Robots and Theology

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Summary: Christian theology describes humans as images of God and assigns them intrinsic value and dignity. Science, on the other hand, attempts to analyze the human animal as the result of the evolutionary process; humans are meat machines that obey specific psychological, biological, and behavioral rules. Artificial Life attempts to build humanoid robots according to the scientific anthropology. This paper sheds a light on the two distinct anthropologies and how they are related - even though they refer to different realms of human expression and are not to be mixed. We will show how the attempt to build machines in our image has a spiritual side that transcends science. We will demonstrate how humanoid robots can teach us more about ourselves and help us to redefine the concept of personhood and make it more inclusive.

Zusammenfassung: Christliche Theologie beschreibt Menschen als Ebenbild Gottes, mit intrinsischem Wert und Würde. Die naturwissenschaftliche Anthropologie, auf der anderen Seite, vorstellt das menschliche Tier als Ergebnis des evolutionären Prozesses und definiert Menschen als Fleischmaschinen, die psychologischen und biologischen Verhaltensregeln gehorchen. Artificial Life (Künstliches Leben) versucht, humanoide Roboter im Sinne der naturwissenschaftlichen Anthropologie zu konstruieren. Dieser Aufsatz beschreibt beide Anthropologien und setzte sie in Beziehung, ohne jedoch ihre Unterschiede zu leugnen oder sie gar zu vermischen. Wir werden zeigen, dass der Versuch, uns selbst nachzubauen, eine spirituelle Seite hat, die die rein Naturwissenschaft überschreitet. Wir werden zeigen, was humanoide Roboter uns über uns selbst lehren können und wie sie uns helfen, ein neues, inklusiveres Verständnis von Personsein zu erarbeiten.

(1) When we move into the interface between theology and artificial intelligence (AI), we deal with the quest for a new understanding of ourselves that is enriched by both dialogue partners. AI has been a controversial field since its beginning. I will not discuss it in length but will focus only one small segment of it, called "Artificial Life." Here, researchers attempt to develop robots, embodied entities that interact with us in our own environments.

(2) When I set out to talk about this relationship between theology and robotics, I will go beyond the anthropology and the comparison of the human meat machine with the silicone-based robot. Instead, I will ask if robots and our interactions with them can teach us something about rules that underlie human relationships. I will especially ask if both the fear and the attraction we feel for our humanoid counterparts might shed some light on one of the key feature of humans in a globalized world, our capability for tolerance of different cultures and syncretism, and our equal capability for prejudice and rejection of otherness. That means, beyond the quest of human nature I will use robots as thinking tools to reflect on the human capability (and limitation) to bond.

(3) In order to do so, I will first outline a theological concept of humans and then a scientific one. It turns out that both are surprisingly coherent and the writers of the Bible several thousand years ago had insights to human nature that scientists are just rediscovering. Then I will outline the concept of robotics I am using here and will finally draw some conclusions about human actions in the world that we might be able to modify when looking at our interactions with robots.

Outline for a Christian Anthropology

(4) The Rabbis who put together the Pentateuch (app. 500 B.C.E.) started the Book of Genesis with the story of Adam and Eve. As preamble to the whole Pentateuch, they added a creation story that was rooted in Babylonian creation myths but added something unique. In the beginning, God creates contrast. Heaven and earth, light and darkness, night and day. God creates with both words and actions. And everything God creates is good (ki tow). And in the end, on the seventh day, God evaluates the whole of creation as very good.

(5) It fell to Rabbi Löw, the Maharal of Prague in the 16th century and most famously known as golem builder, to observe that the only act of creation where the ki tow is lacking is the creation of humans. We humans are part of something very good but we are not ourselves good. This seems strange at first. Because another, and probably the most famous statement about humans in this creation account is that we are all created in God’s image. The Hebrew term salam or “image” means literally a “clay statute” and is usually used for a statue of a Divinity. So each and every one of us, no matter if male or female, rich or poor, black or white, is a divine statue. The Ten Commandments express a very strict prohibition against making any image of God. In light of the Imago Dei one could argue that instead of adoring a statue, we humans ought to adore each other as each one of us is a statue of God. And this has to be taken literally: it is the human body that is the statue. Any concept of a disembodied soul would have been alien to the authors of this creation account.
((6)) But when we are all divine statues, why are we not given the affirmation of ki tow? The second creation account provides an answer. When Adam and Eve in the poetic language of the text eat from the tree of knowledge of good and evil, they start to judge. They start to separate the contrasts of the world, that in God’s eye are all equally good, into categories labeled “good” and “evil.” The story provides immediately one concrete example. Looking at each other after the so-called “Fall”, they recognize that they are naked and cover themselves up. Or, they start to judge nakedness as evil and therefore cover up.

((7)) It is one of the uniquenesses of the human condition that the “I-Thou” relationship implies that the “Thou” is another, and different from me. This means that in recognizing an “I” I also recognize many “non-1’s”, people I am separated from, or – to use the language of Paul Tillich – estranged from. The feat of human self-awareness, often celebrated as the capability that makes us unique and assigns us a special place within the animal kingdom, is also the key to estrangement among humans. This estrangement leads to human separation and the human need for community as well as its constant failure. It leads to the fact that humans can never completely know and understand each others and themselves. All this is part of the human condition, of sin. But humans also do judge and we often use otherness as a justification for rejection. We will later see how deeply the rejection of otherness is rooted in our evolved psychological make-up. For now, staying within the theological framework I am laying out here, we see that the key to the human condition is our tendency to judge and to categorize into good and evil. Hence, the key to the human condition is estrangement – from oneself, from others, from the rest of nature and from God.

((8)) When God according to Christian doctrine becomes human, it is to understand the human condition and to understand why it is impossible for us to “love God with all our hearts and minds” and to “love our neighbor like ourselves”. Thus, Jesus, as true God and true humans bridges the gap between humans and God. And it is no coincidence that in the main ethical framework from Jesus, as laid out in the Sermon of the Mount (Mt 5-7), the judging of others is the most criticized action. When Jesus points out that we all are murderers and cheaters, he doesn’t do so to make us feel bad. When he finishes this part of his sermon he gives us the commandment to love our enemies. So instead of rejecting an “other” because he or she is a murderer or cheater, we ought not to judge them but to love them because we would be capable of similar acts ourselves.

((9)) It is fascinating that the human capability to judge is so deeply rooted in who we are and cause for such greatness and, yet, so many flaws. Paul Tillich points out that in paradise, before the so-called “Fall”, Adam and Eve were in the state of “dreaming innocence”; innocent but also not fully human. The I-Thou recognition does imply a loss of innocence (you are not I) but is also the key to understand humans.

((10)) Bonaventure calls our senses “the portals to the soul”. We share our senses with all other mammals but our judging makes the human use of senses unique. Only because we judge our sensory impressions, do we go out of our way to create positive sensory input: we create music for positive auditory input, we create art for positive visual input. We cook and create perfumes for positive taste and smell input, and we create materials that feel good on our skin. We humans are the only artists in the animal kingdom. And the judgment of each human is unique and reveals who each of us is. But our sensory judgments are also deeply influenced and even manipulated by our societies. We often deem our cultural sensory judgments superior to those of other cultures. Just look at how many people look askance at foods from other cultures or clothes or music. It is hard after a certain age to value strange sensory inputs as highly as those we grew up with. So the judgment of our senses does not only serve as a tool for uniting people in a society, it also serves as a tool for estrangement. The Christian message of redemption does not call back to paradise as we aren’t truly human there. Instead, it teaches us to accept this estrangement and its wonderful sides but try to limit its bad sides.

((11)) The human condition of estrangement is strengthened by other statements in the creation stories. Gen 2-4, while placed in the Bible after Gen 1, is chronologically several centuries older and represents a more ancient tradition. Adam, the man, is made from clay and God breathes the ruach, the breath of life into him. God then presents Adam with all the animals and Adam names them. This naming process indicates a start of a relationship. We only name what we care for. Adam relates to the animals and they are worthy. In the end, God decides to create a companion for Adam as Adam is not made to be alone. And God creates Eve out of a bone of Adam, indicating that both are made from the same flesh.

