

Three Versions of Evolution

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Physical evolution is the first segment of the process and the most ancient. It emerges with the radiation inherent in the initial processes of the cosmos and continues through the decoupling which allows matter to be formed thereby enabling all the structures that we see around us and, apparently, some we don't see as well. It continues as one of the factors driving the change emerging through evolution as we speak.

Biological evolution is the segment of evolution that has created the controversy we are familiar with since Darwin and Lamarck helped us to understand the context within which life forms emerged on our planet. Subsequent work by Margulis, Crick, Woese and many others have extended that understanding although we still don't know how to recreate that force which began the component of the process that brings humans to the top of the ladder from which the third segment of the process is now determining which habitats will prevail going forward. Life may be unique to planet Earth. If it is, we would be pretty special. If human consciousness of the big picture is as unique as it seems, we are the only species that can step up to help facilitate evolution as it occurs. Clearly, we are the only species on Earth that has the intelligence to understand who we are becoming and the consciousness to appreciate how evolution works. It is human culture that is the primary driver of the current phase of evolution. We don't have a good sense of how that works in practice but Big History suggests that it is collective learning and how well we pass what we learn from generation to generation that makes the evolutionary fit between us and nature. Many of the species we share the planet with also have cultures and some are fairly efficient at sharing that information with future generations but none do it as comprehensively as what we do. The fact that human culture is now driving the third segment of evolutionary change is not well understood but it places our species in a unique position

All three segments of evolution have commonality. They all employ the second law of thermodynamics to direct energy flows through open systems to create structures that are increasingly complex and do the work of those structures as they evolve. For example, when nature was building a mechanism to transport oxygen to the blood stream of certain animals that could no longer live under water, lungs evolved in those animals to do that work. This is a long and tedious process but once established is maintained through vertical gene transfer in all those many species of animal for as long as we need oxygen to breathe. Biological evolution does this primarily through natural selection. All three mechanisms/versions of evolution continue to drive the process and function in concert to somehow enable coordination to occur and not disrupt the functionality of the organism. It is fairly easy to appreciate how this emerges through natural selection but more difficult when culture is the driver.

Cultural evolution adds some dimensions. First of all, it puts humans, through our culture, in the position of guiding a portion of the process. By default, to be sure, but an active guide all the same and by a mechanism different from natural selection. In other words, the change is guided by variables in addition to reproduction. The complexity in cultural evolution implies other variables must be involved. We don't yet know how culture drives evolution but scholars like Kevin Laland and Joseph Henrich make a strong case that it does. And, David Quammen in, "The Tangled Tree" also makes a convincing case that the biological component of evolution is significantly more complex than natural selection implies.

So, the process of evolution is already complex yet my guess is that it is also simple. Otherwise it wouldn't be possible to stay focused as it was building such complex organs as lungs or brains or child protective service systems. It seems to me that enhanced functionality somehow guides the process at each step along the way but we don't know yet what that is or how it works

