From the Editor

Facts and ideas from anywhere

William C. Roberts, MD.

LITHIUM

Walter A. Brown, a psychiatrist, recently produced a book entitled *Lithium* on a medication that today is known to be effective in patients with manic depressive illnesses (now commonly known as bipolar disorder).¹ Just as Coca-Cola initially contained cocaine, the recipe for 7-Up once included lithium.

Coca-Cola was a stimulant drink, and 7-Up was promoted in the early 20th century as a calming tonic. Lithium, a silvery-white metallic element, is abundant in natural sources, including rocks and seawater. It was discovered in its pure form in 1817. By the time of the lithium health craze, lithium had established industrial uses in ceramics, glassmaking, and lubricants. Its electroconductive properties have since made it an important component of batteries and cell phones.

In 1949, the psychiatrist John Cade discovered that lithium was extremely effective in treating patients with mania. This first demonstration that a drug could alleviate the symptoms of a mental illness was followed by a succession of psychotropic drugs that transformed psychiatry into the pharmaceutically driven profession of today. Cade was a provincial physician in Australia who had published papers considering the role of vitamins and nutrition in disease, a phenomenon he observed during World War II while interned by the Japanese in Singapore's notorious Changi Prison.

Cade's study of deficiency diseases such as pellagra and hypothyroidism convinced him that some mental illnesses had a biological basis. By collecting urine samples from patients in the mental hospital where he worked and injecting the samples into guinea pigs, he established that the urine of those patients diagnosed with mania was particularly toxic. He thereafter focused his research on lithium salts. He began by testing safe dosage levels on himself and, subsequently, on patients in the hospital. His first patient had been in a chronic state of mania for several years, but after a course of lithium was able to leave the hospital and resume his old job. Despite this spectacular early success,

Cade's work bore no further fruit. In 1950, his early patient developed seizures, became comatose, and eventually died from lithium poisoning. Cade banned its use in his own hospital thereafter.

His work was soon picked up by Mogens Schou. In 1954, the Danish psychiatrist and colleagues tested lithium in a randomized controlled trial, the first to be carried out in psychiatry. They confirmed the drug's remarkable efficacy. Schou established a safe dosage level and a blood serum test to monitor it and made the further discovery that lithium not only relieved the symptoms of mania but acted as a prophylactic against its recurrence. Schou's attempts to establish lithium therapy were met with resistance in the psychiatric profession.

Larger and more rigorously designed trials eventually swung the balance of medical opinion toward lithium. Yet no pharmaceutical company filed a new drug application with the US Food and Drug Administration (FDA) until 1970, at which point the FDA approved its medical use. Its uptake remained slow, however, especially in the USA where it was undercut in the 1980s by the arrival of valproate, a compound with no great therapeutic advantages and one that could be patented. (Lithium, a natural compound, could not be patented.)

Today, lithium inhabits a psychiatric world that is in many ways opposite from the one in which it emerged. Psychoanalysis has given way to biomedicine, and lithium competes in a teaming marketplace of medications. Despite its chemical simplicity, how lithium works is entirely unknown, and its use has not revealed a biological cause for bipolar disorders.

Recent research has validated the old idea that small quantities of lithium are broadly beneficial to health. It appears to preserve and foster the growth of nerve cells in areas where water had relatively high lithium levels, and thus it lowers suicide rates. Small doses may well be a general mental tonic.

DISEASE PREVENTION

Robert M. Kaplan, who served as associate director of the National Institutes of Health during the Obama administration and is presently at Stanford's School of Medicine, has written a splendid book entitled *More Than Medicine*.² He opines that our enthusiasm for biomedical science has inflated health care costs while encouraging us to neglect