((12)) The bone that serves as a basis for Eve, zelaa, deserves some reflection here as it is questionable if it is really, as traditionally assumed, a rib. It speaks for the embodied understanding of the people that wrote the text, that the bone is much more likely to be the penis bone. The Israelites were acute observers of their environment and they must have noticed that the male skeleton does not lack a rib. But while most male mammals do have a penis bone, human males don’t. So it seems much more likely that the bone, that was used to create Eve, is lacking in the human male skeleton. Also, while we don’t know of a culture where the rib has any connotation of fertility, we know of plenty where the penis has; one just has to remember all the phallic statues. This could point to an intriguing possibility. If human males are the only ones whose erections depend solely on arousal and blood flow and is not supported by a bone, then human sexuality is unique. This is expressed in the Biblical terminology. While the Bible uses the neutral “to sleep with” and the war-like “to enter” (like a besieged city) for describing the sexual act, the most common term is yada, “to know”, which is also used to describe the relationship between God and humans.

((13)) Another embodied element of the human condition is skin. The philosopher and theologian Norbert Samuelson kindly called my attention to Rabbi Abraham Ibn Ezra and provided me with an interpretation of Ezra’s theories. Ezra meditated about the meaning of Gen 3, 21 “And God made
garments of skin for the man and his wife and clothed them.” The Rabbi found this sentence highly disturbing since it presented God in the role of a servant which is not an appropriate role for God to be in; also, it seemed unlikely to him that God would kill animals from the Garden of Eden just to give clothes to the man and the woman. Hence, he concludes, God gave Adam and Eve human skin. In the garden they were truly naked and now they are covered.

((14)) A closer look into the text reveals that the relationship between Adam and Eve in the garden is never described as an erotic one; there are no hints which point toward sexual desire of one for the other. The term used to describe Eve’s desire for the fruits from the tree of knowledge is explicitly sexual. After the eating of the tree, man and woman recognize that they are naked and wrap themselves in leaves (3, 7).

As we have seen, they judge nakedness as evil and cover themselves up. But they also recognize themselves for the first time as sexual beings and, thus, recognize their own sexuality. That Eve desires the fruits of the Tree of Knowledge points to a similar direction: the Biblical knowing is both embodied and mental. It mirrors, like the Greek term eros, the insight that we want to know with passion and participation, and both, obviously, can take a bodily form.

((15)) The curse toward Adam and Eve right before God gives them “garments of skin” confirms the embodiment of sin described so far. God curses Adam and Eve with pain in labor – Adam will feel it in the labor of yielding harvest and Eve will feel it in the process of giving birth. Eve is also punished with sexual desire for Adam. But neither pain nor sexual desire were there in the Garden. The ambiguous character of life gets a very embodied element attached to it; labor – both daily work and giving birth – can be satisfying but also painful and stressful; sexuality and sexual desire are wonderful but also painful, hurtful, and destructive. Skin provides the body with protection. But it also marks the boundary between the “I” and the “Thou”. We can connect with touch, skin to skin and, yet, with that very touch do we become aware that we are separated by this skin. That means, the human condition of estrangement is expressed both in our judgment and in our bodily experience.

((16)) Accordingly, the Bible does not distinguish between a body and a soul. The Hebrew term that is usually translated with “soul” is nefes. The most literal translation is “breath”. It can also mean “desire”. In fact, nefes is used to describe both positive and negative emotions, the thirst for life and the suffering and complaint to God. It especially emerges in the interaction between the people of Israel and God. The translators of the Septuagint used the term psyche to refer to the concept of nefes; psyche for them referred to the embodied, communal understanding of humans in the Hebrew world. When the New Testament was written, it faced the same problems. Jesus spoke Aramaic and certainly used the term nefes, but the authors of the gospels were writing in Greek and used psyche when referring to nefes.

((17)) But there is a major problem with the term psyche. Even if the authors used it to refer to nefes, this was not understandable for people without Jewish background; in the Hellenistic world, psyche was understood in its Platonic sense as something metaphysical and disembodied, something individual, and as something that needs to be freed of the body in order to be fully evolved. Historical events in the very early years of Christianity explain why over time the Jewish understanding of nefes was lost and the Hellenistic concept of psyche took over. In 49 c.e., the Roman emperor Claudius evicted all Jews from Rome, no matter, if they were Jews or Jewish Christians. Rome at that time was the intellectual center of the then-known world and the influence of the Roman Christians over other Christian groups was very strong. When the Jewish Christians were evicted, the “pagan” Christians were left without knowledge of the Jewish heritage in their own religion. When they read the gospels and letters they received, they naturally interpreted the term psyche in their own context, relating it to Socrates’ and Plato’s teachings and not to Abraham. Even if Claudius let the Jews return a few years later, the damage was done: in these early formative years, Christian intellectualism had been unguided by Jewish thought and, therefore, had mixed the teachings of Jesus and Paul with Greek philosophy. When with the destruction of the second Temple the importance of the Jesuanic parish in Israel diminished, the influence of the Hellenistic thinking Christians grew. The influence of neoplatonic thought increased during the centuries and today we have to fight 2000 years of this influence to overcome the popular understanding of the “soul” as something disembodied.

((18)) A final meaning of nefes is “life”. In old-fashioned English, one can still find remnants of this different meaning when one hears statements such as “all souls were lost”; here, soul means a human body and does not refer to something mysterious and abstract. Nefes, thus, is closely related to the ruach that God breathes into Adam. The Hebrew term for life is cha’im. But for the Hebrew writers, any abstract concept of life would have been alien. Instead, cha’im means life span, health and safety: a life is lived in health and community and within a specific period of time. That means, the Bible sees humans fundamentally as communal beings. God enters into a relationship with Israel as a whole; the relationship between God and individuals is secondary. Nefes is something that emerges in social interaction and in interaction between Israel and God. This community is celebrated with rituals and prayers that are spoken together; we find remnants of all these prayers in the book of Psalms.

((19)) We have already developed a good understanding of what it means to be human in the Biblical context. Before we can go to the scientific anthropology, we have to discuss one more point: the role of humans in creation. And this role is ambiguous. On the one hand, humans depend like all other animals on God-given food. And, yet, they are given the command to control the rest of creation. The Hebrew term used here is indeed one of oppression. But the naming of the animals points toward a more benevolent relationship. This is supported by the fact that according to both creation accounts the only feature that distinguishes humans from other animals is that they are created in God’s image. And this is not an empirical feature but can be seen as God’s affirmation, a promise of relationship.
(20)) This relationship is formalized in the *b'rît*, the covenant. The oldest covenant between God and God's chosen people is established between God and Noah after the flood (Gen 9). God promises to never send such a worldwide catastrophe again but doesn't demand anything from the people. The next covenant is with Abraham (Gen 15). Again, it is a one-sided contract with God promising Adam land but no duties for the people. These first two covenants are affirmations, gifts from God, and don't demand anything from humans. It is only later that the covenant becomes a contract of mutual duties and ceases to be an expression of God's unconditional acceptance of humans.¹⁰

(21)) To summarize, humans according to this Christian anthropology, are animals who are distinct from other animals for two reasons. For one, they are estranged due to their self-awareness. And, secondly, God has chosen them as partners and has created them as divine statues despite the fact that they are not perfect. The second point, of course, is deeply theological and cannot be brought directly into the dialogue with science. The first point, however, has its direct equivalent in evolutionary psychology.

Outline for a Scientific Anthropology

(22)) The scientific literature about human beings is legion. I do not profess to give in the next paragraphs an exhausting survey of all the insights about humans that have been discovered in recent decades. Instead, I will present only those aspects of the human animal that have also been used to develop the current crop of humanoid robots.

(23)) Humans, like all other animals, are the result of an evolutionary process that has first been described by Charles Darwin. Modern versions of the evolutionary theory focus even more on the influences of the environment on individuals. As an example, the sex of crocodile babies is determined by the temperature in which the eggs are bred. This means the relationship between genotype and phenotype¹¹ which traditionally has been understood as entirely bottom-up is actually very complex and can be top-down as well. It is impossible to determine or even understand an individual based on the genes and species alone. We are not determined by our genes. We cannot be looked at as individuals shaped by their genes; instead, we have to look at species characteristics, at social influences and at environmental influences in order to understand ourselves.

(24)) The human animal interacts with its environment through the perception of it and through embodied actions. Our perception apparatus has six senses to feel the world. Smell, taste, vision, audio and touch are the most commonly known. The sixth sense is the empirically demonstratable sense of our own embodiment, called *proprioception*, that provides feedback loops between our brain and our bodies.

