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# Choosing Life Stories: Body As Teacher

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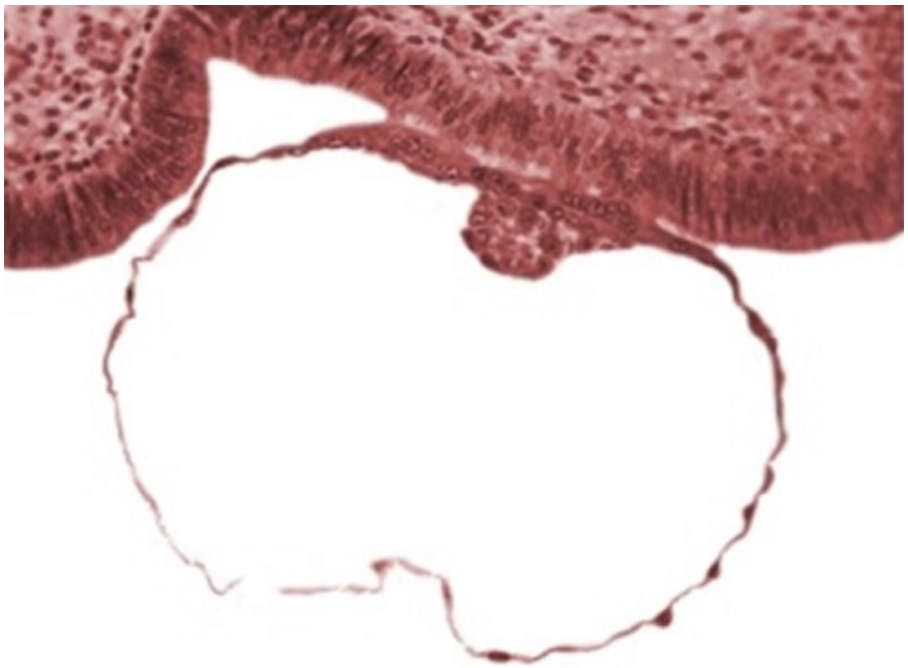

Biological science and the larger society interact with each other. Biologists tell stories--stories such as fertilization, body development, and evolution--using the narrative structures given to them by the larger society. These stories have to be consistent with the scientific data; but what data are collected is also a social judgement. The stories that biologists have told have often emphasized competition and have often marginalized cooperative efforts. New research has shown that these competitive stories offer a very incomplete version of what is happening in our bodies, and that mutual cooperation is a major part of how the body develops and evolves. Understanding the body is key to understanding how parts integrate into wholes and provide new narratives of who we are and what is considered normative in our society.

**I. Introductions: Stories Telling Stories**

Can a search for meaning occur when three people are gathered together, even by Zoom. Believing that this was possible, we came with our differences and our similarities--a black woman Quaker healer, a white woman community activist, and a white male embryologist. We came together to weave the embodied wisdom of our lived experiences and understandings of our bodies and of peace. In searching for peace, in reaching for what the Jewish tradition calls "shalom," we can find few better teachers than our bodies. The body invites us to see a world of creative interplay of cooperation and competition, a world where parts actively seek and negotiate harmony and integration with all other parts.

Our response of awe toward the miracle of life and our gratitude for life have been diminished by seeing life merely as evolutionary competition for scarce resources. The "competition" story is scientifically inaccurate; it is an incomplete and harmful myth. When established as the model for our ways of being human, it repeats, reinforces, and reproduces oppression. Science offers us new stories that celebrate reciprocity and cooperative relationships. These are life stories, where shalom is not a passive absence of conflict, but rather an active, dynamic, mediation of parts to form a living, healthy, and coherent whole.

Humans are story tellers. It's through our stories that we make sense of the world. Our origin stories--how we evolved as a species and how we developed as a body--provide an important framework for influencing our individual and social behaviors. Religious philosopher Abraham Joshua Heschel[1] wrote, "The image of man affects the nature of man.... We become what we think of ourselves." In a remarkable positive feedback loop, the stories we tell create our culture, while our culture constrains which stories get told and replicated. Our cultural fascination with competition tends to limit our awareness of new scientific perspectives. At the same time our belief in competition as a scientific explanation of our origins encourages us to see that as the primary metaphor for our humanity.