more fundamental determinants of ill health, such as behavioral and social conditions. He began by reciting some familiar facts: the US spends far more on health care (18% of gross domestic product) than Western European nations (about 10%) but has a higher infant mortality rate and a slightly shorter life expectancy. While health care spending keeps rising in the US, medical outcomes have begun to deteriorate. He suggests that America's spending is a product of a sicker population, a higher intensity of care, and overmedicalization at the end of life. The author is skeptical of the capital-intensive innovations that excite investors and observes that research and development spending on drug discovery has seen diminishing returns. To achieve the kind of scientific progress we enjoyed in the 1970s would now take 25 times as many researchers as we have today. Kaplan laments that genomics has not lived up to its promise—the link between genetic defects and disease seems less direct than hoped—and that 1800 gene therapy trials had, as of 2012, yielded no cures. He argues that improving patients' measurements on certain biomarkers may have insignificant effects on overall patient health and survival. (I disagree with him on this point.) He argues that colonoscopy screenings do little for reduced premature deaths, as overall mortality from colorectal cancer among those screened (2.9%) is only slightly less than in those unscreened (3.9%). He fears that increasing sophisticated diagnostic technology will lead to many more patients receiving treatments even though they are not suffering ill effects.

Kaplan credits behavioral changes for much of the decline in mortality from stroke and heart disease over recent generations: a public health crusade helped reduce cigarette consumption per capita by 60% from 1965 to 2014. The author sees this as a blueprint for dealing with problems like obesity. In 2014, 35% of Americans were obese. The average is 17% among other nations that belong to the Organization for Economic Cooperation and Development. Obesity contributes to a greater prevalence of the most expensive medical problems, such as diabetes mellitus, heart disease, and stroke.

Kaplan's major point is certainly correct: there is more to be gained from a greater focus on preventing illnesses than from spending enormous sums after they strike. That view may be a tougher sell in an era when it is easier for politicians to speak of a "right to health care" than to insist on "responsibility to live healthily."

IMMUNO-ONCOLOGY

Journalist Charles Graeber, in *The Breakthrough*, indicates that physicians treating cancer patients through the years have had three unsavory options: cut (surgery), burn (radiation), or poison (chemotherapy).³ In 2019, the Nobel Prize in Medicine was awarded to researchers who added a fourth category, immuno-oncology. The subject of Graeber's engaging chronicle, immuno-oncology is the science of helping our bodies fight back.

The idea that we might possess the ability to fend off cancer can be traced to William Coley, a young surgeon, who in 1890 had just started his internship at New York Hospital. After watching a woman die of bone cancer, he examined numerous hospital records seeking examples of similar patients who had fared better. He found Fred Stein, a German immigrant, who also had been diagnosed with bone cancer and was treated with palliative operations. Stein's recovery was further complicated by a bacterial infection. As his fever raged, the tumor seemed to recede. Ultimately, Stein was discharged without evidence of either fever or cancer, an apparent miracle that Coley thought might have something to do with the pus. Coley's efforts to replicate this result—to rescue cancer patients by deliberately infecting them—usually failed. Coley later replaced live bacteria with a concentrated toxin and achieved some remarkable responses. His results, however, were a century ahead of any science that might make sense of them.

Coley's efforts were largely relegated to the dustbin of medical history until 1968, when another young surgeon, Steven Rosenberg, found himself captivated by another exceptional responder, a 63-year-old Korean War veteran, James D'Angelo, who had a gallbladder operation. Reviewing his history, Rosenberg learned that D'Angelo had been treated for stomach cancer 12 years before. When surgeons operated to remove the gastric tumor, they found that his abdomen was sprinkled with metastatic nodules. D'Angelo's already slim odds were made worse by a severe postoperative infection. He was discharged with no expectation of surviving the year. Yet here he was in front of Dr. Rosenberg more than a decade later. When Rosenberg performed the gallbladder operation, he examined D'Angelo's abdomen and found no evidence of cancer. The nodules had vanished.

To Rosenberg, the implication was clear: D'Angelo's cancer—presumably like Stein's in the previous century—was killed by the patient's immune system, which had been revved up by the bacterial infection. Rosenberg soon afterwards joined the National Institutes of Health and began what remains a lifelong effort to build upon his chance observation. Through the persistence of Rosenberg and other researchers, scientists have learned how cancer tricks the immune system, persuading it to stand down rather than attack.

Immuno-oncology has morphed into one of the hottest areas of science. Graeber reports that there are nearly 1000 immuno-oncology drugs in clinical testing. Some seek ways of selectively blocking the "off" signal. Others aim to remove immune cells from patients, supercharge them, and reinsert them back into the patients. Nevertheless, in far too many patients, cancer is still winning.

