Harmony and the Climate Crisis

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When we consider the principles of Harmony – such as interdependence; cycles and seasonality; diversity; health and meeting human needs without undermining natural systems or the needs of future generations – we need first to step back and retrace where we have come from.[1] And I want to do that in relation to climate change.

I was listening to the BBC the other week and heard Owen Paterson, the former Tory environment minister, say that he could live with one or two degrees rise in global average temperatures.[2] In fact, he said it would mostly be good news. Even if we discount Owen Patterson's climate scepticism, when scientists talk about climate change, it appears to the general public that they are talking about tiny differences in temperature – one or two degrees Celsius. The significance of such small changes can be challenging for us humans to understand, given the massive daily fluctuations in temperature, say between the northern and southern hemisphere, between winter and summer, or between night and day. But, if we look at global average temperatures from a historical perspective, through studying the history of planet Earth, we can get a better understanding about our climate and why these small temperature changes are so critical for life on Earth.

The recent history of planet Earth, going back over at least 2.6 million years, shows that we oscillate between ice ages and periods we know as interglacials. Basically, there are around one hundred thousand years of glaciation followed by as little as thirty thousand years of warmer interglacial. These changes are part of the natural cycle tied mainly to variations in the Earth's orbit of the Sun. We have a great library of the planet's history in ice cores and ocean sediments which gives us an excellent record of these repeated hot and cold periods going back millions of years: right now we are in the middle of an interglacial period. Some interglacials in the past have been slightly warmer than the one we are currently living in which gives us an understanding of what life on a warmer planet might be like. The current geological phase, which we know as the Holocene, is dated

to the end of the last ice age over ten thousand years ago. The Holocene has been called the Garden of Eden on the grounds that it is ideal for supporting life on Earth, including the human species. The important point is that the average global temperature range, within which the planet has remained during the Holocene, is only around plus or minus one degrees Celsius. Such a plus one-degree global change is significant because it takes a vast amount of heat to warm all the oceans, atmosphere and land by that much. But what is key is that we have existed, for most of this period, within a very narrow global average temperature range, plus or minus one degree Celsius. When we last had an interglacial state in the Eemian epoch, ending around 115,000 years ago (before the last ice age) the average temperature on Earth was in the order of two to three degrees Celsius warmer than now. And sea levels were on average six metres higher mainly due to the partial melting of the Greenland ice sheets. Each epoch is not exactly comparable, but it gives us the best available evidence of what life would be like on a slightly warmer planet.

This information from the Earth's geological library gives us an indication of what we may be facing in future. For example, a rise of over three degrees Celsius would be a similar situation to that of around five million years ago, when sea levels were twenty-five metres higher then they are now. Small differences in global average temperature can bring about dramatic differences to our climate, ultimately with a huge impact on our well-being.

Modern homo-sapiens have been on this planet for one hundred thousand years or so and the cognitive revolution, when our ability to acquire knowledge and understanding developed, happened near the beginning of this period. So we've had the same ability, physically and intellectually, to develop societies as we know them over this period. But we had a bumpy ride over last hundred thousand years. Initially we were hunters and gatherers, and perhaps there were a few million people at the most. Then we had an exceptionally cold point during the last ice age, probably triggered by a volcanic eruption that blotted out the sun roughly 75,000 years ago. Most of the fresh water was tied up as ice in the poles and sea levels were almost eighty metres lower than today. Genetic analysis indicates that, most likely, we were down to just a few thousand fertile adults at that point, living somewhere in central Africa, the only place, apparently, where there was food and fresh water. And humans were, to put it simply, virtually extinct as a species. If we had gone extinct the world today would be teeming with life.

This is a remarkable reminder of the fact that we depend on a stable climate for our own human wellbeing. Humans are lucky to have survived to this point. It

also shows we are very closely related to each other. When we left the last Ice Age just over ten thousand years ago we moved into a remarkable, not to say almost miraculously stable, interglacial period. The rainy seasons established themselves. If you lived in the northern temperate regions you knew that the temperatures rose above fifteen degrees Celsius roughly in the spring and temperatures remained high until the autumn. Everything we love, everything we depend on, from the grasslands, the rainforests, the marine systems and the coral reefs, settle in the Holocene. The Holocene is almost perfect for us humans.

Now, if the present accumulation of carbon dioxide in the atmosphere continues unchecked, greenhouse warming of four or five degrees Celsius might occur by as soon as the end of this century – this scale and speed of change would be unprecedented. Scientific evidence shows that the dominant cause of the rapid warming we are experiencing today is due to the increase of the amount of so-called greenhouse gases in the atmosphere, mainly carbon dioxide - CO_2 - from burning fossil fuels and cleaning ecosystems like rainforests. These greenhouse gases prevent more of the energy we receive from the Sun from escaping back to space, and this warms the planet.