Ursula K. Le Guin famously criticized the framework of most Western storytelling. In her 1986 essay, "The Carrier Bag Theory of Fiction," Le Guin[2] argued that the main theme characterizing European and colonizer stories is "the Story of the Ascent of Man the Hero...the killer story." Such stories of conflict, action, and heroism are what Donna Haraway recently called "the prick tale." Le Guin hypothesized that our bias for such killer stories of heroic competition originated from the stories that men brought back from the hunt-- thrilling tales about mortal danger, surmounting fears, and killing beasts. The women's stories about gathering roots, tending babies, and growing seeds were seen as less exciting. Nurturing stories were essential for clan survival, yet uncelebrated and absent in the "killer story." Le Guin hypothesized that the first widely adopted tool was probably not a spear, but a bag--something to carry a baby or roots in. Le Guin's "The Carrier-Bag Theory of Fiction" highlights a part of the human story that has been left out.

Le Guin concluded, "Hence it is with a certain feeling of urgency that I seek the nature, subject, words of the other story, the untold one, the life story."

The "life story" needs to be told well. We contend that knowledge about fertilization and evolution has been packaged, not as a "life story," but as a "killer story," a "prick tale." Accounts of fertilization and embryonic development are the first chapters of human autobiographies, strongly influencing later social interactions. Scientific accounts are the basis of many of our most powerful stories, yet they can become outdated, and they are not immune to critique. New scientific stories see competition as a relatively small set of interactions that also include mutual maturation and cooperation.

*Is it time to lay down our loyalties to the killer tale?* Let's review the stories of fertilization and how the body forms organs in order to unlearn what we thought was truth. "When any real progress is made," wrote Henry David Thoreau, "we unlearn and learn anew what we thought we knew before." Today, progress in biology reveals discoveries that allow us to see "the nature...the words of the other story, the untold one, the life story."

**II. Beyond Sperm Tales**

The standard story of fertilization focuses exclusively on the competition of sperm for the grand prize, the egg. Our movies and textbooks have taught us that the female reproductive tract is a passive route through which sperm compete. We're told that the victorious sperm bores its way into the egg, thereby provoking the sleeping egg to start developing into a baby.

This standard fertilization story conforms with Joseph Campbell's typology of the Hero Myth. A masculine hero is expelled from his kingdom, enters a netherworld of darkness where he is challenged by some forces and befriended by others, undergoes a long and perilous journey, defeats any other survivors, and gets the princess to start a new kingdom. It's a great story, a thrilling and self-congratulatory story (as hero myths are supposed to be.) Still, it is only a partial story -- the sperm's point of view. It disregards the "carrier bag", the container, and de-emphasizes the role of community interactions.

Truly, neither the oviducts nor the egg is passive in fertilization[3]. Sperm are immature when ejaculated, meaning they are incapable of finding or fertilizing an egg. Surprisingly, human sperm can't mature until inside a woman. The woman's oviduct cells mature the sperm by secreting certain chemicals that change particular proteins on sperm cell membranes. These changes enable sperm to recognize chemicals that are being released by the egg. Once the matured sperm has recognized these chemicals, it swims rapidly towards the source of these chemicals--the egg. The egg (and its neighboring cells surrounding it in the oviduct) cause further changes in the sperm as the sperm moves closer to the egg. These changes enable a sperm to fuse with the egg once it arrives. Only with the oviduct's involvement is a sperm mature enough to find and fuse with an egg.

Then, what actually happens when sperm reach the egg? Through a microscope, we can see a matured sperm "spooning" with the egg. We see the egg cell membrane fold around the sperm -- an intimate embrace during which the adjoining cell membranes melt, and the two cells fuse to become one.

Just as sperm isn't mature-when it leaves the man's testes, the egg isn't mature when released by the woman's ovary. The egg has not yet undergone the meiotic divisions needed to halve its chromosome number to 23. (The sperm had already halved its chromosomes before it left the testes). When a sperm and egg unite, chemicals from the sperm activate the egg to finish the immature egg's meiotic divisions. After these egg cell divisions occur, the sperm and egg nuclei can merge. At this stage, fertilization has been completed, having

produced a zygote (fertilized egg) that has the normal number of human chromosomes (46) that are needed to begin the generating of an embryo. Thus, the sperm and egg are mutually and essentially involved in each other's maturation.

This new story highlights reciprocal cooperation alongside competition. Human fertilization revolves around mutuality. The egg and sperm are exiles from their parents, two cells on the verge of death. They need to find each other or die. But when the two meet, they mutually activate and mature one another, losing their former identities to create a new cell, the zygote, which can start developing into a human baby who can live several decades or more.

And this zygote divides to form the cells that generate the body through the same processes of reciprocal maturation. The cellular calls-and-responses cause the mutual maturation of the body parts.

