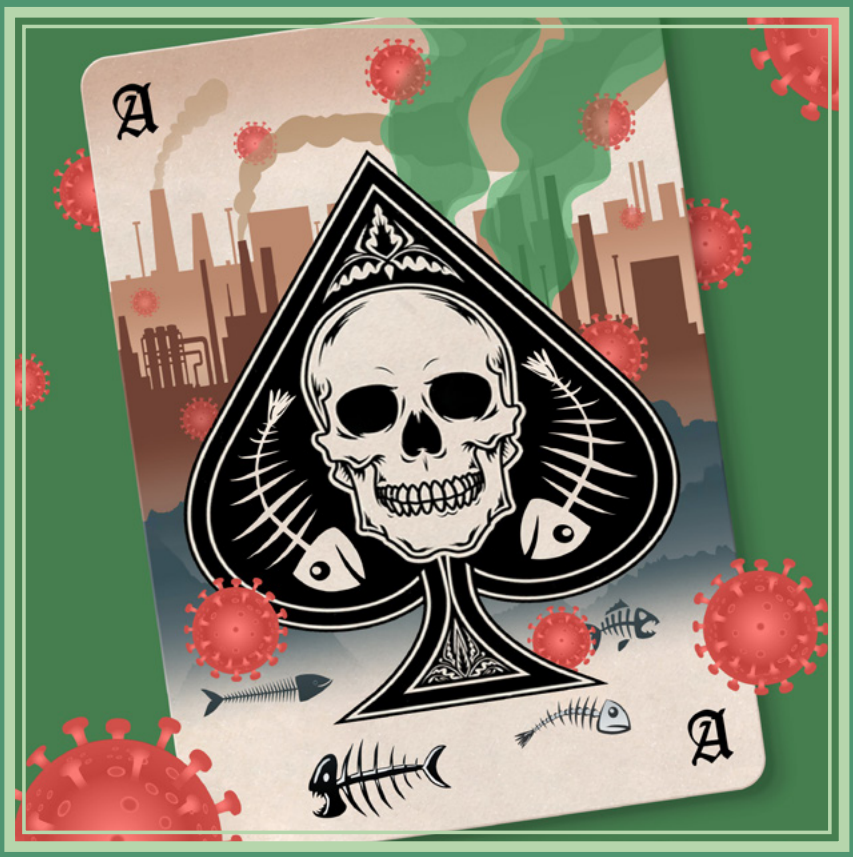
Chapter Four

Karma, Luck & Timing– Gambling for The Environment

Custom Maid Backspin for New World Disorder



We should begin by setting conscience free. When all men of all religions… shall enjoy equal liberty, property, and an equal chance for honors and power… we may expect that improvements will be made in the human character and the state of society.

To Dr. Price

–John Adams –

April 8, 1785

CUSTOM MAID BACKSPIN
For New World Disorder
Political Storms, Corrosive Money, Climate Change and Pandemics

Peter G. de Krassel

But while democracy can be periodically delayed.
It can never be permanently defeated.

The Hill We Climb

– Amanda Gorman –

TO OUR GRANDCHILDREN AND THEIR CHILDREN WHO ARE THE FUTURE; AND SHALL INHERIT WHAT WE LEAVE THEM.
"RESPICE FINEM-E PLURIBUS UNUM" –
AN EYE TO THE END – FROM THE MANY ONE

July 1, 2021
Hong Kong

The cause of America is in great measure the cause of all mankind.

Common Sense

– Thomas Paine–

Acknowledgments and Sources

A knowledge of books is
the basis upon which other
knowledge is to be built.
– George Washington –
Letter to Jonathan Boucher
July 9, 1771

This book is a replay of Post-9/11 history analyzed by fellow glass-mates, with glasses containing alcoholic and non-alcoholic beverages, across the world, most notably the Main Bar and Bert's at Hong Kong Foreign Correspondents Club's (FCC), the numerous saloons on Whiskey Row in Prescott, Arizona, Venice Beach, California, and airport lounges across America, China, Asia, Europe and the Middle East.

I thank all the citizen journalists and professional journos with whom I have had collegial-civilized conversations and heard opposing views on cultural, religious, political, and geopolitical issues. These dialogues have helped me crystalize my thoughts, especially on housing and rental issues. But, more importantly, how to blend them with America's Founding Fathers' vision for America and the world; a vision that is more relevant today for We the Maids to clean out the garbage piling up in America, and sweep out career politicians and their self-serving destructive laws and policies. We the People need to make sweeping changes to benefit us all.

The greatest glass-mates of all, America's Founding Fathers. I quote extensively in this book their ideas and vision, often fueled by alcohol, to remind us what indeed is the American ideal which *We, the Maids*, have allowed the entrenched political establishments to hijack.

On a personal level, I am particularly grateful, first and foremost, to my partner Pauline Taylor, for tolerating the messy research paper trail I leave everywhere we go. "Slainte Mhagh – Slange Var," the Scottish-Gaelic toast. Thanks Babe.

I am obliged to David Ketchum, who, over a couple of glasses of wine, suggested *Backspin* as this book's title, and also to my fast-typing assistant Emily Mak, whose speed-typing allowed me to get this book printed in less than six months.

A special thanks to Mark Tigan, ret. associate professor of Practice: Community Development and Planning, Department of International Development, Community, and Environment, at Clark University, Worcester, Massachusetts, for his critical and constructive editorial input, introduction to Amy Mosher Berry, who researched and helped me write the history of rent control, and the proposed Rent Subsidization Plan – and survey. But doubly to Mark for being a buddy.

To Michael and Sharon Broggie, friends from Los Angeles who moved to Prescott, Arizona and talked me into doing the same. Michael is an author, writer and political fanatic, with whom I discuss and share political ideas and frustrations that reflect the divided electorate in Arizona and America – and brainstorm prospective solutions.

To a mutual friend of Michael and me, Ralph Herman, sculptor, writer, musician, property developer and former client, formerly from Los Angeles, now living in Paso Robles. We catch up periodically over a couple of world renowned local wines. Ralph is quoted in every book I have written, because of his continued solicited and unsolicited political opinions and convictions, humorous advice, and friendship.

Ralph, is mentioned in this book because of his concern about political and legal developments in Hong Kong. He has been urging me, much like many of my other buddies and high school friends – Jake Berman, Rudy Cohen and Josh Michaelly, with whom I get together whenever I am back in the US – to leave Hong Kong, like so many Hongkongers are doing. They helped me understand the misperception Americans have of the situation in Hong Kong because of the protests and National Security Law, believing Americans could be arrested and jailed just for being American. It is a concern that Avi and Janice ("Jan") Rojani shared and raised, whenever I visited them in Ojai, Ventura, to de-compress from the 14

hour flight from Hong Kong to California. Thank you for your more than 45 year friendship, stimulating discussions about American and Middle Eastern politics, and trips to local second-hand book stores to buy many of the history and political classics that adorn my book shelves and many pages in this book.

To Perla and Ami Karney, two long-time friends with whom it was always a pleasure to get together in L.A. Sadly, Ami passed away in January 2017, his friendship and smile sorely missed.

To Joe Lam for his patience and persistence in guiding me through the dark clouds of new media, and continuing to work with me on the media side of my books.

To Julie Chapin, fellow lawyer, actress and political activist, also mentioned in earlier writings, for her continued political activism, political insight and friendship; and her husband Tom, for his friendship and historical tutorials on President Abraham Lincoln.

To Prescott neighbors Geo and Jean Flood and Rob and Jan Leahy for guiding Pauline and me about how to kick-back and settle comfortably into the country groove of Prescott, every time we get there from the concrete canyons of Hong Kong, and for giving me the time and spirit needed to put this book together in my head.

At the end of the book, Research Library lists the numerous authors and writers, their books, columns, articles, stories and Op Ed pieces I have copied and given credit to, in addition to the credits stated in the text itself.

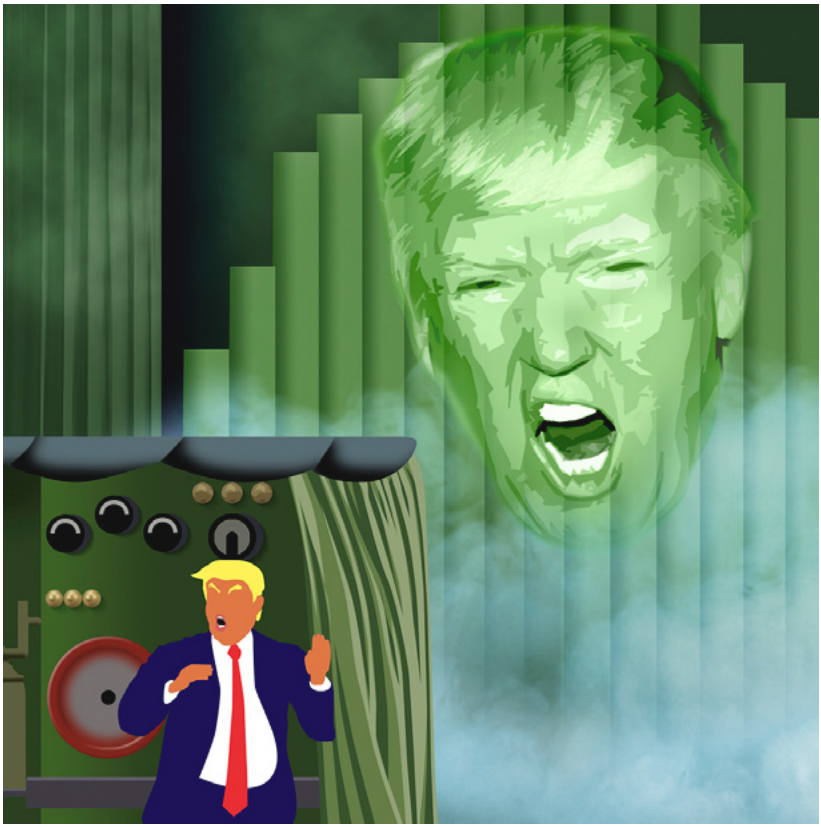
Several others also deserve special mention. Among them, Michael and Luke Paulsen for their book The *Constitution*, an easy read and re-introduction to the *US Constitution*, the oldest written one in the world which many countries have copied, but practiced only by few. Bucker F. Melton Jr., for his compilation of America's Founding Fathers quotes in *The Quotable Founding Fathers*, making my research into the quotes in this book much easier to find. Acclaimed historian Yuval Harari, for his *21 Lessons* for the 21st Century and warning us that *Some Fake News* Lasts Forever. Kliph Nesteroff, the author of *We Had a Little Real Estate Problem: The Unheralded Story of Native*

Americans & Comedy, who picks up where fellow Native American, Will Rogers left off with his political humor, as he reintroduces him as a modern comic, along with a long line of indigenous overlooked comedians. Also, the best-selling author Richard Preston, whose personal frontline experience confronting the Ebola outbreaks in the Congo, gave us two personal eyewitness accounts: *Crisis in the Red Zone and The Hot Zone* – and warning us about the outbreak of new viruses.

To all the foreign correspondents, journalists and authors whose writings taught me contemporary political and economic history and opened my mind to accepting our new social media driven world – and its impact on us.

To fellow glass-mate Viswa Nathan, a long-established Hong Kong journalist and former editor-in-chief of the daily newspaper *Hong Kong Standard*, who got me to focus my writing, articles, blogs, even this book, and on "explaining to non-Americans how the hell your election process and government works." It inspired me to include Americans, who don't seem to know either. Also for introducing me to Hari Kumar, a wonderful and enjoyable editor, critic – and glass-mate – to work with and enjoy good conversations about life, personal honesty in writing, living and getting around cross-culture roadblocks.

Last, and most importantly, to my children – Alexandra, Jonas and Austen – and grandchildren Jonas, Macie and Lily, born after *Spin* was published, to continue to building and trying, to leave ourselves and future generations a healthier world.



Were it left to me to decide whether we should have a government without newspapers, or newspapers without government, I should not hesitate a moment to prefer the latter.

Letter to Colonel Edward Carrington

– Thomas Jefferson –

January 16, 1787

American Axis Hypocrisy, Dumbed-Down & Active

APost 1/6 Reflection
The President, Vice President, and all civil officers of the United States, shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.
CONSTITUTION OF THE UNITED STATES
Article II, Section 4
1787

Continued New World Disorder

The world we knew ended on 9/11 when the US came under unprecedented terror attacks. My aim to document this in a book focusing on my disappointments, relations between the United States and China, Anglo-American and Sino-Latino differences became a trilogy of tomes. It was "A condensed fusion of history and contemporary events that converged yet again as the new century dawned…a contemporary snapshot, a slice of apathetic and parochial life in America today. Both timely and timeless," questioning why religion, politics and sex are subjects we are constantly admonished not to discuss. As I pick up from where I left off, I believe I have come up with some answers.

Career politicians pray that the people they screw don't figure out what is being done to them in the name of country and party – and God forbid – demand a change to the current political disorder. A change that some Americans tried to make on January 6, 2021 – 1/6!

One-Six. It was as profound as Nine-Eleven.

On that day, like 9/11, America's intelligence agencies and defensive-military-might, failed to protect America's Democratic Capitol

from being attacked by a mob of citizenry chanting "Hang Pence," as Vice President Mike Pence was presiding over a Joint Session of Congress to certify the Electoral College vote that put Biden in the White House. The mob tried to stop the vote and keep Trump in power instead, and the chaos forced Pence, and all other elected members of Congress present, to flee.

FBI Director Christopher Wray testified in early March 2021, before a Senate Committee investigating the events of 1/6, that the FBI had sent an ominous warning the night before, on January 5, about extremists "preparing for war." It was sent to authorities at the command level, local Joint Terrorism Task Force network and posted on a national electronic portal for review by law enforcement authorities nationwide.

Capitol Police chief, Steven Sund told a separate Senate panel that the intelligence bulletin arrived at the Capitol police intelligence unit but was never distributed to him and others in his force.

Asked by lawmakers why the information had not been seen by the former Capitol chief, who resigned shortly after the attack, or the District of Columbia police chief, Wray said, "I don't have a good answer."

Yogananda Pittman, acting chief of the Capitol Police, later said that the department knew militias and white supremacists would be coming, "that there was a strong potential for violence and that Congress was the target."

"It was more than just an e-mail," the director said, adding that at least five Capitol police officers who also serve as members of a terrorism task force received it. In addition, the information was included in a "verbal" briefing of law enforcement officials at a local command center.

Six months earlier in September, Wray had warned Congress and America about domestic terrorists. "Trend may shift, but the underlying drivers for domestic violent extremism – such as perceptions of government or law enforcement overreach, sociopolitical conditions, racism, anti-Semitism, Islamophobia, misogyny, and

reactions to legislative actions – remain constant," he said then. It was the very extremists he warned of who attacked the Capitol.

Domestic right-wing extremists were responsible for almost 70 percent of terrorist attacks and plots in the US in 2020, according to the Center for Strategic and International Studies, a Washington think tank.

In opening the March 2, 2021 hearing, Senate Judiciary Committee Chairman Dick Durbin, said that the "federal government had failed to address the growing terrorist menace in our own backyard." He criticized the Trump administration, saying that officials "spent four years downplaying the threat posed by white supremacists."

White Europeans, primarily British Anglo-Saxons, wanting to take over government the same way they took over the country from Native Americans, Mexicans, freed slaves and each other.

Cowboy philosopher Will Rogers, whose observations became the premise and foundation of *Spin,* would probably endorse this conclusion, because of his Cherokee roots – a fact ignored about the superstar, but is explored by Kliph Nesteroff in his book *We Had a Little Real Estate Problem: The Unheralded Story of Native Americans & Comedy*.

Nesteroff reintroduces Rogers, warts and all. Depression, prejudices and the funny line of unsung Native American comedian heroes followed, and the racism, bigotry, and discrimination they have suffered.

The book's title is the punchline to a joke of this narrative by the Oneida Nation comic Charlie Hill. The setup: "My people are from Wisconsin. We used to be from New York."

Hill described pilgrims as "illegal aliens," likening them to house guests who will not leave. I agree and wrote a blog under the same title.

"What Eddie Murphy was in the 80s for young Black comics, that's what Charlie Hill did for new young Indigenous comedians the last 15 years," said Nestoff.

American Goal

I echo my wish that my books continue to be thought-provoking to stimulate personal multi-generational dialogue and debate. Cancel cancel culture, smash-mouth politics of personal identity that is not only still devouring us today – but getting much worse!

Cancel the cancel culture!

America, the dream the Founding Fathers weaved for all the immigrants that made the country what it is today, has become a hellish nightmare.

A country "changed from vanilla WASP to Cherry Garcia white patched butterfly, with butterfly ballots. Or is it a multicultural scoop of Ooey Gooey cake? Apple pie America is a racial blender of caramelized apple. Rich, heavy and lite."

A reality we cannot forget.

America should not forget what drives the American Dream: Foreign students and the immigrants who follow it and succeed. I know it first-hand. I am one. We even make it to the top in one generation. These "aliens" are running American success stories: Google, Microsoft, Adobe, Citibank, IBM and MasterCard, to name a few.

That includes foreign and local women who have run AMD, eBay, Facebook, Fidelity, General Dynamics, General Motors, Heinz, Hewlett Packard, Lockheed, Oracle, Xerox and Yahoo.

Home Grown Dramas

The assault on the Capitol building on January 6, 2021, was the first such action by American citizens in 67 years. The previous occasion when the Capitol came under violent attack was on March 1, 1954. Puerto Rican nationalists had then invaded Congress and opened fire from the spectators' gallery above the House floor, wounding five members of Congress.

The latest attack was an attempt to scuttle the time-honored democratic procedure of the Joint Session of Congress, presided over by the Vice President, certifying the Electoral College vote which will

determine who will be the nation's commander-in-chief for the following four years – the incumbent Donald Trump or his challenger Joe Biden. The attack, particularly the fact that Trump's supporters followed his orders to engage in "trial by combat," led to Trump's impeachment trial in the Senate on January 20 and him becoming the first US president to be impeached twice, the second time when he was no longer president.

Let's not forget that the counting the electoral votes to certify the new president took less than 24 hours in 2021, 35 days in 2000 and four months in 1876.

Thankfully, this time, the White House put out a statement on January 8: "As President Trump said yesterday, this is a time for healing and unity as one nation."

But that statement did not stop the record-extending run of weapon sales that the assault on the Capitol had. Gun sales in January 2021, the month of the insurrection and swearing-in of Biden, hit a historic high of two million, a 79 percent increase over the previous January. The increase extended a record-setting surge that began when the coronavirus pandemic took hold in early 2020. The FBI reported that background checks for firearm purchases exceeded 4.31 million in January, the largest monthly tally since the bureau started keeping track. The FBI conducted 170,000 background checks on the Capitol siege, followed by 524,000 more over the next three days.

"If they can do it at the US Capitol, anybody can decide to have an insurrection anywhere. And with that being said, everybody needs to be able to protect themselves," a gun buyer named Trin Porter – was quoted as saying.

Gun sales often rise during presidential election years amid worries a new administration could change gun laws. Biden has supported gun control measures such as a ban on assault weapons and "would love to see action" on gun control, a Second Amendment that gives Americans the right to bear arms.

Ironically, while gun sales are booming, the National Rifle Asso-

ciation filed for Chapter 11 bankruptcy protection on January 15, 2021, a move that surprised observers of both the firearms advocacy groups and bankruptcy lawyers. As a lawyer who started with a firm specializing in bankruptcy, I am fascinated and perplexed by the NRA bankruptcy. I learned the legal and financial benefits of bankruptcy by listening to some of the foremost bankruptcy experts argue different bankruptcy laws and proposed changes, namely Marin Gendel, Miles Raskoff, Barnie Shapiro and Arnold Quittner, the founders of Gendel, Raskoff, Shapiro & Quittner. Doubly so as an Arizona resident, living on a dirt road in the middle of nowhere, in an "Open Carry" state and a NRA neighborhood, and believer in the Second Amendment and the right of citizens to bear arms, so that I can enjoy my lifestyle securely.

What makes the filing unusual, is that the NRA cited three constitutional rights for moving to Texas from New York and filing for bankruptcy in Texas. The first two, free speech and the right to bear arms are not an issue. The third, the right to "seek a fresh start in bankruptcy," although also enshrined in the Constitution is more obscure.

The NRA said in its bankruptcy filing that it wanted to "establish a centralized, neutral forum in which it can streamline, resolve and address all outstanding claims." It admitted it had no financial problems. Its biggest concern, it said, was the lawsuit filed by the New York Attorney General Letitia James, seeking to dissolve the NRA as a charity, alleging that the NRA's management had looted the organization for personal gain. James accused NRA's management executives of using NRA assets for private jet flights, yacht trips and safaris, which, in turn, undermined the group's mission around gun safety, education and training.

In a letter to NRA members, Wayne LaPierre, longtime NRA head wrote: "The plan can be summed up quite simply: We are DUMPING New York, and we are pursuing plans to reincorporate the NRA in Texas." LaPierre also noted that the NRA was "as financially strong as we have ever been in years."

Separately, the NRA has tried to consolidate all its major litigation

nationwide in Texas. Still, it also made the case descend into chaos as everyone with a bone to pick with the NRA, using the bankruptcy code and courts in their favor.

I agree with Georgetown law professor Adam Levitin who said: "The NRA bankruptcy looks like a play for time and negotiating leverage against the New York attorney-general, but there is no obvious light at the end of the tunnel for the NRA."

In later court filings, the NRA said its assets exceeded its liabilities by $50 million and that revenues were only slightly down in 2020.

New York has moved to have the bankruptcy dismissed, calling it a bad faith filing.

I agree with Sujeet Undap, who wrote a piece in the *Financial Times* titled: *NRA appears to have shot itself in the foot with bankruptcy ploy.*

America's armed democratic roots are stretching out deeper and stronger. They are much more resistant to legal and physical abuse than the Founding Fathers ever envisioned.

The Founding Fathers Constitutional system is not only working – but flourishing.

Coups

For all intents and purposes, the Capitol Insurrection was, a failed coup attempt – unlike the successful one in Myanmar, which followed just weeks after the 1/6 insurrection in Washington D.C. But unfortunately, such coups have a long history in Asia.

The first coup attempt in the US, which failed, and the latest successful coup in Myanmar, bring to mind that coups were common in China.

One of the famous coups in China that can be compared to what happened in Washington on January 6, 2021, was the Chenqiao mutiny. In his column in the *Post Magazine,* a monthly publication of the Hong Kong-based media group, *South China Morning*

Post, writer Wee Kek Koon discusses what happened in China over a thousand years ago, towards the end of the chaotic Five Dynasties and Ten Kingdoms period (907-979AD). Wee wrote on February 21, 2021, under the title *Hostile takeovers:*

"With the end of the Tang dynasty, China was split into multiple political regimes ruled by warlords, while the rump state was ruled in quick succession by five dynasties.

"The last of these, the Later Zhou (951-960AD), was on its way to reunifying the nation when the second emperor died and was succeeded by his six-year-old son – an enticing prospect for the ambitious Zhao Kuangyin (927-976AD), the commander of the palace guards.

"In the spring of 960AD, six months into the new emperor's reign, the court received reports of an impending attack by the Northern Han and the nomadic Khitan people. Without verifying the news, the empress dowager and senior ministers deployed Zhao to lead an army from the capitol, Bianliang, present day Kaifeng, to defend the frontier. Zhao reached the Chenqiao postal station the following evening. There, his younger brother and private secretariat staff provoked the soldiers into staging a mutiny. As a result, a yellow imperial robe was draped on a reluctant Zhao and he was proclaimed emperor.

"Zhao and his army returned to Bianliang and persuaded the child emperor to abdicate and the court officials to recognize him. Thus the Song Dynasty was founded. The Later Zhou emperor and his family were treated with courtesy and the people went on with their daily lives unperturbed – no mean feat considering the massacres and mayhem that accompanied many dynastic changes.

"However, the absence of any "invasion" in the spring of 960AD, the inexplicable availability of the imperial robe among an itinerant military unit, and other questionable details have convinced historians that the mutiny and palace coup had been pre-arranged, probably by Zhao himself."

Sound familiar? Some commentators argue no different than what

Mao Zedong did to Chiang Kai-shek, and President Trump tried to engineer as commander in Chief.

The Big Lie

The lie that Trump used for engineering the coup has devoured, and for all intents and purposes, killed the Republican Party, and is now threatening to do the same to American democracy.

"Denying the legitimacy of our last election is becoming a prerequisite for being elected as a Republican in 2022," observed Gautam Mukunda, host of Nasdaq's *World Reimagined* podcast and author of the book *Indispensable: When Leaders Really Mattered*.

"This is creating a filter that over time will block out anyone willing to tell the truth about the election." It will leave us with a "Republican Party where you cannot rise without declaring that the sun sets in the East, a Republican Party where being willing to help steal an election is literally a job requirement."

It is frightening! Representative Anthony Gonzalez, one of the few Republicans who voted to impeach Trump, told *The Hill,* a political newsletter, about the decision to oust Representative Liz Cheney from her House G.O.P. leadership position because she refused to go along with the Big Lie:

"If a prerequisite for leading our conference is continuing to lie to our voters, then Liz is not the best fit. Liz isn't going to lie to people… She's going to stand on principle."

Cheney told Republican donors and scholars at a retreat for the American Enterprise Institute in Sea Island, Georgia in May 2021: "We can't embrace the notion the election is stolen. It's a poison in the bloodstream of our democracy…We can't whitewash what happened on January 6 or perpetuate Trump's Big Lie. It is a threat to democracy. What he did on January 6 is a line that cannot be crossed." A "peaceful transfer of power must be defended."

Cheney is right. Unless principled Republicans stand up for the truth, conservative Republican ideals and debunk the Big Lie, America runs, as the professor emeritus of sociology at the Chinese

University of Hong Kong and vice-president of the Chinese Association of Hong Kong and Macao Studies, Lau Siu-kai wrote, the risk of another civil war and the death of the American democratic model. In his article, *Democracy vs. Chinese authoritarianism?* A contest the US won't win, published in the June 25, 2021, edition of the *China Daily* – one of the many newspapers I read to stay informed of different points of view, especially the political and economic differences between America and China – Prof Lau made some interesting observations. Although I disagree with his views, I share them with my readers, especially Americans, to understand better a Chinese perspective – hopefully, a step in the right direction to cancel the cancel culture.

American Democracy vs. Chinese Authoritarianism

As Prof Lau put it, "During the Cold War, the United States designated the paramount issue in world politics as the existential struggle between capitalism and communism. Three decades later, the US defines the struggle between "democracy" and "authoritarianism", or, more precisely, the existential struggle between "American democracy" and "Chinese authoritarianism", as the primary international issue.

"US President Joe Biden in 2020 wrote in *Foreign Affairs* magazine that 'the triumph of democracy and liberalism over fascism and autocracy created the free world. But this contest does not just define our past. It will define our future, as well.' On March 31, 2021, he again framed the current moment in world politics as an existential choice between 'democracy' and 'autocracy,' a fundamental decision that is 'what competition between America and China and the rest of the world is all about.' The Strategic Competition Act of 2021 presents the US-China relationship as a zero-sum economic and military struggle between 'democracy' and 'authoritarianism' and creates a political environment that leaves little room for cooperation between the two countries. One American scholar even forecasts that 'the coming decades will feature a long, drawn-out contest between democracy and dictatorship.' What is amazing is that almost everybody in the foreign policy community of the US is

confident that this contest between 'democracy' and 'authoritarianism' will be won roundly by the US.

"By pitting 'American democracy' against 'Chinese authoritarianism,' the US is pitting a romanticized and idealized 'American democracy' against a demonized and false 'Chinese authoritarianism.' The US is implying that the 'universal values' it advocates such as democracy, freedom and human rights are fully realized in the US whereas what happens in China is just the opposite. The assumption is that any country which does not cherish and practice these 'universal values' is by that very fact an autocracy or dictatorship. The contest between 'democracy' and 'authoritarian' is also propagated as an existential confrontation between good and bad. By using this political gimmick, the US attempts to convince people in the US and around the world that China is public enemy No 1 to humanity and that by taking on China or pursuing 'regime change' there, the US is not pursuing narrow national interests, but engaging in a moral crusade for the sake of the international community, fully believing that eventually good is bound to prevail over bad. This ideological offensive smacks of animus, hypocrisy, self-righteousness, arrogance and double standards.

"Such a gimmick is not working and is unlikely to do so. Apart from certain sections of the Western public, most people around the world can see through the falsehoods, misinformation and propaganda drummed up by the US and will not be fooled into rallying behind the US crusade.

"I think any impartial observer will agree that the reality in the US and China is drastically different from the narratives presented by the US. Today, a lot of people in the US and abroad are seeing a failed and unenviable 'American democracy," are unhappy with the sorry state of affairs in the US and are worried about the future of the US and the West as a whole. In 'American democracy,' the salient features include a fractured polity, money politics, flawed democracy, plutocracy, a divided society, political stalemate, rampant racism and populism, ineffective governance, a debilitating sense of malaise, mistrust of the political and social elites, the inability of the US Constitution to solve the political problems, falling confidence

in American democracy, social alienation and pessimism about the nation's future. In short, 'American democracy' is largely unable to achieve the 'universal values' supposedly at its core or to deliver the public goods and services to meet the demands and aspirations of the American people.

"The conditions in China are the polar opposite. The Chinese nation has never before been so united, so spirited, so confident in the leadership of the Communist Party of China, so proud of its political system, so happy with its conditions, so proud of the country's achievements in the past 40 years, and so optimistic about its future. Indeed, 'Chinese authoritarianism' has been able to deliver robust and sustained economic growth, reduction of absolute poverty, public security, social well-being, effective and good governance, technological feats and the rejuvenation of the Chinese nation.

"China sees its political model as rooted in Chinese history, culture and experience and thus it is unique and cannot be exported or replicated. China has no intention or desire to engage in an ideological struggle with the US. In any case, the Chinese political model will never appeal to the Western public. In Chinese political culture, strong political authority, people-oriented governance, collective interests, national solidarity and national prestige are more treasured than individual or partisan interests. And this is frequently interpreted and accused by the US as suppression of human rights in China, even though the Chinese people do not see it that way. Even though China does not see its political model as the embodiment of 'universal values,' if, however, enough non-Western and developing countries as well as a portion of the Western public rate the Chinese political model as successful and see some elements of it as worthy of emulation, their admiration and support for the American political system will inevitably falter. Consequently, the so-called universal values which are presumably 'embedded' in the American political system will no longer be seen as 'universal' and as morally superior. This is probably the major reason the US feels threatened by the Chinese political model. This sense of threat is magnified by the poor performance of the American political system in recent decades. A major reason the US is launching an ideological war against China is an unnerving sense of insecurity

and self-doubt among decision-makers and public intellectuals. By treating the Chinese political system as a worthy competitor, the US is indirectly paying tribute to the Chinese political system. As such, the US embarks on this ideological war from a position of weakness and diffidence. There is a lack of confidence that the US can win this ideological contest eventually.

"In fact, inasmuch as more countries in the world are moving toward what the US is calling 'authoritarianism,' 'autocracy,' 'illiberalism' or 'electoral authoritarianism,' the appeal of 'American democracy' in the world has been falling inexorably. More people are losing interest in 'American democracy.' The cultural heritage of many non-Western societies would discourage them from opting for political systems that allow individual interests to run amok to the detriment of a common well-being. This means that it will be increasingly difficult for the US to galvanize the international community to support its struggle against 'Chinese authoritarianism.'

