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Chapter 7

We Are Now Entering the Noosphere

2009 was the year of Darwin, the 200th anniversary of his birth and the 150th anniversary of the publication of the *Origin of Species*. The whole world celebrated and not just because of the round numbers. Abraham Lincoln was born on the exact same year and day as Darwin, but his round number was not celebrated nearly as much, even in America. Instead, the Darwin celebrations reflected a dawning awareness that evolution matters more than most people think. We need evolutionary theory to understand the world around us. Not just nature, but the nature of humanity. Not just academic understanding, but practical understanding that can help to solve some of the most pressing problems of our age. Call it a great awakening.

As someone who was already trying to change the way the planet thinks about evolution, I was becoming more popular than an Irish band on Saint Patrick's Day. And I found the offers hard to resist. As Alfred P. Doolittle told Henry Higgins in *My Fair Lady*, "I'm willing to tell you! I'm wanting to tell you! I'm waiting to tell you!"

Before I knew it, I had accepted 30 invitations, a veritable World Tour, including five different trips overseas in addition to around the United States. One workshop titled "Do Institutions Evolve?" would be held at a villa in the hills of Tuscany just outside Florence, Italy. What person in their right mind would refuse an invitation like that? Another workshop titled "Why aren't the Social Sciences Darwinian?" was scheduled for May in Cambridge, England, where Darwin went to college. In July, the entire city of Cambridge was celebrating Darwin with a five-day festival, including two forums on

religion that I couldn't resist. I would even be able to visit Darwin's dorm room, which had been recreated as if he might return at any minute!

Anne, my evolutionist wife who works as hard as I do, was not amused. How exactly was I going to fit 30 trips into my already busy schedule, not to speak of the turbulence that it would create in our shared life? How would I teach my courses and carry out my other faculty duties? How would I manage hosting the ten speakers per semester that come through Binghamton in our EvoS seminar series? How would I pay attention to my graduate students? One of them was already fond of saying that I had a supply of Batman smoke bombs that I threw down to disappear. How about our semblance of a home life, including our big vegetable garden? Would I be around to help start the seedlings in April and transplant them in May? Even I ached at the thought that my visits to our tree house and property would become less frequent and that the Binghamton Neighborhood Project might suffer. Anne started to rib me by calling me "Your Darwiness". I protested that she should be glad that I'm trying to change the way the planet thinks about evolution, that I was flattered that she wanted me around, but wasn't life easier in some respects when I was away? No, she replied, it was hard to adjust to the constant coming and going. As the saloon girl in the movie *Blazing Saddles* sang about men, "They're always coming and going and going and coming and always too soon."

Of all the trips that I couldn't refuse, two were especially enticing. The first was a small workshop organized by the John Templeton Foundation, which has almost single-handedly funded research on science in relation to religion and other "big questions", as they put it on their website. The workshop was titled "*Homo symbolicus*: The Dawn of Language, Imagination, and Spirituality". It would be held in late January at Cape Town, South Africa, and would include a field trip to the Blombos Cave on the coast of the Indian Ocean, where some of the earliest evidence for the dawn of culture in our species—from approximately 100 thousand years ago—has been excavated.

The second event was a five day conference titled "Biological Evolution: Facts and Theories" organized by the Vatican, to be held at the Pontifical Gregorian University in Rome during early March. The Vatican was using the year of Darwin to conduct a thorough review of evolutionary theory in relation to Catholic theology and had invited an A-list of evolutionists to help them out. I was privileged to be among them.

These two events were irresistible by themselves but doubly so when considered together. In the space of three months, I would trace the 100-thousand year human journey from the first shell beads and lines etched in stone on the southern tip of Africa to one of the greatest inflorescences of modern human culture, the Catholic Church in Rome. Even though I would be leaving my city of Binghamton, the journey I would be tracing was highly relevant to the Binghamton Neighborhood Project. Cities exist—as does our hope for improving them—thanks only to our capacity for the rapid behavioral change that we call culture.

Someone before me had traced the same route in the opposite direction. Pierre Teilhard de Chardin (1881-1955) was a Jesuit priest and paleontologist during a time when science was regarded as a suitable path to God. He was part of the team that discovered Peking Man, one of the first missing links connecting *Homo sapiens* to the apes, which was an international sensation in 1929 and today is classified as the extinct hominid species *Homo erectus*. He did most of his work in China but also visited South Africa to consult with colleagues such as Raymond Dart, who discovered an earlier missing link that became named *Australopithecus africanus*. Teilhard's best known work is *The Phenomenon of Man*, written in 1940 and published shortly after his death in 1959. The introduction by Sir Julian Huxley, one of the greatest evolutionists of his day

and grandson of Thomas "Darwin's bulldog" Huxley, indicates the respect that Teilhard commanded among scientists. The most remarkable thing about *The Phenomenon of Man*, however, is its spiritual quality. Teilhard claimed to provide a 100% scientific account of humanity in a way that affirmed and strengthened, rather than threatening, his religious faith. He liberally used words such as "spirit" and "soul" and ended his book with these words: "…even in the view of a mere biologist, the human epic resembles nothing so much as the way of the Cross."

