



NGO SUSTAINABILITY

GLOBAL WARNING

PROMOTING SUSTAINABLE LIVING AND RENEWABLE ENERGY FOR THE FUTURE OF OUR PLANET

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Remember, there is no Planet B!

FRANCIS A. VIA, Ph.D.

Francis A. Via has more than 30 years of experience in directing industrial R&D, intellectual property, and market development at Stauffer Chemical Company, Akzo Nobel Inc., and GE. He achieved more than a dozen commercial successes with novel materials and advances in process technology. These yielded hundreds of millions of dollars in new markets or savings, in catalysts and separations processing, polymers, specialty chemicals, and pharmaceutical intermediates.



Francis Via at Stauffer Chem Dobbs Ferry NY, 1987

Dr. Via began his career with Stauffer Chemical Co. and, with its acquisition by Akzo Nobel in 1987, he became part of that R&D leadership team. He directed Akzo Nobel's corporate research-US to capture emerging technology in catalysis, advanced materials, and biochemistry. Utilizing external cooperative research programs at universities and national laboratories accelerated this research. In 1998, he accepted a challenge to build and direct a catalyst research group at the GE Corporate R&D Center where he helped developed pollution-free, commercial fuel cells.

Dr. Via is the recipient of numerous awards including two internal GE awards for technical excellence and productivity – The Willis Whitney Technical Achievement Award in 2000. In 1994 he was elected Fellow of the American Association for the Advancement of Science. He is the recipient of the first Department of Energy Office of Industrial Technology's (OIT) Industrial Partnership Award, 1999. He authored a chapter for the American Chemical Society's millennium publication Chemical Research – 2000 & Beyond; co-authors included five Nobel Laureates. In addition, he serves as a consultant or on review committees for the Department of Energy (DOE), the National Science Foundation, the National Academy of Sciences, and the American Chemical Society.

Dr. Via's article appears further down in this Newsletter

This month's nature poem is "Sleeping in the Forest" by celebrated American poet Mary Oliver. Oliver's poetry covers subjects from the natural world and the time she spent living in Cape Cod, Massachusetts heavily influenced her work. Over her lifetime, Oliver received numerous awards for her work which include the Pulitzer Prize, the National Book Award, and a Lannan Literary Award for lifetime achievement.

"Sleeping in the Forest"

I thought the earth remembered me,
she took me back so tenderly,
arranging her dark skirts, her pockets
full of lichens and seeds.
I slept as never before, a stone on the river bed,
nothing between me and the white fire of the stars
but my thoughts, and they floated light as moths
among the branches of the perfect trees.
All night I heard the small kingdoms
breathing around me, the insects,
and the birds who do their work in the darkness.
All night I rose and fell, as if in water,
grappling with a luminous doom. By morning
I had vanished at least a dozen times
into something better.

—Mary Oliver

“In a Big Step Towards Sustainable Fashion, Scientists Create a Biodegradable, Carbon-capturing Textile From Algae” *Anthropocene Magazine*
by Prachi Patel



Photo: *Srikanth Balasubramanian*

Using 3D printers, scientists recently created a photosynthetic material for t-shirts and shirt labels using algae (photosynthetic organisms) and bacterial cellulose (an organic compound). With these components, the material can absorb atmospheric CO₂ and can be durable against the elements. This new material is a strong contender for mitigating the fashion industry’s carbon footprint. Typical apparel manufacturing produces more CO₂ emissions than aviation and shipping combined, requires a significant amount of water, and produces micro-plastic pollution. This algae-based material grows fast, which makes it easy to grow on a large scale, is biodegradable, and uses less water and resources.

[Full Article](#)

“Climate Crisis Got Worse in 2020, UN Report Says” *Treehugger*
by Olivia Rosane



Photo: *Philip Pacheco / Bloomberg / Getty Images*

The annual State of the Global Climate report published by the World Meteorological Organization last month showed that the climactic events of 2020 conformed with the long-term trend of rising temperatures and increasingly extreme weather incidents, which are widely accepted to be the effects of climate change. The past 28 State of the Global Climate reports have shown similar patterns. Since 1980, every decade has been hotter than the previous and any in recent history. Additionally, other effects of climate change are becoming more apparent such as rising ocean temperatures, ice melt, and natural disasters such as arctic heatwaves, wildfires, and hurricanes. However, the economic slowdown caused by the COVID-19 pandemic presents the world with an opportunity to increase climate and sustainability commitments.