(25)) Humans are primates and, as mammals, give birth to living offspring. Among living beings, there are basically two strategies to propagate genes. One is used for instance by fish: both sexes produce a vast amount of eggs and sperm and leave their millions of offspring without caregiving; all energy is put into the production of numerous offspring. Hence, most offspring dies. Primates follow the opposite strategy. They produce offspring only every few years and spend much energy into caregiving; a loss of an offspring is hard because so much energy has gone into its upbringing. While it seems wasteful to spend so much energy on only a few offspring the advantage is that this offspring is capable of learning which helps the improvand and, hence, the survival of the species.

(26)) Because mammals give birth through the birth canal, the offspring has to be relatively small. And, yet, within a few hours of birth, most newborns are relatively independent. A horse can run nearly as fast as its mother can shortly after birth and a chimpanzee can hold on to its mother's fur very soon after being born. Humans face a dilemma. Due to our big brains, we give birth to our offspring too early and our children need caregiving for a long time. This gives us, however, a huge advantage called *neoteny*. The human animal stays childlike throughout its life. While all other animal children stop being curious and playful after a while, we humans stay that way for our whole life; we can learn new things and gain new experiences until we die. Therefore, we are uniquely equipped for survival through the shaping of our environments and the creation of culture. At the same time, though, we have to care for our offspring for a long time. Having children is a commitment that forces the community to care for members that contribute next to nothing to the well being of the community.

(27)) The question is why we care for our offspring so much. Our emotions towards babies are triggered by the babyscheme (Kindeschenschema).¹² Every creature with certain characteristics makes us react with feelings of love and tenderness and the need to protect. Among those characteristics are big eyes and long eyelashes, a sucky mouth, a round face, a big head in comparison to the rest of the body and a general sense of cuteness. Offspring of most social mammals cannot survive without a parent. A newborn, therefore, has to engage a parent or, if the parent dies, another member of the group to take care of it. It has to induce a mature creature to undergo the effort it takes to raise a child. One of the many and most obvious methods to do so seems to be the babyscheme as it makes the vast majority of grown-ups feel protective.

(28)) Another social mechanism that humans and many other social mammals have, is an instinctive understanding of the emotions behind certain voice melodies. We can detect scolding, soothing, approval and a call for attention.¹³ These melodies convey their meaning independent of the actual spoken words. They are language independent and work with dogs and horses and newborn children alike. Newborns react to these sounds even though they have not yet any understanding of the meaning of language. The reason why people think that newborns can understand language lies in the fact that newborns have innate protosocial responses that trigger our emotional responses and, usually, let us react even more protective and encouraging as the babyscheme alone would do.

(29)) When we meet other humans, the first thing we see is
their face. So the face is an extremely important feature for a social being and with eye contact, we usually demonstrate openness and willingness for interaction. In an experiment, researchers put sensors into a chimp’s brain to measure neural activity in a specific brain area. Then, they showed the chimp various objects. The cells they observed did not do any more than random firing when the chimp was showed faceless objects but reacted immediately to faces. While they were active when showed human faces, they reacted most strongly to chimp faces. It is most likely that we have the same mechanism in our brains. Brains of chimps and humans, except for our larger neo-cortex, are very similar. We cannot analyze human brains with the same invasive methods as chimps, but the analysis of brain injuries and human behavior has often confirmed that social mechanisms that can be shown in chimp brains usually appear in human brains as well. The facial recognition apparatus is universal among humans and it is also one of the main causes for babies’ strong reaction to all those toys that have faces.

((30)) Recognizing faces and distinguishing them from objects without faces is obviously important for a social species. But it is equally important to recognize facial expressions. And, again, it seems that the intuitive capability to correlate facial expressions with emotional meaning is innate. Irenius Eibl-Eibesfeldt went in the 1950s to various tribes that had only recently been discovered and were not used to interaction with Westerners. Wherever he visited, he took a translator with him and made photos with a 90° angle camera so that the subjects didn’t know they were photographed. The translator would say something and Eibl-Eibesfeldt could make a picture of the facial expressions of the subject. These photos demonstrate how similar humans around the planet react with their faces when in a specific emotional stance. They show that emotional responses are not just triggered by certain voice melodies but by facial expressions. Humans have the most flexible faces of all primates; hence, they have the widest array of facial expressions and are thus able to communicate many emotions to other humans.

((31)) Not only can we intuit the emotional state of another human, we can actually feel what the other is feeling. This mechanism is called empathy and enables us to understand someone else’s feelings not only on a rational, but also on an emotional level. One reason for our capability for empathy lies in the fact that we humans all share fundamental body properties. We share facial expressions with specific emotional stances, we share embodiment, we share the embeddedness in the world and we share our capability for bonding. But there seems to be an additional mechanism for it which resides in our neo-cortex. When a human performs a specific act, the brain activity in an interested observer will mirror the neural pattern of the active human, thus giving the observer an impression of what the actor does.

((32)) In an experiment several human subjects were shown two sets of hands. In the first case, the fingers did move and in the second case, a movement was verbally described. In both cases, there were five repetitions while the brains of the observers were measured as much as possible in humans. In the first case, when actually observing the movement, there was neural activity in the motor cortex of the observers. Then, the subjects were asked to repeat the movements they either had seen or had heard described. In the first case, the subjects had no problem to repeat the movement and the activity in the motor cortex was the same as when they were observing action. In the second case however, where movements had been just explained verbally to the subjects, they had quite some difficulties in repeating them. This suggests that the most successful strategy to learn specific actions is imitation rather than verbal explanation.

((33)) Even if mirror cells might have evolved for better learning strategies, they also create a closer bond between us. If the neural activity in our brain mirrors the one in someone else’s brain then we get on some level an inkling of how the other feels right now. The only difference between the two cortical brain activities is that throughout the observation, the neural activity is much weaker than when the act is executed. This way, there is some distinction between my own action and the action of the other. The weaker mirror cell activity in the act of observing helps me to preserve my body identity as it helps me to distinguish between the movements of the other and my own, even though the activity in the cortex is the same.

((34)) There are a few humans who lack some of the social mechanisms and cannot interact with their environment as people we consider as “normal”. These people have usually a condition that is somewhat related to autism. In fact, autism is defined by the incapability to relate to others as others, to put oneself into someone else’s shoes. The most famous experiment to test for autism is the “Sally and Anne” experiment. Two girls, Anne and Sally, are shown to a group of infants. While Anne has a basket in front of her, Sally has a box. Now, Anne will put a ball into her basket and leave the room. Sally, then, takes the ball out of Anne’s basket and puts it in her box instead. The infants are now asked where Anne, when she comes back, will search for her ball. Their answers are measured by how long they watch either the basket or the box.

((35)) Children pass this test easily when they are at least 36 months old. Before this age, they cannot conceptualize that Anne, who was not present when Sally switched the ball, will of course look in her own basket. They have no concept of other people being really other people with a different perspective and outlook. Only when they are at least 3 years old, do they have the insight that people who did not see a specific action will not act according to it. Now they realize that Anne was not present and know that she will look in her own basket. Autistic children never pass the test. Some of them, however, will become aware enough to be in some sort of “mixed” stage where they point to Sally’s box while looking at Anne’s basket. Pointing movement and the direction of their look differ from each other. So, the motor control for the arm gets a different signal than the control for the eye movement. One could say that one part in the infant knows what the other doesn’t. The motor control in this early age is not yet fully developed and the various subsystems are not that integrated so that actions can be mismatched. This means that our sense of self develops only when there is a sense of the other as the other. Only when I realize that there are other people with a different perspective will I learn to distinguish between them.
and me. The often famed self-consciousness is not something inherent in every human from birth on, but is learned and developed in social interaction between infants and the people around them.

((36)) Even if most babies follow very specific bodily and cognitive developmental steps during their individual development, most of these steps are triggered by interaction with the world and do not follow a genetic "program". This theory is supported by the fact that infants who have not been exposed to language until the age of 6 will not learn language. They are capable of understanding abstract symbols but they will not be able to speak or read. While the capability for language is embedded in our brains, we have to be exposed to it to learn it. The development of an infant is circular. Through babyschema and societal norms, the parents are usually moved to feel drawn to the baby and to develop strong emotions toward it. Through the mechanisms of empathy, they project into the infant's behavior grown-up intentions. When the baby cries they think it cries for specific reasons (it is wet, hungry, tired, or hurting) while in fact the infant is simply reacting to some nebulous feeling of discomfort. When the baby smiles they think it is intentional and that the baby expresses love for them, while in fact the baby does not even have an understanding of others as of yet.