THE EBOLA VIRUS

The human immunodeficiency virus (HIV) presented itself in 1981, first gradually and then dramatically.⁴ We now know that it emerged decades earlier, crossing from an

animal reservoir to a human host. It then smoldered in isolated individuals before conditions permitted it to spread explosively. HIV has since become less aggressive and more insidious, especially in the West, but it remains a major health problem, particularly in Africa.

In 1976, 5 years earlier, the Ebola virus had announced its awesome power. Initially, the disease was thought to be an outbreak of typhoid or perhaps a flare-up of Marburg, another emerging virus. The episode created local panic and killed a number of patients in what is now the Democratic Republic of the Congo, but the virus apparently disappeared without causing too much of an international ripple. Not only have Ebola epidemics continued to occur, but the World Health Organization has cautioned that worse epidemics will come.

Richard Preston has written *Crisis in the Red Zone*, his second book on the Ebola crisis.⁵ The first one dealt mainly with an outbreak among laboratory monkeys that had come to the USA via the Philippines and died in a research facility near Washington, DC. The present book highlights the serious epidemic in the West African countries of Sierra Leone, Liberia, and Guinea in 2014 to 2016. In the West African epidemic, international agencies were criticized for offering aid that was too little and too late. Medical personnel—physicians, nurses, technicians, ambulance drivers—bemoaned the lack of medicines, hospital beds, isolation and diagnostic equipment, intravenous fluids, and the materials that make up the infrastructure of modern medical care. Heroes and heroines are brought to life in this book, none more poignant than Dr. Humarr Khan, a specialist in Lassa fever (a viral illness that kills through massive bleeding), who had to adjust to the even more aggressive Ebola virus, and his chief nurse, Mbalu Fonnies. Both Dr. Khan and Ms. Fonnies contracted Ebola and died while caring for their patients, as did several others whose stories Preston featured. The Ebola virus kills 40% of those attacked. Preston details the gruesome effects of the illness: fever, intense headache, projectile vomiting, bloody diarrhea, widespread bleeding under the skin and into organs, intractable hiccups, and a fixed facial stare. No wonder Ebola is considered a “hot” virus, one for which full-protective gear is needed. It makes both care and research especially difficult with negative-air-pressure chambers, cumbersome paraphernalia, and proper decontamination procedures, part of the necessary rituals.

The genome of the Ebola virus has been sequenced and the virus classified into different strains, which often differ by a single mutation but produce distinct mortality rates. The virus’s ultimate animal reservoir is probably the fruit bat. It is spread primarily through body fluids, especially blood, but virus particles also can be present on the skin. The fear is that a further mutation might render the virus airborne, like influenza or the common cold. Preston opines that if this were to happen, it would make the 1918–1919 influenza epidemic seem like a stroll in the park. Ebola has not gone away nor will it anytime soon.

SNAKE BITES

Since 2009, there have been just over 6000 snakebites in the USA each year, and 2018 had the largest number, with 7000.⁶ Of these 6000 or so snakebites, only five a year are fatal. Most deaths occur when a victim has an allergic reaction or is far from medical treatment when bitten. Deaths are particularly on the rise in Texas, North Carolina, and Georgia, where snake bites increased more than 10% in 2018 compared to 2017. In Texas, there were 415 reported snakebites in May and June 2019, 27% more than in that period in 2018. Copperheads represent most bites in the three states, and most are in fast-growing suburbs of cities such as Raleigh, Atlanta, and Dallas.

The reasons for the increase include rapid urbanization as new neighborhoods spring up in what was formerly farmland or forest and the record-setting rainfall in 2019, something that drives snake activity. Wet winters tend to drive snake activity, and drought tends to decrease snake activity. The winter of 2018 was the wettest on record in the US with 9.01 inches of precipitation, 2.2 inches more than average. It is not completely clear why rain drives snake activity, but it has been theorized that it causes flora and fauna to flourish, creating ready food sources for rodents, which become food for snakes. Heavy rains also drive snakes out of their habitats.

Texas, North Carolina, Georgia, and Florida represent 39% of reported snakebites, according to a 2016 study. Copperheads are the dominant snake in all these states except Florida, where the dominant snakes are the Eastern Coral and the Cottonmouth. Copperheads thrive in suburban environments because they have relatively small roaming areas, a strong homing instinct, and a willingness to eat whatever is available, from rodents to cicadas. Copperheads also camouflage themselves easily in underbrush or leaf piles with their tan scales and brown triangular markings. Snakebites are part of the environment in the states mentioned, but many people who now live in the Southeast and in Texas were born somewhere else, mainly the Northeast and Midwest. These newer residents do not realize that snakes are part of the environment.