"By elevating the game of 'American democracy' versus 'Chinese authoritarianism,' the US is urging people around the world to pay more attention to and judge the merits and shortcomings of the two political models. The US hopes that other people use American values as the criteria for judgment and proceed to castigate the Chinese model. But the outcome is more likely to be contrary to the wishful thinking of the US. In today's world, particularly after the COVID-19 pandemic and worldwide economic disarray, most people will place a priority on economic growth, jobs, healthcare, social welfare, social justice, social solidarity, personal security, law and order, quality of life, and the future of their countries than on the so-called universal values extolled and propagated eagerly but poorly and inconsistently realized in the US. The animus of the US toward China will increase anti-American sentiments in China and among overseas Chinese, and will make Chinese people in China and all over the world rally behind the Communist Party of China, allowing the Chinese political system to perform even better in promoting economic development, effective governance and social well-being, widening further the gap in government performance between the two countries, and making 'American democracy' look even more unattractive and undesirable. I am sure that the contest

between 'American democracy' and 'Chinese authoritarianism' will eventually be won by China. By challenging China to compete with the US on which political model is superior, the US is unwise and at risk of losing face both at home and abroad."

Two days earlier, on June 23, 2021, Martin Wolf had penned a column in the *Financial Times* titled: The healing of democracies starts at home, which pointed out that there are longer-term dangers in the planned new alliance of democracies against China under Biden.

"The high-income democracies are right to wish to protect their core values. But the principal threat to these comes not from China, but from closer to home. It is the failure to ensure widely-shared prosperity and defend democratic norms that matter most. It has, alas, been our elites, not China's that have caused this damage. Meanwhile we must recognize the overwhelming need for global co-operation in preserving peace and protecting humanity against global threats, such as pandemics and environmental disasters."

Wolf correctly warns that nothing is more likely to drive the Chinese people even further into the arms of their communist regime than unremitted hostilities from the democracies. In the long run, confidence in our values of openness and freedom is far more likely to change China.

"Yes, the democracies must defend core economic and strategic interests. But they should also remain as open to trade and ideas as possible. Sanctions will not change China. Only the Chinese people can do so. The west must give them a reason to wish to do so," says Wolf.

It is good to see a renewed attempt at western co-operation. But the high-income democracies must avoid some dangerous traps. If they are to lead, they need far more coherent ideas than they showed at the June 2021 G7 in Britain. Moreover, they must try and avoid a calamitous conflict with China. Like it or not, cooperation is essential for humanity to prevent Armageddon. In the long run, above all, the high-income democracies must look within if they are to save themselves. China is not the greatest threat to our interests and values: we have met the enemy and it is us.

Independent Commission

Not conducting a bipartisan investigation to identify the enemy among us who triggered and planned the attack on the Capitol on 1/6 was not only unprecedented, it was un-American. Historically, despite its political divisions, the US formed fact-finding commissions – for example, after the attack on Pearl Harbor in 1941, the assassination of President John F. Kennedy in 1963, and the terrorist attacks of 9/11.

The failure to do so for 1/6 further erodes trust in the government and deprives Americans of lessons to prevent such an onslaught in the future.

"After many of the national tragedies we've experienced over the last 50 or more years, the response was to have a bipartisan investigation that would lay out the facts in a way that would be definitive," said Michael Chertoff, who served as homeland security secretary under President George W. Bush after the 9/11 attacks. "It builds trust. It shows the public at a time of crisis, we can all come together and put the good of the country ahead of partisan interests."

Chertoff and three other former homeland security secretaries who served Republican and Democratic presidents had lobbied Republicans to support the creation of a 1/6 commission, saying the nation needed a better understanding of "how the violent insurrection of the Capitol came together, to ensure the peaceful transfer of power in our country is never so threatened again."

"We need to get a definitive explanation of what actually happened," Chertoff said in an interview after the Senate vote that rejected appointing a commission.

Even though the Justice Department is prosecuting more than 400 members of the Capitol assault team, congressional committees are also investigating and inspector-generals examine their agencies' responses to the attack. But there was no independent group of experts charged with getting to the bottom of the numerous failings that lead to the attack on 1/6.

What is known has only raised more questions.

Why did it take hours for the National Guard in Washington D.C. to receive approval to deploy to the Capitol to fight the insurgents? Maj. Gen. William J. Walker, the D.C. National Guard Commander at the time, has said he did not receive approval to mobilize troops until more than three hours after he requested it. At the same time, Defense Department and Capital security officials have given conflicting statements about what happened.

What was Trump doing during the attack? He reportedly watched television but later claimed that he had called the National Guard, despite his defense secretary testifying that he never spoke to Trump that day. In addition, a Republican member of Congress said she was told that when the House Republican leader, Representative Kevin McCarthy of California, phoned Trump to ask him to call off the mob, Trump refused, siding with the insurgents who he said were evidently more upset about the election than McCarthy was.

Oh yeah, and let's not forget, McCarthy did blame Trump for the attack on the Capital.

What accounts for the lax precautions taken as right-wing extremists and militias openly planned to converge and wreak havoc on the Capitol? Leaders of the Capital Police instructed their officers not to use their most forceful crowd control techniques and missed intelligence reports about the attack.

How much co-ordination was there among extremist groups and Team Trump, most notably Trump's lobbyist buddy Roger Stone, a convict whom Trump had pardoned off on all convictions and charges just weeks before the Capitol insurgency? Stone was seen protesting the election results with extremists at the Supreme Court on January 5. And, to what extent were members of Congress involved in the planning of the rally that preceded the attack? An organizer of the "Stop the Steal" rally said three members of Congress "schemed up" the event with him, though two of the three have denied that claim.

And perhaps most important, how can America prevent another similar scenario from happening again?

For America, which holds itself out as a beacon of democracy, the rule of law and transparency, the Senate ruling not to appoint a commission has also raised a fundamental question: What happens when one political party effectively squelches any effort to look inward to assess government failings that have shaken the public's faith in the nation's institutions?

"This was not just a random event; it was existential in nature," said former congressman Lee H. Hamilton, who was vice-chairman of the 9/11 commission. "How in the world could this happen in this country? It was unbelievable that this far along in a democracy, we could have this kind of an event occur. It needs exploration."

Hopefully that exploration will happen in the federal lawsuit filed by the N.A.A.C.P., on behalf of Representative Bennie Thompson of Mississippi, against Donald Trump and Rudy Giuliani over their involvement with the 1/6 insurrection.

The lawsuit alleges that by attempting to prevent the certification of the election, Trump and Giuliani violated the 1871 Ku Klux Klan Act, one of several anti-Klan acts passed by Congress from 1870 to 1871.

The act reads:

> "If two or more persons in any state or territory conspire to prevent by force, intimidation, or threat, any person from accepting or holding any office, trust, or place of confidence under the United States, or from discharging any duties thereof; or to induce by like means any officer of the United States to leave any state, district, or place, where his duties as an officer are required to be performed, or to injure him in his person or property on account of his lawful discharge of the duties of his office, or while engaged in the lawful discharge thereof, or to injure his property so as to molest, interrupt, hinder, or impede him in the discharge of his official duties … each and every person so offending shall be deemed guilty of a high crime."

The language of the statute is appropriate for the suit, even though adopted for a different reason – to fight Black Codes in the South meant to replace slavery as much as possible.

Charles M. Blow, wrote an Op-Ed piece in *The New York Times* on February 22, 2021, pointing out how similar times were today to the period when the law was adopted.

"To me, the similarities are striking. Millions of people are in the country without citizenship – until it is granted. The white population is growing apoplectic about being outnumbered and overwhelmed. There is a fear of displacement in all its forms. There is a vigorous effort by white supremacists to suppress Black votes, including using the law to do so. And there is a deadly act of violence in a government building that focuses the country's attention and spurs Congress to action."

Blow's concerns are echoed by Kimberly Wehle, a professor at the University of Baltimore School of Law and author of the book *How to Read the Constitution* – and Why. Writing in the political newsletter *The Hill* on May 3, 2021, noted that "as of late March 2021, state legislators have introduced 361 bills in 47 states this year that contain limitations around voting, a 43 percent increase from just a month earlier."

Thomas L. Friedman, *The New York Times* columnist, described these laws best. "This is the equivalent of lighting a fuse to a bomb planted beneath the foundations of our democracy."

American Political Football

When America's Founding Fathers wrote the Constitution and Bill of Rights, they had in mind a reset button to review the republic's domestic and foreign affairs periodically, paving the way for a government Of the People, By the People, For the People.

The election of Joe Biden and Kamala Harris as the president and vice-president, and the Democratic Party gaining control of the Senate and House of Representatives in January 2021, is an ideal example of this elegant mechanism.

The people rejected the domestic and foreign policies of Donald Trump and his Republican Party – and voted in the Democrats to run the White House and the federal government.

With that America is back in the geo-political game, after four years of gradual incremental isolationism, even though American democracy is facing challenges at home.

No different from quarterback Tom Brady who is back after being challenged by the Patriots in New England.

American Football is the best metaphor for America and its political system. Anything can happen no matter what the pundits and bookies say and bet. On the football field or ballot box. I get into basketball and baseball later in the book.

American football, like the American Constitution, is in a class of its own. One-of-a-kind compared to rugby, soccer and any other ball game, just like the American Constitution is one-of-a-kind, that differs from other democracies and political systems.

Watching Super Bowl LV (55), on February 7, 2021, as America was gearing up and getting ready to start former president Trump's second impeachment trial the following week for inciting insurrection, was in many ways a super spreader metaphor for America and its political system and democratic model.

The Super Bowl went ahead as scheduled, notwithstanding the Covid-19 restrictions, just as the Electoral College vote went ahead as scheduled, notwithstanding the insurrection that breached Capitol security. American football beat the pandemic, just as American democracy beat the Capitol insurrection.

Just as Tom Brady at 43, was the oldest quarterback to play in a Super Bowl, let alone win, and coached by Bruce Arians 68, the oldest coach to win a Super Bowl, America has the oldest winning Constitution that governs democracies today, coached by President Joe Biden, the most senior person elected to the White House.

America, the quarterback of liberal democracy, like a Tom Brady, may get sacked periodically, but it will get up and win the political game.

The Tampa Bay Buccaneers 31-9 upset win of the Kansas City Chiefs, was a replay of President Biden's upset win of Trump by almost eight million votes.

Brady, like Biden, relied on his true and tested pros he can connect with to win. Rob Gronkowski came out of retirement, Antonio Brown from football purgatory and Leonard Fournette from limbo land to catch the winning touchdowns. Much like Biden did with Congressman Jim Clyburn, to win the South Carolina democratic primary and Democratic Party nomination – and presidential election.

A few weeks before the deadly attack on the Capitol and the Super Bowl, Arizona State University Sun Devils walk-on running back Jackson He Peizhang, made history by becoming the first Chinese-born football player to score a touchdown in the College Football Bowl Subdivision.

He was wearing a T-shirt with the slogan "Chinese people can ball too" in Chinese, given to him by his coach Antonio Pierce.

"I just wanted to score. It's the one-yard line, you gotta score," said the native of Shaoguan in the southern Chinese province of Guangdong.

"I'm very happy and satisfied, but I know it's a long road and there's a lot of hard work to do now. This is only the beginning," He told the mob of reporters.

Talk about metaphors and Chinese proverbs – in of all places – Arizona my home state in the US, where the November 2020 presidential votes in Maricopa County are being audited for fraud to "Stop the Steal," as of the publishing of this chapter on August 13, 2021.

American Revolution

John Adams, one of America's Founding Fathers, made one of his many excellent observations on the creation of the United States in 1818. "The Revolution was effected before the war commenced," he wrote of the 1760s and 1770s. "The Revolution was in the minds and hearts of the people; a change in their religious sentiments of

their duties and obligations…. This radical change in the principles, opinions, sentiments, and affections of the people, was the real American Revolution."

Many scholars have asked whether the American Revolution was a revolution at all. It was led by lawyers, merchants and property owners – groups that tend to have a stake in social and political stability. Funny enough, those Americans who held power before the revolution were, by and large, still in power afterwards.

The new government that the Founders established enshrined traditional British liberties. Sure, it looks like that the Founding Fathers were acting to preserve their way of life against further imperialistic British encroachments on old colonial freedoms, rather than just creating a new political or social order.

What Thomas Jefferson wrote in the Declaration of Independence about human rights and equality and the purpose of government was nothing new. John Locke and other British political thinkers talked and wrote about people's rights. What made the Declaration of Independence special is that they were enshrined in the official cornerstone of a nation's secular life.

The Founding Fathers experimented with different ideas of government. In one such experiment, a fourth branch of government was established – a council of censors – to serve as the people's watchdog over the other three branches. Imagine that!

The Founding Fathers could read Latin, Greek and Hebrew and be well aware that they were creating a new political model, even though they borrowed heavily from tradition and history, usually after intense debates and reflection, a practice long forgotten by today's career politicians.

Their writings, speeches and quotes were in the original language, whether the Bible, Shakespeare, Cicero, Locke or Montesquieu.

The Founding Fathers were insightful speakers in legislative bodies and courtrooms and wrote prolifically in newspapers and by letter. Their words give us a personal view of their core beliefs that drove

the revolution and the nation-building that followed to make what America is today.

America then was a land of readers and writers. "Americans were literate" observed Henry May and Paul Rahe. "A greater percentage of citizens could read and write than was true of any other nation on earth….Nearly four times as many newspapers were published in the United States as were published in France, though France had six times as many people and was possibly the most literate nation on the European Continent," wrote Forrest McDonald in his book *Novus Ordo Seclorum: The Intellectual Origins of the Constitution.*

America's founding capital was its literate and smart people. Something America has to get back to again after being dumbed down in the past few decades by career politicians. A subject I discuss at length in *Custom Maid Knowledge for New World Disorder,* Volume II of the Custom Maid trilogy. The second edition of volume II of the trilogy titled *Custom Maid Scholarship for New World Disorder,* will show how to get Americans smartened up again the way they were.

The Founding Fathers had political differences that, like many Americans today, became personal, even between family members. John Marshall, couldn't stand his cousin Thomas Jefferson.

Let's not forget they even challenged each other to duels and Alexander Hamilton was killed in a duel with Aaron Burr.

Given their fierce personal differences, intellect and knowledge, their debates and discussions "had an ancient and well-equipped arsenal of thoughts and words upon which to draw."

Something that is sorely lacking today in politically gridlocked Washington D.C., even though the partisan differences are just as traditional and fierce.

Slave Owning Fathers

The Founding Fathers were slave owners, as were most people of means of that time. As repugnant as such status looks today, looking back, one must remember that at the time, slaves were treated

much better than they had been in the past. Humanity was evolving, just as it has been since then, to what people see as unacceptable behavior today.

The Founding Fathers, were bright, educated well-read people, as were most Americans of the day. Steeped in history and religion, they gave us the *Constitution,* their political and economic road map that humanity should pursue. So, when the time came to decide which fork to take during the slavery debate, abolition or continued slavery, the Civil War paved the path America should take.

The abolition road won the Civil War, but has not quite completed the journey down the cultural road to acceptance of all people, regardless of the color of their skin, sex or sexual orientation.

The Founding Fathers vision and mission was for a union of states with different political and economic beliefs and convictions, populated by indigenous tribes, slaves and white settlers from Europe, primarily Britain, to come together as free people, endowed with the basic human rights spelled out in the Bible, as interpreted and practiced by the different religions across America at the time.

The musical Hamilton has raised the question of whether or not Alexander Hamilton the "revolutionary manumission abolitionist," owned slaves.

Jessie Serfilippi, a historical interpreter at the Schuyler Mansion State Historic Site in Albany, New York, in her paper "As Odius and Immoral a Thing": *Alexander Hamilton's Hidden History as an Enslaver,* offers the most convincing case that Hamilton was a slave owner.

"Not only did Alexander Hamilton enslave people, but his involvement in the institution of slavery was essential to his identity, both personally and professionally," Serfilippi writes.

"It is vital," she adds, "that the myth of Hamilton as 'the abolitionist Founding Father' end."

Hamilton married into the powerful Schuyler family in 1780. Slavery was common among New York State's elite. The Schuylers were

some of the largest slaveholders in their area, with more than 40 people enslaved at the Albany mansion and another estate over the years.

Hamilton did criticize slavery at different points in his life, and compared with most white contemporaries, he held enlightened views on the abilities of Black people. He was also an early member of the New York Manumission Society, founded in 1785 to encourage voluntary freeing of the enslaved – and advocate gradual abolition of slavery.

Serfilippi notes that Hamilton, a lawyer, consulted with clients on slavery-related issues and he would not likely have been hired for such work, she argues, "if he were known amongst his peers as having only abolitionist leanings."

As a lawyer, I know that lawyers occasionally represent clients with a different political belief and conviction. Such differences do not necessarily compel the lawyer to turn down the engagement. After all, lawyers are hired guns to do a job for a client. Represent them to the best of their ability. Civilly and criminally. After all, that is how lawyers earn a living.

Albert Lin, the Hong Kong editor of *China Daily,* enjoys hosting Chinese Banquet dinners periodically for his writers from China and Hong Kong and other journalists writing for local and international newspapers as well as business people and entertainers, to exchange views on current affairs, especially US-China relations. Some of the discussions, make it loud debates, were hotter than the Sichuan prawns served during the Trump presidency.

One such diner guest is Richard Harris, a business columnist for the *South China Morning Post,* knowledgeable about America. Discussing America with him is a pleasure. "America is open, transparent and willing to wash its underwear in public in the name of individualism, free trade and the frontier spirit," he points out. This openness, he explains, "can be difficult to understand by those who haven't experienced it. It is an attribute usually seen as a threat. It is exploited by opponents, but it is also America's strength – forcing periodic introspection, cleansing and renewal in public."

Our discussions were not limited to politics. Harris is an investment manager, banker who, like me, enjoys writing columns. We both wrote for the *South China Morning Post*.

"Nearly 100 years of open trading has earned the US dollar the right to be the world's reserve currency and so US interest rate policy dominates global economies," Harris wrote in one of his columns after the 2020 US presidential election. "More important is that the volume traded in 2019 in US equities was US$35 trillion, compared with US$19 trillion on the major Chinese exchanges," he noted.

"It is easy to disrespect the US but very risky to feel superior" was the concluding paragraph of his November 13, 2020 column. A hot political dish that is regularly served and debated at Albert Lin's banquets.

I agree with Warren Buffet's remark that progress on achieving a "more perfect union" in America is uneven but still moving forward. "Our unwavering conclusion: Never bet against America," he said.

Biden tweeted the same on March 11, 2021.

Made in Hong Kong

Looking at Hong Kong more than two decades after it is reunified with mainland China, it is clear that it blends the best of Anglo-American and Sino-Latino cultures, but much more – Sino, mainland-Sino. Back to its Chinese roots, with non-Chinese Hongkongers who made Hong Kong what it is today, that still blend the best of all cultures, races and religions. A notable difference today being more non-Anglo-Saxons are making Hong Kong their home.

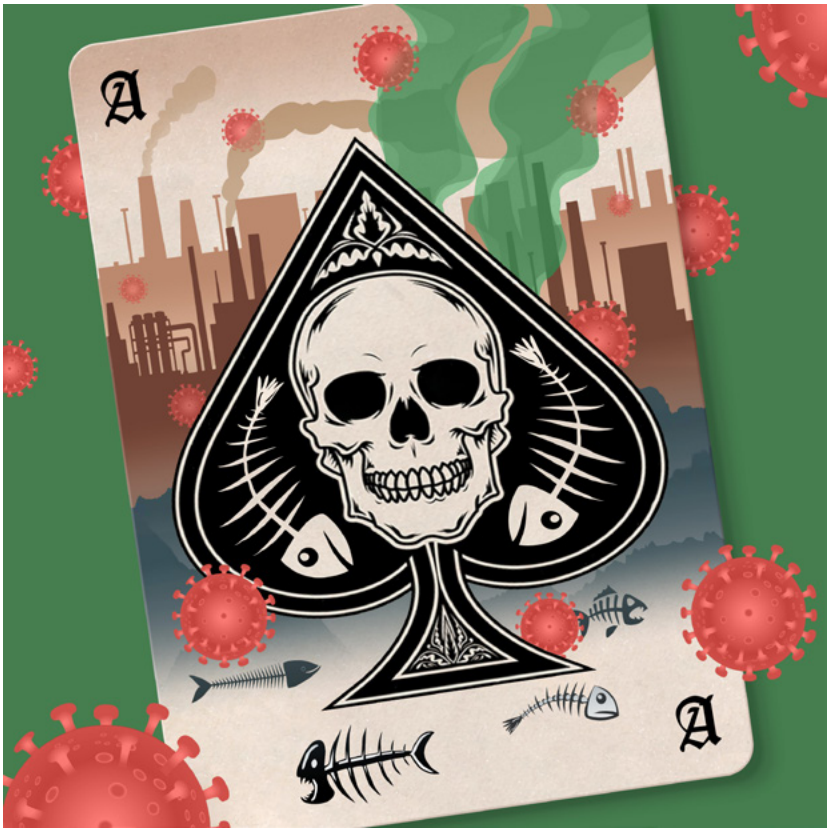
The FCC is still the laboratory that embodies diverse fused functional cultures that question the American ideal – especially during the Trump presidency – and Capitol insurrection.

The "Nixon on China" I proposed in the introduction to *Spin* (page 26) that America change its political and corporate culture, never happened. Instead, it actually got worse – not only in America, but also in Hong Kong, in ways some people predicted before the

1997 handover, but most people didn't start taking it seriously, until after 9/11.

Again, as I wrote in the closing paragraph in the introduction to Spin: "It is time America sobers up from its moral and political hangover. By doing so it will be able to identify and deal with the real enemy. *We the Apathetic People.* The American Constitution and Declaration of Independence have to be revisited so that *We the Maids* can clean up our act so we can better understand our diversity and distinctions as a common humanity. It's up to us to write the obituary for politics as usual. If we don't, terrorists will. Radical times require radical changes."

Terrorists, domestic and foreign, will keep trying to make radical changes as 9/11 and 1/6 bear witness and depressing testimony.



We should begin by setting conscience free. When all men of all religions… shall enjoy equal liberty, property, and an equal chance for honors and power… we may expect that improvements will be made in the human character and the state of society.

To Dr. Price

–John Adams –

April 8, 1785

Chapter Four

Karma, Luck & Timing – Gambling for The Environment

Botany I rank with the most valuable sciences, whether we consider its subjects as furnishing the principal subsistence of life to man and beast, delicious varieties for our table, refreshments from our orchards, the adornments of our flower borders, shade and perfume of our groves, materials for our building, or medicaments for our bodies.
– Thomas Jefferson –
To Thomas Cooper
October 7, 1814

China Sea Sailing

Living on a bay of the Sai Kung Peninsula in Hong Kong, I have enjoyed sailing over the years as a guest with boating neighbors. So, in November 2020, I decided to take a sailing course at Hebe Haven Yacht Club, where my yachting neighbors were members. I was grouped with an interesting and diverse class of five typical Hongkongers.

Trevor Keen, a former lands department official who later joined the Hong Kong Monetary Authority, Nils Veng-Christensen, an IT engineer and consultant, Clayton Yu a shipping executive, Ian "Robbo" Robinson, formerly with Swire and now teaching Landscaping at the Hong Kong University, Chris Haywood, a retired Swire Property executive, and our instructor Mak "Mark" Chi Wing. Trevor, Chris and Ian were Brits, Nils a Dane, Clayton and Mark native Hongkongers.

The lectures, and the grueling and stressful sailing course fighting the winds not to capsize, were held from 10 am till 5 pm, with a break for lunch. Afterward, a beer, cigar and good conversation were the most delightful way to end the class.

Sharing views on local politics and lifestyle with fellow expats who have lived in Hong Kong for more than 20 years, and local Chinese, was a refreshing reminder of what a great place Hong Kong is and why we are all still there. Land planning and development, financing, banking, sanctions that the US imposed on Hong Kong government officials, US-Sino relations, and the importance of landscaping and trees, were freely discussed, with occasional interruptions and contributions by fellow sailors at nearby tables.

In *Spin,* I opened this chapter sharing a Hong Kong harbor cruise experience with a visitor from America on a Chinese junk. For many, the lifestyle in Hong Kong revolves around the sea and sailing, like the territory's history.

The Covid-19 pandemic put an end to travelling at will, forcing many Hongkongers, who often travel on long holiday weekends, to stay home and rediscover their roots – and, also, take to the sea, in "Cruises to Nowhere," kayaks and paddle boards.

The kayak rental business is booming in Hong Kong, especially in my neighborhood in Sai Kung. Eight competing kayak rental businesses, with around 861 kayaks at one count, competing for the millions of staycationers taking to the sea.

The resulting traffic, traffic jams, and accidents at sea involving kayakers who don't know how to swim are mind-boggling.

Pauline and I paddle board with our Border Terrier dogs on board. That brings out the cameras, real and in phones. Kayakers who almost tip out of their kayaks trying to take pictures. Asking one such kayaker who had snapped a few photos of the dogs, if she knew how to swim: "Yes," was the swift reply, followed by "But my friend doesn't," pointing to fellow kayaker behind her in their double-seater kayak.

Marine Police and boating neighbors regularly rescue kayakers in distress. "Thirteen rescues and four injuries requiring hospitalization yesterday," Kevin Overton, a neighbor volunteered as we came across each other walking our dogs in early October 2021. They had been blown onto the rocks by the high winds, some capsizing.

Police are also regularly called to resolve disputes, or arrest perpetrators of assaults, between the competing kayak operators, their clan and family members, followed by ambulances to take away the injured. Much like the Border rievers of Scotland and the Hatfield and McCoys in America.

On May 26, 2021, in Hong Kong – May 25th in the US – the first anniversary of George Floyd's murder, was a Red Blood Lunar eclipse that started a little after 7pm and lasted until 9pm. What a beautiful sight! Mother Nature was showing off her galactic wonders.

The quiet beauty was pierced by noisy people a few houses away, at the end of our street. People yelling and screaming at each other, pushing, showing and punching, with the attackers then jumping into their cars and screeching away, while others ran up the stairs, alleys and streets leading to the main road, their retreat quickly followed with the sound of an ear-piercing police siren and two ambulance sirens that had come to attend to the victims of the kayak operation assault.

This assault was different. It was a triad hit. Directed by one of the family members of the attacked kayak operators, working with the competing kayak business across the bay, that is allegedly triad owned and operated.

The police quickly set up road blocks on the nearby main road and getaway roads, forcing some of the attackers to abandon their cars and flee on foot. Those that dared to escape in their cars were arrested at the road blocks.

The ambulances easily reversed out of our narrow street by backing into a vacant parking space that allowed them to turn and leave with the victims of the assault.

Watching from the roof balcony the police van trying to leave by reversing and trying to turn the van on the street, with fellow officers assisting by waiving on the road, an impossible maneuver by even the best stunt driver, was as hilarious, but even more annoying, for interfering with my Red-Blood-Lunar-eclipse-viewing experience.

Having downed a couple of margaritas, I chuckled watching this impossible maneuver for a few minutes, before I yelled "Reverse. Back into the parking space between the cars," as I waived him to move his van forward to give him enough room to reverse into the vacant parking space.

"And be careful not to hit my car," warned Pauline who was standing by the front gate, as she watched the police van inch its way by her car, after the driver got back into the van having assessed the room he had for turning, and then reluctantly followed my instructions. Then, parked and ready for a speedy exit, as he waited for his fellow officers to finish their investigation.

Back to watching the eclipse, sipping another margarita, enjoying a smoke and a beautiful Hong Kong evening by the moon-lit bay, I decided to forget about the pandemic, climate change, environmental degradation, and all the unpleasant issues, at least for the remainder of the evening, and get into the moment.

Tree Pandemic

Pandemics affect not just people. They affect all living things, especially, trees, the frontline warning system, the suction tanks for CO2. The more inquisitive I became about trees the more fascinated and engrossed I became; and more of my tree experiences came racing forward into memory – the times playing with Greek and Turkish children in the forests and nearby orange groves of Neapolis, Famagusta, Cyprus; today known as Mersin, Turkey – Northern Cyprus.

My forest and orchard experiences further developed in Israel, at the Kfar Hayarok, an agricultural boarding high school, where I majored in fruit trees, and worked in the nursery tending to non-fruit bearing trees. I learned to plant, prune, fertilize, water, and common-sense maintenance, to ensure a fruitful harvest; also nurture non-fruit-bearing trees around the campus that provided shady protection against the scorching sun. The orchards that rapidly encroached the sparse and ever-shrinking forests across which I walked or rode horses, through, to the beach for a swim in the Mediterranean are no more. The area is filled with luxurious housing and highways.

I recall America's national parks, Grand Canyon, Yosemite, and Yellowstone, also the shady hiking trails in Rivas Canyon, Will Rogers State Park, and Griffith Park in Los Angeles, where I introduced and shared the parks shaded pathways and trees with my children Alexandra and Jonas, either on horseback or on foot.

I remember a trip I took more recently, in November 2017, to Finland with Pauline and our veterinary co-founding partner Dr. Kurt Verkest. We had been invited to explore a veterinary business opportunity there. After a couple nights in Helsinki, catching up with the different time zone, and enjoying the sights, sounds, and tastes, we rode a train to Kuopio, some 340km north, watching many of Finland's lakes and forests slip by the window.

In Kuopio, we met with Jukka Hallman, and his business partners, to explore the merits of a lateral flow test for animals to be sent to China. We met at the Hallman offices and were given a tour of the company. We learned that this company once was the world-leading match manufacturer. We were told that matches were "a natural product to manufacture here because of all the trees in Finland." Jukka, who described to us the different family portraits adorning the office walls, also said that at one time, "there were trees everywhere."

However, the development of hand-held gas lighters quickly replaced matches and the factory had to change with the times. It is now a bakery, a leading baked goods factory in Scandinavia. Its snack baked goods can be found in most supermarkets, convenience stores, and gas stations. In other words, rolling with the times, the Hallmans are now rolling in dough.

The Hallman-Finland story of going from being the number one match manufacturer in the world to leading baked goods company, because of the emergence of gas lighters, is an example of how a country and economy can change with the times – in an environmentally friendly way.

The former US president, Donald Trump was so impressed by Finland's forestry management that he famously said while touring California's fire-ravaged forests in 2019 that the Nordic nation has

all but eliminated forest fires because of "raking and cleaning." The comment may have been met with widespread bemusement in a country with more forest than any other in Europe. But Finland's forests are in the middle of a battle about the EU's green strategy and its commitment to more than halve carbon emissions by 2030.

The fight over how the forests are managed and what their wood is used for has split politicians and public opinion in the Nordic country and mobilized everybody from companies to environmentalists across Europe. At its heart, the disagreement is about how forests should be used in attempts to mitigate the effects of climate change.

Should forests be viewed primarily as carbon sinks, which environmentalists claim are so important for biodiversity? Or, should forests also be seen, as big companies and the government suggest, as a source of possible replacements for fossil fuels and their uses in everything from chemicals to energy.

There is little doubt about the crucial nature of woodland in Finland, where trees cover 73 per cent of the land and more than 10 per cent of the population owns some forest. "It is very deep in our genes. In virtually every family there is a forest owner," said Stefan Sundman, head of public affairs at UPM, Finland's largest forestry company.

Sundman noted how processing wood started the industrialization of Finland in the 19th century and that even after a downturn for paper and pulp companies in recent years, the forestry sector still accounted for a fifth of the country's approximately $70 billion worth of annual exports.

Companies such as UPM are trying to reinvent themselves, like the Hallmans, and move away from producing paper to positioning wood as a biomaterial suitable for turning into fuel, construction material, textiles and more. UPM is investing 550 million euros in a chemicals factory in Germany to convert wood into bio-chemicals. It is also looking at the feasibility of a one-billion-euro biofuel facility that could produce aviation fuel.