Today, Teilhard is read almost exclusively for his spiritual quality. He has been forgotten by scientists and is virtually never mentioned in current discussions of evolution in relation to human affairs. Most of my colleagues would be embarrassed to discuss the spiritual side of Teilhard, as if there is something wrong with mixing spirituality and science. In part, this is because almost everyone today has become cynical about the prospects for improving the human condition and especially the role of science in the enterprise.

Sir Julian Huxley, in contrast, was a passionate humanist who felt that mankind must take charge of its own destiny. His many books include titles such as *Religion without Revelation* (1927,1979), *Evolutionary Ethics* (1943), and *Essays of a Humanist* (1964), in addition to *Evolution: The Modern Synthesis* (1942/2010), which literally defined the field of evolutionary biology for the ensuing decades. Here are two passages from Huxley's humanistic work.

> There is no separate supernatural realm: all phenomena are part of one natural process of evolution. There is no basic cleavage between science and religion…I believe that [a] drastic reorganization of our pattern of religious thought is now becoming necessary, from a god-centered to an evolutionary-centered pattern.

> Many people assert that this abandonment of the god hypothesis means the abandonment of all religion and all moral sanctions. This is simply not true. But it does mean, once our relief at jettisoning an outdated piece of ideological furniture is over, that we must construct something to take its place."

No wonder that Huxley praised Teilhard's own grand vision in *The Phenomenon of Man*, even though Teilhard would certainly disagree with the notion of his Catholic faith as an outdated piece of ideological furniture!

How on earth did this kind of expansive optimism lead to the cynicism and limited expectations of today? Why have Teilhard and the humanistic side of Huxley been forgotten by professional evolutionists, who continue to celebrate Huxley as one of the fathers of the modern synthesis? A large part of the answer is contained in this third quote from Huxley, written in 1941:

> The lowest strata are reproducing too fast. Therefore…they must not have too easy access to relief or hospital treatment lest the removal of the last check on natural selection should make it too easy for children to be produced or to survive; long unemployment should be a ground for sterilization.

This passage sounds horrifying to most of us today, certainly to myself. Even more horrifying is the fact that Huxley had lots of company. It was acceptable at that time for passionate humanists such as Huxley to argue that mankind should take charge of its destiny in this particular way. More horrifying still, their talk was not idle and led to social policies on both sides of the Atlantic that can only be looked back upon with shame.

Thus, Huxley and his compatriots were largely responsible for their own demise. Their vision became a pariah concept known as Social Darwinism. Against this background, we can begin to appreciate why Darwin's theory applied to humanity was not a matter of smooth, continuous progress; why it became restricted to the biological sciences; why most people interested in human-related subjects wanted nothing to do with it; why most evolutionists were willing to respect the boundary by concentrating on the birds and bees, leaving human improvement to others; why a fresh look at evolution in relation to human affairs didn't gather steam until late in the 20th century—and why only now is the rest of the world prepared to take notice during the year of Darwin.

When I decided to actually read *The Phenomenon of Man* in preparation for the Vatican conference, I thought that I was paying my dues as a good scholar but that I was unlikely to find much of contemporary interest. I was wrong. Once I grew used to Teilhard's vocabulary (example: Noosphere) and compressed sentences (example: "The consciousness of each of us is evolution looking at itself and reflecting upon itself"), I read the entire section of the book on humans in a single sitting. I was able to do this for only one reason: Just as a chord played on one instrument causes the corresponding strings of a nearby instrument to vibrate, what Teilhard was saying resonated with my own understanding of the human evolutionary story with little need for alteration. In some respects, he seemed to be still ahead of his time, for his science in addition to his spirituality, and I am happy to convey his message. Buckle your seatbelt—we are about to enter the Noosphere.

One of the best ways of conveying the true nature of science is by telling the stories of scientists—be they working with the BNP or Teilhard—and Teilhard's story rivals Darwin's in its panoramic scope. Like Darwin, Teilhard was born into an affluent

family and reveled in natural history as a boy. The family estate was located in the French province of Auvergne, which offered abundant wildlife, and Teilhard's father was an avid natural historian. Teilhard also exhibited a spiritual and mystical streak from an early age that he attributed to his mother. At the same time that Teilhard was collecting pebbles and rocks as a little boy, he was also pondering the frailty of life. Life was indeed frail in those days, even for the affluent. Political instabilities threatened old social orders and diseases could strike anyone down, including several of Teilhard's own siblings during his lifetime.