[Full article](#)

“Third of Global Food Production at Risk From Climate Crisis”*The Guardian*
by Fiona Harvey



Photo: *Alamy*

A new study published in the journal *One Earth* found that a third of global food production will be at risk if greenhouse gas emissions continue to rise at their current rate, leading to warming of 3.7 degrees Celsius. Most of the losses in agricultural productivity would occur in Africa’s Sudano-Sahelian zone and across Southeast Asia. However, if the goals of the Paris Agreement are achieved, and global warming is kept below 1.5 or 2 degrees Celsius, humanity will only risk a 5-8% decline of global food production. While forecasts for the world as a whole are bleak, the agricultural productivity of some regions, such as Russia and other northern countries, would increase under the 3.7 degrees scenario. However, the resulting loss of productivity in warmer regions will outweigh the increased productivity in the north.

[Full article](#)

“The EPA Proposes a Ban on HFC-23, the Most Potent Greenhouse Gas Among Hydrofluorocarbons, by October 2022”
Inside Climate News
by Phil McKenna and James Bruggers



Photo: *Pat McDonogh/Courier Journal*

The U.S. Environmental Protection Agency recently proposed a rule to reduce emissions of HFC-23, a greenhouse gas 12,400 times more potent than CO₂, 85% by 2036. The rule will be acutely felt by the chemical manufacturer, Chemours, in Kentucky. Chemours is currently the largest emitter of HFC-23 in the U.S. releasing hundreds of tons in the last year. Chemours first pledged to eliminate its emissions of HFC-23 in 2015 but failed to follow through on its pledge. The Biden administration has now applied renewed pressure on the company with the new rule, forcing Chemours to operate in a more climate-friendly way.

[Full article](#)

“In California’s Farm Country, Climate Change Is Likely to Trigger More Pesticide Use, Fouling Waterways” *Inside Climate News*

by Liza Gross



Photo: *Sandy Huffaker/Corbis via Getty Images*

Climate change is expected to increase the number of pests and insects for farm crops, as more larvae and eggs survive milder winters. This means increasing pesticide use for farmers in California as the state also prepares for more droughts. The combination of pesticide use and drought can cause a decrease in water quality, affecting the aquatic system and organisms. Better runoff systems and less dangerous pesticides need to be developed and implemented to address future dangers.

[*Full article*](#)

“‘Catastrophic:’ Sierra Leone Sells Rainforest for Chinese Labor”

The Guardian

by Karen McVeigh



Photo: *Issouf Sanogo/AFP/Getty*

The government of Sierra Leone recently reached a deal with China to build a large industrial fishing harbor on Black Johnson Beach, which is adjacent to a protected rainforest. The coastal waters off the beach are relied on by the local communities for food, and provide 70% of the fish found in domestic markets. The Black Johnson project puts fish breeding grounds in danger, and risks polluting several biodiverse terrestrial and marine ecosystems. Sierra Leone’s fisheries minister, Emma Kowa Jalloh, called on people to be patient and stated that the project was essential if the country is to develop.

[*Full article*](#)

“As Extreme Weather Batters America’s Farm Country, Costing Billions, Banks Ignore the Financial Risks of Climate Change” *Inside Climate News*

by Georgina Gustin



Photo: *Sandy Huffaker/Getty Images*

Climate change is beginning to affect all people. In the United States, natural disasters associated with climate change have become increasingly extreme and thus, costly. Extreme weather conditions such as hurricanes, droughts, and freezes have caused livestock and food production to struggle economically, with the majority of the economic burden falling on farmers and ranchers and the tax-funded programs aimed to protect them. However, as climate change escalates, funding will not be able to keep up. This will destabilize the food chain and could cause the financial system to collapse.

[*Full article*](#)

“Air Pollution From Raising Livestock Accounts for Most of the 16,000 US Deaths Each Year Tied to Food Production, Study Finds” *Inside Climate News*

News

by Georgina Gustin



Photo: *Joe Sohm/Visions of America/Universal Images Group via Getty Images*

Rearing livestock for food production leads to air pollution-related deaths. Transportation and electricity generation for rearing add to decreasing air quality. This poor air quality is thought to be responsible for about 16,000 deaths per 100,000 air pollution-related deaths every year in the U.S. In the livestock production-related deaths, predominantly areas such as North Carolina and the Midwestern Corn Belt are affected. The poor air quality is caused by livestock, especially ammonia, which can be harmful when combined with other pollutants to form PM 2.5, which was found to be linked to the deaths. According to studies, plant-based alternative feed-stock could reduce these deaths by 83%.