At the same time, a draft of the EU's new forestry strategy was leaked out in June 2021. It said little about wood-based products but a lot

about how forests should be used as carbon sinks. It made Finland's extensive lobbying efforts in the sector spring into life. "The leaked draft ... was so problematic that member states had to react strongly with a common message," Finland's minister for agriculture and forestry, Jari Leppa, told the *Financial Times,* on September 2, 2021.

He said the draft had threatened the transformation of Finland's Industry by failing to endorse the role wood could play in bioenergy and "short lived products."

"EU policy, Leppa explained, "should encourage the replacement of fossil products with renewable materials. We must remember the main problem is fossil fuels. Forests are never a source of emissions," as they provided carbon sinks for half of Finland's emissions.

A legitimate concern considering that Finland's national meteorological institute recorded that June 2021 was the country's hottest month since records began in 1844 – a common phenomenon in 2021 in countries in the Nordic region.

The pushback worked. The EU's final forestry strategy, published in mid-July 2021, was more agreeable to Finland. It made allowances for the possibility of wood products replacing fossil materials for fuel.

However, Sini Erajaa, an agriculture and forestry campaigner at Greenpeace's EU unit, is far from impressed with the final version, arguing that Finland and its neighbor Sweden succeeded in watering down the EU's strategy to protect corporate and economic interests. "Are we really sure that the interests of one industrial sector are in the interests of Finland? For countries like Finland that are meant to have a climate progressive government, I really wish they would get over being a crybaby and blocking everything," she said.

Erajaa argued that wood could not replace all fossil fuels, and that forests needed to be turned away from purely being "wood-producing farms."

Leppa and the forestry industry disagree. They suggest forests can be both carbon sinks and, by using active management, the source of wood-based products that they claim are renewable substitutes for oil, gas, and coal.

Owners of forests grown for timber are expecting a jump in returns. It will come from a boom in the sale of units linked to the carbon stored in trees used for measuring climate change targets. That is because sales of credits linked to the greenhouse gas locked up in timber forests have soared, confirming Finland's minister of agriculture and forestry, Jari Leppa, is right when he argues forests are carbon sinks.

Trees

If forests are to protect us, then we must protect the forests. The book *The Hidden Life of Trees,* by Peter Wohlleben, makes the point that the forest is a social network. He draws on groundbreaking scientific discoveries to describe how trees are like human families: tree parents live together with their children, communicate with them, support them as they grow, share nutrients with those who are sick in or struggling, and even warn each other of impending dangers.

"The book is amazing," our veterinary co-founding partner Kurt said, as he stopped reading and put it down during our train ride from Helsinki to Kuopio. "Trees function like people. Individually and collectively," he went on as he drew Pauline's and my eyes away from the train window admiring the frozen landscape of snow-covered trees that we were passing by. "They grow and evolve like people, from seedlings to mature trees. It takes them hundreds of years, versus, 50 to 100 years for people," Kurt added.

Trees, like people, panic when confronted with unexpected threats and dangers. Like being transplanted to another place to make a park or develop a forest. Different pests, water quality, and unfamiliar environment makes trees panic like humans do in unfamiliar environments, Kurt told us as he told us about the book in greater detail in response to my question what he thought about trees. Trees also heal naturally. As upper branches sprout and grow, lower branches are discarded, and the holes that falling branches leave on the trunk are gradually sealed to prevent fungal infection that could weaken the tree. "Nature does its thing, sealing a break in the trunk naturally. If the branch that broke was too big and it takes too long

to seal the "wound," funghi will invade and weaken the tree: and a storm will knock it down," Kurt said.

"I remember growing up in Belgium, traveling around the country, how calm I felt in natural forests, and not, in planted ones, with trees all in a straight line," Kurt said.

"People's blood pressure goes down in natural forests, not in planted ones."

In Sweden, access to forests is a human right. Even on private property. At my book launch of Chapter Eight on July 13, 2021, at Bert's, I discussed this right with Johan Nylander, the Asia correspondent for Sweden's business daily *Dagens Industri,* at my book launch of chapter eight on July 13, 2021, at Bert's, "Absolutely. It is a right everyone respects. You can hike, camp, fish, hunt as long as you keep moving and don't stay in one place too long. You can camp overnight and then move on," he told me. "I did it with friends growing up in Sweden and was surprised to find out it's not the same in the rest of the world when I started traveling," Nylander said.

The Covid-19 pandemic has put a damper on international travel, which, in turn, has forced people to stay home and take walks and hikes to calm down and de-stress from the new lifestyle changes we have to accept.

Walks and hikes are great calming activities, especially on a tree-covered trail. Like the trails Pauline and I have experienced across Hong Kong; especially the trail from Clearwater Bay Road up to Junk Peak, or across the mountain range to Poi Toi O, and the nearby Taoist Temple and Buddhist Monastery.

It's depressing when one realizes that in 2020, some 4.2 million hectares of forests, or an area the size of the Netherlands, will have been lost worldwide.

The worst losses were in Brazil, where President Jair Bolsonaro has cut funding for environmental programs and pushed to open protected Amazon lands to agribusiness and mining. Brazil lost 1.7 million hectares of primary forest in 2020, an increase of 25 percent

from 2019. Brazil's losses were three times higher than the following highest country, the Democratic Republic of Congo, according to a report from Global Forest Watch released in April 2021.

Researchers said extreme heat and drought also stoked massive fires that consumed swathes of forest across Australia, Siberia and deep into the Amazon. The losses are a "climate emergency. They're a biodiversity crisis, a humanitarian disaster, and a loss of economic opportunity," said Frances Seymour of the World Resources Institute, that published the report.

Seymour said the most "ominous signal" from the data was the instances of forests themselves falling victim to climate change. "I mean, wetlands are burning," she said. "Nature has been whispering this to us for a long time. But now she is shouting."

Seymour said: "The longer we wait to stop deforestation, and get other sectors on to net zero trajectories, the more likely it is that our natural carbon sinks will go up in smoke," Seymour said.

Reading about Xi Jinping's visit on August 23, 2021, to the award-winning Saihanba forest farm in Hebei province, which once resembled a desert, and is now known as the "Green Lung of Beijing," where he called for more environmentally friendly development in China, is an example of what all leaders should be doing to combat climate change.

China's experience in controlling desertification and land degradation offers an instructive solution. Kubuqi, China's seventh-largest desert, is a prime examples. According to Wan Gang, president of the China Association for Science and Technology, and vice-chairman of the National Committee of the Chinese People's Political Consultative Conference China has reversed land degradation and desertification. Almost 646,000 hectares of the desert have been afforested – forests created to increase carbon capture. Aside from generating a remarkable improvement in local biodiversity, afforestation has lifted more than 100,000 rural residents out of poverty.

China has reversed land degradation and desertification, sad Wan at the opening of the Kubuqi International Desert Forum, in Or-

dos, Inner Mongolia autonomous region on September 28, 2021. In addition, Wan said, the mode of afforestation and the many desertification control technologies that emerged in the Kubuqi has been introduced to countries involved in the Belt and Road Initiative, including Pakistan, Uzbekistan and Saudi Arabia, offering a solution to control the 36 million square kilometers of land around the world that is affected by desertification.

"I look forward to seeing China joining hands with even more countries and regions in preventing and controlling desertification to promote global green and sustainable development," he said.

In Hong Kong, students at the International College Hong Kong Hong Luk Yuen in Tai Po, spent three days planting more than 300 native trees in a narrow 100-square-meter plot, smaller than a tennis court. The city's first "tiny forest," using a method pioneered by the Japanese botanist Akira Miyawaki.

Miyawaki studied forests for 30 years and found that native species planted very densely will start supporting each other. If you can plant trees the Miyawaki way, you can create a forest says environmentalist Camilla Zanzanaini, the 36-year-old founder of the social enterprise Nature makers Lab.

The plants the students in Hong Kong have planted include various ficus plants, camphor and Chinese banyans. "It's different from conventional tree planting, which usually is only one or two species, or might not include native species," said Zanzanaini, born and raised in Hong Kong.

Two exciting things happened through the fall as I sat down to continue writing this chapter in May 2021. First, Richard Powers, the author of the Pulitzer Prize winner, *The Overstory,* released his new novel *Bewilderment.* While the *Overstory* is a multigenerational epic that centers on the mysterious lives of trees, *Bewilderment,* is about a father and his imaginary son grappling with the terror over the climate apocalypse, which the astrobiologist father copes with by searching the stars for other habitable planets – echoes of contemporary America – catastrophic weather, political unrest, a Trump-like president who tweets erratically and spouts conspiracy

theories about election fraud, a deadly virus that jumps from cows to humans; and the fact that three Las Vegas Casinos, followed by the rest soon after that, announced they are reopening 24/7, gambling, because the pandemic is under control. Those that bet on it, lost big time. Not only financially but also personally, particularly healthwise. Those that stuck to hiking and enjoying trees turned out to be the winners.

America's Climate Apocalypse

The forest wildfires on America's West Coast, from California, up the coast, through Oregon, Washington State, and up to Canada's West Coast, created much smoke and ash, not only on the West Coast, but also in parts of the East Coast more than 4,000 kilometers away. Strong winds blew smoke and haze east from California, Oregon, Montana and other states all the way to New York, New Jersey and Pennsylvania, on the continent's other side.

"One of the things about this event that makes it so remarkable is that the smoke is affecting such a large swath of the US," said Jesse Berman, an assistant professor at the University of Minnesota School of Public Health and an expert on air quality. "You're not just seeing localized and perhaps upstate New York being affected, but rather you're seeing numerous states all along the East Coast also being impacted."

David Lawrence, a meteorologist with the National Weather Service, said wildfire smoke usually thins out by the time it reaches the East Coast, but this summer, it's "still pretty thick."

Hurricane Ida made this situation worse for New York, New Jersey, Connecticut and Pennsylvania. It killed least 13 residents of New York as it drenched the US Northeast with record rainfall in September 2021. Eleven of the victims had one thing in common: They were trapped in flooded basement apartment death traps in the boroughs of Queens and Brooklyn. Of the six apartments where people drowned, five were illegal basement dwellings.

Both boroughs have thousands of basement apartments that are subterranean dwellings carved out illegally from larger homes.

They lacked the building code stipulated for legal dwellings: ceilings at least 2.3 meters high, a certain number of windows, ways to get out in case of an emergency and proper drainage.

Aside from failing to meet the city's building code, the illegal basement apartments house indigent immigrants, generally Southeast Asian. There are so many unlawful basement apartments in Queens that eight areas of the borough are consistently among the top 10 places in the city with the most complaints about illegal house conversions.

The day after the flooding, housing advocates and some elected officials called on the city to accelerate stalled efforts to make unauthorized basement apartments legal with required safety standards and periodic inspections.

The President of Queens Borough, Donovan Richards, who grew up in basement apartments, said the city needs to "definitely look" at legalization more seriously. "It's a Catch-22 because we always want to put safety first, but a lot of individuals would have no other option at this moment," Richards said.

"Basements provide a lifeline for many of these communities and for homeowners who need help subsidizing the mortgage."

In Louisiana, the Ida death toll was 12, Governor Bel Edwards said. But those numbers, he warned, could increase because so many people rely on power from generators, which were blamed for four carbon monoxide victims among the 12 deaths.

Edwards said that more than 718,500 customers in Louisiana were left without power, down from the 1.1 million people that Hurricane Ida's devastation initially left in the dark.

Texas Deep Freeze

Millions of Texans in America's second-largest state shivered in the dark, and seven million, a quarter of the state's population, were ordered to boil tap water before drinking it following days of record low temperatures that iced the state, frozen pipes, paralyzed road networks, and damaged infrastructure in February 2021.

More than 30 people died, some of whom perished while struggling to keep warm inside their homes, or from carbon monoxide poisoning from car exhaust in their garage.

Brazos Electric Power Cooperative, a generation and transmission co-op that serves cooperatives across the state, many of which serve poorer rural areas, filed for bankruptcy protection on March 1, 2021. Meanwhile, the financial fallout of the Texas storm that left millions in the dark and sent wholesale electricity prices skyrocketing, continued.

The Texas blackouts were a warning to the nation: Climate change threatens virtually every aspect of electricity grids that aren't always designed to handle increasingly severe weather. The vulnerabilities show up in power lines, natural gas plants, nuclear reactors, and various other systems.

Water, Water Everywhere, and Nowher

Water is at the root cause of climate change and the resulting environmental degradation – apocalypse actually – from fires, droughts, rain and floods.

Water is a subject I devoted an entire chapter to in *Feasting Dragon, Starving Eagle* – titled *Pitcher of Fresh Water – What the World Needs* (pp. 333-347).

We need to understand the role of water well to appropriately address the impacts of climate change caused by human activities and its catastrophic outcome. It is already making severe impacts on the water systems worldwide. Changes in these systems can lead to devastating results as water is critical to the very existence of all forms of life on Earth; it is a source of life, essential to livelihoods, and the foundation of the well-being and prosperity of the human race. Without water, farmers cannot grow crops and rear animals. Globally, most of the climate change risks come down to water. The drought in Syria in 2011, brought farmers to the streets of Damascus to protest against government inaction – and triggered a civil and geopolitical war that is continuing.

The major effect of climate change is altering rainfall patterns, both in terms of timing and the amount of rainfall. Climate models indicate that rising temperatures will enhance heavy rainfall during the rainy season and extend the duration of the dry season. These changes will, in turn, shift seasonal water availability and increase floods and droughts.

The total number of flood events in Asia alone increased by more than five times in 50 years – from 303 during 1970-80 to 1,541 during 2011-20. In that period, the total number of drought events increased from 85 to 152. These floods and droughts can endanger human lives, damage homes and public infrastructure, destroy crops and harm the economy.

Heavier rainstorms will also increase surface runoff, the rainwater that flows across the surface of the land. Runoff is a common source of water pollution. As the rainwater flows over the ground, it picks up litter and chemicals, fertilizers and other toxic substances in the soil, dumping them into ponds, streams and rivers that flow into the sea, thus polluting the entire water body on the planet.

This contamination is detrimental to the aquatic ecosystem and life in general. At the same time, purifying water to drinking standards is expensive. Therefore, access to safe drinking water and water for sanitation and hygienic environment is more challenging.

Second, with global warming, glaciers are receding, causing a decline in snow and ice cover. Glaciers are vital to water resources; as the winter snow packs melt, they add fresh water to rivers and streams. As the atmospheric temperature rises, more precipitation is likely to fall as rain rather than snow. It means less water being stored as snow packs and less available in plastic bottles.

Due to climate change, glacier ice loss rates across the Himalayas have accelerated from an average of just 22 centimeters a year during 1975-2000 period to 43 cm a year in 2000-2016. Scientists also estimate that two-thirds of the glaciers in the Hindu Kush and Himalayan ranges will be lost by 2100 if we do not cut carbon emissions. Moreover, even if we succeed in limiting global warming to 1.5 degrees Celsius, a third of the ice would still be lost, according to some estimates.

Rising temperatures also change the timing and magnitude of streamflow in glacier-fed rivers and the pace of polar ice melt. These changes will negatively affect ecosystems, human livelihoods, and economies, particularly in the countries across the high mountains that depend on ice-melt for drinking water and water for irrigating agricultural farms, mining, hydropower generation, and other needs.

The melting of polar ice due to global warming will raise sea levels and threaten coastal countries – most of them in Asia, but particularly Bangladesh, China, India, Indonesia, Thailand, and Vietnam. These six countries account for about 75 percent of the 300 million people whose land is projected to be flooded by 2050 due to sea-level rise (if reductions in emissions are only moderate).

Floods from glacier lake outbursts caused by the fast melting of glaciers also threaten populations living downstream. And changes in snow packs will affect people who depend on skiing and winter tourism for their livelihood.

Third, climate change is increasing water demand, too. Rising temperatures increase water consumption by people, animals, trees, and plants as warmer air enhances the evaporation of moisture from the soil, trees and plants, and sweat from the skin. As the water demand is already on the increase, inter-sectoral and inter-country competition for water is already intensifying.

Besides, there could be severe competition for water among communities and countries experiencing water scarcity from groundwater depletion and shrinking glaciers. The competition for water could trigger conflicts between countries, as well as between states, counties, regions and other government groupings within countries.

Asian Climate Apocalypse

As with the novel coronavirus pandemic, the impact of climate change is likely to play out disproportionately among Asian countries. Developing countries are most vulnerable and among the least capable of responding to the effect of climate change. Since peo-

ple in Asia will feel the impact of climate change mainly through a change in water systems, water management will call for innovative ways and urgent.

While Hurricane Ida pounded the US East Coast in August-September 2021, drowning illegal basement dwellings in New York. China was also experiencing a similar deluge of water. Twelve people died in Zhengzhou, the capital of Henan Province where more than 20 centimeters of rain fell on the city on the banks of the Yellow River in one hour and caused flash floods that submerged subway trains. The deluge was described as the heaviest in 1,000 years.

More than 100,000 people have been moved out of Zhengzhou. Many among the remaining residents took shelter in libraries, cinemas and museums.

About three kilometers away, the First Affiliated Hospital of Zhengzhou University – the city's largest, with more than 7,000 beds – lost power supply.

In the nearby city of Gongyi, at least four people were confirmed dead and more than 20,000 people were forced to leave their homes. The head of Gongyi city's observatory, Zhao Jianbiao, was washed away by floods, but was rescued by residents several hours later.

Given that many Asian countries are dealing with similar climate change impacts, the global research community can contribute to building climate resilience in Asia by creating, analyzing and sharing ideas and best practices for water management so that countries can learn from one another's experiences and adopt and fund the measures suitable to their context instead of pocketing the funding.

Extreme floods and droughts, which will become more frequent and severe in the coming years, are already posing a significant threat to China's economic development than previously thought according to a report of the United Nations' Intergovernmental Panel on Climate Change (IPCC).

Climate change would intensify the so-called water cycle, the continuous movement of water within the Earth and in the atmosphere in the form of rain, snow and clouds, the report noted in its sixth annual report.

"Extreme floods and droughts are the worst threats to China's social and economic development in the context of climate change," said Wang Wen, professor at Hohai University in Nanjing, China, and a lead author of the report.

To protect vital infrastructure, industries and population centers against extreme weather, authorities should build better systems for the storage, supply and drainage of water and enhance resilience against floods and droughts, he said. Besides, he noted that early warning systems, enhanced monitoring and forecasts of meteorological and hydrological capabilities were also critical.

According to a projection by the IPCC experts, a rise in the Earth's temperature by every I degree Celsius is projected to lead to a 7 per cent increase in the intensity of extreme daily precipitation events worldwide.

Human activities have raised global temperatures by 1.1 degrees since 1850. By around 2040, the global temperature could be 1.5 degrees hotter, based on the worldwide emission levels of five gases that create the so-called greenhouse effect. Suppose, the world fails to step up efforts or implement policies to remove carbon dioxide emissions. In that case, Earth's temperature may rise by between 2.7 and 4.4 degrees by the year 2100, according to "best estimates."

Yuehai, a housewife in Xinxiang city in central China's Henan province, is all too aware of the effects of extreme rainfall. Her neighborhood was inundated in September 2021, in what local authorities described as once-in-a-millennium flooding.

"Our family was among the lucky ones – we still had electricity and hot water," Yuehai said. "In some low-lying buildings, power and water supplies were cut off when the basements were flooded. One of my friends had to climb over 30 flights of stairs each day to get fresh water."

Henan's flooding claimed 302 lives, displaced nearly one million people, and led to direct economic losses estimated at 133.7 billion yuan (US$20.6 billion), according to official figures. The floods have dealt a heavy blow to the province's agriculture sector, accounting

for almost a third of China's wheat supply and a tenth of its corn, vegetable and pork production.

Some one million hectares of cropland were flooded, of which 330,000 hectares saw complete crop failure, based on data from the Henan government.

Besides floods and droughts, China also faces coastal flooding risks from rising sea levels and storm surges, and extreme cold.

Twenty-one marathoners – some of them China's most promising athletes – died in extreme weather during an annual mountain ultramarathon in Baiyin, Gansu province on May 23, 2021. Eight others were hospitalized for minor injuries.

A round of unusual hail, freezing rain, and high winds which the 172 marathon runners negotiating winding mountainous tracks had not expected likely at that time of the year and, therefore, not prepared for, caused the tragedy.

Deadly Glacier Flooding in India

When a portion of the Nanda Devi, one of the world's tallest mountains in the Himalayan glacier, broke off on February 7, 2021, it released the water trapped behind it on the Indian state of Uttarakhand. The resulting tsunami-of-flood-waters, mud and boulders rolling down through the steep river valley, swept away a bridge, two hydroelectric dams, nine and fifteen miles away from the rockslid, and everything else in its path – trees, cattle and people. More than 200 people were believed to have been buried in the sludge, never to be found.

Proglacial lakes, formed after glaciers retreat, are often bound by sediment and boulder formations. Their structural weakness or additional water entering them can break the banks of such watersheds and send massive floodwaters surging down the rivers and streams fed by the glacier.

In the case of Nanda Devi, National Snow and Ice Data Center scientist Bruce Raup told *USA TODAY* that the cause of the burst appears to be a landslide that collided with a steep glacier. He said

that steep mountain environments could be hazardous for numerous reasons, including snow and ice on steep slopes can be unstable and slide catastrophically. In addition, rock and soil slopes, which undergo freeze/thaw cycles, can be unstable and can break loose, particularly during thaw cycles.

Experts said the disaster could be linked to global warming, and a team of scientists was flown to the site to investigate exactly what happened. Geologist Dwarika Dobhal, from the Wadia Institute of Himalayan Geology, told the Guardian that "climate change will make these events more common."

High temperatures coupled with less snowfall can accelerate melting, which can cause water to rise to dangerous levels.

"Most mountain glaciers around the world were much larger in the past and have been melting and shrinking dramatically due to climate change and global warming," said Sarah Das, an associate scientist at the Woods Hole Oceanographic Institution.

The only problem with that, and it is a big problem, is, this explosive cocktail of rising temperatures and aggressive road and dam-building in geographically unstable mountain ranges threatens the lives, economy and security of eight countries in the Hindu Kush Himalayan region – Hindu Kush is not just a good smoke – its real people with their communities, and countries.

The mountains run from Afghanistan, in the west to Myanmar in the east, forming the backbone of countries like India, China, and Pakistan. Rivers like the Ganges, Indus and the Brahmaputra, the upper part of which is known as Yarlung Tsangpo in Tibet , sustain more than 1.5 billion people and industries powering some of the world's fastest economic growth. They also traverse the most volatile geopolitical fault lines.

Climate change is amplifying the dangers. According to Maharaj Pandit, a professor of environmental studies at the University of Delhi, temperatures in the Himalayas have risen faster than other mountain ranges, The International Centre for Integrated Moun-

tain Development, a regional intergovernmental body, says the region will warm above the global average.

The deadly flash flood in Uttarakhand was a combination of "geological activities ... the effects of climate change, as well as the unsustainable infrastructure development that has accelerated the process," says Pema Gyamtsho, the director general of the International Centre for Integrated Mountain Development (ICIMOD) and a Bhutanese politician. "We know the Himalayan region is very vulnerable, but we're not taking that into consideration."

Scientists estimate the Himalayan glaciers will recede by a third by 2100 if the increase in global temperatures is capped at 1.5 degrees Centigrade – a most ambitious target – with losses far higher if the target is missed.

California-Oregon Water War

A century ago, the US federal government had carved a whole new landscape through the marshlands along the Oregon-California border, by draining lakes and channeling rivers to build a farming economy that now supplies alfalfa for dairy cows and potatoes for Frito-Lay chips.

The drawdowns needed to cover the croplands and the impacts on local fish nearing extinction have long been a point of conflict at the Klamath Project, a water-management scheme providing farmers irrigation water in the Klamath River Basin. However 2021's historic drought has raised the stakes, with salmon dying *en-masse* and Oregon's largest lake draining below critical thresholds for fish to survive. Hoping to limit the large-scale death of fish, federal officials shut the gates that feed the project's sprawling irrigation system, telling farmers that the water flowing every year since 1907 would not be available.

Some farmers, furious about water rights and fearing financial ruin, are already organizing a resistance. "Tell Pharaoh let our water feed the Earth," said a sign erected near the nearly dry irrigation canal that would usually be flowing with water from Upper Klamath Lake in southern Oregon.

The brewing battle over the century-old Klamath Project is an early window into the water shortfalls that are likely to spread across the West as a widespread drought, associated with a warming climate, parches watersheds throughout the region.

In Nevada, water levels have dropped drastically in Lake Mead, so officials are preparing for a severe shortage that could prompt significant reductions in Colorado River water deliveries starting in 2022. In California, Governor Gavin Newsom has placed 41 counties under a state of emergency.

While drought consumed much of the West in 2020, setting the stage for an extensive wildfire season, the conditions in the spring of 2021 were far worse than a year ago. According to the US Drought Monitor, more than half of this region, including vast areas of California and Oregon, faces "extreme" drought conditions. Scientists have said the region may be going through the worst drought period in centuries.

In Oregon, conservationists, Native American tribes, government agencies and irrigators are squaring off, and local leaders fear that generations of tensions could escalate in volatile new ways.

"There are folks on both sides that would really like to throw down and take things in an ugly direction," said Clayton Dumont, a member of the Klamath Tribal Council. "I hope it doesn't happen, but it's a possibility."

Some landowners have openly talked about using force to break the fence surrounding the dam property and opening the irrigation gates. They have purchased property adjacent to the head gates and staged protests there. Ammon Bundy, who led an armed takeover of an Oregon wildlife refuge in 2016, said he was ready to bring in allies to help keep the gates open. People, he said, needed to be prepared to use force to protect their rights even if law enforcement arrived to stop them.

"Who cares if there is violence? At least something will be worked out," Bundy said in an interview, ridiculing those not prepared to fight for the nation's food supply. "'Oh, we don't want violence, we'll just starve to death.' So, heaven forbid we talk about violence."

The region has a long history rooted in violence and racial division. In 1846, US War Department surveyors, led by John C. Frémont and Kit Carson, slaughtered more than a dozen Native Americans on the shores of Klamath Lake. The Klamath Tribes eventually signed a treaty surrendering some 20 million acres of land that historically belonged to them in exchange for a reservation along Upper Klamath Lake and the perpetual right to hunt and fish in their ancestral territory.

For the United States, the Klamath Project became a keystone for settling and developing the region. Homestead opportunities for veterans after the two world wars also helped to stimulate the economy and to build a new kind of community.

In 1954, Congress moved to terminate recognition of the Klamath Tribes, which held lucrative timberlands, and authorized the sale of tribal lands.

And the government's guarantee to the Klamath Tribes that they would at least be able to continue fishing ran into trouble decades ago, when populations of native sucker fish – known to the tribes as C'waam and Koptu – along with coho salmon farther downriver slipped into a perilous decline, prompting mandatory protections under the Endangered Species Act.

During a drought in 2001, the federal Bureau of Reclamation initially planned for the first time to entirely cut off water for farmers over the summer. That order spurred an uprising of farmers and ranchers who used saws, torches and crowbars to breach the facilities and open the canal headgates.

US Marshals eventually stepped in to protect the gates, and the Bureau of Reclamation later released some water to help farmers. However, later that year, three men were charged with going on a racist shooting spree through the town where the Klamath Tribes have their offices.

Now some in the basin are worried that the unresolved divisions are poised to erupt again.

"These are not things that are going to get better if climate change continues to give us more uncertainty and less reliable supplies of water," said William Jaeger, an economics professor at Oregon State University who specializes in environmental, resource and agricultural policy issues. He said the drought conditions that emerged in recent decades, in part fueled by declines in snowpack, were likely to happen again in the future – and there needed to be a recognition that the Klamath Basin was overcommitted in its water obligations.

The year 2021 showed us how critical the shortage is already: Even with farmers cut out of the water supply, fish are suffering.

Lake levels fell below the minimum thresholds set by federal scientists, prompting litigation and spurring fears that algae blooms this summer could devastate the imperiled fish populations above the dam; tribal researchers say insufficient flushing downstream from the dam has allowed parasites to flourish.

Already in 2021, juvenile salmon are turning up dead with parasitic infections. Michael Belchik, a senior water policy analyst at the Yurok Tribe, said the die-off could be the worst on record. "This is really catastrophic," Belchik said. "We are starting to talk about the 'extinction' word around here."

Tricia Hill, who grows potatoes, onions, mint and some other crops across some 14,000 acres in the basin, much of it within the Klamath Project, said the focus on managing individual fish species under threat had failed. Despite 20 years of efforts, including water restrictions for farmers, the fish are still in decline. And, according to Hill, the economy is at a standstill and families are struggling.

"It feels really bad to see this much pain and not think that it's doing a darn bit of good, Hill said, standing next to a sprawling patch of desolate land on a family farm that is now in its second season with nothing but scrubby cover crops designed to keep the soil from blowing away. "This is awful – I have cried a ridiculous amount this year," she said.

Also cut off from water supplies this year are several wildlife refuges that are home to 25 at-risk species of birds and fish.

Farmers generally have been split on how aggressively to push back against this year's water shut-off. Hill said she disliked the idea of forcing open the gates, saying that option would do little to help, but other farmers have also called for ratcheting back the threats.

But on the night of June 3, 2021, about 100 people gathered under a large tent next to the headgates on property bought by two farmers, Dan Nielsen and Grant Knoll, who said they have a legal entitlement to the water behind the gates in Upper Klamath Lake under state water law. They contend that the federal government's shut-off violates state and federal laws and the US Constitution.

Tribes and irrigators have each notched victories in court over water rights, and the legal cases are continuing.

At the event, organized by local activists in Bundy's network, speakers talked about the need to reclaim their rights. Some floated unfounded conspiracy theories, linking the water crisis to George Soros, Bill Gates or the United Nations. A Betsy Ross flag flew above the tent while a poster inside featured a quote about freedom attributed to LaVoy Finicum, who was killed by federal agents during the standoff that Bundy led in 2016. Bundy faced federal charges for his role in the standoff, but the jury acquitted him.

The local sheriff, Chris Kaber, told the crowd that he attended because he had personal friends in the group but planned to remain publicly neutral to keep the peace.

Knoll told the group that the best way to open the headgates would be for the local irrigation district – on whose board he sits – to do it, in defiance of the Bureau of Reclamation. But he said his fellow board members seemed unwilling to take that step. "The next way to open it is you know what," Knoll told the crowd. "And that's where all the fun begins."

Facing a similar standoff two decades ago, in 2001, the federal government relented with a limited delivery of water to farmers. But there was no sign that agencies, facing an already depleted lake, would budge this time. An initial plan to provide a small water allocation to farmers was canceled when conditions worsened.

Hill said she expected that some farmers would be unable to make their mortgage payments. So, some may file for bankruptcy. Hill said she hoped that her operation would survive the present challenges, but as a fourth-generation farmer, she had begun to wonder whether her daughters would be able to follow in her footsteps.

"Farmers, by their nature, are optimists," she said. "I have to hope, but I'm definitely worried."

State of Emergency at Lake Powell

The US Bureau of Reclamation, that manages Western states' water and power systems, said it recently released emergency water reserves from reservoirs upstream of Lake Powell – the second-largest reservoir in the US.

The agency's regional director, Wayne Pullan, said that emergency releases from the Flaming Gorge Reservoir would bolster Lake Powell's water levels so Glen Canyon Dam can continue to generate power.

"Unlike an earthquake or a fire or a hurricane, it's not an imminent emergency, but it's been an emerging situation over many years," Pullan told the *Salt Lake Tribune*. "Because of the way this has emerged over the years, we've been able to have this agreement in place and to be ready to act. There's been no declaration of emergency. We consider this a response to an emerging, very difficult situation."

