on embryos. For example, the Catholic Church, in a document approved and ordered to be circulated by Pope John Paul II, argues that

God, who is love and life, has inscribed in man and woman the vocation to share in a special way in his mystery of personal communication and in his work as Creator and Father. For this reason marriage possesses specific goods and values in its union and in procreation which cannot be likened to those existing in lower forms of life. Such values and meanings are of the personal order and determine from the moral point of view the meaning and limits of artificial interventions on procreation and on the origin of human life.<sup>22</sup>

<sup>22</sup> Congregation for the Doctrine of the Faith, "Instruction on Respect for Human Life and Its Origin and on the Dignity of Procreation: Replies to Certain Questions of the Day" (February 22, 1987).

The limits have to do with respect for the human embryo and fetus as a morally protectable human being, a being that is to be respected as to its integrity from the "first instant of his existence."

According to this view, human embryos are not to be the subject of any but therapeutic procedures. Live embryos are not to be operated on unless "these is a moral certainty of not causing harm to the life or integrity of the unborn child and the mother." They are not to be frozen, since this is an offense against their human dignity. Indeed *in vitro* fertilization is forbidden, for inevitably it means the destruction of unwanted or unused embryos and puts in extreme jeopardy those that are used.

But are we to accept the thesis that the human embryo is a human being in the morally relevant sense that it cannot be the subject of experimentation, artificial procreation, or transfer? It is human, no doubt, but what kind of morally relevant status, including rights, does that confer? It is obvious that technology in the area of embryology is subject to restraints imposed by philosophical theories of human personhood, but these can be carried even to the point of making it difficult to discern what contributions such technology might make to the question of human personhood.

Clearly there must be some regulatory restraints upon the manipulation of human embryos for research purposes, but current United States policy in this area of research has been at an impasse. Since 1980 there has been no NIH ethical advisory board, but any request for funding research on embryos requires approval by this board. The failure to resolve this situation results in part from the complexity of the topic, but it also appears to reflect a lack of moral courage. Recently a commission has been reviewing the underlying research questions and the alternative approaches for study. At the very least, even under severely restrictive guidelines the use of human embryos or fetuses from spontaneous miscarriages might be acceptable for research involving some important questions.

So far we have spoken only about human embryos. As we have seen, the functional interpretation of the *imago Dei* relates less to human ontology than to human function—specifically, to our responsibility for the environment. Since the environment includes other forms of life, research on and technological manipulation of nonhuman embryos have significant implications.

What response should we make, for example, to the specific techniques for cloning that have been developed through research on domestic animals?<sup>23</sup> Unfertilized oocytes are split into two parts, one with the nucleus and the other without. A nucleus-free segment is then fused with a cell taken from an early embryo, and the fused cell then divides like an ordinary fertilized egg. A major limitation (both in domestic animals and in speculation about human use) is that the future somatic characteristics

<sup>23</sup> J. L. Marx, "Cloning Sheep and Cattle Embryos," *Science* 239 (1988) 463-464.

of the embryos, when they become adults, are unknown. In cattle this certainty can be resolved by taking only a few cells from a thirty-two-cell embryo and freezing the remainder. These few cells are fused with oocytes and allowed to develop and mature so that the features of the adult animal can be assessed. Then a decision can be made whether to thaw and use the remaining cells. In a sense this is an embryo biopsy.

If part of our *imago Dei* relates to our oversight of the environment, then how we utilize such technology assumes great importance. This is particularly the case since such procedures give us substantial powers in determining the future genetic heritage of any species. Not only are there problems of what characteristics are to be cloned or selected for, but there are also concerns that we might lose characteristics that are now deemed unimportant but that might in the future have great importance. In our shaping of the plant and animal world to our own economic ends, our guardianship can easily lose sight of the need to treat the plant and animal worlds also as ends in themselves. And this might in the very least entail the necessity of guarding genetic variability. God, in giving us the *imago Dei*, did not devalue the other dimensions of his creation. From his perspective all were deemed good.

4. *The human genetic code.* In the DNA of an egg or sperm there are about three billion base pairs, which are arranged in a linear fashion along the several chromosomes. To print this sequence would require the equivalent of about thirteen sets of the *Encyclopaedia Britannica*. Almost half of the DNA is highly repetitive, containing many copies of short sections, and the function of much of the rest is unknown. Finally there are the fifty thousand structural genes that carry the blueprint for specific gene products, such as enzymes.

On both levels—the three billion base pairs or the fifty thousand genes—there is important information to be gained. The federal government is currently considering a huge project relating to these two areas of research. (1) As of February 1988 there were 3,450 genes and DNA segments that had been mapped to specific chromosomes. One goal is to map the rest of the fifty thousand genes. Knowing the location of a gene is an important step toward understanding its function and remedying the effects of harmful mutations. (2) The second approach is to sequence the DNA (determine the genetic code) from beginning to end. This would help to define the functions of the unknown segments.