Today's carbon dioxide levels in the atmosphere vastly exceed those reached at any point during the past 800,000 years. And what's even more startling is that CO_2 is being pumped, by us, into the atmosphere at a rate unprecedented during the past sixty-six million years. It's mainly because of these human activities that scientists are claiming we are entering a new geological epoch, one that has unofficially been called the Anthropocene, or 'human age'. We are waving goodbye, with some considerable risk, to Eden's Garden.

Until recently humans constituted a relatively small world on a big planet. But unsustainable economic development delivered increasing wealth because we had ample atmosphere in which to dump our CO_2 emissions, ample ocean in which to dump our waste, ample plants and animals to consume from the forests and grasslands, and ample biomes like rainforests and marine systems to exploit. And no invoices were being sent back from the natural world to human societies at the planetary scale. But now we have tipped over into what we can today call the era of humans being a relatively big world on a small planet, rather than a small world on a big planet. We are actually, as humanity, hitting the biophysical ceiling of the planet's capacity to support our species. In the context of geological time and the sequence of glacial and interglacial periods, this has occurred in a very short space of time. The process started in the United Kingdom in the mid-eighteenth century with the use of the coal-fired steam engine and the start of the industrial revolution. At that time the global population was just seven hundred

million. Industrialisation continued through to what has been termed the 'great acceleration' in the 1950s when production and consumption entered a period of exponential growth. The consequence is the sixth mass extinction of species (the first to be caused by another species, humans), and abrupt changes resulting from climate change, such as the accelerated melting of the polar ice sheets, the retreat of glaciers worldwide and the massive bleaching of coral reefs. So we have, in just seventy years, from the great acceleration in the 1950s until today, managed to start pushing ourselves outside of a state that we've been in for over ten thousand years when we left the last ice age. This is no small 'achievement'!

And now, we are at a point when what we do over the next decade or so will very likely determine the state for humanity over the next ten thousand or more years. So we are at this pivotal point. That's why one or two degrees Celsius is so important. We can live outside the Holocene. We've done it before: we were a few thousand people, hunters and gatherers in equatorial Africa 75,000 years ago, during the last ice age.

But if we take ethical responsibility for 7.4 billion co-citizens today (and this is projected to be 9.7 billion by 2050), the scientific message becomes as simple as it is dramatic, that the climate of the Holocene is the only one that we know for certain that can support the modern world as we know it. We can no longer, in any societal kind of policy making, consider that what is out there in the oceans and the atmosphere are somehow things that can be endlessly exploited, or can endlessly receive all our pollution. It's exactly the reverse. We now need to internalise rather than externalise everything inside our own economic models because we are now truly at a global saturation point.

The economy has grown very successfully on one measurement, but at the expense of human capital and nature, and it's now urgent that we shift into a new situation where we actually see the economy delivering for society within a safe operating space of planetary boundaries. We now need to understand that nature actually is the fundamental reason why we can have prosperity and economic development on planet Earth. And that is the most important message we need to understand – that nature comes first because nature can do much better without us but we cannot survive without nature. If humans are now a big world on a small planet, and if we depend, all of us equally, on nature, then we must recognise that we all have a personal responsibility for nature. Of course, this has profound consequences for us as individuals. If we view this in terms of a budget, we can 'afford' to pump 3,000 billion tonnes of CO_2 into the atmosphere and stay within two degrees Celsius. We have used up about 2,000 billion tonnes of CO_2 since the 1850s, so we have 1,000 billion tonnes of CO_2 left. At current rates

of CO_2 emissions (36 billion tonnes a year) we have a budget that will be spent within a few decades. To stay within 1.5 degrees Celsius would mean even faster action. This means leaving most of our reserves of coal, oil and gas in the ground and ending deforestation.

This wouldn't keep us in the Holocene, because we are leaving it. But it would keep us in a manageable interglacial state. To get there we need to end the internal combustion engine and shift to electric vehicles. We need to rapidly develop renewable energy and storage technology. We need to eat a more plant-based diet in order to end agricultural expansion into forests and other vulnerable ecosystems mainly driven by meat production. And we need biomes like rainforests to recover in order to store more carbon and protect biodiversity. Finally, we need to move from a linear to a circular economy, reducing, reusing and recycling. The solutions are largely available but the politics lags far behind. It requires a new mindset in terms of the values between us humans and our planet Earth. We need to recognise not just the interdependence between humanity and nature, but that humanity is part of nature.

Notes

[1] David Cadman, 'Principles of Harmony', The Harmony Project, https://www.theharmonyproject.org.uk/principles-of-harmony/, 29 January 2019 [Accessed 10 May 2019].

[2] And also see Adam Vaughan, 'Owen Paterson v the science of climate change', *The Guardian*, 30 September 2013, https://www.theguardian.com/environment/blog/2013/sep/30/owen-paterson-science-climate-change [Accessed 10 May 2019]