



the weekly anthropocene



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

By Sam Matey, April 22, 2020



Earth Day 2020. April 22, 2020 is Earth Day, the 50th Earth Day since the original landmark peaceful protests of April 1970. (Pictured: a version of the Earth Day Flag). Human civilization has made a lot of progress in building a better relationship with the rest of the biosphere since then. A partial list of victories would include the Clean Water Act, averting degradation of the ozone layer with the Montreal Protocol, new protected areas rising around the globe, heroic efforts that have pulled endangered species from the California condor to the golden lion tamarin back from the brink, and the rise and rapid spread of renewable energy technologies as an alternative to fossil fuels. It may seem that the situation now is worse than ever: we are currently faced with a worldwide pandemic on top of the climate crisis. However, amidst the ravages of COVID-19, there are signs of hope that we can use this as an opportunity to build a better, more sustainable, healthier world as part of the recovery. Green shoots of possibility are rising around the world. Amsterdam has announced that its COVID-19 recovery would be guided by the “doughnut economics” model, an incredibly innovative synthesis of environmental and socioeconomic indicators developed by British economist Kate Raworth. (Check it out-it’s worth it-at tinyurl.com/DoughnutEconomics). Milan, Italy announced that over the summer,



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they'll be transforming 22 miles of streets from car-dominated to pedestrian and bicycle-focused, both to reduce potentially pandemic-worsening air pollution and help stimulate the downtown economy (see tinyurl.com/MilanRoads). 17 European governments, including heavyweights like France, Germany, Italy, Spain, and Sweden, have called for the European Green Deal to drive the recovery from COVID-19. Their cosigned letter sums it up in insuperable prose: "The focus is presently on fighting the pandemic and its immediate consequences. We should, however, begin to prepare ourselves to rebuild our economy and to introduce the necessary recovery plans to bring renewed, sustainable progress and prosperity back to Europe and its citizens. While doing so, we must not lose sight of the persisting climate and ecological crisis. Building momentum to fight this battle has to stay high on the political agenda. The lesson from the Covid-19 crisis is that early action is essential. Therefore, we need to maintain ambition in order to mitigate the risks and costs of inaction from climate change and biodiversity losses." (For more, see tinyurl.com/EU17GreenDeal).

South Korea's Democratic Party just won a massive majority (180 out of 300 seats in the National Assembly) in one of the first elections held amidst COVID-19, and they've pledged to enact a European-style Green New Deal (see tinyurl.com/KoreaGND). In America, the states committed to 100% renewable energy, from New York to Maine to (just lately) Virginia, are maintaining their momentum towards renewables: Somerset, the last coal plant in New York state, was officially retired on March 31st. Encouragingly, Joe Biden's coronavirus plan (see joebiden.com/covid19/) explicitly pledges to "Fight climate change as a driver of health threats." He gets it. If Biden wins in November, it will be the perfect time to launch a "green stimulus," putting the economy on the road to recovery by funding a renewables revolution. And finally, for the first time in history, US oil prices are negative. (This may seem absurd at first glance, but oil costs money to store, and if the oil market doesn't look good for the near future due to a coronavirus-induced massive reduction in demand, it suddenly makes sense to pay someone to take it off your hands. For more, see tinyurl.com/NegativeOilPrices). Historically, low oil prices have been bad for renewable energy: they make old-style internal combustion engine cars look cheaper to maintain and act as a price signal to build more oil-powered stuff. But oil prices this low are devastating fossil fuel companies economically (couldn't happen to a nicer bunch of oligarchs!) and illustrating one of the fundamental weaknesses of a fossil-fueled economy: the fuel source is physical stuff that has to be dug out of the ground and transported around the world. A lot of disturbing things can happen to a supply chain that important and that fragile, from storage snafus to geopolitical tensions. Renewables are an inherently more secure and crisis-proof energy source, as it's hard to steal, fight over, price-gouge, monopolize, or run out of sunlight and wind.