**III. "You Complete Me" ~ The Body as Ecosystem**

Body formation happens through other surprising reciprocities. Approximately half the cells in our body are microbial cells--bacteria that have been incorporated and function as integral members of our body. These bacteria also interact with our human cells to generate the organs of our bodily community.

The conventional story we are told is that the immune system is our defensive weaponry that protects us from bacteria and actively destroys anything that is "foreign" to our bodies. However, current science is now putting our relationship with bacteria into a larger context. The immune system is created, in part, by bacteria that enter our bodies through the birth canal as we are being born and through nursing. Once within the gut, the bacteria produce chemicals that induce our cells to generate our immune system, tell other cells to become the capillaries that line our guts, and tells the nerves in the gut to start the peristaltic muscle movements to get rid of wastes. Indeed, we are born immature, and the bacteria help complete us. And these microbes remain with us, in us, and on us, all our lives, becoming critical for our digestion, our hormone production, our blood circulation, our neural synapses, and perhaps even our behavior.

Microbes are responsible for much of life on earth. They are contributing and necessary members of our body community[4]. Cows, for instance, are unable to digest the grass they eat. No mammalian genome, including that of the cow, has a gene that encodes the production of enzymes that can break down cellulose. The cow gets these enzymes from the microbes in her gut. Cows even have a special part of their stomachs, called the "rumen," that houses the bacteria that digest plants. Remarkably, the bacteria that colonized the calf during birth actually direct the building of the rumen. Chemical signals from these microbial "others" collaborated with the cow to build their own home inside the cow. The cow could not exist solely on the cells derived from the fertilized cow egg. It cannot be a cow without these

bacteria. The cow may look like a single organism; however it is also a collection of ecosystems. It may look like an individual, yet "even so the body is not made up of one part but of many."

Symbiosis is a signature of life on this planet. Coral, the mainstay of the reef ecosystem, is a complex interplay of the coral animal, algal symbionts, and bacterial symbionts. The photosynthesis of the algal symbiont provides the animal with its nutrition. The usable nitrogen in our soil is made by the symbiotic activity of legumes and bacterium. Together, they convert atmospheric nitrogen into the molecules that we can use for protein synthesis. Symbiosis is what permits life on earth[5]. It is now clear that, in addition to the competition that plays its role in fine-tuning what survives, we recognize now that there is an enormous role played by intercellular cooperation and symbiosis between species. Our bodies literally form by “becoming with the other.”[6] In our killer story, we cast bacteria as predatory invaders, causing severe damage or death. Most bacteria, however, are either harmless or actually critical for normal health and longevity.

**IV. Retelling the Life Story: Shalom and Rachamim**

Humanity is dying for new stories, life stories, that more accurately reflect life-giving processes of harmonious co-existence. The old stories of competition must be re-incorporated into the larger carrier bag narrative of symbiosis and reciprocal interactions. The Hebrew word “shalom” expresses the values of the carrier bag narrative.

Often translated as “peace,” shalom means a great deal more. Somehow, shalom and peace have come to be interpreted as the opposite of war, an interlude of placid life between the interesting, history-making, and glory-making times of conflict. The concept of Shalom goes beyond this limited view of peace. Shalom comes from the root *sh-l-m* – meaning to be in proper relationship, also connoting friendly reciprocity. Similarly, the Arabic word *salaam* also connotes being safe, secure, and forgiven, among other things.

Making war is simple and easy. It’s “us” against “them.” All the parts of the whole sacrifice their own goals and work together for the common good. We wear uniforms to show our union in common cause; and our place in the hierarchy is not something constantly negotiated. We wear it on our sleeves and shoulders. In contrast, sustaining peace requires negotiation, equalizing, and mutual planning to keep the parts together and in respectful interaction. It is the never completed process of what theologian Catherine Keller has called “respectful agonism.” Peace is actually the active state, and war the default. Negotiation and prevention are difficult and take enormous amounts of humility, patience and creativity. War is easy by comparison. War is the absence of negotiations.

The “killer story,” the “prick tale” makes the narrative of conflict superior to that of negotiation. “Happy families are all alike,” wrote the Christian anarchist Count Tolstoy, “every unhappy family is unhappy in its own way.” Actually, unhappy families seem to have the same sad stories. What is amazing is that out of precarities of existence, out of the uncountable

calamities that can befall families, some happy families do exist. How did they escape ruin? How did they negotiate a harmonious, mutually supportive, organism out of parts that had their own agendas? These are the stories worth telling.