The fact is that we humans now know where the process is heading. It is our culture, with all those other forces that came before it that is driving it. We don't know exactly where that is taking us but we do know that it is defining who we are becoming as a species and what our habitat will be like. The other thing that's different about the cultural evolution version of evolution is that culture is a product of what we do as a group whereas the natural selection version of evolution is a product of what the most fit of a particular generation do in terms of reproduction. So, cultural evolution is a global version of evolution but we don't know exactly what that means in terms of specificity but we do know it involves everyone. The future is in our hands and the outcomes of that will impact everyone. This presents some problems. First of all we don't know, with much precision, what we mean when different people use the word culture. It is sometimes used in a very narrow sense to mean the culture of an organization or the culture of an administration or the culture of an ethnic group. I use it to mean everyone. My sense is that scholars like Laland or Henrich and Christian do as well. We use the word culture in its broadest sense to include my sister Mary Ellen, Koch brothers, my neighbor with the dog that barks incessantly from the time she leaves for work in the morning till she returns after dark, Donald Trump and everyone else alive on the planet. We don't know if any individuals have a greater impact on what emerges and we have no idea how this works in practice. We have no measures although Laland has some interesting thoughts on the metrics and Eric Chaisson's measures may work if they can be applied to the components of cultural evolution once we define them. The point is that we are in a whole new world of change and humans are guiding that change by default rather than by design. Climate change is an example of the problem but only an example. We have been decades trying to agree on what we mean by climate and then who to blame the change on. We have no idea how much time we have to prepare for the consequences and quite probably will have unforeseen consequences that we can't even imagine yet. And climate change will probably be one of the easier cultural variables that we will have to plan for. Certainly the cultural changes based on social behaviors of individuals like mass killings or random drive by shootings, which somehow accumulate to drive components of culture in ways that we only vaguely understand, will be more challenging than climate change which is more concrete, more measurable, and more real than the behaviors of distraught individuals who go out one morning and kill twenty five people that they never saw before. We may well have to turn to fiction to begin to understand why xxxxxxxxxxxx killed yyyyyyyyyyy or why zzzzzzzzzz killed himself. In his novel, "The Harder They Come" T.C. Boyle does more to help us understand such dynamics than the average text on sociology or even social work. The point again is that we live in a different time. Human culture and the way it is driving change makes evolution different now than it was in the previous versions. We, as a group, are in charge of it by default and have been a major player for two or three million years. We could argue about how accurate that statement is but when all is said and done humans through our culture are now in league with Mother Nature to drive the combined impact of all three versions of evolution and the pace of the process is increasing dramatically.

For example, prior to 1920, or so, there were no children removed from the custody of their caretakers by the courts waiting for alternative permanent parents. By 1980 there were 40,000 such children

waiting for permanency. This is a major cultural development since it is through the children of the next generation that collective learning, which David Christian and others suggest is the avenue through which culture drives change. We know the child protective service programs are not as functional as they need to be and if three of those children die each day in the programs designed to protect them, it probably means that we should be doing some things differently and there will probably be unforeseen circumstances that we should be planning for. Furthermore, from a more technical perspective, resources and energy flows into the entropy inherent through the second law of thermodynamics, in the chaos of the child protective service systems is impacting those systems for better or worse. We would be wise to become aware of those impacts and manage them as functionally and efficiently as possible. There is no other way to begin to understand how individual behaviors accumulate to become the force that drives cultural evolution.

So, somehow we humans have risen to a key place in the process of change that is defining our future as well as the futures of all other life forms in this solar system. We would be wise to study this and we need to study how culture guides the energy flows necessary to let the best possible options emerge. The characteristic which puts us in this position is our consciousness of the big picture. Other life forms have sophisticated cultures like the north Atlantic right whales I mention above but, as far as we know, we are the only life form that is conscious of the full scope of the environment in which evolution occurs. The right whales are clearly intelligent as are many other species yet none seem to be conscious beyond the present. None have mastered collective learning as we have or have the level of capacity for cooperation that we have. So we are the only species that could take on the assignment of evolution, version III. We would not take it on either if we had a choice so we get it by default until we acknowledge it as a logical next step for our species. Can we be the only species in the cosmos with this assignment? I doubt it but if we are, we are at the vanguard of extraordinary event. What can the universe be but a huge library of information? Yes, I know, the universe is probably nothing so practical as a library, so Anthropocene, but no matter, head librarian is the role we have inherited.

Suppose there are other life forms that have the level of consciousness that we have, would they not want to know who we are and what we are up to? Would they not know the scope of the big picture? Would they not be in awe as we are? Wouldn't it be logical to prepare our local to welcome them?