To avoid being bitten, herpetologists recommend clearing away piles of leaves, wearing shoes when outdoors, and using a flashlight when out at night. They also recommend leaving snakes alone because they typically will not bother us if we do not bother them.

AGING

In *Borrowed Time: The Science of How and Why We Age*, Sue Armstrong, a Scotland-based writer and broadcaster, investigated the mechanics of growing old and asked why we can’t be more like the Greenland Shark, which “can live for more than 400 years and appears to remain physically fit and fertile to the end.”⁷ Armstrong does not pretend that there is any one answer to the question of why we age as we do. She presents the various theories. The geneticist thinks the answer is in the gene; the immunologist suspects overactivity

of the immune system; the evolutionary biologist believes that evolutionary biology holds the key. There probably is some truth to each of these claims. There is a “hyperfunction theory” positing that genes selected by nature keep working after their reproduction job is done. In the “postreproduction” period of life, Armstrong suggests that genes operate “under ever-weakening evolutionary control” and their inappropriate activity leads to disease and death. Other theories focus on why cells stop dividing as we age, suggesting it is nature’s way of limiting the proliferation of potentially dangerous cells, as in cancer. If the cause of age-related afflictions is that the immune system is running overtime, one can potentially produce drugs that suppress it. But a suppressed immune system, of course, leaves one vulnerable to infection. A group that devotes itself to “calorie restriction” is convinced that aging is the result of eating too much. Some of these advocates favor diets consisting of fruits, vegetables, nuts, and seeds. One-time gerontological wisdom opined that aging was the result of “free radicals”—toxic metabolic byproducts—doing “oxidative damage” to cells. That thesis in recent times has been discarded. The truth is we do not know the mechanisms of aging.

JEROME R. SINGER (1921–2019) AND MAGNETIC RESONANCE IMAGING

As a teenager, Jerome Singer had little interest in school but tinkered with radios and made rifles that shot rubber bands.⁸ He later tried several trades, including furrier, electrician, machinist, and wartime ship navigator. At Boeing, he failed to find a way to make jetliners quiet. He finally found his calling as a professor of engineering at the University of California, Berkeley. Starting in 1959, he built devices using magnets and radio signals to measure blood flows inside a mouse and then inside human fingers and arms. He earned 20 patents and plaudits as a pioneer of today’s magnetic resonance imaging (MRI) scanners. Although nominated for a Nobel Prize, it went to Paul C. Lauterbur in 2003 for work in the same field. Lauterbur credited Singer with creating “an early predecessor to MRI.”

Singer lived 97 years and earned \$2 million from patents related to MRI technology. He taught for 25 years at Berkeley and helped start companies involved in software and use of MRI technology to monitor energy pipelines and prevent ruptures. His wife, Margaret Singer, was a psychology professor at Berkeley and an expert on cults and brainwashing techniques. They filled two houses with books, research papers, and scientific apparatus. She died in 2003.

DOG OWNERS AND EXERCISE

A study in the April 2019 issue of *Scientific Reports* found that dog owners are about 4 times more likely than non-dog owners to meet the USA’s daily physical exercise guidelines.⁹ Scientists at the University of Liverpool, UK, and other institutions studied a group of adults in a neighborhood near Liverpool asking families whether they had a dog. The investigators collected almost 700 participants from 385

households—half women and most middle-aged. About one-third of the people owned a dog. Everyone in the study was asked, including the children, to complete lengthy questionnaires about how much they moved each week. The researchers also provided activity monitors to a few of the families and asked them to wear them for 1 week while exercising as usual.

It was immediately apparent that those who owned dogs walked far more than those without dogs. According to both questionnaires and activity monitors, most dog owners spent close to 300 minutes each week walking their dogs, about 200 minutes more walking per week than those without dogs. Dog owners met or exceeded the standard guidelines for exercising for health: at least 150 minutes of moderate exercise each week. The dog owners also spent slightly more time than the non-dog owners jogging, cycling, or visiting the gym. Children whose families owned dogs walked about 100 minutes each week and played and romped with the pets for about 200 minutes, making them substantially more active than children in homes without dogs. A small proportion of dog owners never walked their dogs and most of those were young, healthy, and female. The results indicate that those with dogs are more physically active than those without dogs.