The Hebrew Scripture's concept of shalom has been famously summarized by theologian Cornelius Plantinga[7]: "The webbing together of God, humans, and all creation in justice, fulfillment, and delight is what the Hebrew prophets call shalom. We call it peace but it means far more than mere peace of mind or a cease-fire between enemies. In the Bible, shalom means universal flourishing, wholeness and delight..." The absence of conflict is only a pre-condition for the active integration that is Shalom. Shalom is close to conditions one sees in a living, thriving organism—an active dynamic exchange between parts to keep the whole healthy and functioning.

Within this structure of *shalom* comes the notion of *rachamim*. Often translated as "mercy" or "compassion," this term comes neither from pity nor suffering. *Rachamim* is from the Hebrew root *r-ch-m*, the root of the word *rechem*, meaning "womb," that most amazing carrier bag of all. Not only is the womb the bag in which the drama of embryonic life takes place, the womb interacts with the fetus to create the placenta. Thus, a new organ is constructed by the mutual collaboration of two organisms. This is how things get done. The uterus, with its placenta, supports, nourishes, and protects the embryo as it matures into a fetus that is ready to be born. The fetus does not need functional lungs, a functional mouth, or a functional anus. Those functions are being taken care of by the mother through the placenta that formed in her uterus.

What does it mean for God to be "rechem" and to require that we be "rachem"? While it certainly means that we are to interact with other life to help mature and sustain it, new research has found a new, unexpected, manner for how the womb works. It can turn deadly foes into supportive companions. Obstetricians know that the greatest enemy to pregnancy is inflammation. If the uterus gets inflamed, the fetus is expelled. However, recent studies have shown that the embryo actually *induces* inflammation as it touches the uterine lining. And this inflammation is necessary for the embryo to implant into the uterus. Inflammation makes the uterine tissue pliable, able to receive the embryo, and it opens up the blood vessels to allow the incoming embryo to be nourished.

The uterus accomplishes this conversion of inflammation from foe to friend by inducing another enemy to become an ally. There are cells inside the uterus called "Natural Killer" cells. They earned this gory name by their being able to attack foreign cells without needing to be trained. This is dangerous to the embryo, which is a body foreign to the mother, since it contains proteins made by the father's genes as well as those from the mother's genes. So one would expect the embryo to be attacked and killed by the Natural Killer cells, as well as by antibodies made against the foreign proteins by B-cells. But the uterine decidual cells are ready for them. They secrete chemicals that turn the immature Natural Killer cells into particular "uterine Natural Killer cells" that prevent other immune cells (such as the B-cells) from attacking the embryo. The uterine Natural Killer cells have become a protectors of the

embryo. Moreover, these uterine Natural Killer cells produces chemicals that block the amplification of the inflammatory response. The uterine inflammation is enough to get the embryo settled, but not enough to kill it.[8] The uterus converts weapons of destruction--the inflammatory response and Natural Killer cells--into collaborators that aid in implanting the embryo. The uterus, rechem, converts swords into plowshares.

Humanity can learn from the embryo -- it is all about forming community, and having different cells take on different functions through negotiation and reciprocity. It is the integration of competition within the confines of making a new whole. The body is a team of cells, some from the zygote and some from other kingdoms of nature. And just like “making the team” in sports, there is some competition of parts to generate the combination that can cooperate together. In the new life story, shalom is an actively acquired, highly valued state. Shalom is the state of a healthy body, its parts in constant negotiation with the others, both cooperating and competing, maturing each other through constant interactions.

“We are not survival of the fittest, we are survival of the nurtured,” wrote social psychologist Louis Cozolino. Indeed, anthropologists see *Homo sapiens* not only as a competitor amongst other hominids, but also as a species that thrived through cooperative parenting and mutual support. In this view of life, a view from the body, where we understand that "we become with the other," we are able to see new modes of relationship between us and the world we live in.

**V. New Modes of Relationship Building**

This new perspective can promote new modes of relationship building. Is it possible that this scientific view of life's wonder could make our culture less violent? We are not merely "killer apes" made from "selfish genes." Those incomplete and socially skewed stories are not scientifically valid. Rather, this new biology supports our response of awe, a response that has been diminished by seeing life as mere competition. We are miraculous, we are wonderfully and fearfully made, as is every species. So how can we continue to permit such miracles to suffer? If stories serve as models or as frameworks for our social agreements, then it is time to adopt and highlight scientific narratives that promote life, worldviews that recognize our one interdependent planetary environment and emphasize caring for others. For our own maturation as responsible members in a world of interbeing and becoming, we would be wise to choose the life stories that would move us into new standards of relatedness.