In sum, this is a crazy time. This Great Lockdown will be remembered as one of the defining events of the century, a world-spanning crisis on a level with (though much more temporary than) climate change. But we can get through this and come out of it with a better civilization than we had before.



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Lemurs “Stink Flirt.” A new study has found that male ring-tailed lemurs (*Lemur catta*) use their scent glands (known to be used for marking territory and social rank, among other things) to exude pheromones to attract females. (Pictured: a group of *Lemur catta* photographed by this writer in Anja Community Reserve in 2019). "During the yearly breeding season, male lemurs rub the glands on their wrists against their fluffy tails and then wave them at females in a behavior called 'stink flirting,'" said Dr. Kazushige Touhara, lead author of the new study. Dr. Touhara's team used



gas chromatography to isolate the three major compounds that together compose the males' glandular cologne, and then tested the reaction of ring-tailed lemur females. They found that only a mix of the three chemicals, as in the wild, would hold a female's attention. This is scientifically notable, as it's the first time ever that pheromones have been conclusively identified in any primate species. A fascinating discovery. For more, see <https://tinyurl.com/y847pfld>.

Civilization and Drought: The American West. A disturbing new study from Columbia University's renowned Earth Institute has produced compelling evidence that the American West is entering one of the worst droughts the region has experienced for centuries, and that it has been made worse by climate change. The researchers analyzed growth rings from thousands of ancient trees, from across nine western US states and part of northern Mexico. They found the signs of four "megadroughts," periods of extreme aridity lasting decades: the late 800s, the mid-1100s, the 1200s, and the late 1500s. They then compared this data to soil moisture samples from the 2000-2018 period and climate models, and found that human-caused climate change accounted for 47% of the severity of the West's current drought, pushing it from a moderate drought into a new megadrought. "Because the background is getting warmer, the dice are increasingly loaded toward longer and more severe droughts," said bioclimatologist Dr. Park Williams, the study's lead author. "We may get lucky, and natural variability will bring more precipitation for a while. But going forward, we'll need more and more good luck to break out of drought, and less and less bad luck to go back into drought." This is truly sobering news. For more, see tinyurl.com/AnthropogenicMegadrought.



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The Amazing Jellyfish Machines.

Professor He Jr-hau and his research team are cutting-edge materials scientists working at the City University of Hong Kong, and they have just created a truly extraordinary device. Their new “lightweight wave-energy-driven electrochemical carbon dioxide reduction system,” known as “jellyfish” for their shape, sit in the ocean and use a “spherical spring-assisted triboelectric nanogenerator” to generate electricity from the energy of waves.



(Pictured: Professor He with a few of his “jellyfish” prototypes). That electricity then powers an electrochemical setup that reduces carbon dioxide from the air—all on site!—and converts it into liquid formic acid (CH_2O_2). Formic acid, notably, is considered a promising energy storage option for hydrogen fuels. (A cool connection, as Professor He and his team have also recently worked on a separate project developing an “artificial leaf” to create fuel-ready hydrogen from oxygen with solar power). Basically, these nifty gizmos use renewable wave energy to remove carbon dioxide from the atmosphere and turn it into a valuable product. That’s an incredible trifecta. As with nearly all other carbon-sequestering technologies, it’s a long way until these can be scaled up worldwide, and the most important action to take is still to switch to renewables as fast as possible, but it’s still an amazingly promising development. The hydrogen-powered ships of the future may fuel up from bigger versions of these incredible creations. For more, see tinyurl.com/AmazingJellyfishMachine.

NASA Coral Game. Do you own an Apple product and are you looking for a new lockdown activity? If yes, then you can play a video game to help NASA map coral reefs with NeMO-Net, a free game on the App Store where players virtually travel through real-life reefs and help scientists identify all the corals. “NeMO-Net leverages the most powerful force on this planet: not a fancy camera or a supercomputer, but people,” said NASA inventor Dr. Ved Chirayath, who built the game’s neural network. “Anyone, even a first grader, can play this game and sort through these data to help us map one of the most beautiful forms of life we know of.” Awesome! For more, see tinyurl.com/NeMO-Net.