[*Full article*](#)

“Researchers Find a Missing Piece in Coral Reef Restoration: Crabs”

Anthropocene

by Berly McCoy



Photo: *Angelo Spadaro*

Unconstrained seaweed growth harms coral reefs by encroaching on habitat space and preventing the growth of new coral. Looking to restore reefs, coral biologists analyzed the potency of the Caribbean king crab, a consumer of seaweed. Researchers transplanted a large number of native crabs to damaged coral reefs and observed that crab grazing significantly enhanced coral reef restoration, especially when combined with human scrubbing of reefs. Seaweed overgrowth declined, and juvenile corals and coral reef fishes increased.

[Full article](#)

“How Bitcoin Mining Keeps Old Fossil-Fuel Plants Alive” *Mother Jones*

by Jessica McKenzie



Photo: *Omar Marques/SOPA Images/ZUMA*

Bitcoin mining consumes more electricity than entire countries, yet its proponents – especially those with a financial stake in the cryptocurrency – claim that it will hasten the transition to renewables. Officials at Greenidge Generation, a power plant that converted from coal to natural gas for Bitcoin mining, make this argument and position their operations as “environmentally sound.” However, the plant’s production of natural gas is not “clean;” the emissions and waste harm the environment, including by threatening local water quality and wildlife. Most essentially, Bitcoin proponents do not acknowledge that there are cases of insufficient regional demands for electricity, where power plants like Greenidge become obsolete in the absence of Bitcoin mining.

[Full article](#)

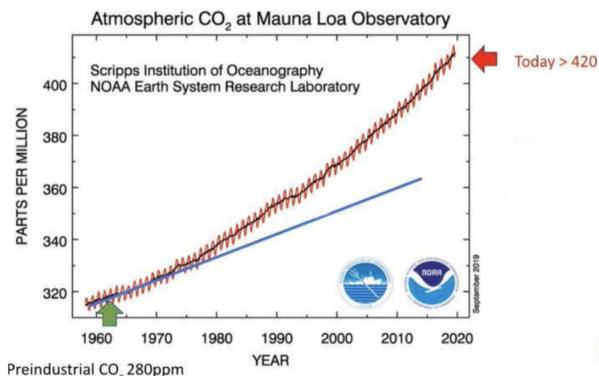
Dr. Francis Via's article on the Approaches for Reducing CO₂ Production and Creating a Sustainable Plastics Industry.

Approaches for Reducing CO₂ Production and Creating a Sustainable Plastics Industry

At the Spring 2021 meeting of the American Chemical Society, Professor Anthony J. Ryan, Director of the Grantham Centre for Sustainable Futures at the University of Sheffield, United Kingdom provided a summary of his life's work on environmental science. Dr. Ryan's work focuses on the impact of the Plastics Industry and CO₂ emissions on pollution and global warming with potential solutions.

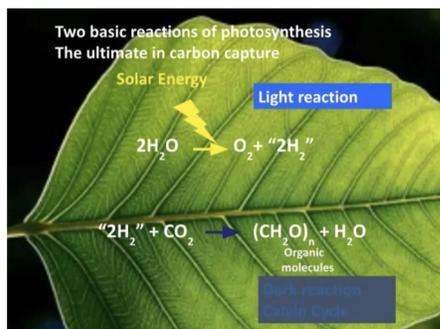
To address the problem of global warming and CO₂ production the following is proposed:

The major problem is that 87% of fossil fuel production is burned to produce energy with the release of CO₂ and particulates. CO₂ levels in the earth's atmosphere have grown



31% to 420ppm in the last 70 years. The global CO₂ adsorption capacity of agriculture, forests, plants, oceans, and waterways is inadequate to reduce or retard current growth rates of CO₂. Unfortunately, technologies for carbon capture and storage are energy-intensive, logistically

challenging, and have not been demonstrated nor implemented on a meaningful scale. The clear sustainable, pollution-free alternative is solar or wind generation of hydrogen via electrolysis of water to replace fossil energy. Electrolysis is a process for separating water into its components Hydrogen and Oxygen. The clear sustainable, pollution-free alternative is solar or wind generation of electricity for electrolysis of water to generate hydrogen and replace fossil fuel. Hydrogen is attractive as an energy source as water is the only byproduct of its combustion. Then hydrogen can be reacted with CO or with CO₂ as shown above to manufacture organic building block molecules, e.g., for the manufacture of pharmaceuticals and other uses. It is one giant leap to use hydrogen as our only energy source. The first demonstration steps are underway. The US Department of Energy and the state of California are funding the



building of 110 hydrogen refilling stations for zero-emission vehicles (ZEV) using fuel cells (FCEVs) for converting hydrogen to electricity with water as the only by-product. Currently, the production of hydrogen for these filling stations is derived from methane, a fossil fuel with the production of CO₂. Longer-term, solar or wind generation of hydrogen via