Whatever the rest of the universe is like in terms of evolution it must be happening within the confines of the laws of thermodynamics and it must be building complexity through guiding energy flows through locals of greater matter density. If life forms with a consciousness of the big picture are involved they will probably be accumulating information from generation to generation as we do

Evolution is the process through which order emerges out of the thermodynamic equilibrium which is the natural state in the cosmos. This occurs as energy flows through temperature and density gradients at locales allowing structures to form to carry out various functions at those locales. For example, gases accumulate with the help of gravity to form suns which are actually store houses of energy that are available to energize systems that are then available to do things, to do work. This happens simultaneously on such vast and such minimal scales that it is difficult for us, Homo sapiens, to appreciate what a fundamental process it is. All life forms emerged and continue to evolve in this way, although some don't change much or at all, from generation to generation, others, like ourselves, change dramatically and have actually become agents of change facilitating the process of evolution. As far as we know, we are the only entity that actively assists Mother Nature as she organizes matter into

structures that do her work. We do this through our culture and although other species have cultures, and some are intelligent, like the North Atlantic right whale, and may also assist in the process of evolution, it is what Big History describes as collective learning that gives us the consciousness of what things were like millions of years ago and what things could be like millions of years in the future. It is this consciousness and our capacity to pass it on efficiently to future generations that makes us unique. No other entity in our solar system has this capacity so we are the only candidate for the position which we now have, and have had for the past two or three million years.

Some will argue that not only are we unique in this regard in this solar system, but we are unique in the cosmos as well. No other comparable function could exist anywhere else in the universe. I think these people simply don't appreciate the scope of the system we are a part of. Should we be the only life form that has the consciousness to understand and see the significance of collective learning as we manage it, we would simply be too special. I believe we are special and our performance, especially in the last 50,000 years or so attests to that specialness but it is special on a minimal scale. Our solar system is tiny and our life cycles as individuals and as a species, are incredibly brief. If a life form on planet earth has evolved to be the head librarian for the information we are accumulating through collective learning, which we have, why would that not occur elsewhere in the universe? Half of our people would probably be delighted with such a prospect and half would probably be terrified.

Our species is helping to build the structures that our biosphere needs to sustain itself. We do that by default because our common consciousness is slow to catch on but there is no other function to perform. Head librarian and what's more appropriate for a species that has channeled so much of our free energy into information management? In addition, that may be the only function which is in the best interest of each of us. And clearly again, we will have to figure out ways to define best interest to include all of us if we are, indeed functioning as a group which we appear to be.

If this is what we are doing and we are all doing it together through our culture then each of us is a critical piece of the process. Whatever else is going on here on Earth, we humans are a team and, it would seem, we need to take care of each other as all teams do. We are not used to teaming on the scale of our current population so we will have to make some modifications going forward. Our social behaviors are most important. We don't know how our behaviors affect our culture and thereby evolution. Clearly, we need to better understand how our individual behaviors impact and guide cultural evolution. Should we take on the challenge of cultural evolution more directly and by design rather than be default? I don't see where we have a choice but, if we do, I would recommend that we keep it simple and focused. We already have our energy flows and resources structured around our basic needs. We need to find a way to do better about that sharing is an example. The notion of pulling oneself up by the bootstraps is a valid one but it is only part of the story. And the power to make decisions and apply resources needs to be realigned to be more consistent with the needs of the management of the project as opposed to the needs of the manager. Can we make such decisions? Not without talking about them

- 1) Human Culture can be seen as a system of structures out of which things get done, work gets done. FUNCTIONALITY occurs, we survive and thrive.
 1. We govern ourselves
 2. We relate to each other

3. We feed ourselves
4. We transport ourselves
5. We heal ourselves
6. We shelter from the elements
7. We raise our children
8. We maintain our body temperature
9. We entertain ourselves
10. We store and retrieve information
11. etc.

We know how natural selection works in biological evolution. Is there some similar mechanism for cultural evolution to select those characteristics in our culture for the most timely and functional variables to emerge at critical points? We don't yet know but I suspect there must be. We have created huge structures for all of these functions and direct enormous energy flows into their accomplishment. It does not seem that such a level of complexity would survive without following some rules of organization.

Thousands of structures and substructures, maybe millions, make up human culture and that culture is one of the drivers of evolution which has emerged through three levels since its beginning 13.8 billion years ago. If we are to be driving, some of the complexity emerging through evolution and through our culture. How can we not be talking about what is doing to our culture, to our future?

T C Boyle, "The Harder They Come", a powerful gripping novel that explores the roots of violence and authoritarianism in the American character. Sten Stensen, his wife and their son Adam and Sara Hovarty Jennings and her dog are the cast.