



the weekly anthropocene



dispatches from the wild, weird world of humanity and its biosphere

By Sam Matey, October 23 2019

New Solutions: The Ocean Cleanup. For the last seven years, Dutch NGO The Ocean Cleanup has been developing and testing a system to clean up the Great Pacific Garbage Patch, using long floating ocean-going barriers that collect plastic like “artificial coastlines.” Now, after a long trial and error process, they have achieved success, with System 001/B (pictured) collecting debris ranging from one-ton ghost nets to tiny microplastics. Next, TOC is building System 002, and their



eventual goal is to scale up to a full fleet of “artificial coastlines” to clean up the majority of floating debris in the Great Pacific Garbage Patch. This is spectacular news! For more, see tinyurl.com/y3f2ml6g and theoceancleanup.com.

New Solutions: Climate Commitments. In the wake of the 2019 UN Climate Change Summit, scientists and activists around the world were disappointed that world leaders’ actions did not live up to the urgency of the threat of climate change, an emotion poignantly embodied in Greta Thunberg’s rhetoric. However, while the United States, China, and India lamentably failed to make any significant commitments at the summit, several other countries and corporations stepped up to do their part for the future. Nine Latin American nations (Chile, Peru, Ecuador, Costa Rica, Honduras, Guatemala, Haiti, the Dominican Republic and Colombia, but notably not Jair Bolsonaro’s Brazil) set a joint goal of moving to 72% renewable energy by 2030, an admirably ambitious step. Germany, Slovakia, and Italy pledged to achieve carbon neutrality by 2050, Finland pledged to achieve carbon neutrality by 2035, and an array of European and South American nations increased their funding for the UN’s Green Climate Fund, which finances climate mitigation and adaptation programs in developing countries. Furthermore, on September 19th, retail titan Amazon announced its “The Climate Pledge,” committing the business titan to use 80% renewable energy by 2024 and achieve carbon neutrality by 2024. As part of the pledge, Amazon has already committed \$100 million to The Nature Conservancy for reforestation projects and ordered 100,000 new electric delivery vans from Rivian, the largest order of electric cars ever. Although many countries, including Trump’s America, are still utterly failing in their responsibility to future generations, many other entities are working hard to try to achieve a stable climate! For more on Latin America, see tinyurl.com/yyobywck. For more on the summit overall, see tinyurl.com/y4qxwrqz. For more on Amazon, see tinyurl.com/y5gwvb33.



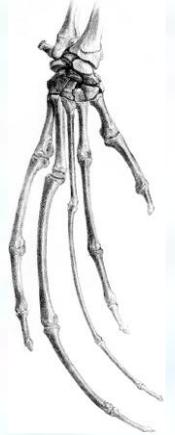
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Madagascar: Aye-Ayes. A few weeks ago, this writer joined a team tracking aye-ayes (*Daubentonia madagascariensis*) through Sangasanga Forest in Madagascar. We knew then that the aye-aye was utterly unique, with a taxonomical family to itself: it grows teeth constantly like a rodent, has an extra-long middle finger that it uses for “percussive foraging” of grubs in trees (along the lines of a woodpecker’s beak), and extra-large ears. Now, a team of researchers from North Carolina have discovered that it’s even more unique than previously thought: it’s the only primate in the world known to possess a sixth finger. This small structure on the side of the wrist, dubbed a “pseudothumb,” had not previously been noticed (even though it’s clearly visible on the upper left in this old image of an aye-aye’s hand bones), but was found to have a host of intriguing characteristics. “The pseudothumb is definitely more than just a nub,” said Dr. Adam Hartstone-Rose, lead author of the new paper. “It has both a bone and cartilaginous extension and three distinct muscles that move it. The pseudothumb can wriggle in space and exert an amount of force equivalent to almost half the aye-aye’s body weight. So it would be quite useful for gripping.” The pseudothumb may have evolved to give the aye-aye extra grip strength, necessary due to the hyper-specialization of its foraging fingers. This is amazing news, another example of the infinite diversity and beauty of the animals of Earth! For more, see tinyurl.com/y497lq2x.