((37)) Many parents insist that their baby cries differently depending on if it is hungry or wet and they are sure that it smiles to express appreciation. They are convinced that their baby recognizes them as parents as it treats them much different from other people, smiles easier, gets calmer faster etc. None of these parents' convictions are correct but these convictions and beliefs are crucial for the baby's development. Only because parents treat their infant as if it had intentions, wishes and desires, has the baby the chance to develop intentionality. Only because they treat their baby as if it was a fully developed and self-aware being, can it develop into such a being.

((38)) Our evolved social mechanisms make the parents react to the child in the only way that helps the baby to develop properly. It is important for the parents to project in order to feel motivated to interact with their babies the way they do. Were they only acting on the rationale of the child's actual capabilities, they would not put quite as much effort into the relationship and the baby would have a less productive learning environment. The undeniable fact that babies react to their caregivers often much more intensely than to other people also can be de-mystified. The unromantic explanation for it is, that the parents have learned to act towards their infant in a way that it can best react to them. Not the baby has learned about the special relationship between it and its parents. Instead, the parents have been somewhat "trained" and coached toward giving their infant the best understandable behavior it can react to; they have learned to behave in a way that their baby can most easily understand. Once this circle of action and reaction and projection is firmly established, the relationship between caregivers and infant presents a suitable learning environment for the infant to grow. In this relationship, the infant will imitate its parents or they will take turns with it for special behaviors. These learning strategies are successful because of the mirrorcells and the parents are motivated to engage their infant sometimes for hours because of their own projections onto their infant.

((39)) The rewards for the child are twofold. On the one hand, parents will interact with their infant more often and more intensely. If the baby participates in the interactive processes, the parents are motivated to participate, too, thus helping the infant to develop faster. On the other hand, there is a chemical reward for the brain in form of dopamine, a neuro-transmitter that is released as kind of reward if a learning process has been successful. Through both social and bodily rewards the child is from the moment of its birth put on a developmental path where is has the best chances to develop grown-up intelligence.

((40)) The developmental psychologist Jean Piaget (1896-1980) was the first to analyze the steps of mental development in the infant.14 Piaget had thousands of interactions with newborns and toddlers and concluded that the seemingly meaningless or illogical utterances they made were not a sign of less intelligence but much rather of a different intelligence. Very small children think with their own logic. It takes many interactions with their caregivers before their intelligence becomes more like the intelligence of a grown-up human. He defined very specific steps for children's development that are similar in all children; pediatricians still use his model to check on the mental health of an infant. While Piaget saw that in the very early month after birth, motor control is an important tool for the development of mental concepts, he focused more on the mental than physical aspects of early child development.

((41)) Experiments show however, that the development of motor and sensory skill is crucial for the development of any mental concept. Objects in our world have a few things in common. They either are or are not, they remain the same over time when there is not other influence at work. If one leaves some object in a room, goes away and comes back later, one can safely assume that the object is still there and is unchanged. Children, when they are born, do not have abstract concepts like "object" in their head. They react to simple cues with simple schemes and have no concept of object consistency. Adele Diamond conducted experiments, in which she put bright toy objects in Plexiglas boxes and placed them in front of a baby.15 The way of access to the content of the box was not in the front but on the side or in the back of the box. When the baby wanted to reach for the object, it couldn't reach it and would bang its hand against the box. So the baby quickly lost interest in the object as it couldn't reach it anyway. Only when the baby's motor control was so well developed that it could reach around and grab the object through a back or side entrance, did it stay curious and the understanding of the object was developed. It seems that intelligence develops through motor control and not the other way round, that is if the body does not develop, there will be problems in mental development.

((42)) Our complete body is mapped on the surface of the brain.16 This mapping is quite distorted as there are particularly important body parts that take up disproportionately large brain areas. For example, the area involved with the lips or with
the fingers takes up as much space as the area involved with the entire trunk of the body. It makes sense as both are very nimble and quite important for our interaction with the world. The whole body map in the brain is also not very accurate with regard to the location of our various body parts. While the feet are mapped on the top of the brain, the areas mapping the arms are on the lower parts. Our genitals are mapped in an area that is below the foot and not close to the area that represents the thighs. This body map shows how closely brain and body are linked. If someone loses a limb, the area that represented that specific limb will cease to get input. Instead of lying dormant, it will often end up firing randomly, in which case the patient experiences phantom pain. Otherwise, it can be taken over by other body parts so that the loss of the limb allows other parts of the body more “brain power” and, thus, more sensitivity. It was through research on body maps in the brain that the “God-module” was discovered. The God-module is an area in the temporal lobes of the brain that is particularly active when people report a “religious” or “spiritual” experience. V. Ramachandran stumbled upon it while studying body maps for the treatment of phantom pain in amputees. His team did a study comparing epileptic patients with normal people and a group who said they were intensely religious. This latter study showed that the epileptics and the deeply religious displayed a similar response when shown words invoking spiritual belief. The media reactions to this discovery were quite intense even if the scientists insisted that this research in no way reduces religion to brain chemistry. But if we are indeed embodied, then the existence of a God-module makes sense. If we are bodies then what ever we deem as “mental” must have a physical manifestation somewhere in the body or its environment.

If we are embodied, then, of course, our religiosity must be embodied, too. Every form of experience, bodily experiences, emotional experiences and religious experiences, must express themselves in physical form and do so throughout the body and in the brain. Our very self-image is embodied as it consists in part by our body mapped in the brain. Brain researchers know of the phenomenon of damage after an accident or stroke, where the patient develops a flawed self image. It can happen that someone half paralyzed after a stroke will not recognize her paralyzed arm as her own. She will make up stories on how the arm must have been exchanged nothing can convince her that this is not so. Her image of herself ceases to be accurate. Oliver Sacks describes a patient who had a brain tumor which was recognized too late and had already seriously damaged his brain. Among other things, he now was blind but he didn’t know that he was blind. He would argue “I am the best judge of whether I am blind or not and I know I am not blind” while running constantly into objects. We can only draw one conclusion. Self awareness is not a mental concept but an embodied one and occurs only in a healthy body.

If seemingly mental concepts such as religion or self-awareness manifest themselves in the physical world then we have to ask what the relationship is between mental concepts and their physical manifestations. Are the physical reactions a consequence of the mental concepts? Or are the mental concepts a result of physical activities? Or are both connected yet in even a different way? If we take the concept of embodiment seriously, then there cannot be any mental concept without its physical expression. We are aware of the mental aspects of specific concepts while they actually occur in the physical world.

If the frontal lobes are damaged through accidents or tumors, the patient is still capable of doing logic and math but ceases to be functional in a social setting. People with such a diagnosis tend to become extremely rude as they lose the sense of appropriateness and cannot relate to other people’s feelings anymore; they also cannot make everyday decisions. While we might be convinced that concepts such as politeness or the planning of one’s schedule are mental processes, Antonio Damasio’s research shows that they are actually expressions of very specific brain activities. As surprising as this research seems at first, it is very much in line with our concept of embodiment and against the Cartesian mind-body split.

But when we look at our species, it is not enough to study an individual system. Rather, we are social mammals and our survival depends strongly on us being part of a group. Herb Benson from Harvard Public School of Health was among the first researchers to study the contributions of the community to the individual’s healing process. He conducted two experiments. In one case, he sent a Rabbi daily to talk to patients after open-heart surgery. In comparison with a control group without daily visits, the counseled group of patients left the hospital on average 3 days earlier. They also had significantly lower relapse rates than the people from the control group. Before any surgery, it is common that the anesthesiologist visits the patient the night before and informs her about the procedure and possible dangers. The patient, then, signs a consent form. Usually such a visit is very short and perfunctory. In another experiment, Benson sent the anesthesiologist to a group of patients with the order to spend a long time with them. The anesthesiologist sat down at the bed and talked in length with the patient about her fears and anxiety, her situation at home and much more. Compared to a control group who had the usual, perfunctory visits, the patients in the experiment needed only a third of the anesthesia chemicals than the control group. Both experiments demonstrate that humans are so fundamentally communal that sickness and healing are directly connected to their interactions with others; both always have some social component and a healing ritual, that involves community, is far more effective than one without these communal elements.