EMPLOYER HEALTH PLANS

The average total cost of employer-provided health coverage passed \$20,000 for a family plan in 2019, according to the yearly poll of employers by the nonprofit Kaiser Family Foundation.¹⁰ On average, employers paid 71% of the cost and employees, 29%. Employees’ cost rose at an even faster clip. The average annual amount workers paid toward premiums for family plans grew 8% in 2019 to \$6015. The average deductible for single coverage that employees pay out of their pockets before the insurance kicks in went up to \$1655. The Kaiser survey was conducted between January and July 2019 and included 2012 randomly selected employers that responded to the full telephone survey.

BOTTLED WATER

I never buy it. I have always considered it a waste of money, but about one-third of Americans choose bottled water over tap water most of the time.¹¹ More than 90% of those buying bottled water cite “safety” and “quality” as their reasons. While it can be safe, this is not always the case. According to a Government Accountability Office (GAO) report from 2009, the most recent data available, about 70% of the bottled water sold in the US is not subject to FDA regulations. That’s because if water is bottled and sold in the same state, it is considered intrastate commerce and is therefore not regulated by the federal government but by the state. This in itself is not necessarily a problem because some state regulations are stricter than the FDA’s. But the GAO report also said those rules can be less comprehensive than for tap water that must comply with the Safe Drinking Water Act, administered by the Environmental Protection Agency.

Bottled water under the FDA's purview may not get the scrutiny we might expect. Bottled water was an \$18.5 billion (wholesale) industry in the US in 2017, but under pressure from both parties, FDA oversight has been lightly staffed. Furthermore, the agency allows bottlers to fill bottles with tap water!

While the water is usually treated, that is not a guarantee. The major bottled-water suppliers guard their prestige brands and have an incentive to do all they can to sell safe drinking water. But there are hundreds of bottled water brands, and some lesser known bottlers with tiny profit margins may not share the concern of the larger recognized ones. Because they don't have to worry about public confidence in their brand name, they can stop using one label and start selling under another without changing the source. A rigorous study in 1999 by the Natural Resources Defense Council tested three samples of >100 bottled water brands and found that one-third of the bottles examined had levels of bacteria or chemical contaminants above state or industry standards or guidelines.

The bottles themselves can also present a health concern, as only a small percentage of all bottled water sold in the US is bottled and shipped in a stable material like glass. Even if the water that fills a plastic bottle is pure, if it sits long enough and especially if stored in a hot place, there are risks of phthalates and other chemical agents in the plastic leaching into the water. These phthalates are endocrine-disruptive agents that pose special threats to pregnant women and young kids.

I will stick with good tap water, which costs about 300 times less than bottled water.

THE PHOTOGRAPHIC EAGLE

The French falconer and Freedom Conservation founder Jacques-Olivier Travers has mounted a camera between the wings of a white-tailed eagle named Victor.¹² The 9-year-old Victor has been photographing from the top of one of the Swiss mountains with a 360-degree camera on his back and a GPS to track his progress. He will fly through Germany, Austria, and Italy before ending his mountain tour in France. During each flight he flies about 1.8 to 3.1 miles and descends 5000 to 9800 feet in search of Travers below. Victor has photographed once-magnificent glaciers that are now crumbling because of global warming. Victor's photographs have shown there are virtually no glaciers left in these mountains. The disintegrating permafrost, which glues a glacier's rocks together, can cause them to crumble with potentially devastating consequences. Italian authorities are scrambling to respond to fears that part of a large Italian glacier near Mont Blanc is on the verge of collapsing. Victor's photos show that the planet is warming quite rapidly.