Other than Flaming Gorge Reservoir, located in Wyoming and Utah, two other reservoirs upstream from Lake Powell will also be tapped to provide water. According to the paper, the manmade Lake Powell that covered 165,000 acres across Utah and Arizona, now covers about 74,000 acres.

"We are facing unprecedented dry conditions in the Colorado River Basin. More details about conditions as well as planning efforts are forthcoming," said Rebecca Mitchell, Upper Colorado River Commissioner for the state of Colorado. "What we do know is that the Upper Basin Drought Contingency Plan calls for increased coordination and planning in situations like this. And those agreements

call for the Bureau of Reclamation to closely consult with the Upper Basin States, including Colorado. It has never been more critical to work together."

Nearly all of Utah, Arizona, Nevada, and New Mexico are under severe drought conditions, according to the US Drought Monitor website.

Pullan noted that water-sharing agreements that were established about 100 years ago force the Bureau of Reclamation to constantly release water from Lake Powell downstream to satisfy water shares in California – also under a drought – as well as Nevada and Arizona.

"Here we are now in 2021, and the basic underlying assumptions that we've been able to rely on are beginning to erode and we can't count on the hydrology. And when we can't count on the hydrology we can't count on the hydropower and hydropower revenues," Pullan told the *Salt Lake Tribune*. "We're really in a new era."

And Amy Ostdiek, deputy section chief of the Colorado Water Conservation Board, said that if Lake Powell's water levels fall below the 3,525 feet level mandated by the interstate agreement, it may "lead to seven-state litigation, which we've never seen before on [the] Colorado River."

It would create a lot of uncertainty and would probably be "a very long, drawn-out process," she told Colorado Public Radio.

Parched California Witchery

In a vineyard flanked by scorched hills and charcoal trees, Rob Thompson gripped two stainless steel rods which he began rotating in a circle while counting under his breath.

Then, he said, he had found it – water, deep beneath the parched ground. "This is really good," said Thompson, 53, scratching an 'X' into the ashen soil with his shoe. "This is a deep one: 750 feet, 55 to 60 gallons a minute." He added, "This one I can feel."

Thompson, 53, with silvering hair and a bear's lumbering gait, is a water witch, a third-generation water hunter. He claims that he

can locate streams of water in the fractures in the earth's bedrock, using two L-shaped rods that together resemble an old-fashioned television antenna.

As California's extreme drought affects the area around Calistoga, which is just a two-hour drive north of the nation's technology capital, Silicon Valley, the water-seeking services of a man relying on two three-foot rods and a hunch are in demand.

"This is the busiest, I think, I've ever been in my life," said Thompson, who was a co-owner of one of Northern California's largest well-drilling companies, but has given that up and now searches for water full time.

His busy schedule is a sign of the desperation of ranchers, vineyard owners and land managers as California reels from a crippling drought that has depleted aquifers, shrunken crops and forced some farmers to sell off their water rights.

The mystical technique of locating new groundwater sources is thought to have first come into vogue in Europe in the Middle Ages. The method is known as dowsing or divining, or even doodle bugging. Those who practice it are called water dowsers or water witches. The phrase may have originated from the practice's being deemed witchcraft in the 17th century.

The National Ground Water Association, a group of experts, including hydrogeologists, that promotes responsible water use, describes water witching as "totally without scientific merit." However, some California farmers who pay for the service, however, say it often provides a cheaper alternative to othermethods, such as hiring a geologist or prospector.

Thomson and other water dowsers are blue-collar workers thoroughly familiar with farming, yet whose beliefs in the "sixth sense" or "subconscious happening" of witching are decidedly more New Age than agricultural. Many say the knowledge of their craft has been passed down to them by their elders, and they revere the age of the practice, even if it sometimes earns them a sideward glance.

"People think we're crazy," said Larry Bird, 77, a Sacramento-based dowser who learned the method from his grandfather, a melon seller from Pawnee, Oklahoma. He described the sensation of being close to the water as being akin to a magnetic field. "It leaves me hot," he said. "Just like if you short a battery."

Sharry Hope, a longtime dowser based in Oroville, California, says standing over water leaves her with a "chilling sensation." Hope claims she learned one of the techniques she uses to find water on maps from a former military officer: She swings a pendulum until it stops and points toward a "water vein," Hope said. "I just mark it with a Sharpie."

Scientists and groundwater experts point out that the dowsers' methods are unscientific and amount to a kind of hocus-pocus. Hydrologists, said Timothy Parker, a Sacramento-based hydrologist and groundwater management consultant, use a combination of satellite imagery, geology, drilling data, geophysical instruments, and other hydrologic tools to assess water sources, "compared to dowsing, which is a person with a stick."

Still, in reality, dozens of vineyards in the wealthy winemaking regions of California have hired water dowsers to find water on their lands.

Fifty of California's 58 counties are under emergency drought declarations. Water holders have been ordered to stop drawing their allotments from rivers. On farms and vineyards, a surge in well drilling and increased reliance on those wells have depleted groundwater.

Drought's Costly Toll

In America's fruit and nut basket, water is now the most precious crop of all. It explains why, amid a historic drought parching much of the American West, a grower of premium sushi rice has concluded that it makes better business sense to sell the water he would have used to grow rice than grow rice; or why a melon farmer has left a third of his fields fallow, why a large landholder farther south is thinking of planting a solar array on his fields rather than the thirsty almonds that delivered steady profit for years.

"You want to sit there and say, we want to monetize the water," asked Seth Fiack, a rice grower in Ordbend, on the banks of the Sacramento River. "No, we don't," he said. Yet, this year, he sowed virtually no rice but simply sold his unused water for desperate farmers farther south. "it's not what we prefer to do, but it's what we kind of need to, and have to."

These are among the signs of a huge transformation up and down California's Central Valley, the most lucrative agricultural belt in the United States, as it confronts both an exceptional drought and the consequences of years of pumping far too much water out of its aquifers. Across the state, reservoir levels are dropping and electric grids are at risk if hydroelectric dams don't get enough water to operate the hydroelectric plants.

Climate change is supercharging the scarcity. Rising temperatures dry out the soil, which in turn can increase heat waves. In recent days, temperatures in parts of California and the Pacific north-west have been shattering records.

By 2040, at least 535,000 acres of arable land in the San Joaquin Valley is projected to turn infertile. That's more than a tenth of the area now being farmed.

And if the drought perseveres and no new water source can be found, nearly double that area of land is projected to become unproductive, with dire consequences for the nation's food supply. California's $50 billion agricultural sector supplies two-third of the country's fruits and nuts and more than a third of the vegetables consumed in the US.

Symptoms of this emerging danger are already visible now. Vast stretches of land are fallow due to lack of water. New calculations are being made about what crops to grow, how much, and where. Millions of dollars are being spent on replenishing the aquifer that has been depleted for so long.

"Each time we have a drought, you're seeing a little glimpse into what will happen more frequently in our climate future," said Morgan Ley, a professor specializing in water science and policy at the University of California, San Diego.

California's fertile Central Valley begins in the north, where the water starts. In normal times, water from rain and snowmelt in winter and spring will swell the Sacramento River, nourishing one of the country's most important rice belts. Usually, growers around the Sacramento River used to cultivate, in a year, 500,000 acres of paddy fields with sticky, medium-grain rice vital to sushi. Some 40 percent is exported to Asia.

That is past. Now, we are not in normal times. There's less snowpack, and, in 2021, much less water in the reservoirs and rivers that ultimately irrigate farms, provide spawning places for fish and supply drinking water for 39 million Californians.

The situation presents rice farmers in the Sacramento Valley, which forms the northern part of the Central Valley, with a tricky choice: Should they plant rice with the present limited supply of water or sell the water and save themselves the toil and stress?

Seth Fiack, the rice grower in Ordbend, took the latter option. Only 30-acres of his farm glistened with green rice paddies in the June sunshine, guzzling water that pours out of a wide-mouthed spigot while 500 acres lay idle, bare and brown. What water he would have used to grow rice he has signed away for sale to growers of thirsty crops hundreds of miles south, where water is even scarcer. At $575 per acre-foot (a volume of water one acre in size, one foot deep), the revenue compared favorably with what he would have earned growing rice. And he is free of the headaches of farming. It makes "economic sense," Fiack said flatly.

Rice is far less lucrative than, say, almonds and walnuts. So, Fiack's fields are now surrounded by nut trees.

Rice farmers are also uniquely advantaged. Because their lands have been in production for so long, they tend to have first dibs on water that comes out of the Sacramento River, before channeling through canals and tunnels down south. Also, unlike the owners of fruit and nut trees, whose investments would wither in a few weeks without water, rice farmers can leave a field fallow for a year, even two.

In the era of climate change, when water can be unreliable, that flexibility is an asset. Rice water transfers have been an essential part

of California's drought coping strategy. In 2021, rice farmers in the Sacramento Valley produced around 20 percent less rice.

Not everyone is happy with the situation. Kim Gallagher, a third-generation rice farmer, left fallow only 15 percent of her fields. Besides her wellbeing, she is also concerned about the effect on the rice mills and crop-duster pilots who live off rice farming, not to mention the birds that come to winter in the flooded fields. "These are trade-offs every farmer has to make, what they can fallow and what they can't," she said. "Everyone has a different number."

Off Interstate 5, which I drove on many occasions and wrote about in earlier books, Joe Del Bosque had been counting on the water flow for rice paddies from the north. It's how he's survived the droughts of the past, he said. This year 2021, he added, "is the worst year we've had."

Del Bosque grows organic cantaloupes and watermelons on most of his 2,000 acres, destined for supermarket shelves nationwide. The license plate on his GMC truck reads "MELONS."

In 2021, he left a third of his land fallow. There's just not enough water. He had planted asparagus on a few fields but soon pulled them out. Then, a neighbor pulled out his almonds.

Stuart Woolf embodies the changing landscape of the San Joaquin Valley. In 1986, Woolf took over his father's farm, retired most of the cotton, his dad grew, switched to tomatoes and bought a factory that turns his tomatoes into tomato paste for ketchup. His operations expanded across 25,000 acres. Its highest value crop is almonds. Woolf now sees the next change coming. The rice water from the north won't come when he needs it. The groundwater restrictions will soon limit his ability to pump. He has ripped out 400 acres of almonds. He's not sure he will replant them anytime soon. He estimates he will stop growing on 30-40 percent of his land in the coming years.

Woolf has left one field bare to serve as a pond to recharge the aquifer and bought land in the north, where the water is, close to Mr. Fiack's rice fields.

Now, he is considering replacing some of his crops with a different source of revenue: a solar farm, from which he can harvest energy to sell back to the grid.

"Look, I'm a farmer in California. The tools we had to manage drought are getting limited," he said. "I've got to fallow a lot of my ranch."

Siberia Burns

Farmers as far away as Siberia's rapidly warming permafrost are also left with fallow farms because of the fires climate change is igniting.

In 2021, for the third year in a row, residents of northeastern Siberia were battling the most terrible wildfire they could remember, and many were left feeling helpless, angry and alone.

They suffer the coldest winters outside of Antarctica with no complaints. But in recent years, summer temperatures in the Russian Arctic have reached 100 degrees Celsius, melting the once permanently frozen ground.

In 2020, wildfires scorched more than 60,000 square miles of forest and tundra, an area the size of Florida. It is more than four times the area burned during the devastating 2020 fire season in the United States. According to government data, this year, 2021, in the first two week's into the region's peak fire season, more than 30,000 square miles have already burned in Russia.

Scientists say that northern Siberia has been warming faster than any other part of the world and causing massive fires in recent years. And the impact can be felt far beyond Siberia. Fires could accelerate climate change by releasing vast amounts of greenhouse gases and destroying Russia's vast boreal forests, which absorb carbon from the atmosphere.

In 2020, a record-setting fire in the remote Siberian region of Yakutia released almost as much carbon dioxide as all fuel consumed in Mexico in 2018, according to Mark Parrington, a senior scientist at the Copernicus Atmosphere Monitoring Service in Reading, England. Yakutia – an area four times the size of Texas – was burning up again in 2021.

For a few days in July 2021, thick smoke engulfed the capital, Yakutsk, the world's coldest city, leaving residents with watery eyes and strangulation. Outside the city, the villagers quench their thirst by fighting fires, shoveling trenches to keep them away from their homes and fields, digging sheets of frozen ice in the ground. Life in this region revolves around the northern forest, known as the taiga. It is a source of berries, mushrooms, meat, wood and firewood. But, when it burns, the permafrost beneath it melts more quickly, turning the lush forest into impenetrable swamps.

Some wildfires are regular, but scientists say they have accelerated at an extraordinary pace since 2018, threatening the stability of the taiga ecosystem. "If we don't have forests, we don't have life," said Maria Nogovitsina, a retired kindergarten director in the village of Magras, a community of some 1,000 residents, 60 miles outside Yakutsk.

As many villagers have done recently, Nogovitsina made an offering to Earth to keep the fires out: She tore some Russian-style pancakes and sprinkled the ground with fermented milk.

"Nature is angry with us," she said.

The people of Yakutia are also angry. They say officials have done little to fight the fires, a sign that global warming may bear political costs for governments.

There is an almost universal feeling that the Russian government did not understand the plight of the people. So, many in Siberia refused to accept the official explanation that climate change is to blame for the disaster. Instead, they would rather go with conspiracy theories that most fires were the handiwork of crooked officials or businessmen hoping to profit from them.

"I haven't seen it, but that's what people are saying," said 83-year-old Yegor Andreyev, a villager from Magras, about forest fires in Siberia. "There's no fire in Moscow, so they couldn't care less."

Russia, in some ways, could benefit from climate change as warmer weather is creating new fertile territory and opening up the

once-frozen Arctic Ocean to more trade and resource extraction. But the country is also uniquely vulnerable, with two-thirds of its area made up of permafrost, which deforms the land, eroding roads and weakening buildings as it melts.

For years, President Vladimir V. Putin dismissed the fact that humans were responsible for climate warming. But in July 2021, he sounded a new message during his annual call-in show with the Russian public, warning that melting permafrost could have "very serious social and economic consequences" for the country.

"Many believe that, with good reason, it is primarily linked to human activity, to the emission of pollutants into the atmosphere," Putin told the Russian people. "Global warming is happening even faster in our country than in many other regions of the world."

Yet Russia's battle continues against a vast law enforcement apparatus, and state mistrust. As wildfires spread in June 2021, prosecutors launched a criminal investigation into local officials who allegedly failed to fight the fires.

"The people fighting the forest fires were close to being arrested," said Aleksandr Isayev, a forest fire expert at the Russian Academy of Sciences in Yakutsk. "Their activities were halted."

People in Yakutia were furious after Russia's defense ministry sent an amphibious plane to Turkey to help the geopolitically important country fight wildfires. It took five days until the Russian government announced that it was sending military planes to fight the fires in Yakutia.

To one of the volunteers, Semyon Solomonov, one thing was clear: any victory over the ravages of a changing climate would be temporary.

"This is not a phase, this is not a cycle – this is the approach of the end of the world," said Solomonov. "Mankind will die, and the era of dinosaurs will come."

Drowning Islands

A central dilemma for many small island developing states (Sids) livelihoods or their lives? The United Nations recognizes 38 member states as Sids because they face "unique social, economic and environmental challenges".

This bloc is particularly vulnerable to climate change as it is heavily dependent on tourism. Although tourism has been devasted by the Covid-19 pandemic, tourism was a significant driver of climate change in its heydays, accountable for eight percent of global carbon dioxide emissions, according to sustainable tourism expert Stefan Gossling.

The predicament these islands find themselves in is essentially recursive: attracting an abundance of tourists for economic survival contributes to a profusion of carbon dioxide emissions, which bleaches the colorful reefs and destroys the pristine beaches that attract tourists. As things are, by the end of the 21st century, all these low-lying islands could drown entirely in rising sea levels – an inevitable outcome of the climate change brought on by excessive emission of carbon dioxide into the atmosphere.

"The difference between 1.5 degrees and 2 degrees [Celsius warming] is a death sentence for the Maldives," said the island nation's president, Ibrahim Mohamed Solih, to the UN General Assembly in September 2021.

The climate change appeals are nothing new, made year after year as storms pummel these islands and the seas rise like a "slow-moving killer," as described by April Baptiste, a professor of environmental studies at New York's Colgate University, who also researches ecological justice in the Caribbean region. She points out that the island states' appeals were ignored for years because they were "dispensable." With little land, political power and financial capital, it was easy to overlook their plight.

These islands have a history of exploitation that dates back centuries and states whose native population is primarily black and brown. "You have that layer of race, racism, marginality to take into consideration," Baptiste said. "I absolutely believe that's at the heart

of the conversation as to why small island developing states are not taken seriously."

People and governments have taken matters into their own hands over recent years. One man from the island nation of Kiribati sought refugee status in New Zealand because climate change posed a threat to his homeland. He was eventually deported.

Vanuatu, also in the Pacific, announced in September 2021 it would seek to bring climate change before the International Court of Justice. Although any ruling would essentially be symbolic, not legally binding, it would clarify international law.

Sustainable tourism expert Stefan Gossling, a professor at Sweden's Linnaeus University School of Business and Economics, and Daniel Scott, a geography and environmental management professor at Canada's University of Waterloo, are two creators of the Climate Change Vulnerability Index for Tourism. Intending to bring the issue to policymakers' attention, they identified the countries with tourism economies most at risk from climate change. The Sids made up a substantial portion of the list.

"The Maldives identified this years ago and they pointed out: 'We're going to continue our tourism development, because that's the only way we can make money in the next couple decades before our islands are lost, "' Scott said.

Salvaging the economic fate of these countries is complex. Colgate University professor April Baptiste says there's no overarching policy to retrain people whose livelihoods are vulnerable in new trades. And Gossling argues that, while they're not the culprits behind global warming, the Sids aren't directly confronting the friction between climate change prevention measures and their tourism reliance.

"I also think there have never been serious efforts by the Sids to consider different economic sectors, because very often it's been very self-evident that you would focus on tourism, you would develop for tourism and that you, by definition, then almost would become dependent on tourism, " he said.

"And I think the strange thing – this conflict has never been vocalized by Sids."

What has been vocalized is a clarion call for substantive action by rich, developed countries. Now that the ramifications of climate breakdown have reached countries that could long pretend it didn't exist, the Sids hope the message is finally getting through.

The poet John Donne wrote: "No man is an island". In the same vein, Maldives' president Solih drove home the point at the UN General Assembly that the island nations have been making for years: "There is no guarantee of survival for any one nation in a world where the Maldives cease to exist."

Beautiful Micro-Plastics

Svalbard, a Norwegian archipelago chilling halfway between the Nordic country and the North Pole, is known as much for its rugged beauty as its remoteness. From the village of Longyearbyen, visitors and roughly 2,400 residents can appreciate the stark terrain around the fjord known as Adventfjorden.

But the beauty of this Arctic inlet conceals messier, microscopic secrets.

"People see this nice, clean, white landscape," said Claudia Halsband, a marine ecologist in Tromso, Norway, "but that's only part of the story."

The fjord has a sizable problem with subtle trash – namely microfibers, a squiggly subset of micro-plastics that slough off synthetic fabrics. Microfibers are turning up everywhere, and among researchers, there's growing recognition that sewage is helping to spread them, said Peter S. Ross, an ocean pollution scientist. He has studied plastic fouling in the Arctic. While the precise impact of microfibers building up in ecosystems remains a topic of debate, tiny Longyearbyen expels an extraordinary amount of them in its sewage: A new study shows that the village of thousands emits roughly as many as all the micro-plastics emitted by a wastewater treatment plant near Vancouver that serves around 1.3 million people.

The findings, published in the journal *Frontiers in Environmental Science*, highlight the hidden impacts that Arctic communities can have on surrounding waters and the major microfiber emissions

that even small populations can produce through untreated sewage.

Adventfjorden's microfibers arrive through a submerged pipe that juts into the fjord like an arm bent at the elbow. It spits out the community's untreated sewage – urine and feces, plus mush pushed down the kitchen sinks and suds from showers and washing machines. Around the world, small or isolated communities wrangle sewage in numerous ways, from corralling it in septic tanks to relying on composting latrines. In Longyearbyen, waste mingles in a single pumping station, no bigger than an outhouse, before squelching to the fjord through tubes winding atop the frozen earth.

"People think, Out of sight, out of mind; the ocean will take care of it, but this stuff piles up," Dr. Halsband said.

Curious about trash that isn't immediately visible to the naked eye, Dr. Halsband and four collaborators sampled the wastewater for microfibers over one week each in June and September 2017, then modeled how the tiny bits might float around the fjord.

"It wasn't as smelly as we were afraid it would be, but there were floaters," said Dorte Herzke, a chemist at the Norwegian Institute for Air Research and the lead author of the paper.

Back in the lab, researchers filtered and sorted the samples. Lacking equipment that could identify fibers as synthetic or organic, the team discarded anything clear or white that might be cellulose. Still, scores of pieces remained, including dark colors likely from outdoor gear – especially in the September samples, collected "when the hunters start to emerge" and bundle up, Dr. Herzke said. (Previous research found that outerwear such as synthetic fleece tends to shed microfibers in washing machines.)

From these counts, the researchers estimated that the community flushes at least 18 billion microfibers into the fjord each year – roughly 7.5 million per person.

To start puzzling out what happens to the bits in Adventfjorden, the team modeled where the microfibers could accumulate and which species might encounter them. The researchers calculated that the lightest microfibers would stay suspended near the surface and

leave the fjord within days, dispersing in roomier waters. Heavier ones would sink to the bottom or cluster near the sewage pipe or inner shore, places that are habitats for plankton, bivalves and bloody-red worms.

Deonie and Steve Allen, married microplastics researchers at the University of Strathclyde in Scotland and Dalhousie University in Nova Scotia, praised the paper's model and said in an email that this "really local and timely field data and sampling" bolster its results. But they said it would benefit from chemical analysis, too, a sentiment echoed by Sonja Ehlers, a micro-plastics researcher at the University of Koblenz-Landau in Germany. Ehlers said she would also like to see the team document how local creatures interact with the microfibers.

The scientists hope their work will prompt Arctic communities to mull new ways to manage sewage and the trash that hitchhikes through it.

"Norway has a lot of fjords," Dr. Herzke said, and Adventfjorden indeed isn't the only one flecked with feces and tiny pieces of trash. That makes it a good case study. "Once we understand this one," Dr. Herzke added, "we can understand others."

Where thorough sewage treatment isn't feasible, Dr. Halsband said, communities could consider essential filtration, promote wool alternatives to synthetics and eke out more wears between washes.

As for Longyearbyen, the researchers said it would soon introduce filtration to capture large debris. That may intercept some smaller bits, too – maybe even downright teeny ones.

Science

The flurry of recent natural disasters, including fires, floods and storms, has focused attention on the complex scientific work that is trying to establish a direct connection with global warming.

When floods swept through parts of China's Henan province killing at least 302 people, a group of scientists who specialize in analyzing

the drivers of extreme weather events found themselves unable to help. Like everyone else, they were horrified by the images of people trapped in water-filled subway stations, as whole blocks of the city of Zhengzhou were flooded by record rainfall.

Their work involved two core questions: did climate change make this disaster more likely? And did it make it worse?

By the time the storms hit China, the scientists were already fully engaged in trying to untangle why the floods in Germany and Belgium earlier in July 2021 had been so devastating.

Demand is intensifying for the work of the World Weather Attribution initiative (WWA), a team founded in 2014 comprising seven core volunteer researchers – all of them also have day jobs and have been unfunded for years.

Two weeks before the German floods, the same questions were being asked about a freak heatwave in North America. Then, fires sparked by record temperatures blazed across Turkey, Greece and Italy.

"We are already struggling to get the manpower," says Geert Jan van Oldenborgh, co-lead of WWA. As the world warms up, he expects the workload to increase, because "events will get worse".

Is climate change to blame? To the casual observer, the flurry of extreme weather events over the past two months can feel like the obvious consequence of rising average temperatures – and something that many scientists have been warning about for years.

Yet establishing a direct causal link between an individual case of flood, fire or storm and the broader climate is an evolving science – and something that is still desperately hard to do in practice.

That climate change is making extreme weather more frequent and intense is a connection that has been "well made", says Peter Stott, an expert in climate attribution at the UK's Met Office. But he adds: "The science gets more difficult when we ask versions of the question to do with a specific [event] ... and say 'is this due to climate change', or maybe more meaningfully, 'how did climate change contribute to this?'"

If the science of climate attribution becomes more accurate, the implications could be substantial. It could make predicting future events precise and identify areas at risk, thus helping societies prepare and adapt.

Reliable attribution could also fortify the legal cases brought against companies and governments in any way accountable for climate change.

The challenge is considerable. "It's quite a tricky question to say 'how much more rain fell in [the European] floods due to climate change'," says Stott. "That is really pushing at the frontiers of science."

Scientists are making some headway. In July 2021, the WWA made a striking pronouncement. It said the North American heatwave that sent temperatures in the Canadian village of Lytton soaring to 49.6C would have been "virtually impossible without human-caused climate change".

The group had reached a similar verdict in 2020 about a heatwave in Siberia, concluding that the 38C recorded in Verkhoyansk would have been "almost impossible without climate change".

"We know that weather varies a lot from day to day," says Flavio Lehner, a climate scientist at Cornell University who works with the WWA. "The question is when [extreme weather events] occur, are they stronger, longer and more severe than they would have been without climate change?"

Yet, they are wary about pushing their conclusions too far. "Every time we publish something, I wake up at four in the morning to make sure that the numbers are correct," admits van Oldenborgh. "It's essential that we worry ... [to get] as close to the truth as possible."

The series of dramatically extreme weather events in 2021 has caught the world's attention, and the previously ignored question about the role of climate has rarely been so present in scientific or political discussion.

Doug Wilson, the chief scientist at the UK's Environment Agency, says the question is asked "after virtually every single [extreme weather] event… Our response tends to be that this is exactly what we'd expect to see in a changing climate. We're not trying to say that a particular event is a result of climate change."

Other scientists, including from the WWA, spend their time analyzing extreme events in an effort to do just that – or the nearest thing to it, since no event is caused by climate change alone. However, findings with the "very strong language" of the North American and Siberian heatwave conclusions are unusual, says Lehner.

Scenarios might include the Earth as it was 200 years ago, before man-made warming set in, creating the present day conditions and a future scenario in which the planet has warmed more than the 1.2C already observed. Researchers then compare how many times the event occurred in each scenario, and make a judgment about whether climate change made it more likely.

Wildfires, for example, can be difficult to analyze without a very detailed model, since they can occur over relatively small areas of land and be influenced by local weather conditions, including those created by the blaze itself.

In the light of the fast-growing number of record-breaking weather events, many researchers are now stressing the need to use more precise models.

"We can't attribute [the recent extreme weather] events to climate change, because the models can't simulate them," says Tim Palmer, Royal Society research professor of climate physics at Oxford University. "The tools we have are not adequate."

At the same time, he adds that assuming these events are not driven or exacerbated by climate change is a "wrong conclusion." Meanwhile, running the sort of high-resolution models that might answer these questions better requires huge processing power – supercomputers that are enormously expensive to build and use.

"We need significantly more funding for climate science," says Lehner. "Our ability to understand and predict climate change, and ex-

tremes like we have just seen, is not limited by our knowledge. It is limited by computing time, ie resources."

In a briefing for policymakers in 2021, the Royal Society, the UK's independent scientific academy, called for creating an international climate modelling center where resources would be pooled.

The world "needs more detailed and precise information to enable robust decision-making in the face of rapidly amplifying climate change," the briefing said. The inability of models to simulate certain events in fine detail "accounts for the most significant uncertainties in future climate, especially at regional and local levels."

As the world struggles to comprehend the devastation wrought by disasters from Henan province to Cologne, interest in climate modelling is growing well beyond the scientific community.

Tom Delworth, a senior scientist at the US National Oceanic and Atmospheric Administration, describes "explosively growing demand" from policymakers for information about how things might change.

"One of the groups that has expressed the most intense desire to understand that is our intelligence services and the military," which are interested in predicting how the consequences of climate change – such as water shortages – might spark conflicts and create new risks, he adds. However, not everyone agrees that there is value in striving for certainty on the causation question.

Giza Gaspar Martins, chair of the least developed countries group at the UN climate negotiations in 2015, argues that debating whether or not individual events were made worse by climate change is a distraction.

"I am beyond attribution science," he says, adding that "we waste time" on this work when the priority should be cutting greenhouse gas emissions and adapting to a changing reality.

Angola, for example, is already experiencing a more severe drought that affects flood cycles, he adds about his home country. "We are

sufficiently convinced [these] are linked to climate change. And that's all we need."

But Mamadou Honadia, a former lead negotiator for Burkina Faso at the UN negotiations, says that attributing individual events to warming helps developing nations argue for climate funding – one of the critical issues on the table at the November 2021's climate conference, COP26.

"It really is very difficult to convince the international community that floods, which happen in developing countries, are due to climate change, without any science-based information," he adds.

Some scientists have even proposed that establishing causal links could help with the rising number of legal cases being brought against companies and governments for their roles in driving climate change.

Plaintiffs could make "better use of climate science – particularly in the field of attribution," wrote a group of Oxford University researchers, including one of WWA's other co-leaders, Friederike Otto, in 2021.

"It does not seem far-fetched any more to suggest that – supported by the right scientific evidence – future cases will compel companies to pay compensation to communities impacted by climate change."

The rapid succession of extreme events in 2021 has prompted anxious questions about whether or not the realities of climate change are outstripping what models had predicted.

In its assessment of the North American heatwave, the WWA said temperatures were so extreme and unusual that they could be the result of "non-linear" climate change, where extreme events do not occur smoothly in line with temperature rises, but more suddenly or intensely.

The Climate Crisis Advisory Group, which is led by the UK government's former chief scientific adviser Sir David King, said the severity of the heatwave in North America and the flooding in Eu-

rope were "difficult to explain" as solely the result of global average temperature rising by 1.2 C from pre-industrial levels.

"Climate change is happening faster than anticipated," the group said. Rapid warming and melting of Arctic ice may have "triggered additional changes in how our weather works."

Not all scientists share the concerns that current models are not up to the job.

"These are extreme events, but we saw them being produced by climate models… I'm really less surprised than some of my vocal colleagues," says Lehner. The sequence of recent catastrophes "might just be by chance. We might not see similar things for a long time in any of these specific places," he added.

The shocked reactions to the extreme weather events in 2021 may also reflect a more general misunderstanding about the realities of living with climate change.

"I think it's fair to say that the communication has been a bit abstract and gives the impression that climate change is far away," says Ted Shepherd, Grantham chair in climate science at the UK's University of Reading.

As the world continues to warm up, extreme events are expected to continue. In July 2021, a study published in the journal *Nature Climate Change* found that "record-shattering extremes" that would be "nearly impossible in the absence of warming" were likely to occur in the coming decades.

It also said that further investigation into such events' likelihood was "vital" since communities tended to plan for worst-case scenarios based on what had been observed in the past, rather than what is possible in the future.

An autopsy of a storm, fire or flood – and the destruction they cause – is likely to find numerous and interrelated drivers, but that can be an unpalatable answer.

"Some people feel that somehow [looking at multiple causes] takes the spotlight off climate change too much," says Shepherd. But he

says it still makes sense to study the causes because the preventive actions that people can choose to take, such as installing flood defenses or warning systems, or policymakers reaction to a disaster once it hits, will also impact how damaging an extreme event is. "You shouldn't let local governments off the hook for bad management," says Shepherd.