But is the project, costing more than a projected three billion dollars, worth the cost? Should it be attempted, given our limited financial resources, in the face of other priorities?

Another application of DNA research led in early 1987 to the search for a “mitochondrial Eve.”<sup>24</sup> Mitochondria are small structures in the cytoplasm of cells that provide energy through biochemical processes.

<sup>24</sup> The basic paper is by R. L. Cann, M. Stoneking and A. C. Wilson, “Mitochondrial DNA and Human Evolution,” *Nature* 325 (1987) 31–36. For a review see *Science* 238 (1987) 24–26.

The transmission of mitochondrial genes to the next generation always follows a maternal inheritance pattern. The research teams extracted the mitochondria from 145 placentas (from five geographic regions) and two research cell lines and concluded that the mitochondrial DNA could be traced back to an African woman who lived two hundred thousand years ago.<sup>25</sup>

What connection might this mitochondrial Eve have with the Biblical Eve who possessed the *imago Dei*? A common contention is that the Eve whose genes persisted was not the only human at the time but that among many women she was the one whose mitochondrial genes happened to survive. One might suggest that both speculative scenarios—tracing all persons back to a primal Eve or tracing all back to an Eve among others (where did Cain and Seth get their wives, and of whom was Cain afraid?)—could both be reconciled with the Genesis stories.

In any case, as the human genetic map becomes complete our understanding of human distinctiveness will be challenged. The percent homology between pairs of species will be calculated for each of the identified genes. Once a gene is cloned in the fruit fly or mouse, the DNA will be used to find a similar gene in the human, another test of similarity. Studies of species similarity in the past have been based mainly on gene products (such as hormones and enzymes), but now the analysis is being directed to the genes themselves.

From a practical perspective we need not fear—indeed, we can be grateful for—human similarities with other species, since they provide a source of medicines, experimental models to study human disease, and the means to test toxic materials that might produce cancer or mutations. From the theoretical perspective, the fact that we have similar genes is further evidence that life at any level has basic requirements for structure and function. These similarities, however, do not resolve the question of origins and provide no evidence against the fundamental belief that God is ultimately responsible for human existence.

Clearly an understanding of DNA contributes to our views of human nature and personhood. But does it do more? Further examination is needed of the widespread assumption that DNA conservation (a phrase referring to species similarities) necessarily implies strong evidence for common ancestry. Similar attention must be paid to the thesis that DNA configurations define individual personhood. Identical twins share the same DNA, but they are two distinct persons. It may not be appropriate to ascribe human personhood to the human zygote solely on the presence of a complete DNA set.

5. *Genetic engineering.* In the broad sense of engineering (the application of scientific knowledge to practical problems), genetic engineering

<sup>25</sup> It should be noted that the 200,000-year time scale is based in part on anthropological data and a constant rate of genetic mutation, assumptions that need careful critical evaluation. Furthermore if several critical assumptions were changed the statistical analysis used to make the forking “tree” diagram might lead to different results—e.g. that Eve was Asian.

has been practiced for some time. Examples include hybrid corn and medical treatment for genetic diseases. Usually, however, the term refers to the dramatic burst within the past ten years in research activity that has been made possible by recombinant DNA (gene-splicing) techniques.

It is important to recognize that recombinant DNA methods can be used for a number of different purposes and that each use should be assessed ethically on its own merits. These purposes include (1) a more detailed understanding of what genes are and how they function, (2) more accurate diagnoses of diseases, (3) production of drugs such as insulin and growth hormone, (4) treatment of medical problems by gene transfer, and (5) more general improvement of the human condition (what is often referred to as positive eugenics).

The first three represent an extension of current medical research and practice. Regarding the fourth, a number of technical problems must be resolved before treatment by gene transfer becomes possible, but it falls properly within the realm of medical practice.

It is the fifth application that is the most controversial. For one thing the causes of some defects are simpler and more easily remedied, while traits that might be chosen for improvement are complex and probably depend upon a number of factors. For another, if one is going to improve either a particular person or the human species, certain characteristics must be chosen as end points. It is argued that it is easier to reach agreement about what constitutes a defect to be remedied than to decide on the characteristics that are goals for improvement. Yet parents continually make choices about experiences—education, music lessons, sports experiences, camping experiences, visits to museums, travel, etc.—that are intended to qualitatively improve their children.

Indeed it is difficult to discern a morally significant difference between so-called negative and positive eugenics. Those who argue that positive eugenics has grander designs—namely, the improvement of the entire race—whereas negative eugenics is concerned with the improvement of individuals in particular cases have confused the type of eugenics with the scope of the intent.<sup>26</sup> That is, it would seem that both positive and negative eugenics could be practiced either with the intent of improving the individual through genetic therapy or with the larger intent of improving the species.<sup>27</sup>

Another way to differentiate them is in relation to a norm. Negative eugenics seeks to improve by bringing persons up to a norm, whereas positive eugenics seeks to improve persons above a norm. But, granted this difference in direction from the norm, is the difference morally significant? Departure from a norm would be morally significant only if the norm were treated as an absolute standard, the departure from which

<sup>26</sup> Cf. e.g. P. Ramsey, *Fabricated Man* (New Haven: Yale, 1970), chap. 3.