It was natural for such a studious and pious lad to become a Jesuit priest, and it was natural at the time for the Jesuits to regard science as a legitimate pathway to God. Teilhard's Jesuit training took him to first to England and then to Egypt, where fossil shark teeth were intermixed with the artifacts of an ancient civilization. From Egypt he returned to England, where he began to ponder evolution not only through his naturalistic pursuits, but also through philosophical tracts such as Henri Bergson's *Creative Evolution*. From the beginning, Teilhard was reaching for a concept of evolution that would explain the totality of experience, the natural *and* the spiritual. He was following in the footsteps of philosophers such as Bergson, but his path was leading him toward conflict with his own church. When the liberal Pope Leo XIII was succeeded by the more conservative Pope Pius X, Bergson's *Creative Evolution* was placed on the Vatican's *Index of Forbidden Works*.

After his ordination in 1911, Teilhard trained to become a fully professional geologist and paleontologist, earning his doctorate from the Sorbonne in 1922, but first he had to endure the horror of World War I as a stretcher bearer. Once again he was voyaging to far off locations such as North Africa, only this time as a helpless observer of a clash of modern civilizations. Throughout the war he risked his life to carry the wounded and dead off the battlefields, for which he was awarded the medal of the Legion of Honor in 1921.

Here is an excerpt from a letter written by Tielhard during the war, explaining the paradoxical fact that wounded soldiers often want nothing more than to return to the front.

> The front cannot but attract us because it is, in one way, the extreme boundary between what one is already aware of, and what is still in the process of formation. Not only does one see there things that you experience nowhere else, but one also sees emerge from within one an underlying stream of clarity, energy, and freedom that is to be found hardly anywhere else in ordinary life and the new form that the soul then takes on is that of the individual living the quasi-collective life of all men, fulfilling a function far higher than that of the individual, and becoming fully conscious of this new state. It goes without saying that at the front you no longer look on things in the same way as you do in the rear; if you did, the sights you see and the life you lead would be more than you could bear. This exaltation is accompanied by a certain pain. Nevertheless, it is indeed an exaltation. And that's why one likes the front in spite of everything, and misses it.

Teilhard was writing neither as a scientist nor a priest in this passage, but merely as an acute observer. His ability to see beyond the individual and to use a word such as "soul" in a way that has nothing to do with supernatural agency would become a hallmark of his scientific worldview.

Teilhard took his final vows in 1918 but his writing from the battlefield was already beginning to trouble his Jesuit superiors. Teilhard was convinced that he saw a deeper truth behind current Catholic dogma. Remaining true to his religion required becoming heterodox. Moreover, his growing reputation in the world of science and his

eloquence as a writer were causing him to be heard. Even young Jesuits were eager to learn his strange new creed. Teilhard had a quality that pulled people toward him, like iron filings to a magnet.

But Teilhard was supposed to be obedient to his Jesuit Order, which in turn was supposed to be obedient to the Vatican. Science was viewed as a legitimate path to God but some paths had locked gates, especially when they seemed to challenge sacred doctrines such as original sin. To make matters more difficult for Teilhard, what counted as acceptable varied with the Papal administration. Just as a piece of legislation might sail through a liberal political administration but become doomed when conservatives come into power, Teilhard might be allowed to work and write as he wished under one Pope but become ominously censured under another. The Vatican required permission for every major decision, such as publishing a paper, attending a conference, or joining an expedition. Previously published work might come to the attention of a zealous conservative faction, eager to make an example of him, at any time. Throughout his life, Teilhard struggled to remain an obedient servant of his church without sacrificing his scientific integrity or spiritual vision that he was convinced was truer to the church than the dogma forced upon him.

To limit his influence, the church sent him to China as a kind of intellectual Siberia, as far from the centers of Western science as possible. But by banishing him from the centers of existing science, they unwittingly placed him in the middle of the action with respect to new science. As Teilhard traversed the vast Asian continent on his collecting expeditions, he observed geology, nature, and culture at a scale rivaling Darwin's voyage around the world on the Beagle. Even better, Teilhard combined all of this with his vast knowledge of Catholic theology and a personal spiritual quality so strong that it was hardened, rather than broken, by the cataclysm of World War I, personal tragedies such as the death of his beloved siblings, and his status as heretic within his own church.

Much as Darwin became famous among scientists on the basis of what he accomplished on the Beagle, Teilhard's international reputation among scientists grew from his exile in China, the exact opposite of what the Church intended. The discovery of Peking Man created a sensation and allowed Teilhard to ponder the mystery of human origins more deeply than ever before. Although only one skull was unearthed, the cultural remains of Peking Man were more plentiful, mingling with the fossils of extinct animals among the still more ancient rocks.

Teilhard resisted what must have been an extreme temptation to leave the church, which forced him to sign a statement repudiating his ideas on original sin (ironically, during the same week that the Scopes monkey trial began in America), refused to let him accept a professorship at the Sorbonne that would have been the zenith of his academic career, refused to let him publish his spiritual work for his entire life, and even refused to let him spend his final years in France. Teilhard died in America and is buried in a quiet spot in the Hudson River valley, only a few hours from Binghamton. His final quiet act of rebellion was to place his unpublished manuscripts in the hands of friends and beyond the reach of the mighty hand of the church.