Findings in clinical psychology add yet another layer to this communal understanding of us. Our brain does not function as a computer that stores data, but works with a method, psychologists call external scaffolding. Instead of “storing” information, the brain creates pointers and uses properties from our surroundings to associate with them and, thus, remember things. Experiments have been conducted in which videos are used to test the memory patterns of the subjects. Imagine a video where a man sits on a chair in his office. Suddenly, the phone in the hallway rings and the man stands up and leaves his office. The next scene shows a man on a phone in the hallway but he is not the man of the previous scene. And, yet, usually all test subject who are shown the film are sure they see the man from the first scene and do not
notice that he has changed. This experiment demonstrates our desire for pattern recognition, our desire to make up stories and draw up connections that make sense of the world. We see a man, hear a telephone ringing, the man standing up and, of course, when we see in the next scene a man on the phone we automatically assume that to be the man of the first scene. In another video, the test subjects are shown a film clip in which two women are talking. The camera focuses on the actress who is speaking so that while one is speaking, the other is invisible. In each such moment, something is changed about the appearance of the invisible actress (e.g. her hair, or scarf, or her glasses). In total, there are 10 changes but, again, only 1% of the viewers noticed a change. There are only two possible interpretations of these failures. The one is that our brain is a big computer and we store what we perceive in it. If this were the case, we are not very good at it; otherwise, we would notice the changes. The other interpretation is that we don't "store" anything but just react and, through interaction, create a pattern that creates a scaffold of the event in which what we perceive and the narrative we hold become connected.

((488)) To summarize, humans are embodied beings and entirely embedded in both their social and their physical environment. Due to our facial recognition apparatus and our capability for empathy we have a high capacity to interact with other humans.

((499)) But how do we interact with non-human entities? Experiments show that we treat computers instinctively with the rules of politeness we use for the interaction with other humans and that we bond with them and create communities with them. In one experiment, elementary school teachers and computer specialists were asked to evaluate a deliberately bad teaching program for elementary school students. After they had tested the program for a while, the computer on which they worked asked them to evaluate its performance. For the most part, people responded positively. Afterwards, these same testers were led into another room with other computer terminals and were asked to evaluate the learning program again. Here, on these different computers, their answers were less positive about the quality of the tested software but they still sounded somewhat satisfied. Finally, a human with pen and paper asked the testers for their opinion on the software and the testers were very negative about it. Such a program should never be used in school, they said. The testers had not voiced these criticisms to either the computers they had tested the program on, or to the computers in the other room on which they had done a second evaluation. These same people, when asked if they would ever be polite to a computer or think they could hurt its feelings, rejected such a notion vehemently. This experiment suggests that somehow we seem to apply our rules of politeness to non-human entities such as computers. Obviously, the participants in the experiment did not want to hurt the computer's feelings. They even assumed a level of kinship between different computers and, therefore, applied similar rules of politeness on the computer on which they did a second evaluation. They didn't tell these machines their true, very critical opinion either out of the feeling to not hurt the feelings of the second computer by criticizing one of its "fellow computers" or because they assumed some "contact" between the two so that the second would tell the first what had been said.

((500)) In another experiment, people and computers were placed inside a room. Half of the computers had green monitors while the other half had blue monitors. Half of the people wore green arm badges; the other half wore blue ones. All together played interactive games and the people with blue arm badges were much more successful when using computers with blue screens to reach their goal than using "green" machines. The same, of course, was valid for the other side. So, slowly, the people with green arm badges bonded with the green-monitored machines and the "blue" people with the "blue" machines. After approximately half an hour, the people wearing the blue arm badge expressed more solidarity with the computers with the blue screens than with the humans with the green arm badges; the same was true for the humans with the green arm badges. It seems that through the interactive games and the experienced benefit of interacting with the machines with one's color code, the color code took over as a definition for "my" group. The entities with the other color code, no matter if humans or machines tended to be rejected. Through the interactive games, communities were created that contained both human and non-human members. It seems that somewhere during our interactions with a computer do we start to assume that a computer is as sensitive as a human is. Therefore, we behave politely and don't want to criticize it openly. We also seem to bond with the entities of our own group no matter if they are human or not. No animal has an "inbuilt" sense of species recognition which means that it is not part of our biological make-up to automatically treat all humans better than all other beings.

((511)) Humans seem to be able to accept anyone or anything into their group with whom they can sufficiently interact. As soon as such a stranger is accepted into a group, he or she is seen as an equal part of the group; that group defines itself by the members that both belong and do not belong to it. After all, humans are educated from birth on how to interact with their fellow human beings. It is necessary for a baby to be able to do so as its survival depends on it. Throughout our lives, we learn patterns of behavior – such as being polite and don't openly criticize someone. It is very easy to apply these ingrained rules to every entity we interact with. It is very hard to not do so as it demands a conscious effort of us. The behavior to treat non-human objects as if they deserved some form of politeness or regard and were somewhat like us is called anthropomorphism, the human ability to morph/ change everything into a human and treat it accordingly. Usually, the term has a slightly negative connotation. Theologians especially criticize human terms used to describe God as "shepherd" or "father", or, within patriarchical structures, as an old, usually Caucasian, man with a long white beard. The experiments described above suggest however that anthropomorphization is the initial and natural response to anything we interact with; it takes a conscious effort not to anthropomorphize. As social mammals, we are best when we interact and any use of these trained and built-in behaviors is easy; anything else is hard.

((52)) So far, we have described the human animal as body
in community. We are dependent on our social group, first for our survival as infant and later to survive in a hostile environment where most other animals are stronger than we are, or have better senses than we do. But there are limits to our capability of bonding that are also deeply rooted in our evolved psychological make-up. Human interactions depend fundamentally on shared physical space. We depend on voice melodies and facial expressions for an active interaction; we are designed to get emotional cues from the other and give these cues ourselves in order to have meaningful relationships. The mirror cells that we discussed as a major part of the feeling of empathy, do not necessarily work without close, physical proximity. They are only rarely activated just when hearing about someone's activities or reading about them, when this human is distant from us. We all know from movies that we can easily empathize with strangers on the screen. What we share here is the human experience that is embedded in our common physical and emotional make-up. But for real empathy, we need close proximity or at least the similarity of the situations in which I and the one I perceive only from a distance find ourselves in.

((53)) There are developmental reasons for why we might perceive strange looking or speaking people as somewhat lesser persons. When we are born, we react to any sound and babble just about any possible sound. However, as early as with six months of age, babies start to react stronger to sounds that are in their mother tongue and in their babbling, they start to use only the sounds from their mother tongue. This early language differentiation has long been known. But recent findings show that this enculturation process is even more intense. Studies\(^7\) show that six months old babies have no difficulties distinguishing between chimp faces, even though to the average grown-up chimps do look alike. And, yet, shepherds famously can distinguish between their individual sheep. The reason for this is obviously familiarity. Shepherds bond with their sheep as they are in close proximity. They perceive them as members of their own group and are therefore capable to see them as individuals and to distinguish between them. A newborn doesn't have yet a sense of community and bonding; as we have seen, self-awareness starts to develop in children approximately when they turn 3. So it is not the concept of familiarity that helps them to distinguish between these faces but a mechanism of the visual system. The universality of this mechanism vanishes immediately as soon as the babies are around six months old. Then, it becomes encultured and babies can only distinguish between faces that have familiar features.

((54)) One explanation for this finding is that when babies are born they are at the very beginning of the process of bonding that will start to develop at the moment of birth. All inbuilt social mechanisms are active but they are purely instinctive and reactive, without inner connection. The facial recognition apparatus is one of them and helps babies to recognize faces from non-faces and to distinguish between them. The more bonding occurs, the more the baby will focus on the faces of those people that are immediately connected with it, either parents and family and frequent visitors. It is necessary to do so as the baby's survival depends fundamentally on its capability to attract those people that are most likely to care for it. Over time, every child becomes a specialist for the faces it is surrounded with and cannot anymore distinguish between faces that are principally different, being it the faces of chimps or sheep. Unfortunately, the same happens for humans with different facial features. This can be quite harmless: if a child never sees a man with a full beard, it will probably have some trouble distinguishing between men with beards later on. But it can be dangerous when it is applied to people with different skin colors or body forms.

((55)) Anthropological and archeological studies of military and early church history have revealed that there seems to be a limit of app. 150 people with whom we can bond at any given time.\(^6\) It seems that groups start to divide in subgroups as soon as this number is reached; that is, military groups divide into smaller command units and even in Rome and ancient Greece, military divisions never exceeded 150 people. Experiments conducted by Dan Simmons add another strong argument for the case against limitless human capacity to bond with others of their species. He sent students of his on a university campus to ask a variety of people for directions. In the middle of a conversation, other students of his would carry a door between the student who asked and the person who gave directions. One of the students behind the door would replace the student who had asked initially and in many cases, the person who was asked didn't even notice a change. An analysis of these incidents showed that in a constellation where a person from a "higher" social class asked for directions, people would mostly recognize a change. That is, if a "professor" type would ask a student, the student would nearly always notice a change while when a student or handyman would ask a professorial type, they sometimes wouldn't even notice gender switches or different skin colors.