<sup>27</sup> There are several other issues that might be noted. Respondents to a public opinion poll made little distinction between somatic gene therapy (that would affect only the patient) and germ-line intervention (that would be transmitted also to children), but they saw a clear difference between treatment of specific diseases and more general efforts at improvement.

would be morally unacceptable. On this view, for those who fall below the standard we have the moral obligation to find ways to improve their lot, whereas it would be thought immoral to improve beyond the standard. But such a natural-law thesis depends upon the claim that the norm has a nonarbitrary absolute value. One might appeal to the *imago Dei* concept to support this claim, arguing that God created humans with a given human essence or norm and that any attempt to alter the norm is to play God and hence is immoral.

But are we playing God when we attempt to improve persons beyond any given norm? It is the Promethean myth, not the Bible, that describes a god who jealously guards the secrets of the universe from human discovery. The actions we fear are not to be described as playing God but as misplaying humans. A more reasonable approach is to insist that all of our endeavors be carried out in the spirit of being answerable to God. The Creator bestows the power of creation (in an analogical sense) on humans to be used morally.<sup>28</sup>

Beyond this lies the contention that there is a given human norm, established by the *imago Dei*. But is that which makes a human being "normal" a set standard or given essence, or is it a statistical norm? If the former, how are we to discover it? The natural-law theory is plagued by the difficulty of discovering the natural norms it advocates. Its appeal to what would regularly or normally be the case were development not interfered with presupposes a priorly conceived ideal of human personhood. If the latter—if it is a statistical norm—then there is no prohibition against altering it, for by raising those who are below the mean or median we raise the mean itself. The moral imperative to improve beyond any norm that exists may not be as strong as the imperative to improve up to a norm, but from this it does not follow that there should be a moral prohibition to improve beyond a norm.

All of this must be tempered with the humility born from realizing that there are limits to the changes genetics can bring about. The experience of conversion can produce profound changes in behavior without altering the genes. We cannot bring about the fruits of the Spirit or treat sinfulness by genetic engineering, for humanity is not fully defined or described in terms of DNA. An individual with an excellent genetic endowment would still be subject to arrogant pride and irresponsible behavior toward God and others.

## V. CONCLUSION

One might wish that from this discussion a definitive picture of the human person might arise. This is too much to be hoped for. Our discussion, however, does point to a number of important conclusions.

<sup>28</sup> For a review of other ethical issues see A. Verhey, "The Morality of Genetic Engineering," *Christian Scholar's Review* 14 (1985) 124-139.



First, it points to the claim that humans cannot be understood, interpreted, or analyzed apart from their being considered physical beings. Both brain and genetic research point to the extremely important formative roles our biological heritage plays. Hence it is appropriate and not anti-theistic to attempt to explain human persons and their behaviors in physiological terms.

Second, this claim must be tempered by a realization that though explanation might proceed bottom up, complete accounts also require top-down understanding. Humans cannot be understood apart from psychical considerations, for they are purposeful beings who seek to understand and find meaning in their world. Whatever patterns compose us, those patterns must be understood and shown to bear meaning. This means that the concerns of natural science cannot be the be-all and end-all of explanation. An understanding of the human person will invoke the insights of the social sciences as well. In fact it might be appropriate to reexamine the distinctions that are sometimes made between the hard and soft sciences and between the natural and human sciences in light of concerns for whole-person explanations.<sup>29</sup> In this regard we need a common effort that draws upon the resources of the natural sciences, the human sciences and the humanities.

Third, if we are correct about these points, it means that the practice of medicine must also be holistic. The health-care provider must not only look to the physical causes of the conditions to be treated but must also evidence concern for the "human" or "personal" dimensions of the condition. Indeed the ability to successfully treat the condition physically might not be enough if health-care providers are to treat human persons as bearing the *imago Dei*.

Finally, the scientific account of the human person is from the Christian perspective incomplete, for it fails to take account of our relatedness to God. No matter what else the *imago Dei* concept implies, it surely points to this: To understand humans we must see them from the viewpoint of relatedness to God. It is in these terms that human wholeness and human nature must also be explored. To use an Augustinian image, both the lenses and their subject matter must be illumined by the light of God.

<sup>29</sup> Two important sources on these themes are C. S. Evans, *Preserving the Person: A Look at the Human Sciences* (Downers Grove: InterVarsity, 1977), and M. S. Van Leeuwen, *The Person in Psychology: A Contemporary Christian Appraisal* (Grand Rapids: Eerdmans, 1985).