When *The Phenomenon of Man* was published in 1959, Teilhard's spiritual and scientific flames could at last burn brightly together. Then his scientific flame began to wane and ultimately flickered out. Science has no central hierarchy, no capacity to exile its members, to force them to sign confessions, or to censure publications that challenge dogma—except, perhaps, when the dogma is so widespread that a centralized authority isn't needed! Ironically, whatever happened in a decentralized fashion to silence Teilhard among scientists was more effective than the centralized efforts to silence Teilhard within the church.

Like Darwin, Teilhard's worldview was suffused with the immensity of time and space. A photograph from one of Teilhard's expeditions shows an arid landscape in northwestern China that seems almost without life, with barren mountains thrusting out of the earth's crust, decomposing into sand filling the valley below. Since Teilhard, like Darwin, was trained in geology in addition to zoology, he had a deep appreciation of the purely physical forces that shaped the surface of the earth for billions of years before the first spark of life.

Teilhard was not the slightest bit tempted to attribute supernatural agency to the origin of life, despite his spiritual nature and Jesuit training. He assumed that life was a purely physical process, but one that was qualitatively different from what came before. He used the metaphor of water completely changing its properties when it is brought to a boil. With life came a new kind of diversity in the thousands of species adapting to their environments. Seen in the immensity of time and space, living creatures spread over the surface of the planet and formed a kind of a skin, as Teilhard put it. Most places on earth are not like the barren landscape in the photograph; they are cloaked in vegetation rooted in soil that includes the remains of past life mixed with the physical earth. Current life drinks from an atmosphere conditioned by past life. The word "biosphere" had already been coined to describe the influence of life on the planet earth and Teilhard adopted the term with pleasure.

Now for Teilhard's own contribution. He asks the reader to imagine excavating layers of soil. Deep down there is only the physical earth. Closer to the surface, organic materials begin to appear. Then, still closer to the surface, human artifacts start to appear. At first they are barely present, such as flakes of stones chipped from rocks to make tools. Then they come more abundant. In the immensity of space and time, the artifacts of human activity spread over the surface of the planet and form a kind of a skin, like the skin of life that proceeded it. A word is needed for the human skin. The noosphere.

Now for an exceptional act of brilliance. Teilhard did not view humans as merely a highly successful species. He imagined humanity as a new evolutionary process, capable of generating a diversity of cultural forms, just as life is capable of generating a diversity of organic forms. That makes the origin of our species as momentous, in its own way, as the origin of life.

As with the origin of life, Teilhard was not the slightest bit tempted to attribute human origins to a divine spark. "Man came silently into the world", as he put it, a species like any other. A chance combination of biological adaptations led to the metamorphosis. The convergence might have been serendipitous, even highly improbable, but once accomplished it literally took on a life of its own. The term noosphere therefore has two meanings; the physical skin of the human presence on earth and the new process of evolution that Teilhard loosely referred to as "thought".

The new process necessarily relied upon different mechanisms than biological evolution but its outcome was essentially the same. Teilhard was adamant that *human cultural diversity is like biological diversity*. He asked the reader to imagine the biological tree of life branching over a period of hundreds of millions of years. Then one of its tips becomes a new evolutionary process that starts branching at an incomparably faster rate, overtopping many of the previous branches as human cultures spread over the earth and displaced other species. Teilhard did not pass moral judgment on the replacement of biological diversity with human cultural diversity. His main point was to stress that both biological and cultural diversity obey the same laws of natural history. Culture did not free humanity from evolution. Culture was evolution at warp speed.

Next, Teilhard described the long-term arc of cultural evolution as resulting in coalescence in addition to a diversity of forms. The earliest hunter-gatherer cultures were "grains of thought" that merged with other grains to form ever larger societies. Looking into the future, he envisioned a single global society that he called the Omega Point,

which would also be a form of supreme consciousness--the process of evolution reflecting fully upon itself.

The Templeton Foundation workshop provided a perfect opportunity for me to compare Teilhard's vision with current scientific knowledge about the dawn of culture in our species. In less than a day, I traveled from my city of Binghamton to Cape Town, South Africa, a trip that would have required weeks on shipboard for Teilhard. Templeton Foundation workshops are an intoxicating blend of intellectual and social interactions among people from diverse disciplines, at a pleasant location and punctuated with good food and drink. This one included archeologists, anthropologists, primatologists, linguists, philosophers, and evolutionists such as myself. Two days of conversation were followed by the visit to Blombos cave, located several hundred kilometers from Cape Town on a high bluff overlooking the Indian Ocean. As the cave was being prepared for visitors by Christopher Henshilwood, who heads the archeological team excavating the site, I marveled at the fact that I was sitting on the exact same spot as my distant ancestors, anatomically the same species as myself but just beginning to wear ornaments such as shell beads and using pigments such as ochre. This was the very moment that mankind was transforming from a mere species to a new process of evolution, as Teilhard would have put it.