((56)) We all might be tempted to state that such a thing would never happen to us. But it is part of our biological make up and has its roots in our evolutionary development. We have not been created to live in a global community but to live in small tribes that roam the planes. We need to recognize people from our own group very well, have to be aware of their emotional stances and we have to recognize social structures. Because our brainpower is limited, we do not have much capacity to spare in order to apply these capabilities to every human being. Like all other animals, humans do not have a sense of species recognition. But we bond with anything that is close to us on a daily basis and reject strangers, no matter if human or not. We use categories such as social class, importance for us, and the possibility of meeting again to exclude most of the people we meet from our own social group.

Points of Commonality between both Anthropologies

((57)) A comparison between the theological and the scientific anthropologies outlined above reveals several commonalities. The curse of pain in labor finds its equivalent in neo-teny. Only because our brains are so complex and capable of judging and categorizing, are they so big and cause problems.
at birth. We are the only animal with such difficulties at labor and we are the only animal that has nearly no chance of surviving giving birth without the help of other humans. This helps the survival of our offspring as people who might have helped birthing a baby are more likely to feel some responsibility for it, which extends the group of care givers. But it is interesting that the Bible already makes the connection between brain size, intelligence and labor.

(58)) The concept of sin as estrangement has its equivalent in several scientific properties. The recognition of you-aren’t-I is the result of parental love and guidance. Self-awareness is not an inbuilt quality of human beings but learned. The “thou” as part of my group is encultured within the first few months of an infant’s life and, as the capability for human bonding is limited, the non-recognition of strange faces is justified by stories.

(59) Here one can find the deepest connection between theology and science. Science can only tell us about the various functions of the human animal. But the existence of religion suggests that story-telling is deeply rooted in the human system. The very fact that most religions have a creation story points to the fact that while humans are scientifically spoken animals, they tell stories to give their life meaning. By placing humans into a cosmological context, they give themselves a meaningful place within creation. Humans tell stories in any possible context. Stories give meaning to our lives. All religions are based on stories. And even in science stories are abundant. But the scientific enterprise depends on eliminating the human element as much as possible. On the other hand, it is the very narrative structure that makes religion so important for human life.

(60) A good example is the circular development of human infants. As we have seen, the scientific explanations for why we put so much effort into our offsprings even if there is no immediate reward, is quite unromantic. But humans tell stories about and with their infants, and they create rituals for the beginning of life (such as baptism in the Christian tradition) and have stories about the reward of parenting. They create societal taboos against infanticide. Story telling and evolved psychological mechanisms work together to maintain and improve the human animal.

(61) Even if I find coherency in scientific facts about the human animal and the Biblical narrative, I do not attempt to convolute these very different forms of human expression. I just find it remarkable that the rabbis who thousands of years ago attempted to give meaning to the human condition, did so with remarkable keenness. Because much of what they explained in meaning-giving stories can be explained today in science as well. But the Biblical narrative has one component that science never has and never ought to have. Science is descriptive. The scientific anthropology outlined above is based on hypotheses that bring together many different scientific observations and theories. But this anthropology defines us solely as animals whose life is devoid of any meaning. According to this anthropology, we are bags of skin, random mutations, a result of the evolutionary process that lasted millions of years. Whenever science leaves this level of description and attempts to construct meaning, it ceases to be science and enters the religious realm.

(62) Therefore, it is important to let the religious and the scientific anthropology both stand side by side to see where they can mutually enrich each other, without convoluting their very different spheres. This is, however, fairly easy to do because both are so coherent in many ways. And both together can help us to see how we interact without technological counterparts and what this can teach us about the concept of personhood.

**Humanoid Robots**

(63) It was Japan that started the first attempt to build humanoid robots. Like most other industrial nations, Japan faces the problem of an ageing society. But in difference to these other nations, Japanese society is exclusive and doesn’t welcome strangers. In order to care for the elderly without loosing too many people from the productive work force, Japan decided to build robots for this purpose. These robots had to be humanoid for two reasons. For one, humanoid dwellings are built for the human body and its needs so that a humanoid shape can navigate them most easily. Also, since we are socialized with humanoid shapes it seems likely, that a humanoid robot is less threatening for elderly people than a non-humanoid. After consulting with Japan for several years, Rodney Brooks from M.I.T. started his own humanoid robot projects in 1992 and led teams that first built the robot Cog, a torso and moveable head with two arms, and later Kismet, a head and neck with a very expressive face. The development of both robots was accompanied by much media interest but, unfortunately, the expectations far exceeded the accomplishments and in 2001, both projects were abandoned; both robots are today displayed in the M.I.T. museum. Japanese robots surpass US-American robots in their capability to move autonomously in natural and, hence, constantly changing environments. But Kismet is the most advanced humanoid robot ever built with regard to social intelligence. While Cynthia Breazeal, who built Kismet, is today working on the robot Leonardo, which surpasses Kismet in social skills, Leonardo resembles a furry animal and not a human being. Therefore, I will focus my discussion on Kismet.

(64) Kismet is a head on a neck with four degrees of freedom (DoF). Degrees of freedom are the measurement of flexibility in a robot. For instance, when a joint can move two-dimensionally in two directions, it has 2 DoFs. Kismet’s neck can move forward, backward, left and right which means it has 4 DoFs. The head consists of 2 flexible pink ears (4 DoFs), big, blue eyes (4 DoFs) with long eye lashes, furry, brown eyebrows (2 DoFs), and a mouth (2 DoFs) with big red lips (6 DoFs). It babbles and mimics the 4 social voice melodies. With this design, Kismet follows the babyscheme. As it is only a head, the head-body relationship is skewed; it has big blue eyes, prominent red ribbon lips and, for a robot, is very cute. Kismet has an internal emotional system that gives each possible emotion a vector value in a 3-dimensional coordinate system (x-axis: positive and negative valence; y-axis: open and closed stance; z-axis: arousal). The DoFs of...
the face and neck are linked to the internal emotional representation; if Kismet’s internal emotional stance changes, so does its face. This is especially expressive for the neck. Open stance (e.g., curiosity) is represented with a leaning-forward motion and closed stance (e.g., rejection) is represented with a leaning-backward motion. Kismet reacts most strongly to faces (either toys or human). It also is attracted by movement and color. Its emotional system reacts in the mammalian way to the 4 voice melodies. It can share attention (follow gaze direction and pointing). Therefore, Kismet seems to react to social cues. While Kismet looks clearly like a robot, it is as humanoid as technologically possible. As we have seen, humans have a very fine-tuned sense for facial recognition. In fact, if there is even something very slightly off in a face, we react negatively. It is not possible with the technological means today to rebuild a human face exactly and all attempts to do so had to be discarded, as people were put off. While Kismet doesn’t look like a human, its expressive face triggers several social mechanisms.

((65)) Perhaps the most important aspect of Kismet is that it cannot learn. This was done intentionally. Cog could learn and was able to improve its bodily coordination in time. But Kismet was mostly used to observe robot-human interaction. Since it was known that it couldn’t learn, the team knew not to project anything into its behavior but was able to study the humans that interacted with it. For instance, Kismet reacted faster to the people who worked on it; its reaction time was slowed down with strangers. While it was tempting to interpret this as familiarity (Kismet knows its programmers), it was clear that it was the other way round: People who interacted with Kismet a lot had learned to behave in a way that Kismet would get the clearest signals and could react quickly. Kismet is a purely reactive system. It reacts to its environment but does not do anything on its own. But one of the programmed responses to a lack of stimulus is that Kismet will look sad and bored; if someone enters the room, Kismet will immediately look up, direct its eyes toward the newcomer and starts smiling. This will motivate the human to interact with Kismet; we can’t help react to a smile that makes us welcome, even if it comes from a robot.