Manhattan: A New Ant. In a fascinating piece of news, biologists from Columbia University have discovered a new species of ant, not in some distant jungle but right outside their front door. The new species is similar to some European cornfield ants, but doesn’t match any of the world’s 13,000 known ant species. It doesn’t yet have a scientific name, but has charmingly been dubbed the “ManhattAnt.” Its native habitat, (or at least that portion so far discovered), is the highway medians of Broadway at its junctions with 63rd and 76th street. Researchers suspect that the ant evolved its distinctness as a result of living in the hotter, drier urban environment. It also has high levels of carbon isotopes in its body, likely indicating a high-corn syrup diet from humans’ food waste. The saga of the ManhattAnt is a great reminder that the processes governing the natural world, like evolution, still hold in human-dominated environments. The cities of the world may teem with unique, yet undiscovered species! For more, see <https://tinyurl.com/y3xsyl79>

Maryland. After being driven out by pollution in the 1880s, researchers have found that bottlenose dolphins have returned to the Potomac River! A population of 1,000 individuals is living-and breeding-in the lower reaches. Great news! For more, see <https://tinyurl.com/y66zyo77>.



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Big Changes: Reorganization of Global Biodiversity. A landmark new study recently published in *Science* analyzed data from 239 other studies that together examined over 50,000 “biodiversity time series” (observed changes in biodiversity in a particular ecosystem overtime) to put together a comprehensive picture of how Earth’s biodiversity is changing in the Anthropocene. Their findings were surprising, but encouraging: they found that the species composition of almost all ecosystems is changing rapidly, with approximately 28% of all species in an ecosystem being swapped out for new species every ten years. Although most ecosystems are losing many local animals and plants, they’re seeing little change or even a slight increase in overall number of species, as new immigrant species are coming in-and their old inhabitants are moving to new ecosystems, meaning little overall loss of species. “Our study shows biodiversity is changing everywhere, but we are not losing biodiversity everywhere. Some places are recovering and adapting. When biodiversity is in the news these days, it is often because the Amazon is on fire, or there is a global mass mortality event in coral reefs, and rightly so, because these are terrifying news. However, there is a lot of recovery also taking place silently in the background, and many places where not much is happening. Our study puts these things on the map and shows they are not contradictory,” said Dr. Maria Dornelas of the University of St. Andrews, lead researcher. The researchers also noted that this reorganization was more rapid and more variable in marine ecosystems, possibly due to fewer barriers to movement. They also highlighted tropical ecosystems, both on land and at sea, as an area of special interest and concern, as there may be no present-day analogues for the new ecosystems that will emerge as the warmest part of the Earth is warmed further by climate change. Tropical marine ecosystems were found to be one of the few places experiencing overall losses of species richness, as tropical fish are moving to newly warm waters and there are no “super-tropical” fish to replace them in their ever-hotter homes. It appears that in the Anthropocene, climate change, land use change, and doubtless many other factors we don’t yet fully understand are combining to create a world on the move, where animal and plant species are spreading, retreating, and forming new ecological relationships. This is going to be a fascinating century. For more, see <https://tinyurl.com/y3fmrhd4> and <https://tinyurl.com/y33pybga>.

Big Changes: The Permafrost Problem. An international research team pooled observations from over 100 Arctic field sites in a new study in *Nature Climate Change*. They estimate that melting permafrost released an average of 1662 teragrams of carbon each winter from 2003 to 2017, and that an average of only 1032 teragrams (Tg) was reabsorbed during the summer growing season-a net emission of 630 Tg of carbon per year. It appears that the long-dreaded “permafrost feedback loop,” in which global warming that melts permafrost that releases carbon that melts more permafrost, and so on, is already under way. Disturbing. For more, see tinyurl.com/y4xfc9ch.