It was easy to see why the mere species would choose this location, now a nature preserve and almost as wild today as it was back then. The coast was uninhabited as far as I could see in both directions. The sky and sea were a kaleidoscope of blue and white; blue sky, white clouds, blue sea in a dazzling variety of hues, and white froth as the surf crashed against the rocky shore. The cave would have afforded protection against the big predators that were a constant threat to our ancestors but now were removed from the

landscape. Braving the surf would be treacherous, for my ancestors no less than myself, but numerous quiet tide pools were carved in the rocks that teemed with shellfish and beckoned me and my companions to use them as natural jaccuzzis. Furry mammals about the size of woodchucks scurried among the rocks. They are called rock hyraxes and amazingly are more closely related to elephants than to woodchucks. Life is so malleable that the same ancestral species can be molded into forms as different as an elephant and a rock hyrax, depending upon the hammer blows of natural selection. My ancestors certainly enjoyed feasting on rock hyraxes, whose bones are mingled with the fish bones, shells of mollusks, and ashes from the campfires inside the Blombos cave.

Actually, this was not necessarily the scene that my ancestors gazed upon from this spot. During the last 100 thousand years, climate change caused the sea level to drop and the shore to recede so far into the distance that some of my ancestors living during this period would have gazed upon an African savannah rather than the sea. For part of this time, the cave was completely swallowed by a sand dune, only to be exposed again when the changing climate once again brought the sea to the doorstep of the cave. One of my companions directs my attention to the two giant rock formations on the shore that I have been gazing at all along. They are clearly different from each other. One is ancient rock formed during the early history of the earth. The other is sandstone, made from the compressed sand of the dunes that engulfed the cave only seventy thousand years ago. The difference is obvious after it has been pointed out to me, but unlike Darwin and Teilhard, my worldview is not suffused with the vastness of space and time. For me, my physical surroundings seem so solid that they must be eternal. I must stretch my imagination to see them as a point on an arc of continuous change, stretching into the past and future as far as the eye can see, like the uninhabited coastline in front of me.

At last the excavation site within the Blombos Cave is ready to receive visitors. All archeological sites, including the excavation that preceded the construction of the university's downtown building in Binghamton, are handled with extreme care. This one is handled with even more care than usual, as one of a handful of sites that can shed light on the dawn of culture in our species. We are instructed to walk carefully along some planks and down a ladder into a pit with a vertical wall of sand in front of us. The wall reflects the chronology of time. Barring physical disturbance, the lower you go, the earlier the material was deposited inside the cave.

Just as a microtome shaves ultra-thin slices of tissue for inspection, the excavation involves shaving slices of sand from the vertical wall. It is an unbelievably meticulous process, involving cataloging every fragment that might be of possible interest. The current face of the wall is studded with objects that I yearn to identify. This was exactly how Teilhard asked his readers to imagine the physical noosphere; human artifacts beginning to mingle with biological material and the physical matrix of the earth.

Forget about the movie scenes of Indiana Jones entering an ancient temple and yanking the precious object from the grasp of a rotting mummy. Precious objects are jutting from the face of the sand wall but they are waiting for the *next* slice, which might require years! Christopher points out features of interest, including the bones of their food and dark layers of ash from their fires. The two most spectacular finds are shell beads and a block of ochre, a mineral used by indigenous people around the world to make red pigment, with lines etched in a design. Even the most humble objects contain clues to the lives our ancestors, however, and it is surprising how the clues can add up to a convincing story based on clever detective work. Christopher points out a red horizontal line in the wall that indicates the presence of ochre. He speculates that this might have been a spot where the stone was ground to make the pigment, with some of the powder falling onto the cave floor. One member of our group speculates that it might be a leather garment dyed with Ochre that rotted to become the thin red line in the sand. Christopher

is intrigued with this idea, which hadn't occurred to him. It's easy enough to test the hypothesis by analyzing the soil for organic compounds indicative of animal skin. In this fashion, the story of our ancestors at the dawn of culture can be pieced together with more certainty than you might think.

Our current knowledge of the dawn of culture in our species is based not only upon clues from sites such as the Blombos Cave, but from all the scientific disciplines that were represented at the Templeton Foundation workshop. Teilhard would be pleased. Especially pleasing would be the union of two themes that he stressed separately but did not put together: reflection and cooperation.