BIRDS DECREASING*

Common bird species control pests, pollinate flowers, spread seeds, and regenerate forests. When these birds disappear, their former habitats change considerably. A team of researchers from universities, government agencies, and

nonprofit organizations collaborated in a new study that combined old and new methods for counting birds.¹³ For decades, professional ornithologists have been assisted by amateur birdwatchers who submit their observations to databases that help carry out surveys of bird populations each year. In this new study, the researchers turned to those surveys to estimate the populations of 529 species between 2006 and 2015. Those estimates included 76% of all bird species in the US and Canada. The researchers then used birdwatching records to estimate the population of each species since 1970, the earliest year for which there is solid data. The approach of combining population abundance estimates across all species and looking for an overall trend is apparently unprecedented. Among the worst hit groups are warblers, with a population that dropped by 617 million. There are 440 million fewer blackbirds than there once were. Europe is experiencing a similar loss of birds, also among common species. Grassland species have suffered the biggest decline by far, having lost 717 million birds. These birds have probably been decimated by modern agriculture and development. In addition to habitat loss, pesticides may have also taken a toll. Pesticides called neonicotinoids make it harder for birds to put on weight needed for migration, delaying their travel. Not all birds, however, are decreasing in number: the numbers of bald eagles, falcons, and waterfowl are on the upswing.

*I am indebted to my brother, Stewart, for sending me this article.

CLIMATE CHANGE IN TEXAS

The state of Texas consists of 268,000 square miles encompassing several climate regions, each with varied economic, social, and environmental drivers. Scientists predict a significantly warmer and dryer climate with occasional catastrophic flooding.¹⁴ We need to contain every drop of water. Texas is a microcosm of water issues nationally. With 85% of its population living in metropolitan areas, Texas continues to urbanize, creating more severe water challenges. More buildings and roads mean less green space to absorb water runoff, increasing flash flooding and pollutants from parking lots and turf into river systems. Irrigated landscapes use significantly more water during summer months, drawing down water supplies. People from lower socioeconomic backgrounds are disproportionately hardest hit from the impact of extreme weather events.

Water utilities have become efficient in delivering and treating water. The division between growing urban needs and dwindling rural water supplies has too often forced our state leaders to choose who gets water and who does not. Upstream users clash with downstream agriculture, water-reliant businesses, and coastal fisheries. Advocates are divided into camps, pitting environmental interests against community needs, and rural interests against urban needs.

Everyone has a stake in water. We need to turn the faucet off when brushing our teeth. We need to use less water in the

shower. It is only going to get worse. Cape Town, South Africa, for some time has had an extreme water shortage. It won't be long before several US cities are in the same situation.

RECORD HEAT AND DROUGHT IN THE SOUTH

Across the South in 2019, record heat temperatures occurred in dozens of cities, especially in the Southeast.¹⁵ The 2019 summer tied for the hottest on record for the northern hemisphere. The string of warm months suggests that 2019 will be among the five hottest on record. The triple-digit daytime highs have combined with an acute lack of rainfall to rapidly dry out most of the Southwest, causing what is known as a "flash drought." Rainfall totals in the Southeast have been <40% of their normal averages in August and September. The region now ranges from "abnormally dry" and "moderate drought" to "severe drought," the first three stages of a five-stage drought scale. The flash drought is impacting agriculture, damaging range and pasture grasses for livestock, and making it difficult to harvest peanuts in the dry, hard soils. If drought conditions continue in the Southeast, it could bring wildfires and severe crop losses.

CIGARETTES AND CIGARETTE FILTERS

Cigarette butts are the world's most littered item, and they pose intractable trash problems.¹⁶ Throwing the butts on the ground is a firmly entrenched habit for many smokers. Indeed, about 65% of cigarettes smoked in the US are littered. The European Union in May 2019 adopted new rules under which members must pass laws within 2 years requiring tobacco companies to fund the cleanup of filter litter as part of a crackdown on single-use plastics. Cigarette filters, which are used in virtually all cigarettes manufactured today, are made from cellulose acetate, a form of plastic. Cellulose acetate filters were added to cigarettes in the 1950s after studies linked smoking to lung cancer. Studies have questioned their health benefits saying they do not block all chemicals. The World Health Organization has said market claims that filtered cigarettes are healthy are fraudulent. There is no good side to cigarettes.