This view that allows science to express awe and that promotes relationships over the combative, individualistic, and selfish view of life is also a perspective where science and religion can become allies; for this is a worldview of relationships that is often promoted by religions.[9] It is one of the central themes of Buddhism that any phenomenon comes into being (be-comes) only because of the coming into existence of other phenomena in a network of mutual cause and effect. The Jewish theologian Martin Buber wrote, "In the beginning was the relationship." Now, these respectful I-Thou relationships are being

expanded from those relationships between humans to our relationships with all the natural world. Pope Francis' encyclical *Laudato Si'* is one such document concerning how to establish such relationships. Becoming with others is at the root of the African notion of Ubuntu and with many indigenous American ecological and spiritual traditions. Such views of life, remarks James Tully[10] are "neither altruistic not egoistic, for that debilitating distinction rests on the presupposition that organisms are independent and self-sufficient to begin with." Science and religion are finding common ground at a time when they need to become allies if they are to preserve the world and to preserve the wonder that gave rise to both of them.

**Notes**

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## ABOUT THE AUTHORS

.O Love is the pseudonym of an African-American Quaker leader, community activist, and spiritual doula in Philadelphia. Her ministry was recognized by the Central Philadelphia Monthly Meeting in 2017: “Love and Respect Transform: A ministry of deepening our understanding and experience of alternatives to violence” is observed through the principles of healing by exploring the transformational power of Love. Neighboring Philadelphia communities is where she addresses issues pertaining to environmental racism, classism, addiction, negative thought systems, and the impact of internalized oppression. She is a maturing leader and founding mother of two environmental justice organizations in the city: Serenity Soular and Philly Thrive, and she serves as a healing justice facilitator for the organization POWER an interfaith organization committed to building communities of opportunity that work for all. She has over 30 years of facilitating small group/break-out sessions and is skilled at using theater to address difficult social issues. .O is the recipient of the 2014 Leeway Transformation Award as a Solo Performance Artist for her social change work in North Philadelphia. The Leeway Award for social change concerns art with a vision that alters how we think about ourselves, our society, or our culture. In 2019, she received the Shepherd of Peace Prize from the Good Shepherd Mediation Program.

Ms. Susan Curry is a community organizer, educator, and environmental activist. Awards include Earth Charter Summits Leadership, Philadelphia Clean Water Fund Citizen Activist, Sustainable Living Leader, and Volunteer of the Year. She retired from a 29-year career directing a national non-profit where mathematicians remarkably taught algebra to 2nd through 6th grade inner-city “disadvantaged” students. Since “retiring,” she has served as President of the Alliance for a Sustainable Future, founded an organic farm that now feeds more than 400 families, organized community plantings of more than 900 trees, installed more than 30 rain gardens, and edited a newsletter to reduce lawn chemicals. Her Master’s degree paper “Toward Sustainability Consciousness,” was inspired by early sustainability thinkers: Lester Brown, Mathis Wackernagel, Paul Hawken, and The Natural Step. She reported on stages of consciousness beyond the “conventional/conformity” stage that most adults settle into, and what factors move a person to a higher stage. Her spiritual lineage includes Thomas Berry, Integral Enlightenment, Craig Hamilton, Jeff Carreira, Adyashanti, Thomas Hubl, Rupert Spira, Pir Zia Inyaht, and Tara Brach. Her new passion is interspecies communication. Susan met .O at a Joanna Macy workshop 20 years ago.

Dr. Scott F. Gilbert is an embryologist, author, and teacher. He is the Howard A. Schneiderman Professor of Biology (*emeritus*) at Swarthmore College, where he taught developmental genetics and embryology for 35 years. He is also a Finland Distinguished Professor (emeritus) at the University of Helsinki. He currently has three books in print: *Developmental Biology* (a textbook in its twelfth edition), *Fear, Wonder, and Science* (a volume on reproductive biotechnology), and *Ecological Developmental Biology*, a textbook that discusses the relationship between the developing organism and its environment. Scott also has a degree in the history of science from the Johns Hopkins University, where he was a student of Donna Haraway. He is a member of the American Association for the Advancement of Science and has been awarded the Viktor Hamburger Prize in Developmental Biology, the Kowalevsky Medal in Evolutionary Developmental Biology, and the Service Award from the Pan-American Society for Evolutionary Developmental Biology.

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