For Teilhard, the vital spark that transformed us from a mere species to a new evolutionary process is the capacity for *reflection*, which he described this way:

> From our experimental point of view, reflection is, as the word indicates, the power acquired by a consciousness to turn in upon itself, to take possession of itself as of an object endowed with its own particular consistence and value: no longer merely to know, but to know oneself; no longer merely to know, but to know that one knows. By this individualization of himself in the depths of himself, the living element, which heretofore had been spread out and divided over a diffuse circle of perceptions and activities, was constituted for the first time as a centre in the form of a point at which all the impressions and experiences knit themselves together and fuse into a unity that is conscious of its own organization (p. 165).

Teilhard's writing is dense but hypnotic in its precision, poetic while remaining descriptive in a literal sense. We might want to decompress what he is saying, but there is

nothing that is obviously wrong. In fact, contemporary books such as Terrence Deacon's *The Symbolic Species* confirm and elaborate upon Teilhard's densely stated thesis.

The capacity for reflection allows us to imagine new worlds and then step into them, as Teilhard describes in a continuation of the same passage.

> Now the consequences of such a transformation are immense, visible as clearly in nature as any of the facts recorded by physics or astronomy. The being who is the object of his own reflection, in consequence of that very doubling back upon himself, becomes in a flash able to raise himself into a new sphere. In reality, another world is born. Abstraction, logic, reasoned choice and inventions, mathematics, art, calculation of space and time, anxieties and dreams of love—all these activities of inner life are nothing else than the effervescence of the newly-formed centre as it explodes upon itself.

Once again, this is an accurate summary of Terry Deacon's thesis that we are unique in our capacity for symbolic thought, which allows us to create imaginary worlds and then step into them.

It is clear from these passages that Teilhard regarded reflection as an *individual* capacity, similar to his own prodigious capacity for reflection. He also appreciated the importance of groups in passages such as this one:

> Throughout living phyla, at all events among the higher animals where we can follow the process more easily, social development is a process that comes relatively late. It is an achievement of maturity. In man, for reasons closely connected with his power of reflection, this transformation is

> accelerated. As far back as we can meet them, our great-great-ancestors are to be found *in groups* and gathered round the fire (pp. 203-4).

Even in this passage, Teilhard implies that the individual capacity for reflection came first and accelerated social development. The contemporary evolutionist Michael Tomasello developed the same thesis in his book *The Cultural Origins of Human Cognition*, published in 2000. Mike has changed his mind, however, as part of a rapidly growing consensus that *cooperative groups came first*. The human capacity to reflect could not have evolved, and cannot exist in its current form, without trustworthy social partners.

Teilhard himself was a titan of reflection as an individual but he was building upon the ideas of Darwin and hundreds of other thinkers that preceded him. His development was nurtured by both individuals and social institutions. Every expedition that he took required extensive cooperation. His reflections would be useless if he couldn't transmit them, requiring more cooperation. The failure of his church to cooperate almost put an end to his reflection. Teilhard was not an individual. He was a node in a vast system of cooperation, including his immediate social partners and his culture, which had become structured over a period of centuries to facilitate the cultural practices that we call science. As a thought experiment, imagine that Teilhard had been given plenty of food, water, and affection as a boy but no access to any intellectual resources whatsoever. If he could write *The Phenomenon of Man* under those conditions, that would be individual reflection.

As for modern reflection, so also for its rudiments in our ancestors. Our closest living relatives—chimps, bonobos, gorillas, orangutans, and gibbons, are extremely smart, but their particular form of intelligence is predicated on the fact that they can't necessarily trust their neighbor. Male chimps cooperate to hunt for food or patrol their territory, but they also are obsessed with achieving social dominance within their group.

Female chimps also compete with each other to monopolize the best resources for themselves and their kin within the group. A baby chimp can't leave its mother to play with the other chimps; it might get beaten up or killed.

Modern human social life can get this dysfunctional. Think of arms races among superpowers, blood feuds in tribal societies, and bitter political disputes in which the only thing that matters is to beat one's opponent. The kind of reflection that Teilhard had in mind comes to a screeching halt under these conditions, no matter how smart people remain in other respects. For reflection to get started in the first place, there had to be an atmosphere of trust.

That atmosphere was not created by everyone suddenly becoming nice, but by the ability to easily thwart the ambitions of others. My evolutionist colleague Christopher Boehm calls this "reverse dominance" in his book *Hierarchy in the Forest*. In a typical primate dominance hierarchy, the meanest individual or coalition manages to intimidate the others and monopolize the resources. In a typical small-scale human group, including hunter-gatherer societies around the world, the meanest individuals and coalitions are ridiculed, punished, expelled or even executed unless they change their ways and fit in with the rest of the group. We are an aggressively egalitarian species and our passion for equality is manifested whenever we exist in small groups with a relatively even balance of power among the members.

Equality is the requirement for a major transition, as we learned from the parable of the wasp. As soon as individuals could no longer succeed at the expense of their neighbors, collective survival and reproduction became the primary means of natural selection. Only then could our ancestors begin to freely share what they learned, develop an inventory of symbols with shared meaning, and otherwise make the transition from just another species with a fixed repertoire of behaviors to an open-ended evolutionary process.