((66)) Kismet is built based on a mechanistic and functionally reductionist anthropology. If one assumes, that any capability of the human animal is “mysterious” or cannot be explained in purely scientific terms, one cannot build humanoid robots. In other words, the reductionism assumed in the humanoid robot enterprise is pragmatic and not an ontological statement. The controversy of AI lies mostly in the misunderstanding of this fact. On both sides of the argument people think that if AI succeeds building a machine with very similar capabilities to ours, it has proven that we are nothing but machines ourselves. Obviously, this conclusion is wrong as no project can prove its own assumptions. Rather than demonstrating our “machine-ness”, a successful AI-project would show us as ingenious inventors. It is this aspect of AI that has fascinated religious leaders for centuries. In the Jewish tradition, golems are artificial men build from clay, animated by God’s ruach. This ruach is symbolized by the divine name (the tetragram YHWH), either on a piece of paper in their mouths or written on their forehead. While some versions of these legends contain a motif of hubris, in most versions the construction of golems is understood as a celebration of God and God’s creativity in us. In fact, golem building is seen as a prayer.31

((67)) When we become aware that Kismet is not threatening to our self-understanding, then we can put aside the fear and animosity it often evokes. We can now ask, what such a robot can teach us about ourselves. First of all, experiments with Leonardo32 show that people react much stronger to a physical robot than an equally reactive 2-dimensional animation. This supports our claim that humans are embodied creatures that react most strongly to creatures that share their physical space. Kismet invites people to interact with it and to create stories and rituals. While it does not understand language and, due to its lack of learning capabilities, cannot bond with individual humans, people assume that it understands them, reacts to them, and has real emotions. This supports our claim that humans are social and bond with all objects that interact with them. Also, it demonstrates the strength of our projective abilities that we display when interacting with babies. Kismet is remarkable piece of engineering. Even if the attempt to build a humanoid robot is doomed to failure with the technologies currently available, Kismet demonstrates that there will come time when technological counterparts of ourselves might be feasible — at least, given the achievements of today, we have to take this possibility seriously.

A Concept of Personhood Based on Our Findings

((68)) This leaves us to ask how we ought to treat these results of our creativity and imagination. We are now left to ask if future humanoid robots could be assigned personhood. And it is here that we need both theology and science to come up with a definition that is not too broad but that also does not exclude any human beings. Most accounts of personhood use the concepts of “being human” and “being a person” interchangeably and as ethical categories.33 Every human being deserves to be treated as a person even if he or she is incapacitated (through a disability, disease, or rejection by other human beings). Against this position stands the opposite understanding that ties personhood solely to capability: any being can be a person when capable of symbolic processing and any being that is not capable of it is not a person. According to this scenario, people in a coma, with severe dementia and similar incapacities as well as human babies are not seen as persons, while well trained chimps are.34

((69)) People use the second stance when arguing against Kismet’s personhood because of its physical form. One argument is that robots are artifacts, artificial entities that cannot participate in the community of persons. However, when we take the Hebrew understanding of life (chain), then robots are alive when participating in a meaningful way in a human community. Also, as I have laid out somewhere else35, being alive is a biological category and as such value free. Not everything alive is valuable and can participate in the community of persons and, therefore, being alive cannot be a condition for personhood.
Other arguments against Kismet's personhood center on its lack of self-awareness, and learning capabilities. These arguments can be rejected for two reasons. First, technological progress is fast. If we just look at the development in the last decades due to electricity and silicone, we see that we cannot principally assume a glass ceiling for technological advancement. While there is no way to predict the speed of technological development with any certainty, we can be sure that it will surpass all our assumptions. Basing any analysis of the potential for robotics on the state of technology today is meaningless. Secondly and more importantly, it is dangerous to base any assignment of personhood on empirical features. Nazi-Germany denied the personhood of people of Jewish descent based on a pseudo-scientific race-ideology. And 50 years ago, the southern states of the US and, even more recently, South-Africa denied personhood to people with dark skin. Race is a social construct. The very fact that all humans can interbreed shows that we do not belong to different species. That makes any argument based on empirical features dangerous.

This leaves us with the first definition of personhood that identifies humanness with being a person. Robert Spaemann argues that the assignment of personhood has to be species-based; i.e. if I assign one human personhood I have to assign it to all humans and if I assign personhood to one dolphin I have to assign it to all dolphins. Given the scientific anthropology outlined above, this seems questionable. Humans do not have an "in-built" sense of species recognition and reject humans with unfamiliar features and are, in fact, incapable of distinguishing their faces. And, yet, humans are willing to bond with machines, anthropomorphize them, and treat them as if they were persons. In other words, I find something correct and something incorrect in both definitions of personhood mentioned above. I agree that personhood is an assignment and cannot be based on empirical features and capabilities alone. Personhood is a social construct and different from the biological species definition of being human. We assign personhood to individuals not based on their capabilities but based on their interaction with us. Personhood is not assigned to a species as a whole (as we lack the recognition of this concept) but to individual beings, independent of their species or biological (or non-biological) features.

Daniel Dennett defines the six conditions for personhood as follows. Rationality, consciousness and intentionality, verbal communication, moral agency, the stance adopted towards the being in question, and, finally, reciprocity in the assignment of personhood. As we have seen, parents need to treat their babies as persons in order for the infants to become healthy grown-ups that will propagate the species. They do it even if babies lack all of Dennett's conditions, except the stance toward them. This means, all except this one condition are only sufficient conditions for personhood. Only the stance I take toward the personhood of another being is a necessary condition. This, however, does not make the other conditions obsolete. Because if this were the only valid condition, we could, in principle, assign personhood to everything from stones to amoebas. According to the Biblical anthropology outlined above, every human being is a divine statue and, as such, a person. This assignment of personhood is a divine gift and cannot be proven. But the Bible assigns it only to humans; humans have a special place in creation. While we cannot use this as scientific argument we have seen that human society works because we act with anthropomorphism towards everything that reciprocates our actions towards it in some way.

The writers of the Bible were not yet confronted with technological creatures that might be new kinds of divine statues. It is here that Dennett's conditions become interesting. Kismet is not a person because it has no potential to develop rationality, intentionality or moral agency. It is reactive and cannot learn. But even if it could learn it is doubtful that it would become complex enough to develop these features. But this cannot be in any way an argument against the potential personhood of future robots. If a robot becomes complex enough to develop the sufficient conditions of personhood outlined by Dennett, there is no reason to deny it personhood. Any attempt to do so would, when applied to all beings, exclude all those human beings from the community of persons that lack these conditions as well.

It is at this point that Biblical and scientific view of human beings merge. From a Biblical perspective, every being that enters the state of sin, the estrangement caused by the recognition of the "I-Thou", is a person. Every being that bonds with some other beings while, at the same time, rejecting other beings as non-persons, is a person. There is no way to refute this definition of personhood on scientific grounds. But the scientific anthropology supports the Biblical account, as it tells us exactly our capabilities and our limits for bonding as well as the necessary steps to develop them.

Any entity that is assigned personhood by some human beings, and that is potentially capable of being estranged, is a person. Because it is only the state of estrangement that gives rise to moral agency, self-awareness, and intentionality. Only estrangement enables us to assign personhood to others and to reciprocate their assignment of personhood to us. Only estrangement enables us to deny other people personhood.

Because personhood is linked with the theological concept of sin, it has to be pointed out that this particular concept of sin is independent of the concept of guilt. The human system has evolved the way it has and humans cannot be blamed for estrangement as they cannot be blamed for being mammals. But this concept of sin is helpful as it points towards our basic incapability to assign personhood to some of our fellow human beings. If we argue against the personhood of robots we do so using empirical features that, applied to human beings, would deny personhood to some human beings as well. This however, from a Biblical standpoint has to be rejected.

Robots, therefore, can be used as thinking tools to analyze the concept of personhood afresh. They make us aware of our own bonding limitations and enable us to work towards a world in which we assign personhood to all human beings - despite our prejudices and judgments - even if this might mean that we have to assign personhood to the children of our technological future as well.
Endnotes

1. For a more in-depth discussion see my articles “Artificial Intelligence I. Scientific”, “Artificial Intelligence III. Theological”, “Artificial Life”, in: “RGG (Religion in Geschichte und Gegenwart), vol. 1.

2. While I agree that it is problematic to translate JHWH simply with God, I will do so nonetheless. In recent years, the language of God, Godself etc. and the replacement of any personal pronoun referring to JHWH with “God” has become well established among feminist theologians to avoid assigning a gender to JHWH. I will follow this tradition.


8. The following reflections come from H. Seebass: Hebräisch-Aramäisches Wörterbuch zum Alten Testament.


11. The phenotype of every individual describes how its appearance looks like. For instance, there is a well-established link between body height and nutrition, if nothing else. A child might not become very tall. Even if there is a genetic predisposition for height, the actual height of a creature, meaning the phenotype cannot be determined by genes alone.


