

Peter Turchin and Daron Acemoglu—The Growth of the Noosphere: Part One

David Sloan Wilson: Okay. Well, welcome, Daron Acemoglu and Peter Turchin! I am so happy to be talking with you today.

This conversation is part of a project called the Science of the Noosphere. That term was coined by Teilhard de Chardin to refer to a mental dimension to human society. And Teilhard observed that in some ways, we're just another ape species. But in other ways, we're a new evolutionary process, cultural evolution, making the origin of our own species as significant in its own way as the origin of life. And he describes small scale society as tiny grains of thought which diversified but also coalesced into larger and larger units. And extrapolating into the future, he envisioned the entire earth as a kind of superorganism with a global consciousness.

And so, that's kind of the framing for today's talk. Both of you are highly qualified to comment on the expanding scale of human society from a modern scientific perspective. But you come from very different disciplinary backgrounds. And so, I think of this conversation as a coalescence of academic cultures, as part of the coalescence that's needed more generally. And so, I'd like to begin, if we may, with having each of you describe your academic backgrounds that brought you to the study of this subject. Daron, beginning with you, what is your academic background that kind of forms the basis of your approach?

Daron Acemoglu: Thank you, David. And hi, Peter. It's great to be here. Thanks for inviting me to be part of this conversation, David. I am an economist by training and a lot of my research has been on institutional foundations of long run economic growth, prosperity, poverty, and also by implication, understanding the dynamics of institutions. For example, democracy, that seems such an amazing innovation in terms of how human affairs are organized, where it comes from, when it works, when it doesn't work. So, those were the questions that motivated me for much of my career. But over the last few years, even more closely related to the subject matter, I'm also thinking about how we have evolved from the small hunter-gatherer-forager days to building institutions for large scale cooperation and conflict and what are the feasible limits of that cooperation, in what ways we can get that cooperation without getting all of the conflict and the carnage that it has produced over centuries. So I think having this conversation with you, David, and with you, Peter, is really an important milestone for me.

DSW: That's great. And Daron, could you say more about the tradition of what I call the new institutional economics as I understand it, associated with Douglass North and when it arose? My understanding is that it arose in the 1970s and kind of in reaction to neoclassical economics which had nothing to say about institutions. And it was disenchantment with that school of economic thought that led to this institutional focus. But you know more about it than I do. So, let's hear about it from an expert.

DA: Yeah. I mean, I think from the beginning, if you look at the classic economists, institutions did play an important role in their thinking. It wasn't just neoclassical sort of reasoning about supply and demand and prices, but early stages of the economic discipline's evolution, of course, focused on the simpler problems. It's what the economist Abe Lerner sort of said, "Economics became the queen of social sciences by focusing on solved political problems." So, politics was left in the background. And I think many scholars have tried to bring that in one way or another. Thorstein Veblen was an early proponent of that. Karl Polanyi, although not as an economist, in some ways more as a political scientist or a sociologist, and Douglass North and many of his followers.

And I think there are pluses and minuses to each approach. Douglass North, in some sense, was most compatible with neoclassical economics because he tried to incorporate it. My thinking is that in fact there are many aspects of the economics discipline that are very powerful, both as an empirical approach and as a conceptual framework. But missing in that framework is the role of power, social

power, and how that power is organized. Institution is one part of it. Cooperation is another dimension. Conflict is another dimension. And I think what I have tried to do, again complimentary to what Douglass North has achieved, is bring power in its various ramifications into the economic and political discussion.

DSW: That's great. And another conversation in this series is with Josiah Ober on Greek democracy, which was a wonderful conversation that's part of this series. So, Peter, now over to you. And could I ask you to begin with your father who was a major figure in the development of Teilhardian thoughts? So first, your father, and then you.

Peter Turchin: Thank you, David, for inviting me to this conversation. And nice to meet you, Daron. I've been admiring your books and articles for a long time. Yes. Well, starting with my father is quite appropriate because he always mentioned that he considered himself as a disciple of Teilhard de Chardin. And in fact, he admired his book, *The Phenomenon of Man*, greatly. And he in fact styled his most important philosophical book after Teilhard's book, because my father's major book was called *The Phenomenon of Science*, all right? So, my father actually was by training a theoretical physicist. But then, he switched in mid career to do more what he called cybernetics. So computer science, but also mathematics. A new type of mathematics where he contributed quite a lot.