Seeing cooperation as a precondition for reflection and reflection as a form of cooperation fits Teilhard's broad vision even better than reflection as an individual capacity that came first. After all, Teilhard thought that reflection *becomes* a kind of distributed consciousness at the Omega Point. Now we can say that it *begins* as a form of distributed consciousness at the scale of very small groups.

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As I compare the *Phenomenon of Man* with current scientific knowledge, I am struck by how often Teilhard gets it right and in some respects is still ahead of his time. Inside and outside the Ivory Tower, there are two major conceptions of human nature that are both wrong in their own way. The first is to regard ourselves as exclusively the product of genetic evolution, giving us a fixed nature that cannot change except by future genetic evolution. This is the specter of genetic determinism that so many people find threatening because it implies an incapacity for change. It is profoundly wrong to the extent that human mentality and culture also count as evolutionary processes, capable of producing new forms that never existed in the past. Many of my evolutionist colleagues still think primarily in terms of genetic evolution. Those who fully appreciate the import of the statement "there is more to evolution than genetic evolution" are still in the minority. Teilhard was way ahead of his time when he described humanity as a phylum of diverse and rapidly evolving psychological and cultural forms, while remaining a single biological species.

The other major conception of human nature that is wrong in its own way is to suppose that evolution explains our physical bodies and a few basic instincts but has nothing to say about our rich behavioral and cultural diversity. In contrast, Teilhard insisted again and again that humanity was still bound by the rules of evolution, as in this passage:

> There is no need for me to emphasize the reality, diversity and continual germination of human collective unities, at any rate potentially divergent; such as the birth, multiplication and evolution of nations, states and civilizations. We see the spectacle on every hand, its vicissitudes fill the annals of the peoples. But there is one thing that must not be forgotten if we want to enter into and appreciate the drama. However hominised the events, the history of mankind in this rationalized form really does prolong—though in its own way and degree—the organic movements of life. It is *still* natural history through the phenomena of social ramification that it relates (208).

In other words, *human cultural diversity is fundamentally like biological diversity*, a statement that I made at the beginning of this book as the essence of the evolutionary paradigm. It will be a great day in the future when everyone follows Teilhard's lead by avoiding both the error of genetic determinism and the error of regarding culture as a liberation from evolution.

Teilhard was also right about the speed of cultural evolution and the coalescence of cultures at ever-larger scales. He appreciated the importance of path dependence in cultural evolution—the fact that you can't always get there from here—which I emphasized for genetic evolution in my parable of the wasp. He even anticipated Jared Diamond's magnificent book *Guns, Germs, and Steel* by observing that European culture was capable of more rapid evolution than traditional Chinese culture. It is wrong for Teilhard to be read only for his spiritual message. Let his scientific flame burn brightly again!

And what about his spiritual message? How could Teilhard remain so strong in his Christian faith without requiring a God interested in the affairs of people or even a single divine spark anywhere in his entire story? Because he regarded Christianity as the leading edge of cultural coalescence, not in the sense of conquest, but in the sense of expanding the human capacity for love. The following passage toward the end of *The Phenomenon of Man* helped me to prepare for my own journey from the Blombos cave in January to the Vatican in March.

> It is relatively easy to build up a theory of the world. But it is beyond the powers of an individual to provoke artificially the birth of a religion. Plato, Spinoza and Hegel were able to elaborate views which compete in amplitude with the perspectives of the Incarnation. Yet none of these metaphysical systems advanced beyond the limits of an ideology. Each in turn has perhaps brought light to men's minds, but without ever succeeding in begetting life. What to the eyes of a 'naturalist' comprises the importance and the enigma of the Christian phenomenon is its existence-value and reality-value.

In other words, religions *live* in a way that philosophies don't. They are cultural life forms that grow, replicate, and adapt on their own, which makes them *more real*. Teilhard continues:

> Christianity is in the first place real by virtue of the spontaneous amplitude of the movement it has managed to create in mankind. It addresses itself to every man and to every class of man, and from the start it took its place as one of the most vigorous and fruitful currents the

> noosphere has ever known. Whether we adhere to it or break off from it, we are surely obliged to admit that its stamp and its enduring influence are apparent in every corner of the earth today.
>
> It is doubtless a quantitative value of life if measured by its radius of action; but it is still more a qualitative value which expresses itself—like all biological progress—by the appearance of a specifically new state of consciousness.
>
> I am thinking here of Christian love.

By the time the Vatican conference rolled around, the year of Darwin was killing me. I returned from each trip to frantically catch up on my work, only to leave for the next trip further behind. Maintaining a semblance of order at home requires both Anne and I at the best of times. Now the accumulating mail began to resemble snowdrifts and the dust bunnies under the bed grew so large that Anne started to call them wooly mammoths. She was tolerant but didn't spare her "I told you so" look at choice moments. Plane flights became precious opportunities to work. I wouldn't try to sleep on a transatlantic flight, just doze long enough to continue work.