The political debate around climate is changing, even if the science can still seem imprecise. As people watch their homes burn, or disintegrate under floodwater, the support for climate skepticism is waning, says MP Francis Scarpaleggia, a member of Canadian parliament, who chairs the House of Commons' standing committee on environment and sustainable development.

The public is increasingly convinced of the link between extreme weather and climate change, "regardless of whether the academic work precisely links the two", says Scarpaleggia. "It's one thing to read about the science, but you need to see the tangible impacts for that science to sink in."

Yet the fear that any uncertainty might fuel climate denial is powerful.

Bjorn Stevens, a professor at Hamburg's Max Planck Institute for Meteorology, says "some people get really nervous when we say there are some things that we don't understand" because they worry that climate unknowns may "undermine the case for reducing carbon." But he adds: "I tend to think people are more sophisticated than that. Just because you don't know everything, doesn't mean you don't know anything."

A Taste of What's in Store

Devastating floods and heat waves across the globe have disrupted the lives of millions of people and left scientists and environmentalists worried about the even more extreme weather to come.

In July 2021, scientists with the Intergovernmental Panel on Climate Change met virtually to discuss the first installment of the group's sixth assessment report, which will update the established

science around greenhouse gas emissions and projections for future warming, its impact and a climate tipping point.

A study titled "Increasing probability of record-shattering climate extremes", which was published on July 26, 2021, by *Nature Climate Change*, or NCC, said more events that break weather records by large margins could be expected.

It found that the northern mid-latitudes have now become particularly vulnerable to record-shattering heat, as exemplified by the recent heat wave across North America. Many long-standing temperature records were broken by as much as 5 C.

The study said that such extreme weather events are likely to occur more frequently in the next few decades, noting "they would be nearly impossible without climate change".

The year 2021 alone will be remembered for some of the most extreme weather conditions ever recorded, a further indication of the impact climate change will have on the planet.

The summer 2021 floods killed dozens in Germany and Belgium, destroyed homes, and even washed away medieval castles. In India, the monsoon season saw bizarre scenes. The floods' intensity and scale in early July 2021 stunned climate scientists.

In Canada and the United States' northwest, an intense heat wave saw temperatures soar to as high as 49.6 C, leaving well over 100 people dead and forests on fire. Earlier in 2021, snowstorms devastated much of Texas.

In Greece, authorities ordered evacuations as wildfires raged on an island near Athens. Temperatures of more than 40 C and strong winds have fanned more than 150 wildfires in different parts of the country in July 2021, adding to the conflagrations in Turkey and other areas of the Mediterranean.

In Turkey, a coal-fueled power plant in the country's southwest and nearby residential areas were evacuated as wildfire flames reached the plant. Turkish President Recep Tayyip Erdogan said that his country battled the worst wildfires in its history. The wildfires raged for weeks killing more than a dozen people.

As global temperatures rise, the *Nature Climate Change* study said, extreme heat events are becoming more frequent, more intense and longer-lasting and causing an uptick in record-breaking temperatures logged around the world in recent years.

The impact of global warming has been clearly visible for decades– from the bleaching of the world's coral reefs as seawater temperatures rise to the melting of the Greenland ice sheet and permafrost in Siberia.

Erich Fischer, the study's lead author, told the British website, Carbon-Brief, which covers developments in climate science, climate policy and energy policy – that climate-change extremes are like athletes on steroids. "We define record-breaking events as events exceeding the previous record by any margin," Fischer said.

"That may often be just 0.1 C warmer than the previous event, which is not relevant in terms of impacts. Where the records become really relevant is if they are shattered like in the case of the Pacific Northwest heat wave." Explaining the comparison with sports, Fischer said: "I argue that extremes in a changing climate are like an athlete on steroids who suddenly breaks previous records in a step-change manner."

Scientists had long predicted such extremes were likely. But many are surprised by so many happening so fast – with the global atmosphere 1.2 C warmer than the preindustrial average. The Paris Agreement on climate change calls for keeping warming within 1.5 C.

The intensity of some of 2021's climate events has shone a light on the modeling used by climate scientists, suggesting that some of the modeling may be underestimating the rise in weather extremes.

Paul Read, of the faculty of medicine at Monash University in Melbourne, Australia, said: "We cannot rely on technology to pull us away from the precipice of a climate tipping point.

"We need social and political mitigation – wholesale behavior change – as well as technological adaptation," he added.

Diet Change

As governments strive to achieve bold national climate goals, vast amounts of money are being allocated to boost mass transit systems and conduct research and development for cleaner energy alternatives. But there's one carbon-spewing sector that remains ripe for reinvention: the meat we eat. If nations don't invest in its transformation, we risk negating the climate progress being made elsewhere.

A new report co-authored by United Nations senior adviser Dr Albert T. Lieberg, and produced with support from The Good Food Institute Asia Pacific, illustrates how accelerating global demand for meat and dairy products is heavily contributing to greenhouse gas emissions and putting immense pressure on natural resources, contributing to land degradation, deforestation, biodiversity loss, water pollution and water scarcity.

The report, titled *The Need for Change,* reveals that in the 30-year span between 1989 and 2019, global meat production nearly doubled, from 174 to 337 million tons, driven in large part by emerging economies. The most substantial growth in meat consumption per capita has occurred in East and Southeast Asia, particularly in China. In that same period, global milk production also rose from 537 million tons to 883 million tons.

These dramatic increases have manifold negative impacts on our planet. Beef production is the top driver of deforestation globally, with cattle ranching directly associated with 80 per cent of current Amazon deforestation. Besides, animal-based agriculture is responsible for up to a third of all fresh water consumption in the world, far surpassing the amount used for industrial, municipal, or household purposes.

Global greenhouse gas emissions by the livestock sector alone exceed emissions by all cars, trains, ships and planes in the world combined, and contribute more than the overall emissions of the United States. In short, the ambitious climate targets that are needed to avert environmental catastrophe are not achievable without global dietary change.

These concerns are particularly acute in the Asia-Pacific region. China is the world's most significant meat-producing country, accounting for 24 per cent of global meat production in 2019, and projections show continued regional increases in the coming years.

Without immediate action to change that trajectory, nations risk not only depleting their finite natural resources and increasing the risk of breeding zoonotic diseases, which contribute to widespread illness and food supply disruptions.

Fortunately for us all, technological innovation has brought humanity to the threshold of a new food production era, which has the potential to dramatically reduce the climate and public health risks associated with animal farming.

The latest generation of innovative plant-based proteins – like those produced by Beyond Meat and Impossible Foods – deliver the same flavors and culinary experience that meat-eating consumers are used to, with zero chance of causing a pandemic. Similarly, cultivated meat, which is grown in laboratories directly from animal cells, rather than raising animals by conventional farming, eliminates the risk of zoonotic disease by divorcing meat production from industrial animal agriculture.

A shift towards plant-based food and cultivated meat wouldn't just make nations less prone to outbreaks. It would also free up vast areas of land and other resources that are currently being misused. Research shows that producing a plant-based burger can emit 90 per cent less greenhouse gases than a quarter pound of US beef. It would also reduce water use by 99 percent, energy by 46 percent, and land by 93 percent. Similarly, cultivated meat can also substantially reduce water use and greenhouse gas emissions, and will use a projected 95 per cent less land area than conventional beef production.

Plant-based meats are more widely available, but even though prices are coming down for some successful brands, most products in the market are still well above price parity with conventional meat, which discourages their widespread adoption. It is precisely the kind of imbalance that public-sector investment has the capacity to fix.

To drive down costs to consumers and stimulate economic development more broadly, governments need to significantly invest in open-access research aimed at accelerating the progress of plant-based and cultured meat.

Such funding can help close critical research gaps, such as improving methods of plant-based and cell-based food manufacturing or optimizing non-animal proteins to assess their suitability for use as ingredients.

This strategic approach is working for renewable energy, and it can work for food too. By using public funds to reduce consumption of conventional, resource-intensive meat and dairy, in favour of more nutrient-dense and sustainable alternatives, nations can contribute to a necessary global shift and preserve life on this planet for future generations.

The Crunch

In scientific circles, it's called entomophagy – eating insects. In Thailand, which has more than 20,000 cricket farms and regular consumption of over 140 insect species, it's called good business.

With the global population rising towards 8 billion, food prices increased more than 30 per cent in 2020-2021, besides deepening concern over the environmental harm industrialized food production practices would cause. Insects are being talked of as the future of food security.

As Gourmet Grubb in South Africa launches BSFL milk – BSFL stands for black soldier fly larvae – Bentspoke Brewing in Canberra is bottling insect-based beer. Companies worldwide are beginning to sell insect-based flour, burgers, fitness bars, pasta, bread and a wide range of snacks.

Since the UN Food and Agriculture Organization's 2013 *Edible Insects* report, the subject has attracted heightened attention, homing in on several clear advantages. Insects reproduce at a prodigious rate, they have a tiny carbon, water and ecological footprint and, if you can suppress the "yuck" reflex, insects make an excellent source of protein, fatty acids, vitamins and minerals. Compared with cow,

pigs or chickens, insects have a lot going for them. We consume just 40 per cent of the body weight of a cow and 55 per cent of a pig or chicken. While insects, we can consume 80 per cent of the body weight of insects. For every kilogram of consumable protein, cows need 10 times as much animal feed, five times as much water and 10 times as much land. A cow's carbon footprint is six times that of insects. A subject I discussed at length in my book *Feasting Dragon, Starving Eagle* (p.315).

The FAO reports 650 species of edible beetles, 360 caterpillars, 320 species of ants, bees and wasps, 240 species of grasshopper, locust or cricket, 50 species of termite and around 200 species of fly. About two billion people currently eat them. More than 90 per cent of the insects are harvested wild, mainly in the rural areas of developing countries, but the squeamish aversion to insects remains strong in most Western countries. Not being a squeamish person, I have in fact tried several species of different insects at insect restaurants in China, Thailand and Vietnam. Beer sure tastes better washing them down.

It is natural to link insects with death and decay. Given their size, it is difficult to eat them without being conscious of crunchy body parts. Note how much of the success of the modern meat industry has been down to hiding or disguising the "icky" aspects of dismembering a carcass, diverting the slippery bloodiness of animal entrails to the pet food industry and ensuring all meat products arrive on the supermarket shelf as benign, homogenized slabs.

As a result, much of the emergent insect food industry is being built on the assumption that their products will need to be disguised – note how Beyond Meat, Impossible Foods and other "fake meat" innovators have built their business model around disguise.

Snacking on silk worms or deep-fried crickets at a Bangkok market stall is likely to remain a minority pursuit as insect protein companies such as Ynsect in France or Gourmet Grubb focus on fish meal, pet food and ground protein flours that can be made into snack bars, milk, bread or crispy snacks.

The simple reality of food *neophobia* – an aversion to trying new foods – will make the rise of the insect food industry slow-moving.

In 1921, the Belgian-American scientist Joseph Bequaert was emphatic in his pioneering book *Insects as Food*: "What we eat is more a matter of custom and fashion [rather] than anything else. It can be attributed only to prejudice that civilized man of today shows such a decided aversion to including any six-legged creatures in his diet."

Despite the rising environmental imperative to tap the potential of insect protein, it is clear that "custom and fashion" will continue to obstruct progress. The vegetarian beliefs of Buddhism and dietary rules for Muslims and Jews will restrain demand for insects or insect protein among more than a quarter of the world's population. The habits of the world's regulators will also present fascinating obstacles. The current angst over the possible origins of Covid-19 makes it clear that it could take years before we can ensure we are protected against the bacteria, viruses, parasites and funguses that can thrive in insects or the allergies they can cause.

Heaven knows where insects and insect protein sit with global phytosanitary rules, supermarket "best before" labelling or biosecurity rules concerning the possible escape of non-native insects from the automated mass-rearing facilities that will need to be developed to produce stable, reliable, and safe supplies of insect-based products.

The current global insect food market is small – estimated at around US$688 million in 2018. In contrast, beef, pork, and poultry sales are about 1,000 times the size of the current insect protein market. However, considering the steadily rising food prices and mounting concern about the enormous environmental harm done by today's food processors, the demand for insect-based food is expected to grow to US$8 billion by 2030.

Climate Solutions

On January 17, 1995, a security camera inside a convenience store in Kobe, Japan, recorded activities inside the store: At 5:46 a.m., a cashier plucked change from the register and passed it across the counter to a customer, who, coins in one hand, plastic bag in the

other, turned toward the shop door. In that instant, the entire store lurched, shoving everything in it toward the wall behind the register. Both the cashier and the customer sank to their knees, caught in a circular shaking motion that sent shelves sliding and tipping, hurling boxes and all loose items to the floor, and slamming the front doors open and shut.

Outside, at the waterfront port, which is spread across several artificial islands, the land moved like water, rippling in the seismic waves. Concrete quays built to keep water out collapsed into Osaka Bay.

Seismographs quickly confirmed: A magnitude 6.9 earthquake had paralyzed the entire city. Bridges and highways were destroyed; water, electricity, and telecommunication lines were cut off. Hundreds of thousands of people lost their homes. Over 6,000 people died. Restoration work took many years.

Today, researchers worldwide view Kobe as an example of a modern city where structures failed to perform the way engineers thought they would.

Halfway around the world another metropolis – San Francisco – has drawn worrisome parallels: Like Kobe, the Northern California coastal city sits at the heart of a dense, seismically active urban area constructed on enormous areas of filled land, much of which is protected by a sea wall vulnerable to the rising waters caused by climate change.

Its particular confluence of geology, city construction and overdue infrastructure updates feeds into its vulnerability. Other cities around the world – from Jakarta, Indonesia to Christchurch, New Zealand, and any city along the coastline of the Pacific Ocean from Alaska in North America to Patagonia in South America – also face the twin challenges of seismic hazards and rising seas.

While each locale must find solutions suitable to its circumstances, the premise remains the same: Time is running short for fortifying the infrastructure built in a world that did not account for climate change. Today wealthier countries might have better odds of succeeding; nonetheless, the challenge for all is the same – how cities

secure themselves against disaster today while also anticipating future adjustment and adaptation.

San Francisco is a microcosm of some of the challenges lurking around the globe. And while the city is making some progress in fortifying its protective sea wall, the question is: Are the plans unfolding fast enough? Are they ambitious enough?

Researchers from the US Geological Survey say there is a 72 percent possibility of at least a 6.7 magnitude earthquake hitting San Francisco before 2043. It could come even as early as tomorrow. At levels like that, Port of San Francisco engineers calculate that the city's underwater sea wall, a 19th-century pile of rocks and concrete that holds the northeast waterfront in place, is likely to slide into the San Francisco Bay. The result: a catastrophic un-hemming of a city of nearly 900,000 people. That the wall has already sunk into the bay makes the future risks that much more foreseeable.

In an earthquake over 7.0 in magnitude and with an epicenter within 10 miles of San Francisco, the Embarcadero roadway that carries a traffic load of around 94,000 vehicles on a typical day is predicted to split. Along this thoroughfare, bookended by views of the city's two bridges, lies the West Coast's key financial district on one side, and the historic waterfront that welcomes over 15 million visitors each year on the other. About 300,000 tourists arrive through the city's international cruise terminal each year, and as many as 48,000 regional commuters pass through the Embarcadero BART station each weekday. It's also a central channel for utility lines like water, electricity, gas, and sewage ducts that keep the city in motion.

One of the most worrisome earthquake scenarios, described in *Waterfront Resilience Program* documents points out that when the ground spills into the bay, engineers fear that so, too, might the utility corridor, rupturing pipes and electricity lines. The historic pier sheds and bulkhead wharves would tumble into the water, and the wooden piles supporting them would splinter. Researchers predict that the land supporting near-shore blocks of the city – former marshland – will convulse like water just as in Kobe, displacing anything and anyone atop it. If the quake hits on a weekday, 40,000

people could be along the waterfront, many stuck in collapsed structures or piers over water. This same area, along the Embarcadero, holds the city's disaster response services, including evacuation facilities and its emergency operation center, which would be cut off when most needed. Over $100 billion in building value and economic value are potentially at risk from sea wall collapse, not including pricey utility repair. Port engineers fear much of the sea wall itself would be irreparable.

The Port of San Francisco (which manages 7.5 miles of the city's waterfront, including the three miles buttressed by the sea wall) had assumed the wall needed upgrading. But it did not know just how direly until 2016, when officials released a preliminary study of the seismic vulnerabilities. Unlike some sea walls, San Francisco's provides structural support as well as flood protection. The subsequent 2020 report detailed its weak points on both fronts. As climate change makes ocean levels rise, the sea wall will increasingly have to perform in a context for which it was not designed.

Given that an earthquake could strike any day, the port's immediate priority is ensuring the sea wall's integrity in such an event. But doing so also must consider the sea level rise, and its uncertainties of how fast and how high. Thus, risk mitigation decisions made now must allow for the unknowable.

Patrick King, who directs port and maritime work at Jacobs, the engineering firm managing the port's resiliency program, articulates the urgent challenge of designing a future waterfront. "This infrastructure was built for a certain environment that no longer exists and is rapidly changing," he said. And now, "we need to predict what that environment is going to look like" in the unforeseeable future.

"Wall" is a generous word for the pile of rocks sitting on top of mud running along San Francisco's northeastern waterfront. During the feverish early days of the feverish gold rush, San Franciscans built the sea wall in a slapdash effort to establish some flat land at the edge of the hilly city. Horses were struggling to lug gold-filled wagons over the hills, and San Franciscans needed warehouses and counting-houses on level ground. Impatient for steam-powered shovels

to arrive from across the country, residents began dumping into the marshland of Yerba Buena Cove whatever was on hand: loose sand, debris remnant from city construction, unwanted goods, trash, remains of abandoned ships. After a year, San Francisco had expanded three blocks into the Bay.

The California Legislature established a Board of State Harbor Commissioners to rein in the construction chaos and create a harbor development plan. Construction of their first sea wall – essentially a rescue mission for the trashed harbor – began in 1867. A better-funded effort took off in 1878, and construction continued in stages over the next four decades.

Though longevity was not at the forefront of the undertaking, the wall still stands – long outlasting what anyone could have expected. And to some experts, this is worrisome.

"I would suggest that San Francisco has triple jeopardy," Mr. King said: earthquakes, sea level rise and aging infrastructure.

Until now, the wall has mostly worked, though barely. In the 1906 earthquake, the sea wall shifted into the Bay, crumpling streetcar tracks, rupturing pipes and destroying homes. Entire stretches of street slid sideways; other portions dropped a few feet. In today's city, a similar disaster would cause a much worse impact.

In 1989, the magnitude 6.9 Loma Prieta earthquake liquefied sections of soil, most notably in the Marina District, where terrible fires broke out. Along the Embarcadero, the sea wall cracked. Some of its construction joints split open.

"We had a huge fissure out here," recalled Mac Leibert, 51, general manager of Pier 23 Cafe Restaurant & Bar, gesturing to the Embarcadero roadway outside of the squat blue-and-white cafe.

The epicenter of Loma Prieta was 60 miles southeast of San Francisco. Its distance tempered the effects of its shaking in the city. But, next time, San Francisco might not be so lucky.

Against the impending bleak scenarios, steps for a safer, more secure future of the waterfront have become visible. Yet, ahead lies

the difficult work of balancing design solutions, an unknown future and budget constraints – all against the backdrop of the fast-ticking clock.

Seismically shoring up the sea wall is first on the port's list of projects. It means retrofitting bulkhead wharves and walls by reinforcing piles, joints, and decks, and strengthening the fill so it will not liquefy. It also involves working with emergency medical workers and emergency responders to understand how their capabilities might be affected by an earthquake.

Right now, the port is in "the creative phase," developing its first adaptation plans, which will be revealed in the fall of 2021. The measures will not be restricted to seismic risks. According to the port's Waterfront Resilience Program director, Brad Benson, "It's better to build once to solve multiple problems."

Making seismically fortified structures resilient to rising seas is not as simple as raising the wall's height. Generally speaking, most sea wall infrastructure has, until now, been designed to weather an isolated storm, allowing time to repair before the next one. Going forward, sea walls will need to provide protection not just several days a year, but twice daily, at increasingly elevated high tides. Infrastructure design will have to account for this increased stress, and even more so in seismic zones, says Mark Stacey, an engineering professor at the University of California, Berkeley. "The seismic aspect has to be really robust, and probably some redundancies or over design," he explained. "Because earthquakes will coincide with those flood protection systems being active."

While much of the San Francisco Bay is suited to marshes or other green infrastructure as flood control, the Embarcadero nearshore waters are generally too deep for such strategies. Certain ecological interventions, like a textured sea wall to encourage marine life, could provide critical habitat but will not benefit seismic or flooding mitigation strategies.

However structures are seismically strengthened, the ability to adjust them will be built in. Because the sea wall material, the mud and fill underneath, and the adjacent infrastructure varies along

the waterfront, so will strengthening and adaptation techniques. "It can't just be, let's elevate three feet so that we can't flood in this particular area," said King, who directs port and maritime work at the engineering firm Jacobs. "It's gotta be what is the future state of this environment, and what is the population going to need? You have to build in the adaptive capacity to change as the environment changes."

In 2021, the San Francisco Bay Conservation and Development Commission permitted a levee upgrade project in nearby Foster City that exemplifies how adaptation over time could play out. Every five years, the city will evaluate the physical structures and updated federal and regional guidance. Then, if necessary, it will perform a new risk assessment, potentially adjusting systems.

The looming question over any discussion is how to pay for these projects. The sea wall project is estimated at $5 billion, and it is only one of many port projects addressing waterfront resiliency. But it is a price tag that will be paid over 30 years, and funding options look good. The successes of public-private partnerships in existing waterfront projects bode well for future work. California state's 2021 budget showed a surplus which enabled providing $11.8 billion for climate risk, of which $211.5 million is earmarked for coastal resiliency. Besides, in 2021 the Biden administration announced that it is expanding the Federal Emergency Management Agency's Building Resilient Infrastructure and Communities program, which provides pre-emptive hazard mitigation funding.

All these options are positive developments in the United States, where funding is typically not allocated until after the disaster: Think of the FEMA and HUD money after Hurricanes Katrina and Sandy. "This really separates us from other places, doing upfront planning," said Brian Strong, San Francisco's capital planning director and chief resilience officer. "It's very hard to get the money before the disaster happens, to be proactive about it."

Strong's remarks come just months after his city weathered other simultaneous disasters: Covid-19, noxious air quality, extreme heat. The budget surplus enabling climate funding was the result of the

pandemic not undermining the economy as severely as projected. According to California Assembly member Al Muratsuchi, chair of the Joint Legislative Committee on Climate Change Policies, now could be "a once-in-a-lifetime opportunity" to invest in climate crisis preparedness.

After shepherding his city through the challenges of the past year and culling lessons about disaster response along the way, Strong is sanguine, if sober, about San Francisco's ability to be prepared for what comes next.

"We really don't have a choice," he says. "It's impossible to solve everything in a few years. We're taking a long-term view."

Fukushima Nuclear Waste Discharge

On April 13, 2021, the Japanese government announced it would release more than one million tons of the contaminated wastewater from the Fukushima nuclear power plant, which was destroyed by the 2011 tsunami, into the Pacific Ocean over the next 30 years. The announcement said Japan would draw up an action plan for the discharge and organize working group sessions to hear the opinions of local governments and fisheries organizations. It would also survey local residents before the first discharge begins in about two years.

About 1.25 million tons of contaminated water are held in about 1,000 tanks at the Fukushima Daiichi site.

The United States backed Japan, saying it "appears to have adopted an approach in line with globally accepted nuclear safety standards." Still, Tokyo's plan triggered an outcry from Japanese fishermen, neighboring countries, and international organizations.

South Korea reportedly began considering filing a petition against Japan at the International Tribunal for the Law of the Sea, including calling for an injunction.

The concerns have been raised at a United Nations forum on June 23, 2021. It has also been brought up at the 31st Meeting of States Parties to the United Nations Convention on the Law of the Sea (UNCLOS) by China, South Korea, Russia, and others.

"All countries have the obligation to abide by the provisions of the UNCLOS on the protection and preservation of the maritime environment, and jointly take care of the home that mankind depends on for survival," China's deputy permanent representative to the United Nations, Geng Shuang, told the meeting.

He said, the volume of radioactive water that Japan intends to discharge, the duration of the discharge, the sea area covered, and its potential risks are all unprecedented. He also said studies have shown that once the radioactive water is released into the sea, it would quickly spread to most of the Pacific Ocean, and beyond.

According to international law, Japan must fulfill obligations, such as timely notification, full consultation, environmental impact assessment and monitoring, international cooperation and information exchange. But Japan, Geng pointed out, decided unilaterally to dump the contaminated water into the sea, purely based on its economic considerations.

"This approach is opaque, irresponsible and unfriendly. It is maliciously intended, knowingly offensive and self-interested, and it runs counter to the consensus and momentum of the international community to protect and sustainably use the oceans," Geng said.

China, said Geng, strongly urges Japan to earnestly fulfill its international obligations and handle the issue of the contaminated water prudently in an open and transparent manner.

China's foreign ministry also "lodged solemn representations" with Hideo Tarumi, Japan's ambassador to Beijing, accusing Tokyo of a "suspected violation of international law."

Greenpeace has vehemently opposed the discharge of the contaminated wastewater from the nuclear plant into the Pacific.

"In the coming years, Japan needs to publish monitoring data so we can see the treatment ability in the first and second processes. This is a key question," said Ray Lei Yuting, the head of research at Greenpeace East Asia.

Lei Yian, an associate professor of physics at Peking University, said third-party institutions should monitor the process. He noted that

Japan had said the concentrations of radionuclides were very low after the first treatment, but later it was found out that some nuclides still had high concentrations.

"So, it needs to have a third party institution to monitor the level of radionuclides after the second treatment."

The contaminated water would run through a filtration system, which captures dozens of radioactive substances except for tritium, a radioactive isotope of hydrogen with a 12.3-year half-life.

Tritium, which is considered one of the least harmful radionuclides, can exist within the human body.

The water in the tank contains about 860 trillion becquerels of tritium, while about 1.2 quadrillion becquerels remained inside the reactor building and the reactor itself, according to Tepco, the company that runs the plant.

The company had said in 2018 that the treated water contained more dangerous isotopes with longer radioactive lifetimes along with tritium, including carbon-14, cobalt-60 and strontium-90.

"These and the other isotopes that remain all take much longer to decay and have much greater affinities for sea floor sediments and marine organisms like fish, which means they could be potentially hazardous to humans and the environment for much longer and in more complex ways than tritium," Ken Buesseler, a marine chemist at the Woods Hole Oceanographic Institution, said in a paper published in 2020.

Greenpeace East Asia's Lei Yuting said: "The questions are if Tepco can retreat the water, how much they can retreat and how much time it takes."

Experts have pointed out that sea disposal is not Japan's only option for the contaminated water from nuclear plant. They say that methods involving hydrogen release and stratum injection can be considered, along as burying the water underground.

The Korean government also highlighted the international dimensions of the issue.

"Disposal of contaminated water is an issue of global importance, as its impact on human health, the maritime ecosystem and the environment goes beyond boundaries and borders," said Jongin Bae, the Seoul's deputy permanent representative to the UN.

"We underline that transparency, open and good-faith consultation with all stakeholders, including neighboring countries, and precautionary principle must be fully observed in making a decision having transboundary impact."

A Russian diplomat to the UN said: "We share the concern stated by the representatives of the Republic of Korea and China when they were talking about the planned release of water from Fukushima plant.

"We also share the opinion that it would make sense to have a comprehensive assessment of this by a specialized agency and also bilaterally with neighboring states."

Japan's decision to proceed with the sea-disposal plan was also condemned at another UN forum on June 23, 2021.

At a meeting of the United Nations Human Rights Council, Jiang Duan, the minister of the Chinese mission to the UN in Geneva, said the Fukushima accident had caused extensive leakage of radioactive material, which has had a profound impact on the marine environment, food safety and human health.

In a statement, Jiang called the Japanese plan "extremely irresponsible."

Climate Change Challenge

In dealing with climate change, I agree wholeheartedly with French President Emmanuel Macron who implores the West to re-engage with China and Russia to combat climate change through Working Group II, and control "the globalization of hate" through social media.

On climate, this meant "results, not just promises – carbon neutrality by 2050, further commitments to targets in 2030 and the laying

out of very specific and concrete agenda."

Joint action and involvement in climate change is indispensable to limit the planet's warming to 1.5 C instead of 2 C. According to climate expert Joy Pereira, Vice Chair of Working Group II of the Intergovernmental Panel on Climate Change, an intergovernmental body of the United Nations. "In terms of the atmosphere, we have been changing it through our activities, where the majority of the emissions actually comes from the energy and agriculture sector, with industry and transportation and building, providing the remaining emissions," Pereira said at a webinar in Hong Kong on February 5, 2021.

"We need to have global emissions to peak before 2030 if we want to take a pathway compatible to 1.5 degrees Celsius warming, and carbon dioxide emissions should fall by 45 percent by 2030, reaching net-zero around 2050, with deep cuts in methane and other emissions," Pereira said.

"The important thing to remember is that the impact of climate change are different in different parts of the world," Pereira reminds us.

"Planet Earth is our only home, and addressing climate change has a direct bearing on the future of humanity," said Zhou Shuchun, a member of the Standing Committee of the Chinese People's Political Consultative Conference National Committee, and publisher and editor-in-chief of *China Daily* at the same webinar.

"Climate change is the biggest global challenge facing mankind. The negative impact on all aspects of life is increasingly stark as the planet's ecosystem suffers. Against this backdrop, a pandemic and momentous changes not seen in a century have triggered a deep reflection on the relationship between man and nature," Zhou noted.

To raise people's awareness of climate change, it is best to have stories with a positive angle to show people how a solution can be achieved and share best practices advises Jonathan Lynn, head of communications and media relations at the Intergovernmental Panel on Climate Change.

"If you can bring a story where you show how the community has come together and dealt with this crisis, and maybe come to a longer-term solution where they can make their community stronger afterwards, this taps into a sort of deep, almost mythological kind of need in humanity," said Lynn.

I can relate and agree. When I lived in Los Angeles in the Will Rogers Guest House adjoining the Will Rogers State Park, the community always came together and helped each other out after the fires and floods that would roll over the Santa Monica Mountains into our canyon.

The same holds true for the neighborhood I live in Hong Kong. Neighbors from the high ground in the hills surrounding the bay we live in, come help clean up the debris and damaged property after severe typhoons.

I agree wholeheartedly with Zofeen Ebrahim, editor of the Pakistan online platform, *The Third Pole*, who said covering climate change is complicated because it is an abstract subject.

"There is a lot of science involved in it," she said, adding that the coverage requires learning, researching and deciphering the language of the scientists.

Krixia Subingsubing, a reporter for the *Philippine Daily Inquirer*, a paper I enjoy reading whenever I am in the Philippines, said most people in the Philippines are aware of the connection between climate change and the extreme events that have hammered the country with thousands of deaths and billions of dollars in damages, but there are still challenges getting people involved.

"Our paradigm right now is that climate change is really a communication battle," she said, adding that relevant stories not only need to combat "climate change deniers," but also need to focus on how to draw attention from people who are indifferent to the topic to learn the science behind it.

Progress is being made since I rode my horse, with my law partner Jerry Cohen, from my home in Pacific Palisades to my office in

Beverly Hills, on May 7, 1979, to protest the Arab oil embargo and continued use of fossil fuels.

It is encouraging to see countries, companies and people making net-zero pledges. However, I suspect that some companies are making these pledges to benefit from the positive publicity, without necessarily doing anything. Fake News!