And he was very interested in applying the ideas of cybernetics to human societies. Actually, to both science, as *Phenomenon of Science*, the title of his book says. But also, he wrote later a book called *Inertia of Fear* which actually got him into very big trouble in the Soviet Union. Remember, this was all before the Soviet Union collapsed. And there, he was extending his ideas to societies. So, let me just run a little bit ahead and say that several of his ideas I've found extremely productive. So when we start talking, he actually has a whole chapter about multilevel cultural selection, although he does not call it that way, because he wrote the book in 1970s before this concept was even I think formed.

DSW: Peter, let me break in with these timelines here. 1970s, 1980s, so on. So the 1970s, when people like Douglass North were working, that was the dark age in evolutionary theory as far as group selection was concerned. It was thoroughly rejected, would not be revived until later. And so really, evolution had very little to contribute to this topic until it itself became multilevel. 1990s, 2000, so on and so forth. So, that's the extent to which things are coming together. And when your father then anticipated multilevel selection, that was on his own basically. He wasn't getting that from evolutionary theory.

PT: Yeah. And he was coming to these ideas from a very different direction than biological evolutionists.

DSW: Yeah. So, continue.

PT: Yeah. So, he was thinking about how do complex organisms arise and how do complex societies arise. And so, he proposed a model really of first multiplication of units. So think about an annelid worm, right? Your annelid worm has many segments. And my father's thinking was that this was a general mode of evolution from simple to complex things, is that first you get multiplication of units. So, each segment is the same. But then, once that multi-segmentary organism has arisen, then you can see evolution pushing for specialization of different segments that do different things.

So, one segment becomes the head and starts to control other things. Others specialize in something else. And very soon, you have an organism in which if you look at it, you won't even see the segments, right? Because they have evolved to bear different functions and it's all integrated. And so, that is really very close to what multilevel selection later on has proposed. And here, I'm referring to the books by John Maynard Smith and Eörs Szathmáry. So, they basically were talking about major evolutionary transitions. And that was later, after my father.

DSW: Yeah. And Peter, again, we're featuring major evolutionary transitions including Eörs Szathmáry as part of this series. Our series begins with the origin of life and major biological transitions before getting

to human origins and major cultural transitions. That's the sweep of our series. So anyhow, continue please.

PT: No. Unless you have questions about my father's approach, which I'm happy to answer, but I think I got the gist of it.

DSW: Oh, yeah. Now, to you. So your trajectory, which I love, I know it well, basically you're here today because of a midlife crisis is the way I remember it.

PT: Well, that's true. I always wanted to be a scientist and follow in my father's footsteps. And so, when I started in college and then graduate school, I was really fascinated by theoretical biology. And that's what I was trained as. So, I applied the tools of statistical analysis and mathematical modeling to such questions as the non-linear dynamics of animal populations, both in time and in space. So for example, congregation of animals, and let's say, proto-societies that they could actually form. And as you say, yes, when I hit 40 years old, and I thought at that point that... Basically, the big question I was working until that point was why do populations of animals go through cycles and chaos. And we saw basically the outlines of the answer. It took me a few more years to publish a book called *Complex Population Dynamics* where I basically put everything I knew about it. But at that point, I wanted to have a challenge. And so, instead of divorcing my wife, I divorced biology and married social sciences basically.

DSW: And so, you came up with what you call cliodynamics.

PT: So initially, this was a hobby because I was thinking back to such giants of population dynamics as Alfred Lotka and Vito Volterra, who in the 1920s really overturned the study of population dynamics, because they showed that you can get population cycles without external drivers. That was the idea that first ecologists like Charles Elton, for example, thought that the reason for these cycles is because environment changes. But Volterra and Lotka showed mathematically that cycles can arise as a result of population interactions.

And so, I was thinking at first, let's try to create some simple mathematical models of societies, their dynamics and evolution. And I started doing that. But because I've always been working at the interface between theory and data, I could not stop at just making models. I wanted to see what the data could tell us. And I was really surprised because I found that in fact, there's huge amounts of data that archeologists and historians have gathered. And that basically started me on this path of both translating verbal theories into mathematical models, deriving predictions from them, and then building large databases of historical information to test those hypotheses.