I therefore arrived at the Rome airport punchy with fatigue and didn't appreciate where I was until the taxi passed the Coliseum on the way to my hotel. My jaw dropped open, as if I was a country bumpkin. Everyone has heard of the Coliseum but I was overwhelmed by its size. This was the place that held 50,000 spectators, that was flooded to hold mock navel battles, where people and animals were killed by the thousands as a form of entertainment, including the early Christians, who really were fed to the lions! Right next to the Coliseum was the Arch of Constantine, the Roman Emperor who converted to Christianity and attributed his military successes to the protection of the Christian God. Never mind that Jesus preached to turn the other cheek.

The conference was held at the Pontifical Gregorian University in downtown Rome, founded over 450 years ago by the Jesuits, Teilhard's order. It was organized at the highest level and the speakers were actually scheduled to meet the Pope, although that event had to be cancelled at the last minute. Many of the people attending the conference wore religious vestments signifying their order and rank within their order. To me, they looked as exotic as Obi-Wan Kenobi from *Star Wars*. Sprinkled among them were my own evolutionist colleagues—lots of them—since this conference was going to include five whole days worth of talks. When the Vatican decides to evaluate evolutionary theory, it goes all the way.

During one of the intermissions in the cavernous hall outside the auditorium, I was surprised to be approached by a young man in the ankle length robe of a student priest who spoke with an American accent and was from Binghamton, New York! Then a German Priest named Emerich Sumser introduced himself to say that he had read and enjoyed my book *Darwin's Cathedral* as part of his doctoral dissertation. In neither case should I have been surprised. Of course student priests come to Rome from around the world for training, including my city of Binghamton, and Catholic priests are among the best scholars and scientists in the world, as we saw in the case of Teilhard.

Yet, I was also surprised when one of my evolutionist colleagues who is also a knowledgeable catholic pointed out a Cardinal, or a "red hat" as he called him, in the audience.

"Do you know who that is?"

No, I replied dumbly.

"That's the head of the Congregation for the Doctrine of the Faith. Do you know what that used to be called?"

No, I replied dumbly.

"The Holy Office. Do you know what that used to be called?"

No, I replied dumbly.

"*The Inquisition*."

Whoa! I was impressed. The church was still keeping a watchful eye on scientific inquiry, blocking some paths and allowing access to others, just as in the days of Teilhard. The amazing thing about Teilhard was that he could retain his idealism about Christian love, which he would describe as the soul of his church, despite a lifetime battling its bureaucracy. He referred to his final futile trip to Rome to seek permission to publish his work as "stroking the whiskers of the tiger."

The conference began with the nitty gritty facts of biological evolution—paleontological evidence, molecular evidence, speciation, development, complexity. Lynn Margulis was there to talk about her symbiotic cell theory, the prequel to the parable of the wasp. Then attention was focused on the origin and evolution of our species, including cultural evolution. The last two days were devoted to philosophical and theological implications of evolution, with talks by scholars and theologians from the Vatican and Gregorian in addition to my evolutionist brethren. Translators were present to translate Italian into English and English into Italian through earphones that could be obtained in the lobby.

In my own talk, I gave a whirlwind tour of major transitions—when evolution goes the way of the wasp—and its implications for human biological and cultural evolution. I ended with a discussion of religion as a product of evolution and the current relevance of Teilhard's ideas. I said that Teilhard got a lot of things right, as I have related in this chapter, but that he got one thing wrong, which I have saved for the end of this chapter. Teilhard portrayed the Omega point as the inevitable outcome of cultural evolution. Our current knowledge does not allow us to be so sanguine. Regardless of whether evolution is biological or cultural, small scale or large scale, it can always go the

way of the strider or the way of the wasp. The only way to reach the Omega point is by becoming wise managers of evolutionary processes. Left unattended, cultural evolution will take us where we don't want to go.

I was not the only person to discuss Teilhard at the Vatican conference. His name surfaced repeatedly, even with pride that a Jesuit priest had contributed so substantially to the history of evolutionary thought. Yet, judging from the conference, the Vatican seemed no closer to accepting the full implications Teilhard's ideas than when he was alive. The Catholic scientists, scholars, and theologians were far too sophisticated to accept American-style creationism and intelligent design, which they would regard as the Beverly Hillbillies version of theology. They seemed willing to accept what the evolutionists had to say about biological evolution. When it came to humans, however, they were still committed to divine intervention and were wrestling with the age-old question of how so much evil can exist in a world created by a benign and all-powerful God. As an individual, Teilhard had managed to transcend this formulation to achieve a deeper understanding of his religion, like a caterpillar metamorphosing into a butterfly. As an organization, the Catholic Church might never be able to accomplish the same transformation. Cultural evolution, like biological evolution, is path dependent. You can't always get there from here.