Climate Thinking Impact on Next Stock Crash

Upward pressure on prices, wages and interest rates will trigger the next stock market crash. It will send investors scrambling for cover. There is still safe ground but it involves a leap of faith from short- to long-term investment priorities.

Markets are now grappling with the economic consequences of the Covid-19 pandemic and the climate change threat. However, they are yet to adjust to the massive shift in the world's financial needs.

As Jose Vinals, group chairman of Standard Chartered says, "trillions of dollars of investment are needed" from public and private sources to cope with the fallout from Covid-19 and the threat of climate change. It will require a financing revolution to meet that demand.

Vinals was speaking at the Asian Development Bank (ADB) virtual annual meeting in 2021 that brought together financial experts, government officials, and politicians from across Asia and beyond to discuss the challenges ahead for Asian economies. These leaders reached a remarkable consensus on the urgency of achieving financing reforms.

John Kerry, the climate envoy of US President Joe Biden and a panellist at the Manila meetings, said Asian governments and the ADB should "raise their ambition" in dealing with the biggest threat to humanity ever encountered.

But that was easier said than done. Governments, many of which are carrying heavy debt burdens, have poured in US$20 trillion to deal with the economic consequences of Covid-19. They are simply not in a position to raise their ambition.

The private sector is where the money is. Gross financial assets in the private standards amount to US$200 trillion, according to the Allianz Global Wealth Report, the UN and other estimates. But how to attract these to long-term public investments?

The financial industry needs to step up with innovation, so that more private investment from Asia and elsewhere does not find its way into greatly overvalued Western stock markets.

The financial industry's current approach to saving the planet can be best be described as fragmented. At its center is the much-hyped concept of ESG (environment, social and governance) investing, which is all about encouraging good corporate behavior.

The movement claims to have attracted some US$30 trillion of investment to date but this is invested indirectly (via mutual funds, etc) in the shares of companies that meet ESG criteria rather than directly in specific climate change alleviation and other socio-economic projects.

Bond investments have a more direct impact, but while the green bond market has reached nearly US$1 trillion, that is still small compared to the trillions of dollars needed in areas like climate change and infrastructure.

As Vinals suggested, what is needed is not just green bonds, or blue bonds (to finance marine conservation) but rainbow bonds for different areas of need, including Covid-19 bonds, the kind Standard Chartered has helped pioneer in Thailand and India; or, as Indonesian finance minister and former World Bank managing director Sri Mulyani Indrawati argued, governments and politicians "need to care more about the SDGs" (the UN's 17 Sustainable Development Goals).

The trouble is, it is impossible to invest directly in these goals except through a few specialist funds. This is precisely where radical thinking is needed, and that kind of thinking seems more prevalent in China than in the market economies of the West.

Zou Jiayi, Chinese finance vice-minister and alternate governor of the ADB, went straight to the point when she suggested that multi-

lateral development banks like the ADB and World Bank are obvious institutions that can prepare projects and issue bonds to finance them.

By boosting the capital of the multilateral development banks, governments can kill two birds with one stone-identifying and financing climate change actions and other projects while unlocking the door to private investment.

This kind of thinking is essential for a new Marshall Plan for climate and other financing that Rachel Kyte, dean of the Fletcher School at Tufts University, argue is needed. Let's hope that such innovation comes ahead of the trauma of a stock market crash.

China Promises

China has created huge business opportunities for global capital in its green financial markets.

Tsinghua University in Beijing predicted that to achieve net-zero carbon emissions – or carbon neutrality – by 2060, about US$21.36 trillion will be invested. Itwould mean funds equal to over 2.5 percent of the country's annual GDP should be invested into this area per year.

Goldman Sachs modelled a potential path to net zero carbon by sector and technology, saying US$16 trillion in clean technology infrastructure investment in China by 2060 could create 40 million jobs and drive economic growth.`

Shouldn't America and Europe be doing the same?

China's goal is very ambitious. When it's leadership announced in September 2020 that the country's objective is to reach a peak in carbon dioxide emissions before 2030, and achieve net-zero carbon emissions 30 years later, many global investors yawned in disbelief.

China's 14th Five-Year Plan period (2021-2025) will play a crucial role in the country's climate efforts and prove the naysayers wrong. The initial infrastructure changes in the 14th Plan include heating the pipeline infrastructure.

People of Texas in the United States had realized the importance of heating the pipeline infrastructure – or, rather, their government's failure to implement the state legislature's 2011 legislation to heat and freeze-proof the local pipeline network – when they experienced the deep freeze of February 2021.

Beijing's move to heat and freeze-proof the pipeline infrastructure within the five-year period (2021-2025) of the 14th Plan will require a fundamental transformation of the entire social and economic systems, with the financial system playing a crucial role.

If anyone can do it, China can.

Globally, only China and the European Union have set up clear standards of classification for green finance and completed by the summer of 2021 the China-EU Shared Classification Catalogue for Green Finance.

China has been testing a nationwide emission trading system for almost a decade. From January 1, 2021, more than 2,000 companies in the power generation industry began receiving the first set of annual carbon emission quotas. A month later, the country started a trial run for emission trading domestically. The goal is to launch a nationwide emission trading program before 2060.

Initially, this program is will cover coal and gas-fired power plants, with emission allowances, allocated depending on a plant's output and technological mix.

As of the writing of this page in September 2021, there are 21 emission trading programs in the world covering carbon emissions of about 4.3 billion metric tons annually, which account for nine percent of the world's total emissions. According to the World Bank, sixty-four carbon pricing initiatives that have been implemented, or are scheduled for implementation, covering 46 national jurisdictions worldwide.

Goldman Sachs has listed four key interconnected technologies for China on the path to net-zero emissions – renewable power, clean hydrogen, battery energy storage and carbon capture technologies.

Even though China sees green finance as a critical tool for carrying out a green transition of its economy alongside, for example, reforming the electricity system, shifting subsidies from fossil fuels to renewable energy, and setting national and local green targets similar to the EU – its green finance plan is doomed to fail.

I agree with the analysis of Mathias Lund Larsen, a senior research consultant at the International Institute of Green Finance at the Central University of Finance and Economics, in Beijing, who believes China's green financing has already stalled, leaving it short of the cash needed for its climate goals.

"Green bonds are being lauded as the big success story of Chinese green finance, but the market has only grown slowly, even decreasing in 2020. With the latest fall, China's annual domestic issuance stands at $30.5 billion in 2020 compared to $30.5 billion in the launch year of 2016. The National Green Development Fund launched in the summer of 2020 amid great expectations, but has a meagre $12.6 billion at its disposal," said Larsen.

"Combined with the roll-out of the national emission trading system that is still far from complete, and which lacks its European sibling's scope and price, the financing shortfall is arguably more than half the up to $900 billion needed to achieve the 2060 goal," Larsen added.

A total of 17GW of new coal plants were approved in the first half of 2020, more than the two previous years combined, and more than three-quarters of the global capacity installed in 2020. According to Global Energy Monitor, this takes China's coal capacity under construction or developing to a staggering 250GW, more than the total US capacity.

The lack of green priorities in the Covid-19 recovery is evident in work done by Vivid Economics' comparison of stimulus packages. While the EU allocated 37 percent towards green purposes, China handed out more support to fossil fuel than to green transition, projects, ending up with one of the least green stimulus packages globally.

But green financing was already stagnating in 2018 and 2019, suggesting that Covid-19 is not the source of the slowdown. Instead, financial regulation and financial institutions are waiting to see how real the goals are.

China's Energy Crisis

Power shortages and blackouts across China's industrial heartland started in June 2021, first because of the high electricity demand, then deepened due to soaring fuel costs, and was exacerbated by the government's environmental conservation policies.

Coal-dependent provinces in China's eastern and northeast regions faced rising fuel costs to the extent that power companies suffered losses for every unit of electricity sold due to a policy cap on prices that have been in force since 2019. China's boycott of Australian coal also contributed to the increased fuel costs.

The lack of power in the northeast had shut down traffic lights, residential elevators and 3G mobile phone coverage as well as triggered factory shutdowns.

Rationing of electricity and water was enforced during peak hours in many parts of northeastern China since mid-September 2021, triggering state media reports of power supply disruptions in many cities and stoking concern among the country's avid social media users.

Goldman Sachs estimated that as much as 44 percent of China's industrial activity has been affected by power shortages, potentially causing a one percentage point decline in annualized GDP growth in the third quarter of 2021, and an estimated two percentage point drop from October to December 2021.

Global Delusion

The goals China has set for itself are unrealistic. But they are being replicated globally. Not just in coal, but oil. Patrick Pouyanne, CEO of Total, one of the biggest oil and gas companies, who wants his group to be recognized not "as an oil and gas company, but an energy company," is conservative about diluting the group's traditional

business.

Major institutional investors are threatening to dump their stakes in oil and gas companies unless they do more to combat climate change.

Pouyanne, decried as a "paradox" the view that "we will solve the climate change challenge just because there is no more equity invested in oil and gas majors, that's something completely wrong."

State-owned oil companies, including the likes of Saudi Aramco or the Abu Dhabi National Oil Company, "are not prepared to stop producing" and if Total cuts back then "Russian companies say, 'all that is quite good for us' because they will get the asset."

While a firm believer in renewables, the Total chief said the narrative over the shift to greener energy needs more nuance, pointing to the lack of debate among politicians and environmentalists over how much it will cost consumers.

"We have to face the reality that there is something wrong in the political debate," said Pouyanne.

"People think it's renewable, so it should be free."

Energy Companies Feel Climate Change Pressure

Exxon Mobil CEO Darren Woods was dealt a stunning defeat by shareholders when a tiny activist investment firm, Engine No.1, with just a 0.02 percent stake, snagged at least two board seats and promised to push the crude driller to diversify beyond oil and fight climate change.

For Woods, who had aggressively opposed the insurgents, it was just the latest setback in a rocky 4½-year tenure that has seen what was once the world's most-valuable company shed more than US$125 billion in market value.

The vote was unprecedented in the rarefied world of Big Oil and underscores how vulnerable the industry has suddenly become as governments around the globe demand an acceleration of the shift away from fossil fuels. It's also a sign that institutional investors are

increasingly willing to force corporations to participate in that transition actively. For example, BlackRock, the second-largest holder of Exxon with a 6.6 percent stake, voted for the new directors Engine No.! nominated.

"This historic vote represents a tipping point for companies unprepared for the global energy transition," the California State Teachers' Retirement System, or CalSTRS, which had supported Engine No. 1, said in a statement after the meeting. "While the ExxonMobil board election is the first of a large U.S. company to focus on the global energy transition, it will not be the last," CalSTRS said.

Significatly enough, the same day Exxon Mobil shareholders elected Engine No.1 candidates to the board, the Royal Dutch Shell was ordered by a Dutch court to slash its emissions harder and faster than planned, dealing a blow to the oil giant that could have far-reaching consequences for the rest of the global fossil fuel industry.

In other corners of the commodities sector also shareholders are showing frustration with executives' reluctance to embrace challenging environmental goals.

On the same day that Exxon investors met, management at Chevron Corp. was rebuked by its shareholders, who voted for a proposal to reduce emissions from the company's customers. DuPont de Nemours Inc. recently suffered an 81% vote against management on plastic-pollution disclosures, and ConocoPhillips lost a contest on adopting more stringent emission targets.

The Exxon meeting proved to be a nail-biting.

Electoral Changes

The opening round of activist shareholders making real board changes, lead to round two: activist voters in Norway, the worlds' wealthiest sovereign fund, thanks to its oil revenues from the North Sea, and its fossil fuel investments – followed suit when they went to the polls on September 13, 2021. They elected a Labour Party-led coalition to replace the Centre-Right government that was in power for eight years. Climate issues had dominated the election cam-

paign after the UN declared the findings of its latest climate study "a code red for humanity."

It brought to focus the climate of the various political parties and pulled the ruling Conservative party in opposite directions by climate-conscious liberals and populists embracing the oil industry.

Norway leads the world in electric vehicles, thanks to generous tax breaks. At the same time, the conundrum for Norway is that its wealth is derived from the sale of hydrocarbons. The fear that phasing out oil and gas production – as the climate-campaign parties want – would cost tighter public finances and job losses in regions servicing the North Sea echo some countries resistance to abandoning cheap fossil power generation. Meanwhile, the eagerness with which many Norwegians embrace de-carbonization, from the ubiquitous electric vehicles and bicycles to demands for better railways and less meat, is overlaid with the same cultural suspicion and redistributive conflicts between rural and urban places, and between peripheral elites, as we see in other countries.

The electoral change in Norway, was followed by an election surprise in industrial Germany on October 3, 2021. Forty-five percent of Germans under 25 turned out en-mass to vote for the real change championed by two parties – the Greens and FDP – that agree climate change is humanity's biggest threat. The turnout rendered every party unable to form a government on its own but at the same time gave climate activists greater strength.

The center-right CDU-CSU bloc that kept the outgoing Chancellor Angela Merkel in power for 16 years could garner only 24.1 percent support, its worst in seven decades. The Social Democrats (SPD) figured at the top yet got only 25.7 percent of the votes cast. It means a multi-party coalition is needed to form a government. Thus, the climate change activist Greens and FDP became kingmakers, forming a coalition with the center-left SPD, that put Olaf Scholz in the chancellery, replacing Angela Merkel, whom he has served as vice-chancellor and finance minister since 2018. Green's co-leader Annalena Baerbock is likely to become foreign minister. Robert Habeck, fellow co-leader became the minister for econo-

my and energy. FDP leader Christian Lindner, is likely to be the finance minister, giving the climate change activists a place at the policy-making table.

Simon Schnetzer, a political analyst who studies the youth vote, said younger Germans experienced years-long "awakening," starting with the refugee influx in 2015 and the ensuing populist backlash. Next came mass climate change protests. In 2020, the pandemic revealed that Germany had become a laggard on digitalizing public services and spending on the Internet.

"Before these three crisis ... this was a 'feel fine' generation, it felt like a wealthy future was secure. It does not feel that way anymore," Schnetzer said.

Paulina Brunger, a young climate activist, recalled her surprise at the swift government response to the pandemic, from emergency laws to huge spending programs. "We had politicians saying this is a crisis. It's going to be hard. But we can get through it together," she said. "We've now seen with Covid-19 what politicians can do when they think there's a crisis, and how little they have acted on the climate."

Where is The Urgency for Climate Change?

Like Ezra Klein of *The New York Times,* I spent the weekend of reading a book I wasn't entirely comfortable being seen with in public. Andreas Malm's *How to Blow Up a Pipeline* is only slightly inaptly named. You won't find in it any instructions for sabotaging energy infrastructure. A more accurate title would have been *Why to Blow Up a Pipeline.* On this, Malm's case is straightforward: Because nothing else has worked.

Decades of climate activism have brought millions of people together onto the streets but they haven't turned the tide on emissions, or even investments. Citing a 2019 study in the journal *Nature*, Malm observes that, measuring by capacity, 49 percent of the fossil-fuel-burning energy infrastructure now in operation was installed after 2004. Add in the expected emissions from projects at some stage of the planning process and we are most of the way toward warming

the world by two degrees Celsius – a prospect scientists consider terrifying and most world governments have repeatedly pledged to avoid. Some hoped that the pandemic would alter the world's course, but it hasn't. Oil consumption is hurtling back to pre-crisis levels, and demand for coal, the dirtiest fuel, is rising.

"Here is what this movement of millions should do, for a start," Malm writes. "Announce and enforce the prohibition. Damage and destroy new CO2-emitting devices. Put them out of commission, pick them apart, demolish them, burn them, blow them up. Let the capitalists who keep on investing in the fire know that their properties will be trashed."

The question at the heart of Malm's book is why this isn't happening already. "Were we governed by reason, we would be on the barricades today, dragging the drivers of Range Rovers and Nissan Patrols out of their seats, occupying and shutting down the coal-burning power stations, bursting in upon the Blairs' retreat from reality in Barbados and demanding a reversal of economic life as dramatic as the one we bore when we went to war with Hitler," he says.

Malm offers two answers for the resolute nonviolence of the climate movement. The first is "strategic pacificism," the belief that nonviolent protest is more effective than violent resistance. Much of the book is occupied by Malm's rebuttal to potted histories of past social movements, which is persuasive in parts. He's undoubtedly right that we sanitize past uprisings, lionizing the peaceful and blackening or forgetting the names of the violent. There is at least an argument that it's the interplay of forces that transforms societies. There was no peaceful American Revolution. There were riots and rifles woven into the civil rights movement. "Does this movement possess a radical flank?" asks Malm.

As to whether blowing up pipelines would work here, and now, Malm is less convincing. The likeliest outcome is that a few dozen climate activists would be jailed for years (as some already have been) and a wave of laws criminalizing even peaceful protest would sweep the nation. He has no answers for those who fear the probable political consequences: an immediate backlash that sweeps

enemies of climate action into power, eliminating even the fragile hopes for policy progress.

"I do think we need to show society there's something radical on the line, but can you imagine how thrilled Republican politicians would be if people began blowing up pipelines?" David Roberts, the author of the invaluable climate newsletter *Volts*, told *New York Times*' Ezra Klein. "They've been trying to make eco-terrorism a thing for years. Imagine the first time someone gets hurt."

Elsewhere in the book, Malm is firmly opposed to tactics that could signal contempt or hostility for the working class. But the consequence of a wave of bombings to obliterate energy infrastructure would be to raise the price on energy immediately, all across the world, and the burdens would fall heaviest on the poor. Malm tries, at times, to resolve this tension, suggesting that perhaps the targets could be the yachts of the superrich, but in general he's talking about pipelines, and pipelines carry the fuels for used Nissans and aged ferries, not just Gulfstream jets.

Higher energy prices are political poison, which is why, according to leaked audio, why Exxon Mobil supports a carbon tax: The company knows that any politician who dares propose such a tax will do more to harm the climate movement than to help it (this is a lesson, thankfully, that the Biden administration has learned). It's difficult, then, to believe that raising prices on the same fuels through a campaign of bombings would mobilize the working class on behalf of climate action.

Still, violence is often deployed, even if counterproductively, on behalf of causes far less consequential than the climate crisis. So skepticism of the practical benefits of violence does not fully explain its absence in a movement this vast and with consequences this grave. To that end, Malm quotes the writer John Lanchester, who asked, in 2007, whether the absence of eco-violence was because "even the people who feel most strongly about climate change on some level can't quite bring themselves to believe in it."

This question does not apply only to violence. It applies to quieter questions of political strategy and policy demands, and it is of-

ten asked of the climate movement. "It has become fashionable to call for a World War II-style mobilization to fight climate change," wrote Ted Nordhaus, the founder of The Breakthrough Institute, in an essay questioning whether climate activists believed their own rhetoric. "But virtually no one will actually call for any of the sorts of activities that the United States undertook during the war mobilization – rationing food and fuels, seizing property, nationalizing factories or industries, or suspending democratic liberties."

Nordhaus goes on: "The vagueness and modesty of the Green New Deal is not proof that progressives and environmentalists are closet socialists. It is, rather, evidence that most climate advocates, though no doubt alarmed, don't actually see climate change as the immediate and existential threat they suggest it is."

I don't believe the strong form of this argument any more than I believe that people smoke in their 20s because they doubt that lung cancer is a horrible way to die. Much of the modesty Nordhaus identifies is a relative of the political realism that, in other contexts, he praises. Many climate activists choose an asceticism in their own lives that they wouldn't dare ask of others, not because they believe it to be wrong, or unnecessary, but because they fear political annihilation. Most vegans I know avoid meat in part for climate reasons, but they know it would be disastrous to the causes they care about if President Biden demanded that all Americans do the same.

It's true that there is a discordance between the pitch of the rhetoric on climate and the normalcy of the lives many of us live. I don't see that as a revelation of political misdirection so much as a constant failure of human nature. We are inconsistent creatures who routinely court the catastrophes we most fear. We do so because we don't feel the pain of others as our own, because there are social constraints on our actions and imaginations, because the future is an abstraction and the pleasures of this instant are a siren. That is true with our health and our finances and our loves and so of course it is true with our world.

All of this has been on my mind for reasons that should be extraordinary, but have become, instead, grimly banal. June 2021 was the

hottest June ever recorded on land. Portland, Ore., saw temperatures of 116 degrees Fahrenheit, a sentence that doesn't make sense to me even as I know it to be true. In Lytton, British Columbia, temperatures reached 121 degrees, and the city simply ignited. "You can't even comprehend it," one resident told CBC Radio. "Our entire town is gone."

In California, where I lived, two of my children, three grandchildren, and Klein live, 2020 was a hellish, unprecedented year of fires, with more than four million acres consumed. There were days when the smoke covered the sun and every breath stung the throat. But 2021 is tracking even worse. And it's not just California. "North America chokes in smoke, looks like an ashtray from space," read a Weather Channel headline.

But you'd never know it watching C-SPAN. The bipartisan infrastructure bill cuts most of the climate investments from President Biden's American Jobs Plan, leaving them for a future reconciliation package that may or may not pass. There's been much debate on the left over whether the bipartisan bill should be killed, or at least stymied until its successor is closer to passage. But the bipartisan bill includes some climate priorities – $47.2 billion for climate resiliency projects, $73 billion for upgrading the electricity grid – and there's little reason to believe that destroying it will make Senator Joe Manchin likelier to support a sweeping, partisan effort.

It is not nearly enough, but it is better than nothing. The same is true, to be honest, even of the broader investments Biden envisioned. That is the state of climate policy in 2021, and I am not optimistic that it will be much different in 2022, or 2025.

"Climate alarmism is useless," tweeted Juan Moreno-Cruz, the Canada Research Chair in Energy Transitions at the University of Waterloo. "The impacts of climate change are here. Let's talk about climate realism." The problem, he continued, is that "talking climate solutions have left us unprepared for actual climate change. We keep running models and fighting over which 'solution' is the best, but we have done nothing to address the impacts of climate change. Adaptation research and implementation is severely underfunded."

But when Klein spoke to Moreno-Cruz, his realism didn't seem much more realistic, and he knew it. "We need to provide adaptation measures and investments to the majority of people on the planet," he told me. Adaptation is a monstrous challenge, arguably harder and pricier than simply reducing emissions would be. It requires infrastructure, migration support, income and food security, and much more, and the financing must flow from rich countries to poor countries. "At that point, it becomes very similar to mitigation in the sense that our incentives in the rich countries to protect the poor countries are not aligned," Moreno-Cruz said.

We underestimate the horrors humans will adapt to. There is no expanse of suffering that guarantees a compassionate response. The wreckage of the coronavirus is a reminder that even the deaths of family members, friends and neighbors will not inevitably transform our politics. More than 600,000 American lives have been lost, and for all that, the 2020 election looked much like the 2016 election, and fights over even so modest an adaptation as masks roiled the nation. Worse, American politics moved on as soon as the epicenters of crisis shifted beyond our borders. There is nothing in the past year that should make us believe that ruinous suffering in India will focus minds in America.

The reality is, if we fail to keep warming below the longtime global goal of two degrees Celsius, well, two degrees remains better than 2.5. And 2.5 is far preferable to 3. And humanity would much rather have 3 than 3.5. And so on, and so forth. There is no point at which giving up makes more sense than fighting on.

But to the immediate question – how to force the political system to do enough, fast enough, to avert mass suffering – I don't know the answer, or even if there is an answer. Legislative politics is unlikely to suffice under any near-term alignment of power I can foresee – though I earnestly hope Congress will pass at the least, the investments and clean energy standards proposed in the American Jobs Plan. I doubt a wave of bombings would accelerate change, and even if I believed otherwise, who am I to tell others to risk those consequences? The pace of renewable technologies has been a welcome surprise, and I would have us spend endless billions on

technological moonshots – including nuclear, direct air capture and even geoengineering research. There is nothing we should not prepare to try, but even if we invent the fuels of the future, we will need policymakers to deploy them over the cries of industries that want to profit from the machines and oil wells of the past.

The good news is that the worst of the climate crisis seems less and less likely. We are on track for three degrees of warming, measured in Celsius, not four or five. But three degrees is still a catastrophe of truly incomprehensible proportions, visited primarily upon the world's poor by the world's rich. We are engineering a world that is so much worse than it needs to be and that will be lethal for untold millions.

"I suspect that human beings will not go extinct from climate change, but I have higher standards than that," Kate Marvel, a climate scientist at Columbia University, once told me. "And for me, there's almost an abdicating of responsibility by saying, 'Well, we're not going to do anything about climate change unless it's going to kill every last one of us.' Because the things that, for me, are really frightening about climate change are the consequences for human social systems."

Humanity has spent thousands of years building the social organizations and technological mastery to insulate itself from the whims of nature. We are spending down that inheritance, turning back the clock. I don't believe this reveals our true preference for the world our descendants will inhabit. I believe it reveals our deeply human inability to take the future as seriously as we take the present.

Biden's Climate Gambit

At his 2021 Leaders Summit on Climate, President Joe Biden unveiled a plan to more than halve US greenhouse gas emissions from 2005 levels by 2030. Unlike previous attempts to counter climate change through carbon taxes, this proposal included extensive government investment and regulatory changes.

But now the gritty reality of passing the associated legislation has hit. Is more state spending politically feasible? Are there alternatives, such as a mileage-based tax on drivers, as some lawmakers have suggested? Yet regulatory and small taxation changes are no substitute for comprehensive, transformative intervention. The president's initial proposal was on the right track.

In economic theory, climate change is a conceptually simple, though inconvenient, problem: it is simply a negative externality. A negative externality occurs when one person's behavior adversely affects another in ways she cannot (legally) control. In an unregulated market, too many of these negative externalities are produced. In the case of climate change, each of us produces too much greenhouse gas because we do not consider its effect in ruining the climate for others.

Economics has an off-the-shelf remedy: tax it. This creates disincentives to the activity, which offsets the externality effect. A cap-and-trade scheme such as the EU uses has a similar effect.

President Biden's climate change strategy eschews this straightforward gambit. Instead, we get a complex mix of supply-side investment and regulation targeted at specific sectors. It is the kind of government meddling traditionally regarded with suspicion by "mainstream" economists, and indeed I hear many economists make this complaint. When such an elegant correction to a market failure exists, why risk a more unconventional strategy? Is this a concession to political reality? Partly, yes. Biden did not believe a new tax on consumers could pass Congress. Is this therefore a second-best strategy? Not necessarily.

The problem with the simple story of climate change as an externality is just that: it is too simple. It neglects important dynamics in adapting the economy to climate change, which require a more extensive response than a carbon tax. The Biden plan considers these dynamics.

The first of these is the supply side of the economy. The traditional story says that, left to our own devices, we consume carbon-intensive products, and therefore a tax is required to divert our con-

sumption away from them. In turn, this incentivises businesses to produce more carbon-efficient products because demand for them has risen.

However, this ignores market failures which exist on the economy's supply side. Many goods which we want consumers to switch to are public goods, goods which a private actor would have little incentive to provide. The bipartisan infrastructure bill includes the installation of electric vehicle charging stations across the US. This kind of provision would not automatically arise without direct government investment – and however much you tax my petrol car, I will not go electric unless you give me a place to charge it.

The second is the economics of innovation. Goods are not simply "supplied"; in many cases, they need to be invented. It has been known in economics for some time that in a free market, research and development is underprovided. Paul Romer won the 2018 Nobel Prize in economics for this discovery. Even if you create demand for more carbon-efficient energy, the private sector will be too slow to innovate to supply it.

This argues strongly for the inclusion of large government expenditures on R&D for carbon capture and energy storage, as in the bipartisan proposals.

Finally, the textbook story ignores dynamic effects. Many green energy sources benefit from "learning by doing": the more we produce and consume them, the more efficient they become. This is something ignored by a carbon tax, which taxes the carbon produced today but does not take account of the carbon we might save tomorrow. It is therefore welcome that Biden plans to put in legislation a requirement for a portion of energy to come from zero-carbon sources. Subsidies for electric cars can also be justified in these terms, although again this measure did not survive bipartisan talks.

The plan is far from perfect. Greater investment in rail infrastructure, on a scale currently observed in China, would be a helpful addition in transitioning Americans away from cars. There is little in the proposals that addresses consumption of carbon-intensive imported goods; this is an area where a well-designed carbon tax might in fact be helpful.

And of course, there are real concerns that this may be too little, too late. This is especially the case when we consider the sort of measures which can gain the support of Republicans, if passed through bipartisan agreement, or "centrist" Democrats, if passed through reconciliation.

A plan for transitioning to a low-carbon economy was overdue. Although this might not look like a plan the textbooks would have prescribed, it may be better for it.

California Coast's Wind Farms

The notion of wind farms churning in the Pacific Ocean, creating clean energy to power homes and businesses, has long been dismissed because of logistical challenges posed by a deep ocean floor and opposition from the military, which prefers no obstacles for its Navy ships.

But evolving technology and a president determined to rapidly expand wind energy have dramatically shifted the prospects for wind farms in the Pacific. As a result, the Navy abandoned its opposition and joined the Interior Department to bless two areas off the California coast that the government said could be developed for wind turbines.

The plan allows commercial offshore wind farms in a 399-square-mile area in Morro Bay along central California, and another area off the coast of Humboldt in Northern California.

It marked the most significant action the federal government has taken to promote wind energy along the West Coast and is part of President Biden's aggressive plan to expand renewable energy and shift the nation away from fossil fuels. "This is a breakthrough that will allow the siting of offshore wind in the Pacific Ocean," said Gina McCarthy, the White House climate adviser.

And it is a milestone for California, which has committed to renewable energy and has been experiencing the effects of climate change like few other states. The summer of 2021, saw wildfires rage and the highest temperature ever recorded was logged at 130 degrees Fahrenheit in Death Valley. Sea levels are rising, coasts are eroding and drought is intensifying.

Gavin Newsom, the Democratic governor of California, called the move "historic."

"Developing offshore wind to produce clean, renewable energy could be a game changer to achieving California's clean energy goals and addressing climate change – all while bolstering the economy and creating new jobs," said Mr. Newsom, who had tussled regularly with the Trump administration over California's attempts to cut fossil fuel pollution, and has now found an ally in President Biden.

The announcement came within weeks after the Biden administration approved the nation's first ever commercial-scale offshore wind farm, to be built off the coast off Massachusetts.

About a dozen other offshore wind projects along the East Coast are also now under federal review.

The administration estimates that wind turbines in Morro Bay and near Humboldt could together eventually generate enough electricity to power 1.6 million homes.

If those numbers are realized, the California coast will rank as one of the world's top wind power generators generators.

The wind farm off Massachusetts is expected to comprise up to 84 giant wind turbines. By comparison, Newsom estimates that the California sites could hold more than 300 turbines.

When the areas might be leased to companies is yet to be decided, but Biden administration's Interior Secretary Deb Haaland said, it was "a priority."

While the offshore wind industry has boomed around the world, particularly along the coasts of Norway and the United Kingdom, it has flourished where the water is shallow and turbines can be anchored to the ocean floor. By contrast, the Pacific Ocean floor drops steeply from the coastline, making the water too deep to anchor wind towers. As a result, some companies have built floating turbines. There are currently about 20 such small floating turbine farms worldwide, but none at the scale envisioned by Governor Newsom. However, he said he has already heard from potential de-

velopers and is expecting enormous interest. "We've had not just international companies, but governments reach out to us."

Meanwhile, groups representing the fishing industry are outraged. They say that the administration has sped forward with a plan that is larger and more potentially more disruptive to marine life than they had anticipated.

"We're totally against this," said Tom Hafer, president of the Morro Bay Commercial Fishermen's Organization. "We've been consulting with the Castle Wind people for a long time, and we helped pick the spot and developed a memorandum of understanding on an area that we thought would be sustainable for us. That was about 120 square miles. This is 399 square miles. We're going to lose a whole bunch of fishing grounds. There will be cables in the water. We don't know how the whales will react. There are a lot of unknowns. People don't realize how massive this project will be."