15. See “Liebe und Hass” (s. endnote 12).


33. For one of the most thorough discussions of the philosophical discussion of personhood see Robert Spaemann, “Personen: Versuche über den Unterschied zwischen ‘etwas’ und ‘jemand’”. Stuttgart: Klett-Cotta 1996.

34. Most famous representative of this understanding of personhood is the Australian philosopher Peter Singer. His most comprehensive work is “Practical Ethics, Cambridge: Cambridge University Press, 1999.


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KRITIK / CRITIQUE

But Perhaps Robots Are Essentially Non-Persons

Selmer Bringsjord

((1)) After making a few theological remarks on Foerst’s profound and stimulating “Robots and Theology,” and agreeing with her that deficient robots of today do not imply that those of tomorrow will likewise lack personhood, I point out that it is nonetheless entirely possible that the nature of “robothood” does forever preclude their being persons.
Does Biology Matter?

Matt Rossano

(1) Dr. Foerst presents a thorough and interesting synthesis of the scientific and theological conceptions of personhood, arriving ultimately at the provocative conclusion that given the achievement of sufficient complexity, there would be no principled reason for denying personhood to robots. While I find myself in agreement with this conclusion, I suspect that where Dr. Foerst and I part company is on the issue of how likely it is that robots will ever achieve that level of complexity. In fact, I'm deeply skeptical that this achievement is even possible. For if it is, we are left with an even more perplexing question - why doesn't biology matter? I think biology does matter. It think it matters an awful lot - and it is that issue that I will explore in my commentary.

(2) Before getting to the heart of my commentary I need to dispense briefly with three tangential issues. Given space limitations, I will only express my reaction/displeasure without much detail. (1) I strongly disagree with any notion of a God-module. The neuroscience studies of religious experiences have, I believe, completely discredited this idea. (2) Mirror neurons were first discovered in monkey brains, and so are not likely (in and of themselves) to be the basis for any uniquely human mental functions; and finally (3) I think describing infant development as "circular" is misleading - it sounds as if it is going nowhere. I think "reciprocal" is better terminology.

(3) Now to the heart of the matter - can we take the idea of robot personhood seriously? I'm skeptical, but I hope to base my skepticism in more than just bio-chauvinism. Instead, I'll try to make the case that accepting Dr. Foerst's argument forces us to devalue biology far beyond what the current evidence permits. To start, note well that in presenting her case, Dr. Foerst repeatedly sets up a nature/nurture or genes/environment dichotomy that evolutionary biologists and psychologists have soundly rejected. For example, we are told that "We [humans] are not determined by our genes. We cannot be looked at as individuals shaped by their genes; instead we have to look at... social influences and environmental influences in order to understand ourselves." (23) Additionally, it is stated that "self-consciousness is not something inherent in every human from birth on, but is learned..." (35) These statements compel us to accept only two options for understanding human nature: we are either endowed genetically with certain traits or we acquire those traits through environmental learning.

(4) But these are outdated options. We are neither determined by our genes nor by our environments. Instead, we are determined by the interaction of our genes with our environments over the course of development, and indeed, our lifetimes. In the context of this interaction, however, any attempt to trivialize the genetic contribution is, I think, misguided. Thus, the statement "we are not shaped by our genes" is just flat wrong. We are shaped by our genes. It's just that our genes are, by design, open to specific kinds of environmental regulation and influence.

(5) I think Dr. Foerst's discussions of both the development of self-consciousness and parent/offspring bonding suffer from the "hangover" effects of this false dichotomy. No, children are not born with self-awareness and they do require proper social experience for this capacity to emerge. But a critical part of this emergence is the child's genetic potential actualized through social experience resulting in a neocortex capable of reflective self-awareness. Cross-fostering studies with apes show us that even if you take a nonhuman primate and raise it as if it were a human child, it does not turn out to be a little furry human. The genome that you start with matters.

(6) On parent/offspring bonding we are told that (paraphrasing) it is the "babyschema" and societal norms that attract parents to their offspring and cause them to develop strong emotions toward them (36). Yes, these factors play a role. But so do biological factors that operate quite distinctly from any "societal norms." I'll mention just three: (1) nursing in mothers causes the release of oxytocin, a powerful chemical for emotional bonding, (2) the sight of her baby's smiling face activates the dopamine-laden reward centers of a newborn's brain including the substantia nigra and the striatum, and (3) marriage and fatherhood reduce levels of testosterone in men, inhibiting risk-taking and aggression, and facilitating emotional bonding. Furthermore, the tendency to over-extend intentionality is pervasive in humans (not just parents) and evidence of this tendency can also be found in non-human primates. These findings undermine any attempt to isolate "societal norms" as the exclusive or even primary cause for why parents bond with their infants and/or project intentionality onto their actions. Nurture is important, but nature matters too.

(7) It may be necessary for Foerst's argument that the nature/nurture dichotomy be erected and then shot down in favor of a strong environmentalist account of personhood. This lays the groundwork for an argument along the following lines: "since the emergence of personhood is more critically dependent upon the social milieu rather than the internal makeup of the creature involved, then any sufficiently complex system (whether biologically-based or silicone/plastic-based) embedded within the right social milieu will give rise to personhood." But this logic unravels when we recognize that the nature/nurture dichotomy is a false one from the get-go, and the ensuing environmentalist triumph is a mirage. I think powerful phylogenic and ontogenetic evidence points in exactly the opposite direction to the one where Foerst is trying to go. Natures matters - biology is not incidental to embodied cognition, it is the very fabric from which embodied cognition (and thus self-awareness and personhood) emerges.

(8) Let's look at what the current evidence says about the achievement of personhood. First, it only reliably emerges in one biologically-based primate species after a decade or so of an ontogenetic process wherein the biological makeup of that species interacts in specific ways with its social environment. Second, the one primate species with "personhood potential" only emerged after tens of millions of years of an evolutionary process acting on the particular biological traits.
present in one phylogenetic branch. Third, this phylogenetic branch only emerged after billions of years of an evolutionary process acting on biological stuff to create sufficiently complex cognitive/social organisms. Given this history, wouldn’t it be at least modestly surprising if the biological character of the personhood-producing stuff and the evolutionary and ontogenetic processes that have acted on that stuff were only incidentally related to the personhood that arises from it?

((9)) There’s another line of evidence that offers further support for my view that biology matters — and matters deeply — in this whole arena. The entire history of human technological development is not one of inventing technologies that possess fundamental natural features. We humans are, as Foerst points out ((66)), ingenuous inventors. But what we are ingenuous at inventing are alternative ways of playing nature’s game. No one would mistake our flying machines for birds or our swimming machines for fish. Our computers play championship-level chess, but not as human chess champions do; and our memory storage devices store vast amounts of information, but not the way natural memories do. Why then, should we expect that our ‘thinking/ambulating’ machines will possess personhood? They will think, ambulate, and relate to us in ways that we will recognize as different from other biologically-based thinking, ambulating, and relating creatures. Yes, we will probably endow them with ‘intentionality’ and ‘personality’, but it will be in the same appropriately qualified form that we use in relating to pets, cars, computers and other ‘human-like but not-quite-human’ social entities that have become familiar aspects of our modern world.

((10)) Now, to be clear, I’m not saying that machines don’t fool us into thinking that they are human sometimes. Of course, they have, and they do. Biology isn’t required to fool us — some of the time. But biology is required to fool us all of the time. We invent machines to do all manner of activities — playing chess, cleaning the pool, navigating the car, and so on — but they are different, separate machines. What we will find — I’m convinced — is that to do all the things that a human does will require being made of human stuff. Furthermore, it will also require ‘growing up’ as a human grows up. But we already have billions of these creatures running around the planet, so why bother? Nobody wants a robot maid who has all the ‘downsides’ of being human. Instead, what our robot manufacturers will create for us is a maid who is better at the specifically ‘maid-stuff’ without all the ‘extraneous’ human stuff that just gets in the way. But it’s in the ‘extraneous’ stuff that ‘humanity’ and ‘personhood’ are found.

((11)) The really big question then is: “What if I’m wrong?” What if biology really doesn’t matter as much as I think it does? In this case, the implications for theism seem paralyzing. For then it appears that we are so much smarter than God. What took the Deity billions of years to accomplish (with immeasurable suffering, death, and extinction) we have pulled off in a relative eye-blink without so much as a scraped knee for the effort. If our robots truly turn out to be ‘persons’ in every important sense, then why oh why didn’t God do it first? Why did God bother with us?

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Roboter und Anthropologie

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