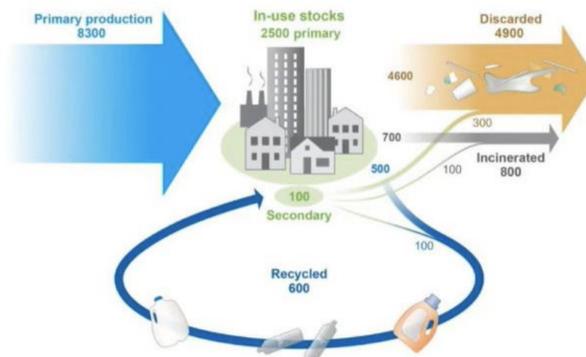
electrolysis of water to replace fossil energy will be considered for future refueling stations.

To convert the plastics industry to a sustainable enterprise the following is proposed:

Single-use plastics have become essential during the COVID-19 pandemic to provide critical personal protection equipment (PPE). However, the environmental impact of single-use plastics has become an increasing problem. Local and state regulations have been phasing out “throw-away” shopping bags and some plastic wrapping. Humanity is currently experiencing problems with plastics production, accumulation, and disposal.



Since 1950, 8 billion metric tons have been produced with 40 billion tons projected by 2050. In only 70 years, more plastic has been produced than all the people who ever lived –(107 billion people at 62 kg each). Most all the 8 billion metric tons (BMT) of plastics have been created from only 5% of the fossil fuels consumed by the world. Reuse and Recycling are difficult and expensive. It is cheaper and less energy-intensive to manufacture virgin polymers from fossil fuels than to recycle. Disposal cost has been shifted to the consumer and away from the producer and retailer. Of all the plastics that have been produced 28% are still in use, 56% have been discarded and only 9% incinerated for energy use and less than 7% have



been recycled. However, all current commercial polymers could be manufactured from natural bio-sources.

What has been presented as environmentally friendly compostable alternative packaging (see photo) actually does not readily degrade. When they do, they release water, CO₂, and even worse methane.

The entire plastics industry can be de-fossilized. All major commercial polymers can be manufactured from bio-sources such as cellulose, carbohydrates, etc. The manufacture of all commercially significant polymers from bio-sources can be



driven using solar or wind-generated hydrogen as the only energy source. Thus, we can make the industry totally sustainable and free of fossil fuels.

BOOK REVIEW: **Under the White Sky**

By Elizabeth Kolbert

Review by Katie Pratt

Elizabeth Kolbert, a well-known investigative reporter, recently wrote, *Under the White Sky*, a book that takes a deep dive into how the human species is currently combatting, or hoping to combat, the effects of human-induced climate change with hands-on and innovative solutions. Throughout *Under the White Sky*, Kolbert visits scientists with a variety of backgrounds, including engineers, chemists, and biologists. She explores how these experts work to combat the consequences of climate change.

As the human species spread globally, demands of population increased and the environment was heavily impacted—rivers' flows were reversed, invasive species were introduced, native species' habitats were shrunk, and above all else, changes in global climate. Through her observations and conversations with local experts and scientists, Kolbert raises a question of what nature really means today. Overall, there is no “natural” way to preserve and protect nature but neither is there an “unnatural” way. The way nature exists now is the result of human influence, and for the foreseeable future, this will not change. In order to prevent further devastation in the ecosystems, using gene editing to make the population less dangerous or even to shrink it by limiting reproduction abilities could benefit the environment greatly.

Species around the world are facing unprecedented population decline as we live through the sixth extinction. For example, in Hawaii, scientists specializing in coral reefs are attempting to create and breed heat-resistant coral that can later be introduced back to the ocean to help repopulate the reefs. Coral reefs play a vital role in capturing and storing carbon as well as creating the habitat for countless biodiversity and marine life.

Kolbert explores various invasive species as a blueprint leading towards a controlling-carbon solution. The name of the book, *Under the White Sky*, refers to cooling the earth by blocking the sun. By imitating the effects of a volcanic eruption in the atmosphere, scientists are currently studying how releasing reflective particles into the stratosphere could mitigate the harmful impacts of global warming. This does not come without downsides and there could be many unforeseen consequences. Experts generally agree that solutions should involve the reduction of greenhouse gases and geoengineering, including carbon capture or releasing reflective particles, need to be used in tandem if we want to maintain a habitable planet.

NOTE: Elizabeth Kolbert was recently inducted into the Academy of Arts and Sciences, as a science writer.

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