The moves come as Biden has pledged to cut the nation's fossil fuel emissions 50 percent from 2005 levels by 2030 by pushing policies designed to promote the use of electric vehicles and clean energy such as wind and solar power. In particular, the administration has pledged to build 30,000 megawatts of offshore wind farms by 2030.

Wind farms off California have been considered for a long time. The Obama administration had hoped to bring offshore wind farms to California. But it was never able to sell leases to commercial companies. In 2018, the Trump administration's Interior Department identified three areas, including the Morro Bay and Humboldt county waters, for leasing. But the plan became dead in the water when Pentagon officials objected.

Biden has sought to unite his Cabinet in finding ways to promote renewable energy and cut carbon dioxide pollution under what he has called an "all-of-government" approach to tackling climate.

"Now there is a strong commitment at the top to making this happen. That's the big breakthrough here," said Dan Reicher, who served as assistant secretary at the Department of Energy in the Clinton administration and now is an adviser to Magellan Wind, which develops projects with offshore floating turbines.

When Magellan first sought to build floating wind farms in 2012, "there was huge skepticism," Reicher said. But in the past decade, the technology has advanced enough that more companies are investing in it, he said.

The US still has a long way to go to catch with China when it comes to wind farms. China is the leader in offshore wind capacity generation. China's installed capacity grew 27.8 percent in 2020, making up half of the world's 6.07GW of energy generated by offshore wind farms, far ahead of the Netherlands' (24.6 percent) and Belgium's (11.6 percent). On an accumulated basis, Britain built 29 percent of global total of 35.2GW, followed by China's 28.1 percent and Germany's 22 percent.

Can Billionaires Lead Climate Fight?

Technically, the US "war on terror" was over as of September 11, 2021. Since the 2001 attacks on New York and Washington, the United States will have spent US$4.7 trillion waging war by the end of 2022 – excluding a further US$1.1 trillion in interest on debt used to finance the wars and US$2.2 trillion in future obligations for war veteran care – according to the Brown University Cost of War study.

The human cost was more than 900,000 people killed and 38 million displaced. Look how US Treasury debt rose from US$5.8 trillion in September 2001 to US$28.4 trillion by August 2021.

Such financial and human costs of the "war on terror" might be trivial compared with the coming climate change costs to the whole planet. War costs only add to climate warming. The Brown University study found that the US Department of Defense was the world's largest institutional consumer of fossil fuels and a key contributor to climate change.

The Intergovernmental Panel on Climate Change warns that the planet is running out of time to deal with the problem. This is a crisis not just for one county, but for everything living on Earth. Like the Covid- 19 pandemic, we need a whole-of-government and whole-of-society approach to act decisively.

The European Union has got its act together with its Circular Economy Action Plan. It sees the problem clearly: "There is only one planet Earth, yet by 2050, the world will be consuming as if there were three."

The world spent US$2 trillion on military expenditure in 2020, four times the amount spent on energy transformation. The first can only add to global carbon emissions and more destruction, while the other addresses our common fate.

Why should business take the lead in this war on climate change? The simple answer is the business community makes almost all the products that the world consumes, including weapons of war.

JAccording to the Carbon Disclosure Project, just 100 of these private and state-owned firms have been responsible for more than 70 per cent of greenhouse gas emissions since 1998.

Another reason is that governments and politicians simply have not got their act together. Harvard business strategists Michael Porter and Katherine Gehl put it this way in their 2020 book *The Politics Industry*. "Most people believe that [the US] political system is a public institution with high-minded principles and impartial rules derived from the Constitution. In reality, it has become a private industry dominated by a textbook duopoly ... incapable of delivering solutions to America's key economic and social challenges."

Put climate change in that basket of problems. The authors recognized there are no scientific or business barriers to finding solutions to tackle climate change. There is also no shortage of money, with central banks providing the means to tackle the pandemic and financial crises.

We have an existential crisis wherein the rich are getting richer. Meanwhile, the people in the bottom half of society are paying for climate change disasters by losing habitat and jobs.

This is not sustainable for politicians or for businesses. In 2012, billionaire businessman Richard Branson said, "our only option to stop climate change is for industry to make money from it".

After the pandemic, hurricanes, forest fires, and floods, businesses

worldwide are learning there is no alternative except to embrace climate change in their business models. One reason for the change of mind is that the finance sector realized that climate change imposes enormous financial risks. So, it created the Task Force on Climate-Related Disclosure to pressure the industry to act.

The task force reported US$640 billion in costs from climate-related natural disasters, with up to US$43 trillion in financial assets at risk by 2100.

If politics is toxic, only the corporate sector can lead action on climate change. The top 500 asset managers control more than US$ 104 trillion of assets, with the top 20 controlling 43 percent of it. So, convincing a small number of key corporate owners to act can make a tremendous difference.

One example suggests serious climate action by the global rich is feasible. Thanks to Brazilian President Jair Bolsonaro and his profit-driven business allies, the Amazonian rainforest is disappearing fast.

The Amazon rainforest stores the equivalent of 4-5 years-worth of human-made carbon emissions, up to 200 tons of carbon. At US$50 per ton for carbon, the Amazon is worth US$IO trillion to the world. The number one by market cap at the beginning of 2021 was Apple Inc with a market cap of $2.4 trillion.

The top one per cent of the world's wealthiest people held US$173.3 trillion in 2019. Could some billionaires get together to buy the Amazon rainforest from Brazil, whose external debt is US$548 billion?

This question might sound like a joke, but it is a serious one. Climate change is deadly serious. If business is not serious about climate change, they better not forget that there is no escape route for anyone when the crunch begins.

US, China Can Cooperate on Climate

There are areas for the United States and China to work together on climate change despite intense geopolitical tensions. The climate crisis is a challenge neither of them could solve independently.

Even when the US-China relationship was in rough shape, the channels for environmental diplomacy have been kept open, Jennifer Turner, director of the Wilson Center's China Environment Forum, said at a recent virtual conference.

She identified areas where the two could cooperate to achieve their climate goals. For example, in the electric vehicles market, she said China has a "beautiful" program for phasing out internal combustion engine cars by 2035.

"Just like solar PV panels, China lit a match on the global market," said Turner. "The global electric energy market is plenty big for both countries to just be crazy in terms of producing lots of products and innovating." Another area for collaboration is energy-efficient buildings, she said.

"Globally, 70 percent of the CO2 emissions are related to buildings, both the construction and the running of them – heating, cooling and lighting," she said. In comparison, 70 percent of the CO2 emissions in China and 36 percent of the emissions in the US are linked to producing energy.

When Barack Obama was the president, there was a lot of cooperation between the US and China on building energy efficiency, Turner noted. Some of that cooperation could move forward.

Zhang Yongsheng, a senior research fellow and director of the Research Institute for Eco-civilization at the Chinese Academy of Social Sciences, also speaks of the benefit Sino-US cooperation for environmental protection can bring about. Zhang who addressed the same virtual conference as Turner said: "In areas of new energy, electric vehicle and green infrastructure, if the US and China can work together, it would definitely be a win-win situation." He said many in the US might be unaware that China is serious about its commitment to carbon neutrality and is trying the hardest to fight climate change. He said that China made the commitment not because of international pressure but because going green could be an opportunity in its interest. "China has realized that the traditional growth model is unsustainable, and that green transition presents a huge opportunity. So green development and carbon neutrality

have become China's development strategy."

Qi Ye, professor of environmental policy and management at Tsinghua University, told the conference the basis for cooperation between the US and China is the understanding and consensus that action on climate change is the new driver for economic growth.

Climate pledges by governments to date – even if fully achieved – would fall well short of what is required to bring global energy-related CO2 emissions to net zero globally by 2050, a new report by the International Energy Agency said.

"It means none of these countries can achieve their goals for carbon neutrality independently. The best way would be working together on technological innovation," said Qi. "Ironically, while we see the growing international consensus around carbon neutrality, it is still very challenging to build consensus within each country. It is particularly difficult now because this political atmosphere is not conducive to cooperation."

Frederick Mayer, dean of the Josef Korbel School of International Studies at the University of Denver, also said that the US and China need to work together because they have "an enormous stake" in addressing climate change.

One of the few, if not the only pronouncements I agree with made by the United Nations Secretary-General Antonio Guterres is – that cooperation between China and the United States is essential, and the hope that big countries will commit to net zero emissions of greenhouse gases by the middle of this century.

"The China-US cooperation is vital. It was vital for the Paris Agreement. It remains vital today, together with other important partners," Guterres said at the news conference to launch the State of the Global Climate in 2020 Report. He was responding to a question regarding a joint statement issued by China and the US on coping with climate change after talks in Shanghai.

The statement was released after talks between Xie Zhenhua, China's special envoy for climate change affairs, and US Special Presidential Envoy for Climate John Kerry on Thursday and Friday in the Chinese city.

Replying to a question about his expectations for the virtual climate summit, the UN chief said he expected a number of countries would be able to commit to net zero emissions of greenhouse gases by the middle of the century and to commit to a drastic reduction of emissions for the next decade in the context of the review of their nationally determined contributions.

US President Joe Biden on March 26, 2021, invited 40 world leaders, including his Chinese and Russian counterparts, to attend a virtual summit on climate change.

According to the UN report, statistics showed that 2020 was one of the three warmest years on record. The past six years, including 2020, have been the six warmest on record.

Temperatures reached 38 C at Verkhoyansk in Russia on June 20, 2021 the highest recorded temperature north of the Arctic Circle.

Rising Sea Levels

The UN report said the sea-level rise was accelerating, while ocean heat storage and acidification are increasing, diminishing the ocean's capacity to moderate climate change.

During 2020, the unprecedented number of 30 named Atlantic storms led to at least 400 fatalities and cost $41 billion in damage.

Scientists say global emissions must be brought down to net zero by 2050 in order to limit global warming to 1.5 C above pre-industrial levels and prevent cataclysmic climate impacts.

In an interview with *Reuters*, UN Secretary General Guterres said he wants the US, the world's biggest economy, to commit to at least halving its greenhouse gas emissions by 2030.

Guterres said the White House's own pledge is needed to set the bar high. "My expectation is that the United States will be able to present a reduction of emissions for 2030, in relation to 2010 levels, above 50 percent," Guterres said.

"If it happens, I have no doubt that it will have very important consequences in relation to Japan, in relation to China, in relation to

Russia – in relation to other areas of the world that have not yet entirely defined these levels," he said.

If the US cut emissions as Guterres suggested, it would amount to a 47-percent reduction by 2030 from 2010 levels, according to the research firm Rhodium Group.

Developing economies also need financial support to decarbonize their economies, and the industrialized nations that are responsible for most of the excess greenhouse gas accumulation in the atmosphere must deliver this support, Guterres said. That includes meeting a goal to transfer $100 billion each year to help poorer nations cut emissions and adapt to the impacts of climate change.

China, the leadingdeveloping country, has announced that it will strive to bring its carbon dioxide emissions to a peak before 2030 and start decling to become carbon neutral before 2060.

Call For Meaningful Targets

In April 2021, global leaders called for cooperation to reduce greenhouse gases towards an eventual goal of net-zero carbon emissions in a bid to tamp down a rapidly warming planet.

Some 40 heads of state, representing over 80 percent of the global economy, including China's Xi Jinping, German Chancellor Angela Merkel, and French President Emmanuel Macron, came to the summit.

Addressing them, President Joe Biden, the summit's host, cited the need to balance costs and responsibilities. European leaders called for greater use of innovative financing and disruptive green technologies while President Xi Jinping underscored the role of developing counties in sustainable development. Xi emphasized the importance of sound environmental policies for sustainable economies, development, social justice and equity. "We should protect nature and preserve the environment, like we protect our eyes," he said. "We must be committed to a people-centered approach."

Xi also pledged to "strictly control" coal-fired power plants in China's current five-year plan and "phase it down" over the following five years. These and other steps – including efforts towards building green Belt and Road Initiative, China's signature infrastructure program – "requires extraordinary hard efforts from China", Xi added.

Biden focused his remarks on the balance between outlays and opportunities for the global community, requiring political resolve and firm emission-reduction commitments amid the promise of new jobs, industries and technologies. It echoed his domestic messaging as he tried to overcome Republican resistance to his environmental agenda.

"This is a moment of peril but also a moment of extraordinary possibilities," he stressed in a short, and occasionally faltering, speech. "We really have no choice. We have to get this done."

Merkel and Macron called for new and innovative thinking coming out of the Covid-19 pandemic, citing a European Union agreement to implement the European Climate Law. That legislation commits to an intermediate target of cutting net greenhouse gas emissions by at least 55 percent by 2030 from 1990 levels.

"Let's move more quickly on our cooperation on innovation and disruptive technologies, which will enable us to rise to the challenge, and drive down our costs," Macron said. "This will be at the core of the European action."

The environment represents one of the few issues on which Beijing and Washington have found common ground.

The world's biggest carbon polluters, China and the US, agreed to cooperate with "urgency" after Biden's climate envoy, John Kerry, met his Chinese counterpart, Xie Zhenhua, in Shanghai.

"There are many issues on which we don't all see eye to eye," US Secretary of State Antony Blinken said, referring to the global community. Climate change was "not one of them," he said.

Blinken's reassuring words come as the US and China face off over

defense, technology, trade, culture and a range of other issues. There was also uncertainty about Xi attending the conference. The confirmation came only at the last minute, notably on the day a US Senate committee advanced popular, bipartisan legislation, known as the Strategic Competition Act of 2021, that would further sanction China, strengthen Taiwan ties, bolster US technology and check China's military ambitions. It perhaps signaled that China, the world's leading carbon emitter, is as keen as others about environmental safeguard.

Climate Cooperation Hinges on Better Ties

US climate envoy John Kerry's dialogue with Chinese leaders in the fall 2021 had gone beyond global warming, with Beijing making clear that it expects broader US efforts to improve bilateral relations. Kerry spoke with Vice-Premier Han Zheng and with China's top diplomat, Yang Jiechi, and Foreign Minister Wang Yi.

Yang told Kerry that Beijing was open to dialogue and cooperation, but cooperation "should be two-way and mutually beneficial." He said according to the Chinese foreign ministry readout, that Washington should correct its "wrong policies" on China to create the atmosphere for Beijing and Washington to "intensify communication, coordination and cooperation on climate change, pandemic control and economic recovery" and a wide range of other global and regional issues. China's condition for cooperation was emphasized more forcibly by Foreign Minister Wang Yi. He told Kerry that the United States should meet China halfway and take positive actions to push Sino-US relations back on track. Wang noted that as Beijing sees it, the US side wants to turn climate cooperation into an "oasis" in China-US relations. "But if the oasis is surrounded by desert, it will soon become desertified," he pointed out. Any cooperation on climate change Wang stressed "would be inextricably linked to improved China-US ties," and that the climate change cooperation "cannot be separated from the overall sentiment of Sino-US relations." Wand also reminded Kerry that the US "should stop seeing China as a threat and opponent, and stop besieging and suppressing China all over the world."

In recent years, Sino-US relations have undergone a sharp decline and serious difficulties. The reason, as seen by Beijing, is that the US has made a major strategic misjudgment of China."

Wang told Kerry that the US should take concrete action to improve ties and respond to the two lists presented to the US deputy secretary of state, Wendy Sherman, during her visit to Tianjin in July 2021.

"Of course, we have shown our sincerity," Wang reminded Kerry and went on to say, according to a video clip circulating on social media, that:

"As you know, according to our Covid-19 prevention protocols, whoever has met you must be quarantined for 14 days. But we are willing to make the sacrifice to communicate with the US on issues of our common interests."

During Sherman's visit, Beijing had spelled out its three bottom lines, which Wang reiterated by Wang during his talks with Kerry. They are, the US should not seek to subvert China's model of governance, interfere in Taiwan, and should remove sanctions imposed against China over human rights concerns.

According to the Chinese ministry, Kerry said the US was willing to step up dialogue and cooperation with China in a mutually respectful way. He also said: "Given the science and what's happening, we're all going to deal with this certainly for the rest of our lives. This challenge is as big as any we face on a global basis. And China, my friend, plays a supercritical role."

According to the US State Department, Kerry used the talk with Wang to call on China to do more to reduce emissions. The United States, he said, "remained committed to cooperating with the world to tackle the climate crisis, which must be addressed with the seriousness and urgency that it demands." Kerry also encouraged the PRC to take additional steps to reduce emissions."

Lu Xiang, a research fellow on US studies at the Chinese Academy of Social Sciences, thinks the remarks that Wang and others have

made are clear signs that cooperation would be compromised if bilateral relations were dominated by confrontation. Lu said:

"The political climate right now is still very bad. You can even say that bilateral relations are the worst they have been since Henry Kissinger came to China in 1971."

"From the various US remarks, the confrontational element between China and the US seems like it is even their strongest priority, so under these circumstances climate can be a window, a chance for the two sides to have some mutual understanding."

As Lu sees it, for Kerry to come now, "his purpose must not only be for climate talks but also with a broader mission."

Zhu Feng, a professor of international relations at Nanjing University, said Wang wanted to stress to the US that cooperation should be reciprocal. He said:

"Such talks will be very positive because the climate change issue is a big, definitive problem not just for bilateral relations but also for the future of the international community. On the one hand, they will continue to talk … but on the other hand, China has also made clear that cooperation on climate change cannot just exist alone … so it's also Beijing's new gesture of some sort."

Zhu noted, Beijing had already announced its carbon reduction targets, but the two countries' different schedules and composition of energy production were problematic. "China uses a lot of coal so now the US wants China to just present a very clear-cut schedule to get coal usage shrinking." However, emissions reduction "is not just dependent on the Americans' schedule, but ourselves – we need some sort of balanced approach."

Securing a public commitment from Beijing to stop financing overseas coal projects ahead of the UN global climate summit in Glasgow in November 2021, was reportedly among Kerry's top priorities.

A senior global policy adviser for Greenpeace East Asia Li Shuo, said, "China has been rolling back its support for overseas coal

plants in recent years amid the drive for high-quality growth for its belt and road projects." The shift, Li thinks, "is also driven by the lowering of energy appetite in many developing countries because the pandemic has hit their manufacturing industries. But China's public commitment to a moratorium remains critical to ensuring that this shift is not temporary."

U.S.-China Climate Cooperation

China and the United States are keeping the door open for further cooperation that could include technology, industry, trade and more albeit packaged under the urgent need to tackle climate change.

Their joint statement, released on April 17, 2021, in Shanghai, allows the two countries to "continue to discuss ... concrete actions in the 2020s" to reduce climate-warming emissions over a wide range of activities.

These include power generation, energy storage, grid reliability, carbon capture, green hydrogen, renewable energy deployment, green agriculture, energy-efficient buildings, low-carbon transport, including aviation and shipping.

The two sides have identified the many areas where cooperation is desirable and essential for the world's two biggest greenhouse gas emitters. They include emerging technologies, such as in batteries, carbon capture, and zero-carbon fuels. Sino-US collaboration in these areas could significantly advance research, development, finance and deployment worldwide.

Moreover, the reference to taking action in "the 2020s" points to two critical factors: one the US wants accomplishments soon since the Biden administration faces an election in four years, and the other, China is committed to reducing its coal consumption to achieve carbon neutrality by 2060.

At the climate summit hosted by the US on April 22-23, 2021, the US said it would cut greenhouse gas emissions (not just carbon) by 50-52 percent by 2030 from 2005 levels – its most ambitious target so far. Besides, in its 14th five year-plan (2021-25), China has also

pledged to limit the increase in its coal consumption and to phase down coal in its 15th five-year-plan (2026-30).

For the US to realize its declared target, it will need to deploy more renewable energy sources, such as solar and wind power, develop battery technologies for storage, and generate new fuels to replace petroleum products for vehicles.

Likewise, China needs to shift from coal-which currently provides 57 percent of its energy – first by using more natural gas, which emits less carbon, to allow time to ramp up its renewable energy capacity and, then, develop new fuels to reduce reliance on natural gas.

Sino-US cooperation could lead to many mutually beneficial deals. China could provide the US with large quantities of solar panels at reasonable prices, while America could sell vast quantities of natural gas to China. They could also find areas of collaboration in research and development that satisfy the US narrative of "compete and cooperate."

Tributes should be paid to John Kerry and China's climate envoy Xie Zhenhua for grasping the opportunity to bring their countries together when relations have gone off the rails and hashing out the joint statement. They have worked well together before. In 2014, they got their respective governments to commit to decarburization goals and rallied other countries to sign the Paris Agreement in 2015 under the UN Framework Convention on Climate Change.

Their latest joint statement recounts past efforts and commitment "to working together" ahead of COP 26, the next round of UN climate negotiations held in Glasgow in November 2021, to strengthen the implementation of the multilateral treaty to limit global warming to 1.5-2 degrees Celsius. It means Xie and Kerry will have to be very hardworking diplomats in coaxing other governments to step up their efforts.

Cutting coal usage is vital for the world but challenging. According to the United Nations, coal usage in electricity generation must fall by 80 per cent below 2010 levels by 2030. So, China's pledge to

phase down coal use within ten years is crucial because it will help other major coal users; notably India and South Africa, to see a path forward.

The Shanghai joint statement contains other far-reaching efforts, too.

China and the US will push for international investment and finance to support decarbonization. The Paris Agreement has a provision to raise money to support climate action in developing countries, which has yet to be fully met, including by the US. The joint statement also provides that China and the US will cut their production and consumption of hydrofluorocarbon (HFCs), a potent greenhouse gas, as required under the October 2016 Kigali Amendment to the Montreal Protocol. The amendment requires its 197 signatories to cut HFCs by more than 80 per ent over the next 30 years. So far, 118 countries have ratified it, and it is only now that China and the US have signaled that they will too. If all signatories implement this amendment, it is estimated to curb an increase in global temperatures of up to 0.5 degrees by the end of the century.

Partners in Climate Fight

The planet is now 1.18 degrees Celsius warmer than it was at the end of the 19th century, primarily because of greenhouse century, gases we have released from burning fossil fuels. The results? More intense wildfires, rising sea levels and more extreme weather events – are undeniable signs of climate change.

When 40 world leaders – representing the largest carbon dioxide emitters and countries most vulnerable to climate change – participated in a virtual Leaders Summit on Climate that the US President Joe Biden hosted on Earth Day 2021 (April 22), they discussed actions urgently needed to get the world on track to limit the global temperature rise to 1.5 degrees, as outlined by the Paris Agreement. The United States, Canada, Japan, then and South Korea announced climate targets of at least a 50 per cent emissions cut by 2030. China has also shown encouraging signs that the end of its overseas coal financing is fast approaching. The Postal Savings Bank of China has put restrictions against funding future high-carbon projects such as

overseas coal and coal power projects. The People's Bank of China has also indicated that the government will implement green investment principles and control investment in new overseas coal plants.

Ding Yifan, an expert from the State Council's Development Research Centre, said China had already stopped financing coal or thermal power plants and focused on developing solar, wind and nuclear projects in host countries in an effort to make the Belt and Road Initiative greener.

Once such moves are followed by other Chinese banks and officially recognized by the government, they will align China's overseas investment policies with its domestic climate ambitions to reach peak emissions before 2030 and carbon neutrality by 2060.

With China, a global leader in wind and solar installations, helping host nations develop clean, affordable and safe energy and modernize their power grids is a clear path to a long-term bilateral relationship.

Just as President Xi Jinping is making the initiative greener, Biden's climate finance plan is vital to improving US overseas investments. In the past decade, the US has been pushing global infrastructure for liquefied natural gas, generating substantial carbon and methane emissions and exposing host countries to high price volatility. The US currently provides billions of dollars of public funds for overseas fossil fuel projects every year. In addition, financial institutions such as JPMorgan Chase, Citi, Wells Fargo and Bank of America are promoting fossil fuel investment overseas. While imploring other world leaders to reduce investment in coal projects, Biden must also rein in US fossil fuel investment to gain credibility as a climate leader.

Leaders from Bangladesh, Bhutan, and Kenya were at the summit as part of the Climate Vulnerable Forum and Vulnerable 20 Group of Ministers of Finance (V20), representing 1.2 billion people in 48 countries who rely on fossil fuel energy.

Already anxious about rising sea levels, extreme weather and growing food and water insecurity – all caused by climate change – these

countries need access to investment to face the dire future they face. They need clean, cost-competitive, and safe electricity sources to cope with the vicious circle of climate crisis. A solid plan to support these vulnerable countries to develop with sufficient stable energy and resilience must be a parallel consideration.

A clean break from fossil fuels is good for the global climate and economy. A solid plan to support vulnerable countries to develop with sufficient stable energy and resilience must be a parallel consideration.

Climate-vulnerable countries are putting forward "survive and thrive" strategies to hasten their economic and market transformation towards resilience. Their country-led "Climate Prosperity Plans," envision resilient economies by 2030 that fully integrate low-carbon economic growth to optimize prosperity and partnerships.

The investment opportunities for clean and cost-competitive energy point to a way forward for energy technologies and resilient investments. They also provide China and the US with a historic opportunity to work with climate-vulnerable countries and other major economies to strengthen climate-focused investment and trade, promote technology transfer, reduce the cost of capital, help modernize power grids and build other resilient, quality infrastructure.

China and the US are seeing these opportunities. The latest US-China Joint Statement Addressing the Climate Crisis said that "both countries intend to take appropriate actions to maximize international investment and finance in support of the transition from carbon-intensive fossil fuel-based energy to green, low-carbon and renewable energy in developing countries".

Decisive climate action and investment plan that maximizes prosperity and is jointly developed by China, the US, and climate-vulnerable countries must be pursued.

Leaders from vulnerable countries must be heard as voices calling for urgent action as well as partners in future diplomatic, economic

and technological progress. Otherwise, migration from these countries will soon be the biggest climate challenge we face.

As heat, drought, and rising sea levels render swaths of the planet uninhabitable, unimaginable numbers of people may eventually have to relocate to terrain in the latitudes best suited for survival. I agree with Parag Khanna, the author of *Move: How Mass Migration Will Reshape the World – and What It Means For You*, who said, "The toughest challenge that lies before us isn't reducing emissions, its relocating people."

The US and Europe are already overwhelmed by people relocating – immigration!

COVID Origin Scrutiny Like Climate Change Debate

The way the discussion on the origin of COVID-19 was derailed by conspiracy labelling reminded environmental economist Ross McKitrick of the debate around climate change debate.

"There are ideas that were never disproven and actually have a lot of evidence to support them, but for political reasons and cultural reasons within the university they just aren't looked at," McKitrick, a professor at the University of Guelph in Ontario, Canada, said in an interview.

As bias on a particular issue becomes structural, McKitrick said, it would make its way into government communications and even into "big tech" platforms such as Facebook and Twitter, which make editorial decisions–decisions they "have absolutely no business making" – to censor one side of the debate.

True, I experienced it when I wrote a blog in April 2020, titled *Onions, an Easy Cure for Covid-19,* about how onions can be used as a compress and a temporary cure while waiting for a vaccine to be developed. Chinese medicine doctors and holistic practitioners have long been using onion as a medicinal cure. My account got blocked as my blog readers, who had pharmacists in their family, complimented me on the piece, and shared family experiences using onions as a cure for many ailments.

In the case of the virus, as more scientists and even President Joe Biden joined the chorus that the lab leak theory can't be dismissed because a natural origin hasn't been proven, many media and online platforms such as Facebook had to backtrack on their decision to censor the one side.

"We saw that play out over a period of around 12 months. Now what happens with the climate change issue is the same thing. But it's playing out over a much larger time frame," McKitrick said.

Author and veteran science journalist Nicholas Wade was one of the early observers who noted that the virus origin discussion had been wrongly steered in a particular direction by influential figures in the scientific community.

The discussion and media reports, were shaped by mainly two articles published in two influential scientific journals, the *Lancet* and *Nature,* dismissing the lab leak theory as unscientific, with one of the articles labelling it a conspiracy theory.

Since then, it has come to light that Peter Daszak, the organizer of the *Lancet* article, that was published as an open letter, has ties to the Beijing-run lab researching coronaviruses in Wuhan, the epicenter of the virus outbreak. However, he didn't disclose that connection in the letter. Meanwhile, the Chinese regime, that wanted to avoid blame, had an obvious interest in denying any origin theory, except a natural one. It has been vocal in denouncing any lab leak possibility.

According to a report in *The Epoch Times* (July 22-28, 2021), documents released under freedom of information requests showed that the two articles appeared to have been part of a coordinated effort originating from a February 2020 teleconference organized by Dr. Anthony Fauci, director of the US National Institute of Allergy and Infectious Diseases (NIAID). Fauci, whose organization has funded research on coronaviruses at the Wuhan lab in the past, said early in the pandemic that there was evidence the virus had a natural origin. But he has later backtracked on his position as other members of the scientific and political community came out saying the issue is not settled yet.

Wade, who was a staff member for *The New York Times*' science pages for many years, as well as a writer and editor for *Nature* and *Science*, says that scientists rely on influential scientists and those in positions of power in academia to advance their careers. It could often mean that those who see flaws in prevailing ideas advanced by influential figures are afraid to speak up.

"If you take an unpopular view that one of the leaders of your field or scientific establishment seem to oppose, then you're putting your career at some risk," Wade said.

"Given that, I suspect there may be other instances where a small group of scientists has influenced everyone else. Climate change is one possibility one might look at."

Early in the pandemic, many media reports referred to a "scientific consensus" on the virus rising from a natural source. But Wade and McKitrick point out that science doesn't work by consensus.

"Politics works by consensus and by counting votes, and science doesn't, and shouldn't," Wade says.

After the reversal in recognizing the lab leak theory as a valid hypothesis, some media that had actively labelled that possibility as a conspiracy theory interviewed experts on the issue. They justified the former stance by saying some scientists didn't want to support the position of the former US president, Donald Trump, who was very vocal in criticizing Beijing for the virus outbreak.

In one such article, *CBC News* quoted a scientist who said, "You don't want to be seen to be contributing to the misinformation or to a toxic narrative that harms people."

Wade says such arguments are "so childish."

"I'm just amazed to hear this argument coming from the mouths of educated people who should know a lot better than that," he said.

McKitrick says if scientists "lie to the public when it suits their political purposes," the public would downgrade their trust in academic scientists and think that scientists are putting politics first, whether it's the virus origin discussion or the climate change debate.

Ian Clark, professor emeritus of earth and environmental sciences at the University of Ottawa, agrees that politics have no place in science.

In the case of climate change, a field that Clark is involved in, there are different factors that, he says, that have made the issue political. For example, there are "geopolitics involved, with Russia and China supporting environmental movements, because it's crippling Western democracies."

The issue bears ever more importance as climate change is at the forefront of policy-making in Western countries, with the US, Canadian, and other governments enacting legislation to curb the use of fossil fuel that causes CO2 emissions, leading to telling impacts on the economy and people's daily lives and cost of living.

Madhav Khandekar, a retired Environment scientist in Canada with a PhD in meteorology, says many papers are being published in peer-reviewed journals questioning various assumptions linking human activities and climate change. Still, the media has not taken note of them.

Khandekar has authored many such articles pointing out that climate changes are due to natural reasons rather than human activity. They were published in peer-reviewed journals such as *Pure* and *Applied Geophysics* but went unnoticed by the media.

"More and more scientists are now questioning some of the basic assumptions of global warming science," Khandekar said in an interview. But he also pointed out that many dare not speak publicly, especially younger scientists concerned about their career prospects.

William van Wijngaarden, a physics professor at York University in Toronto, Canada, who has studied climate change, has observed the same issue.