DSW: Yeah. And I think Teilhard's theme of coalescence, and then the theme of academic coalescence is really important to consider and to get these timelines. For example, the study of complexity, which basically began with people like your father, couldn't really develop without the advent of widespread computing. So that takes us into the 1970s, 80s, 90s. And now, the study of history when you entered it. I mean, there had been grand theories of history in the past, and most of them had failed, were too simplistic. And at the time that you entered it, the idea of history as a quantitative science was very new and marginal as I understand it. And so, a little bit about your approach, how that interacted with historians basically as they did their work.

PT: Well, it's still somewhat marginal as far as the historians are concerned. The discipline actually has been having quite a lot of resonance amongst social scientists. So sociologists, economic historians, anthropologists, and archeologists. And so, this is where we get the most support. We launched a journal called *Cliodynamics: The Journal of Quantitative History and Cultural Evolution*. Cultural evolutionists, of course, are a major source of both inspiration and support. And so, most of the researchers active in this field, they're social scientists. And I knew from when we started that it would be hard. That many historians would be not very happy about natural scientists invading their turf.

DSW: Now why, Peter? Why? Just dwell a little bit. Why?

PT: Well, first of all, the way that history and social science are divided in the anglophone countries, is that history is considered as a humanity. It's not a science. And so most historians, they don't really care about history of science because they don't care about testing theories, for example. Of course they do, when they explain things. Anytime a historian writes some kind of narrative, they sneak some explanatory theories into it, all right? But typically, what happens is that you have accumulation of explanations. So I'll have to cite this one German historian, Alexander Demandt, who in 1984, published a book where he counted 230 hypotheses, explanations, of why Roman empire collapsed, for example. And since then, there has been a couple dozen more. So the explanations multiplied, but there is no mechanism, which is key to science, which just means rejecting some hypothesis in favor of others.

And so, that's one of the reasons. But the other reason is that historians... I would say three reasons. The first one, because the historians are not scientists. Second is because most historians love the detail, the glorious detail and the differences between societies. And I actually love that too, but they think that, that's all there should be. There are no general principles. And the third one is that most historians have not bothered to read any of the articles or books that we say. And so, most of the reactions I see on Twitter is when there is some kind of popular article talking about cliodynamics, that's all that particular historian reads. And then, they basically spew their venom on Twitter and saying how this is so horrible and so on and so forth.

DSW: I remember the first time I invited you to our campus to give a talk. We have a very highly regarded Egyptologist who came to your talk and then at the end, stormed out of the room with a disgusted look on his face. And so, that kind of said it all.

PT: Let me just add one more thing. I should end this by saying that the reception among historians actually exceeded my wildest expectations, because a very substantial minority have taken it up. So for example, if we have a chance to talk about the Seshat data bank, that thing is impossible to do without historians and other scholars of the past. So, you have more than a hundred historians who have been supporting us by volunteering their knowledge and expertise. So a substantial minority, and growing by the way, have become very good colleagues.

DSW: Yeah. And this is the time to mention Seshat, that basically what you're doing and always have done has two components. As with your biological work, there's a theoretical dimension and there's an empirical dimension. And now, with Seshat. Well, you can say it. But basically, it's the assemblage of a worldwide historical database that you kind of liken to the human genome project. So a little bit more, and then we'll launch into our past, present, and future stage of this conversation.

PT: Sure. Just a few brief words. When I started actually reading more history and reading more historical research, I was basically flabbergasted by how much is actually known about. I mean, yes, there are lots of lacunas and there are gaps in our knowledge, but there is also a huge amount of information. And furthermore, it grows very rapidly, partly as a result of new technologies, such as, for example, in archeology, we have all kinds of new techniques. But also, historians are coming up with new ways to interpret historical records. And of course, digital humanities, specifically digital history, it has been a great way to organize data.

So basically, our job was to take that knowledge and translate that into data that could be analyzable. And that turned out to be quite possible. And so, that's why we now have just the whole batch of articles that are analyzing the 2020 data of these from Seshat. Lots of great results, very interesting results. This is after ten years of hard work. And the first five or six years were really hard because it's a huge amount of work and it also took huge amount of money, resources from the funders to effect it. But now, we are at the sweet spot where you can see the fruits of this labor.

DSW: Okay. So Daron, do you want to comment on any of this before we segue to the next past, present, future stage?