UNINHABITABLE EARTH

David Wallace-Wells has expanded his 2017 *New York Magazine* article by the same title, where he's deputy editor. That article became the magazine's most viewed ever.¹⁷ He writes about the most extreme possibilities of what may come if we keep spewing carbon compounds skyward. Although there were skeptics about his message in 2017, those critics largely have been subdued by infernos that have laid waste to huge swatches of California; successive monstrous hurricanes—Harvey, Irma, and Maria—that devastated Texas, Florida, and Puerto Rico in 2017; serial cyclone bombs exploding in America's heartland; so-called 1000-year floods occurring every 2 years; polar ice shelves fracturing; and refugees fleeing desiccated areas in North Africa and the

Middle East where temperatures have approached 130°F, and from Central America where alternating periods of drought and floods have now largely replaced normal rainfall. He explains how we were convinced that we could survive with a 2°C increase in average global temperature over preindustrial levels, a figure first introduced in 1975 by William Nordhaus, a Nobel Prize-winning economist at Yale, as a safe upper limit. Because 2°C was a conveniently easy number to grasp, it was repeated so often that policy negotiators confirmed it as a target at the 2009 Copenhagen Climate Summit. We now know that 2°C would be calamitous. Major cities in the equatorial band of the planet would become unlivable. In the Paris agreement of 2015, a 1.5°C increase was deemed a safer limit. At 2°C of warming, one study estimated 150 million more people would die from air pollution alone than they would after a 1.5°C increase. After watching Houston drown, California burn, and chunks of Antarctica and Louisiana dissolve, it appears that "safe" is a relative word. Currently, we are at only 1°C above preindustrial temperatures. The preindustrial level of atmospheric carbon dioxide was 280 parts per million (ppm); we are now at 410 ppm. The last time that was the case, 3 million years ago, seas were about 80 feet higher. A rise of 2°C would be around 450 ppm. Wallace-Wells says we are currently headed beyond 500 ppm. The last time that happened on earth, seas were 130 feet higher. He envisions an eastern seaboard moved miles inland, to Interstate 95. Long Island, New York City, and nearly half of New Jersey would disappear. It is unclear how long it takes for oceans to rise in accordance with carbon dioxide concentrations, but we would not want to wait to find out.

Wallace-Wells indicates that we are presently on course for a rise of somewhere between 3°C and 4°C and that it could even reach an 8°C increase by this present century's end. At that level, anyone still in the tropics would not be able to move around outside without dying.

GLOBAL SHIPPING

Every year some 60,000 oceangoing freight ships carry \$7 trillion in goods and commodities around the world.¹⁸ Just one of the largest of those ships can exude as much sulfur oxide gas, a major contributor to acid rain and respiratory diseases, as 50 million diesel-burning cars. But big changes are coming. Beginning January 1, 2020, ships will need to use cleaner fuel or be outfitted with new exhaust systems to abide by new international rules. The new rules will cause a demand spike in the oil market 4 to 6 times as big as 2008, when oil skyrocketed. Fuel that ships currently use literally comes from the bottom of the refining barrel. The new rules mandate that the maximum sulfur content in marine fuels be reduced to 0.5% from its present 3.5%. The Finnish Meteorological Institute predicted that the new rules could extend the lives of 570,000 people who would have died prematurely from 2020 to 2025. This shift will affect as much as 5% of global oil demand and will be more

expensive. The dirtier fuel costs roughly \$325 a ton while one kind of compliant fuel costs \$600.

BEWARE OF SCAMMERS

These scammers work hard to fool us older folks.¹⁹ In early 2018, I received a phone call that one of my grandsons had been arrested and needed bail money. Over several calls the scammer discouraged me from notifying my grandson's parents, supposedly to spare him their opprobrium. My phone seems to ring several times a week from these "fraudsters." Now, I ignore the calls.

CIVILITY

Keith Thomas has produced a book entitled *In Pursuit of Civility: Manners and Civilization in Early Modern England*.²⁰ "Civil" and "civilian" evoke the social life of a people not under military rule. The world of the *civitas*—the organized community—is the only place, according to Aristotle and Cicero, where the good life is possible. Thomas defines the word as "the virtue of citizens" and Samuel Johnson in his 1755 *Dictionary* defined "civility" as both "politeness" and "the state of being civilized." Civility entails living peacefully together in "quietness, concord, agreement, fellowship, and friendship," as Elizabethan schoolmaster Richard Mulcaster put it. This book appealed to me because I fear our manners are diminishing.

William Clifford Roberts, MD
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