DA: No. I mean, I think I don't have anything to add. Peter gave a very nice summary of his father's work and his work. And I'm a big fan. I think quantitative methods have a huge role in helping us understand the past and understand the social forces at work. I think that I have some different emphases on some of the details and somewhat different approaches complimentary to Peter's. But we'll probably talk about some of those as we go along.

PT: And I know, Daron, that you also integrate models with data in your work. So in this respect, we're fellow travelers.

DSW: Knowing both of your work well, I see tremendous continuity. And *Why Nations Fail*, your great book, Daron, begins historically with the colonization of the new world and just amazing stories about that which I'll return to, and I'll raise some of those points myself. So what I want to do now is to, is do three segments past present future and to have Peter you, lead the first segment. Let's cover Teilhard's ground from the original of our species in very small scale societies, tiny grains of thought, as he put it, gradually increasing to the nations of today coming into Daron's territory. But of course he would think of it and it is over the long term an increase in scale, but you described something called the Z shaped curve. But tell us more in detail of what science currently tells us about the last 10,000 years of human history, which led to a net increase in scale. Everyone knows that, but the dynamics basically that were responsible for that. And what's actually described more of a zigzagging process than just a linear process.

PT: Well, first of all, yes, during the Holocene, basically the last 10,000, 11,000 years, the scale of human society has grown by an astronomic six or seven orders of magnitude. So from society of hundreds, maybe few thousands, we now have hundreds of millions and even billions, right? So that is, it's a basic social fact of social science that really begs for explanation. But this change was first of all, not gradual. So right now we are about to finish an article where we show that in fact, it was much more like punctuated equilibrium. You have periods of rapid change and then long periods of apparent stagnation and things like that. So, even that, and of course for every two steps forward, there is one step back. So you have empires rise, but they're also fall and collapse.

So, that is one thing. But the other thing is that during this process, some other aspects of human experience have actually have gone on quite a roller coaster. So we can talk about equality. We can also talk about wellbeing, right? So we can talk about warfare and all those things have gone in very interesting and completely non-linear fashion. So the wellbeing, for example, the first urbanized societies who were based on Neolithic agriculture, they were extremely unhealthy people, so the wellbeing really collapsed. And then we see, we can trace the wellbeing by, let's say the average stature and we see cycles basically. Sometimes, the average population height is a very sensitive measure of biological quality of life.

DSW: Let me just flag that here. Because, it's something I love about your work. People ask, "how do we know this? How can we know this?" Well, body height will tell you a whole bunch. How big you become.

PT: Exactly. And you have skeletons. There are too many skeletons in European museums, spanning the last several thousand years and, Anthropometrics, I guess that's the name of the discipline, they've been processing this data. This is one of the examples of where we get really wonderful dynamical data on the past. But in terms of inequality, so you have already brought up the issue of democracy. Of course we cannot travel back into the Pleistocene and observe people there. But to the best of our knowledge, they were quite democratic. Not everywhere, there were some societies that would have had inequalities, but they were much more egalitarian than what came after them. And so what happened was that,

especially the first centralized societies, complex chiefdoms and archaic states. They were pretty horrible of places to live.

Even for kings. The kings were assassinated all the time. I mean, we have been gathering data on the probability of a ruler to be deposed or killed, and we can actually quantify these types of things. And of course, 90% of the population was living in abject poverty, was completely at the whim of the elites and rulers, and they were sacrificed, which to me is, human sacrifices is sort of the ultimate indignity and inequality. But also we can see the huge differences in heights between nobles and peasants and so on and so forth. And so then something happened and we started on our road to more democratic, more egalitarian, but by no means we got anywhere near to the egalitarianism that we see in the Pleistocene, because still, even in a democratic societies, we have huge disparities of wealth, all right? But at least, it's not as bad as living in an archaic despotic state. Certainly democracy has helped to counteract that move.

So that's why we see a Z curve. So five million years ago, our great ape ancestors, they were quite despotic, they had social hierarchies. So in the chimp populations, there is one person, what we call an alpha male, who beats up everybody. There is a beta male who beats everybody, but alpha male and so on. And then alpha female is beaten by all the males, but she beats all the females below her. So it's a very strict social hierarchy and it's violently maintained all the time. So that's very different from what happened to Homo sapiens, even the Homo genus starting with the two million years ago.