He told *The Epoch Times* that when he has witnessed at scientific conferences a noticeable reluctance among attendees to publicly ask questions from the "non-politically correct side" of the issue. But it's a different matter in private.

"When you talk to people one on one, when there's no one else around, such as when having lunch with them, I've had a number of them say, 'Please don't tell the others I told you this, but I agree with you,'" said van Wijngaarden, who doesn't believe anthropogenic global warming has been proven.

"There are very few people who have the courage to really stand up against this."

Many of those holding contrarian views are also subjected to public character assassination. There are websites created by climate change activist organizations profiling those who are skeptical of the prevailing narrative, trying to cast these scientists in a negative light and discredit them.

Van Wijngaarden says in many cases those who want to shut down the scientific debate on climate change don't have a strong background in the hard sciences and are more from the social sciences.

He points to the example of the discussion on carbon dioxide's impact on global warming.

As the world became more industrialized, carbon emissions from fossil fuels increased. Those who believe that human activity is the cause of climate change say the emitted carbon dioxide leads to significant warming due to the greenhouse effect.

Van Wijngaarden says his own research shows that if carbon dioxide is doubled, there will be less than one degree Celsius warming, which he says is not very significant. The complication, however, comes from the fact that as it gets a little warmer, there will be more water evaporation, which amplifies the greenhouse gas effect, with the expectation being that there would be more warming. And that's where the disagreement lies.

"That's where things get murky. The measurements are not clear that the water vapor is increasing all that much," he says, adding that it's quite a complex issue due to different factors involved.

He says the scientific literature from the Intergovernmental Panel on Climate Change (IPCC), the United Nations body that is the

primary driver of climate policy globally, has been saying that with this additional vapor factor, the warming will be amplified to 1.5 to 4.5 degrees Celsius.

That, says Van Wijngaarden, is a huge error bar. The findings of his research, he points out, lie on the lower end of this margin.

According to Van Wijngaarden, almost all the models used in the climate science community to come up with these predictions run warm and have been seen to predict much more warming than what is actually observed.

"It's very difficult to model the Earth's climate. There's a lot of things you have to take into account. Even the biggest supercomputers may not be powerful enough to handle it," he says.

Given all these uncertainties and large error margins, van Wijngaarden says, it's crucial that the scientific community sticks to the fundamentals of science and looks at all data objectively, rather than becoming defensive and ignoring the uncertainties.

Van Wijngaarden says there were many predictions in the late 1990s about massive temperature increases that were supposed to happen by now, but more than 20 years later, those predictions haven't panned out.

"In the hardcore physics community, they would say you guys better be cautious about the claims and understand what you're doing. But in the climate community, a lot of people have been rather naive, and I'd say have become defensive. That's troubling to me," he said.

In a book he wrote on climate change in 2016, van Wijngaarden notes that the IPCC acknowledged there were mistakes in its reports, such as a claim in its 2007 report that the Himalayan glaciers would be melted entirely by 2035. He questions why these mistakes were not caught if the scientific work was conducted with input from over 2,500 scientists and experts. The answer, he says, is that small subcommittees wrote the different parts of the report, and a small number of individuals only reviewed the report as a whole.

Khandekar agrees that almost all models used in the field predict more warming than warranted by reality. He says he has seen it

first-hand, using data from decades past to produce forecasts for the present and finding the results to be much warmer than what was actually recorded.

"I have lost my faith in climate models," he says.

McKitrick says that based on the social media postings of many of the scientists creating the models, it's clear that many of them are environmentalists, "so they may not want to be seen running a model or saying anything that might dissent from the climate emergency campaign we're seeing."

Both McKitrick and Khandekar point out that there are models developed in Russia, where scientists are presumably more disconnected from the community in the West, that don't predict as much warming.

Activists from the climate change protest group Extinction Rebellion took part in a protest march in St Ives, Cornwall, England, on June 11, 2021, on the first day of the three-day G7 summit.

Clark notes that results from a Russian model are closest to the measured global temperatures from satellite records. He is waiting to see IPCC's 2022 report to see if there have been improvements to the models.

Among the arguments used to dismiss scientific findings refuting anthropogenic global warming is that most published work on the issue agrees that climate change is due to human activity.

Besides the fact that science doesn't work by consensus, McKitrick notes that a lot of research is steered in one direction by the funding given for research. He points out that many government grant competitions in Canada, for example, don't start off by questioning the science linking human activity to climate change, but take it for granted that there's a crisis and ask how emissions should be reduced quickly.

"It's very difficult to get funding for something on the climate issues," McKitrick says, adding that the funding bias "puts a filter in place where there's a non-stop supply of studies that will find some

element of the natural world is suffering due to climate change."

McKitrick, who maintains that climate is changing due to factors beyond human activity, says it's "odd" that there are no news stories about how climate change is having a beneficial effect, such as more greening.

"If the story was in the other direction, if we were in a cooling trend, you'd expect to see a lot of stories about how global cooling is going to be harmful to ecosystems," he says.

He adds that there's a lot of "ambulance chasing," with people wanting to show that they somehow explained or predicted a phenomenon.

This is commonly seen following heat waves, such as the summer 2021 in Western Canada and the Western United States, where some scientists commented that greenhouse gases are significantly exacerbating the warmer temperatures.

"They always appear after something's happened and say, well, this is consistent with what we were expecting, but they can't predict an event ahead of time," he says.

"It's a kind of problem that is completely unfalsifiable, as it's not a science that you can ever test. It's not a theory you can have an experiment to see whether it's true or not."

Van Wijngaarden, who describes himself as a political liberal, says he got into the field of climate change with the motivation to defend "poor Al Gore," whom he thought was being targeted by conservatives for his environmental activism.

"I fully expected that I would decide on this in the Al Gore camp. Then I started to look at the data and the claims made, and the claims are just silly," he said.

He thinks a significant factor contributing to the bias of many in the field who link climate change to human activity is that many people in the mid- to late-20th century started to develop a "heightened awareness of pollution" for a good reason, against the backdrop of

issues such as plastics ending up in oceans and oil spills impacting the ecosystem.

"I think a lot of us, myself included, became very much environmentalists," he says.

When theories linking human activity and global warming emerged in the 1990s, given the state of mind of many environmentalists, it was easy for people to agree that that was the case, since there was already an understanding that "we've been treating the environment so badly," he says.

McKitrick adds that major political factors behind the scenes fuel the movement.

Pointing to the net-zero emission goals by 2050 pushed by international bodies and adopted in many countries including Canada, he says he finds the timeline to have a "remarkable coincidence" with China's 2049 goal – the ambition of the Chinese Communist Party to become the world's dominating player by the 100th anniversary of the founding of the People's Republic of China.

"The two are really pointing in the same direction," McKitrick said.

"By the middle of this century, the West will have seriously weakened itself and demolished its own industrial strength and access to energy and other things that have historically made it strong and prosperous, and at the same time, we've got China massively expanding its fossil energy infrastructure at home and around the world and pursuing its expansionist ambitions."

That's why he's concerned about the many 2050 net-zero initiatives that he says have no basis in scientific fact and will cripple the economy.

"One of the really disturbing aspects of Western policy is the number of financial institutions that are cutting off all funding for oil- and gas-and coal-related developments," he says.

It not only impacts the domestic economy in these Western countries, but it creates an environment where developing countries that

need infrastructure for energy projects can no longer go to Western-based international banks. Instead, they will have to rely on China and its Belt and Road Initiative.

McKitrick also notes that the environmental groups that are instrumental in pushing for climate policies in Western countries are notorious for being silent on China's environmental performance. Again, he puts this down to Beijing's influence operations in the West.

This is exacerbated by major financial institutions that are desperate for more business in China. These Wall Street giants cut funding for energy projects in the West in the name of climate activism and social responsibility, but expand their energy funding projects in China, he says.

Beyond issues of geopolitics and influence operations, McKitrick notes that the climate change movement has also reached a point in Western countries that it has become a "transcendent cause."

"It's an area where there is a huge amount of data and it's not all that difficult to look things up. But what I encounter with students is that they've got very strong opinions on the environment, but almost no actual information about it as often it comes as a surprise for them to see, for instance, how much the environment has improved in Canada and the United States," he says.

"It's more of a belief system and a moral code than a scientific issue for them, and I think that contributes to the fervor of the issue. People just begin to think that your attitude towards carbon dioxide emissions is the marker of whether you're a good person or not."

He says, seeing a general trend in society, politicians cater to these sentiments for political scores and votes.

Clark says the theory of linking human activity to climate change has been solidified in the West by a few influential figures.

He gives a few names as examples.

One is Michael Mann, currently director of the Earth System Science Center at Pennsylvania State University. Mann's work along

with the works of two colleagues in the late 1990s, is behind the famous "hockey stick" graph that shows temperatures from the year 1000 to the 2000s, demonstrating dramatic rises in temperature starting around the industrial era. The graph was featured in Al Gore's 2006 film *An Inconvenient Truth*.

The graph has been disputed in the scientific community, including in a paper co-authored by McKitrick that showed a period of warming around the 15th century that was warmer than that in recent times. The paper noted natural variations in climate over time, with scientists pointing to different factors contributing to the temperature variations.

Nonetheless, Clark says Mann's work, which to him is "patently wrong," has been used to convince many politicians and young people that the Earth is heating up due to carbon dioxide.

The Epoch Times asked Mann for an interview but didn't hear back.

Clark says James Hansen, who was the director of the NASA Goddard Institute for Space Studies (GISS), is another influential figure leading to NASA's activism on the issue. Since retirement, Hansen has joined Columbia University's Earth Institute as an adjunct professor and has been arrested on a few occasions during environmental protests for obstructing traffic and police.

"He has his career staked on this, so he can't do anything but pronounce on global warming," Clark says.

The Epoch Times contacted Hansen for comment but didn't hear back.

The issue of NASA's activism on climate change was derided by 49 former NASA scientists and astronauts in a letter in 2012, asking that NASA and GISS "refrain from including unproven remarks in public releases and websites."

"We believe the claims by NASA and GISS, that man-made carbon dioxide is having a catastrophic impact on global climate change, are not substantiated, especially when considering thousands of years of empirical data," the letter said.

"With hundreds of well-known climate scientists and tens of thousands of other scientists publicly declaring their disbelief in the catastrophic forecasts, coming particularly from the GISS leadership, it is clear that the science is NOT settled."

On the political side, one of the most influential figures was Maurice Strong, who Clark says managed to get very powerful people involved in the cause.

Strong, a Canadian business executive, held key positions in the United Nations, including as under-secretary-general of the international body.

Strong was the founder of the United Nations Environment Program and organized key UN conferences on the environment. He also initiated the first international expert group meeting on climate change.

Strong has had major links to China, through the business corporations he was involved with and later in his UN work, and moved to Beijing upon retirement where he lived until his death.

Clark says the onus is on the media to report objectively on the issue, but too many seem to be following an agenda and give voice to those who want to push one side of this issue.

He says the insufficiently challenged green movement has now morphed into a major political force, with governments formulating policies based on unfounded science that have major implications for people's lives, and offering incentives for newer technologies that could have even worse environmental impacts.

"What people hear all the time is heat dome and wildfires are all because of CO2, and people don't have the science literature, but the idea that we can dial it back if we just turn down CO2 emissions is absurd if you understand the carbon cycle and climate," he said.

"But that's what people hear, and that's what they vote for, and here we are with carbon taxes."

He says it's important that people be presented with the facts and for the media to pursue the objective truth.

"To use the old analogy from the 'Wizard of Oz,' we need to pull back the curtain and expose the man behind the curtain."

Mother Nature's Reveng

The Ebola and Zika pandemics were warnings of what was to come if we didn't listen to the science, accept the realities of climate change and deal with collectively its devastating impact on biodiversity. In brief, work together to prevent future calamities.

Richard Preston describes in his book, *Crisis in The Red Zone*, describes an emerging virus that comes out of the ecosystem, magnifies itself in people, sweeps away lives, meets opposition from the human species, and finally dies out.

Zhang Jiren, the editor of the book's Chinese version sums up best the field of vision the book describes. "It elaborates on Ebola's past, present and future. By comparing the Ebola outbreaks in 1976 and 2014, we can view the things from historical and current perspectives," he says. "The author also makes a prediction about the outbreak of a new virus, which you could argue, came to pass with the outbreak of Covid-19."

Preston realized the power of Mother Nature. The virus, in his opinion, was "nature's revenge." The virus makes "no distinction between people, rich or poor, in what nation they live or what their political views are. None of these things matter to a virus."

Consequently, Preston believes it is necessary to pay attention to the conditions of poor people. "We are only as strong as the weakest individuals of our society. When people are poor, underprivileged, live in crowded conditions, don't have access to doctors and medical care, they become nothing but a place where a virus can establish itself, and affect everyone."

Preston finds similarities in the outbreaks of Ebola and Covid-19. "When Ebola first arrived, many ordinary people in Africa did not believe it. They said Ebola was a political hoax. They said: 'In any case, Ebola will never come to my community or my family.' And all of those beliefs were wrong," he says.

Preston noted that millions of people in the US had spoken precisely as the Africans spoke about Ebola. "They said: 'It is a trick, a political hoax. And 'it's not very dangerous'; 'I don't have to worry' or 'I won't catch it.'"

He went on to add: "I think what we are seeing here is human nature. It seems nobody really wants to look at a very dangerous thing, and nobody wants to admit how dangerous these viruses are."

Sound familiar?

Then, guess what. In early February 2021, during the height of the Covid-19 pandemic, the Democratic Republic of Congo (DRC) identified a new Ebola case, raising fears of a new outbreak of the deadly hemorrhagic fever. The National Institute of Biomedical Research confirmed the virus had been identified in samples taken from a patient with symptoms who had sought treatment. It was a farmer, the wife of a survivor of Ebola, who showed the signs of the disease. The 42-year-old woman died within three days.

The resurgence of Ebola in a region plagued by rebel violence comes as the DRC faced a second wave of Covid-19 cases that is stronger than the first. According to the World Health Organization (WHO), though the country's testing capacity was limited, it recorded almost 23,500 confirmed Covid-19 cases and 679 fatalities in the first week of February 2021.

Isn't it time *We the Maids* sweep out this kind of thinking, clean up the breeding grounds of deadly viruses, and sweep in common sense and science?

Echoes of Concern

French President Emmanuel Macron urges Europe and the U.S. to allocate up to five percent of their vaccine supplies to developing regions, including Africa. "We are allowing the idea to take hold that hundreds of millions of vaccines are being given to rich countries and that we are not starting in poor countries," Macron said ahead of the 2021 G7 meeting.

"It's an unprecedented acceleration of global inequality and its politically unsustainable too because it's paving the way for a war of

influence over vaccines," Macron said. "You can see the Chinese strategy, and the Russian strategy too."

Macron said that diverting a small share of the vaccines to Africa from Europe would not hinder Europe's vaccination efforts.

"It won't change our vaccination campaigns, but each country should set aside a small number of the doses it has to transfer tens of millions of them, but very fast, so that people on the ground see it happening."

"It's in the interest of the French and the Europeans. Today I have more than 10 million of our fellow citizens who have families on the other side of the Mediterranean," he added.

Without helping countries around the Mediterranean, Africa and Balkans, European countries will never be able to reopen because they'll continue to face the threat of re-importing Covid-19 variants resistant to the vaccines.

The rapid spread of Covid-19 in Africa exemplifies the threat. It took 146 days for Africa to register its first 20,000 deaths in January 2020, but at the beginning of 2021, it recorded that same number of deaths every 15 days.

The same is happening to the Mekong countries of Laos, Cambodia, Thailand, Myanmar and Vietnam. Some of these countries are the world's poorest. Their healthcare infrastructure, particularly in rural areas, needs support. The outbreak has led to some 30 percent rise in the number of people living in acute poverty in the region's rural communities.

As a July 2020 UN policy brief noted, the socio-economic crisis caused by the pandemic "threatens to destroy the livelihoods of Southeast Asia's 218 million informal workers." According to its forecast, remittances from Southeast Asians working abroad were likely to fall by 13 percent, or $10 billion.

Did a Lab Accident Cause Covid-19?

Alison Young is an investigative reporter in Washington, D.C. During 2009-20019, she was a reporter and member of *USA TODAY*'s na-

tional investigative team. Young has spent more than a decade revealing shocking safety breaches that officials at laboratories in America did not want the public to know – like unknown exotic and deadly bacteria hitching rides out of high-security labs on workers' dirty clothing, silently spreading contagion for weeks, how spacesuit-like protective gear and tubes carrying safe oxygen to scientists have torn or broken, how high-tech safety systems have failed dramatically, vials of viruses and bacteria missing without a trace, and researchers bitten by infected lab animals allowed to move about in public while waiting for signs of infection to appear, rather than quarantine them.

These and similar safety lapses are happening with disturbing regularity at elite US labs operated by government agencies, the military, universities and private firms. There is no reason to believe such incidents aren't happening in labs in other countries.

The notion that more than 2.7 million deaths worldwide – as of March 2021 – could be the result of a lab accident has been met with skepticism and derision by many journalists and scientists who often portray it as a crackpot conspiracy theory fueled by the China-bashing rhetoric of the former US president Donald Trump. Without question, the lab-leak theory has been politically and racially weaponized in ugly ways. Nonetheless, that rhetoric needs to be separated from legitimate questions about lab safety that are deserving of investigation.

Science, like journalism, is supposed to be about facts and about getting to the truth. Nonetheless, those who dare seek answers to reasonable questions about any lab accident in Wuhan are accused of peddling conspiracies.

Young says "Let me be clear: Labs in Wuhan might not have played any role in the origin of the pandemic. But a year later, no source has been found, and the world deserves a thorough, unbiased investigation of all plausible theories that is conducted without fear or favor."

No matter what, this is a moment for the United States and the world to take a hard look at the safety of biological research labs

and the risks they can pose – because problems at these facilities are real.

Lab accidents aren't rare. What's rare are accidents sparking outbreaks of deadly diseases. But those have happened.

The risk of deadly viruses held in laboratories leaking into nearby communities either from the discharge of infectious waste, or carried by workers who didn't know they were infected, has long been a concern.

In America, scientists and members of Congress – both Democrats and Republicans – and the nonpartisan Government Accountability Office (GAO) have expressed concerns for years. In reports and hearings, they've worried that the proliferation of laboratories working with high-risk pathogens is increasing the aggregate threat of a deliberate or accidental lab release causing a catastrophic outbreak.

"The public is concerned about these laboratories because exposing workers and the public to dangerous pathogens, whether deliberate or accidental, can have disastrous consequences," the GAO's Nancy Kingsbury told Congress at a hearing in 2014.

If the Covid-19 pandemic were found to have been caused by a lab accident, it would have far-reaching implications for the fragmented and secretive oversight of biological research in the United States and worldwide that currently relies heavily on the scientific community to police itself.

Like most people, Young hadn't ever given much thought to the safety of biological research facilities. She just assumed they were impenetrable sterile fortresses, heavily regulated and guarded, equipped with layers of cutting-edge technology and staffed by workers who zealously adhered to safety protocols.

Then in 2007, as the reporter of *The Atlanta Journal-Constitution* covering the Centers for Disease Control and Prevention (CDC), Young started getting tips about problems inside the CDC that is internationally reputed for operating the world's premier public health laboratories at its secure headquarters campus in Atlanta.

With the help of a tipster, she revealed that the CDC's then-new $214 million infectious disease lab building – a crown jewel in the nation's race to defend against the threat of bioterrorism – suffered an hour-long power outage from a lightning strike and the failure of its emergency backup generators. The blackout shut down critical safety systems in the 368,000-square-foot facility, known at the agency as Building 18, including specialized air pressure systems that help ensure lethal viruses remain inside individual labs.

What's worse, copies of CDC documents and emails that Young later obtained revealed an even more alarming picture than the lightening that struck Building 18. They showed that CDC had dismissed warnings from the agency's own engineering staff, years before the lab opened, that the backup power system's design "gives us no protection whatsoever from many types of failures."

Following up on another tip, Young revealed that scientists in this same troubled building were conducting experiments on a type of dangerous bacteria in a biosafety level 3 lab – the second-highest security level – where the containment door was sealed with duct tape.

The tape was applied around the edges of the door a year earlier, after it was discovered that a malfunctioning ventilation system was pulling potentially contaminated air out of the lab into a "clean" hallway, where others in the building walk around in street clothes and without any gear to protect against infection. Nine workers who had been in the fallout zone were tested for potential exposure to the highly infectious bacterium that causes Q fever, which is classified as a potential bioterror agent and can cause mild to severe symptoms, including potentially fatal heart problems. No one was infected.

As Young stood in front of the duct-taped door on a summer day in 2008, escorted by five CDC officials, the head of the agency's occupational safety program downplayed the significance of the duct tape. The public was never at any risk, he said, the lab was perfectly safe, and the ventilation system had worked properly, and since the incident happened a year earlier.

"Then why is the door still sealed with duct tape?" she asked.

"It's an enhancement," replied Patrick Stockton, who at the time was the CDC's safety and occupational health manager. "We could take it off."

Then why weren't they removing it? Think about that: This was a new $214 million federal building that the CDC had touted back then as the world's most advanced laboratory. And yet the CDC was relying on duct tape to help safeguard against the release of dangerous bioterror bacteria.

In many ways, it was emblematic of what Young's reporting has found over the years about how labs and regulators approach safety.

In 2008, Louisiana State University's AgCenter in Baton Rouge was secretly cited by federal regulators for serious biosafety lapses while researching Brucella bacteria, posing a health hazard to livestock. Federal records showed that safety failures resulted in a cow in a nearby pasture – that was not involved in the experiments – becoming infected. LSU also was cited for sending infected cattle to a slaughterhouse where the meat was sold for people to eat.

In the decade that followed, as a member of *USA TODAY*'s national investigative team, Young reported on more incidents at the CDC and scores of other US labs operated by the federal government, universities and private organizations across the country.

In 2014, a type of deadly bacteria not found in the United States, called Burkholderia pseudomallei, escaped from the high-security bioisafety level 3 labs at the Tulane National Primate Research Center near New Orleans. It infected monkeys that lived in outdoor cages and had not been used in experiments. Federal regulators concluded that the bacteria likely was carried out of the lab on workers' contaminated clothing. The bacteria, which can cause serious illness in people and animals, can colonize soil and water in suitable climates. However, tests did not find evidence it had spread into the environment.

At the University of Iowa, records showed that officials in 2014 discovered that a scientist had been conducting experiments with a

genetically engineered strain of the MERS virus – which causes a deadly and contagious respiratory disease in humans – without getting approval from the university's biosafety committee.

A particularly alarming string of incidents in 2014 included the CDC potentially exposing dozens of its workers to live anthrax and also having dangerous mix-ups with specimens of the Ebola virus and a deadly strain of avian influenza.

In 2015 it was discovered that biological labs operating at the U.S. Army's Dugway Proving Ground near Salt Lake City had been mistakenly shipping live anthrax spores to labs around the world for a decade, the result of faulty assumptions that the research specimens they were sharing had been effectively killed – when they could actually still grow and kill.

In an award-winning 2015 investigation called *Biolabs in Your Backyard*, the *USA TODAY* team found that more than 100 US labs working with potential bioterror pathogens had faced secret federal sanctions for safety violations. Still, regulators had allowed them to keep conducting experiments while failing inspections, sometimes for years. Among the labs with some of the worst regulatory records, they found, were labs operated by some of the same federal agencies that are responsible for regulating laboratory safety.

Laboratory accidents continue to happen across the United States. But the public rarely hears about them because pervasive secrecy obscures failings by labs and also by regulators.

There is no universal, mandatory requirement for reporting lab accidents or lab-associated infections with dangerous pathogens, the *USA TODAY* investigation found. And even when labs lose their permits to work with hazardous pathogens because of serious safety violations, the government keeps the labs' names secret, citing security concerns and a federal bioterrorism law.

According to documents Young obtained using the federal Freedom of Information Act, US laboratories reported more than 450 accidents during 2015 through 2019 while experimenting with some of the world's most dangerous pathogens – those subject to federal

regulation because they "pose a severe threat" to health and also have the potential to be turned into bioweapons. These pathogens, which the US government calls "select agents," include anthrax, Ebola, plague, deadly strains of avian influenza and types of SARS coronaviruses.

The safety breaches reported to the U.S. Federal Select Agent Program – which is jointly run by the CDC and the U.S. Department of Agriculture – ranged from animal bites and needle sticks to failures of safety equipment and mistakes that resulted in infectious particles becoming airborne inside labs.

The program's annual reports to Congress showed that regulators deemed the breaches serious enough to put workers at risk of becoming infected in nearly all reported cases. As a result, more than 660 US scientists and other lab workers involved in the incidents underwent medical assessment or treatment with preventative medication.

According to the reports, which provide only statistics and no personalized details, almost none of these lab workers got sick. However, a few going about their lives at home and in public for months became infected over the months. Their exposures were identified only because their lab happened to conduct annual blood tests, checking for antibodies to research pathogens, something that federal regulators don't require. Fortunately, the organisms they were working with were types of bacteria that, while dangerous, don't spread easily from person to person.

But what if a lab worker were unknowingly exposed to something far more contagious, a virus that can infect others before any symptoms appear?

There are several ways a pathogen can "escape" a laboratory and cause a public outbreak. First, a lab worker can become infected because of a failure in safety equipment or procedures. Sometimes these infections, such as those involving pathogens that spread through contaminated air or through invisible aerosolized droplets, occur without the worker even realizing a safety breach has occurred.

Viruses and bacteria can also be carried out of labs on contaminated clothing and equipment or through a mishap in sterilizing the lab's solid or liquid waste.

Lab accidents causing documented outbreaks that spread to people or animals have happened, but of course, rarely. Among such rare mishaps, an influenza epidemic in 1977 that spread throughout the world was found to have been caused by a strain of the virus that appeared to be nearly identical to one that hadn't circulated since the 1950s. Many scientists believed that it was not a naturally occurring outbreak; it was likely the result of a stored virus specimen that escaped due to an accident during a vaccine development project in a laboratory.

Again, in 2007, herds of cattle in Surrey, United Kingdom, began developing painful blisters on their tongues, lips and feet – symptoms of the highly infectious foot-and-mouth disease that renders the livestock useless for milk and meat. In this case, it was a strain of FMD Virus from a 1967 epidemic – a strain that was being used at a laboratory and vaccine manufacturing complex in Pirbright, not far from where the cattle fell ill. British safety regulators concluded that the outbreak was likely caused by leaking wastewater from the Pirbright facility's drain pipes, which contaminated nearby soil with live virus and then was picked up on vehicle tires and carried to the herds.

Coronaviruses similar to the one causing the Covid-19 pandemic have also occasionally escaped labs. For example, in 2003 and 2004 – in the months after intense international efforts managed to contain the spread of Severe Acute Respiratory Syndrome (SARS), that was then the first type of deadly coronavirus to infect people around the globe, a series of laboratory accidents threatened to reignite the epidemic that had sickened about 8,000 people in 29 countries, killing nearly 800 of them. The SARS coronavirus virus killed at a higher rate than the similarly named SARS-CoV-2 virus that causes COVID-19.

First, a researcher in Singapore working with specimens of West Nile virus became infected with the SARS virus in a shared laboratory that used "inappropriate" lab safety measures. Investigators

concluded that the infection resulted from accidental contamination of the researcher's West Nile virus specimens with the SARS virus. Both viruses were found in a research specimen the scientist had used before becoming ill. Nobody else got sick.

Then, a researcher in a Taiwan laboratory became infected with SARS, likely by cleaning up spilled liquid waste. He attended a meeting in Singapore and didn't show signs of illness until returning home and developing a fever.

"In the post-epidemic period, the greatest risk from SARS may be through exposure in laboratories where the virus is used or stored," the WHO said in an update about the Taiwan lab incident.

In April 2004, an outbreak began in China after two researchers working at a virology lab in Beijing became infected by the SARS virus. Before the outbreak was contained, nine people were infected. The mother of one of the researchers died.

How the two researchers got infected was unclear. Neither of them had conducted experiments using live SARS coronavirus, and no accident was reported at the laboratory. However, after the outbreak had been contained, the WHO said in a May 2004 update that "investigators have serious concerns about biosafety procedures at the Institute – including how and where procedures using SARS coronavirus were carried out, and how and where SARS coronavirus samples were stored."

No specific accident was identified at the laboratory, the WHO said, "and it is conceivable that an exact answer may never be determined."

Against this backdrop, it's surprising that questions about any lab accident in the Chinese city of Wuhan continue to be dismissed as promoting a conspiracy theory.

The Wuhan Lab-Leak Theory

When an unknown pneumonic disease was detected in Wuhan on December 31, 2019, and its cause was identified on January 9, 2020, as a coronavirus, a lab accident seemed a possibility to Shi Zhengli,

a renowned scientist at the Wuhan Institute of Virology (WIV) and the leading coronavirus researcher. She was among the first to identify horseshoe bats as the natural reservoirs for SAR-CoV, which sparked an outbreak in 2002, infecting more than 8,000 people globally and killing 774 of them. As SARS bats became a major subject of study for virologists around the world, Shi Zhengli became known in China as "Bat Woman" for her fearless exploration of their caves to collect samples. She and her colleagues at the WIV have also performed high-profile experiments that made pathogens more infectious. Such research, known as "gain-of-function," has generated heated controversy among virologists.

Shi Zhengli's anxiety over the possibility of a leak from WIV causing Covid-19 pandemic is discussed in an article the *Scientific American* published in 2020. It said Shi Zhengli had told the magazine of a frantic review of her lab's records during the early days of the outbreak to see whether there had been any incidents, especially related to the disposal of materials used in experiments. She said she was relieved when her lab learned the genetic sequence of the virus infecting people in Wuhan didn't match any of the viruses her team had collected.

"That really took a load off my mind," she told the magazine.

Shi Zhengli has expressed outrage at public speculation following claims made by then-US president Donald Trump and his secretary of state, Mike Pompeo, that a lab in Wuhan may be responsible for the pandemic. Diplomatic cables, first reported by *The Washington Post,* showed that in 2018 – the year before the Wuhan outbreak – the US Embassy in Beijing had raised concerns about safety practices inside WIV, where China's first biosafety level 4 laboratory had become operational, enabling the facility to do far more dangerous experiments. "During interactions with scientists at the WIV laboratory, they noted the new lab has a serious shortage of appropriately trained technicians and investigators needed to safely operate this high-containment laboratory," said one of the cables from January 2018.

In the final days of the Trump administration, Pompeo's State Department posted on its website a fact sheet titled, "Activity at the Wuhan Institute of Virology." The document made clear that the US government doesn't know where, when, or how the Covid-19 virus was initially transmitted to humans.

Even so, it called for greater scrutiny of information it said the US government has learned about the facility, including that the virology institute has been doing classified research with China's military since at least 2017 and that several researchers at the institute became sick in autumn 2019, before the first identified case of the outbreak. But no details were provided in the fact sheet.

A joint China-WHO scientific team visited WIV from February 16 to 24, 2020 looking for the source of the Covid-19 pandemic. Members of the WHO team said they were assured, during conversations with staff at the institute and at other biological labs in Wuhan, that a laboratory accident was extremely unlikely to be the pandemic's source.

In the weeks since leaving Wuhan, the WHO's team was questioned about its independence and depth, including by the Biden administration, amid news reports that China denied the team access to raw data on possible Covid-19 cases identified during the early part of the outbreak.

"We have deep concerns about the way in which the early findings of the Covid-19 investigation were communicated, and questions about the process used to reach them," White House national security adviser Jake Sullivan said in a statement. "It is imperative that this report be independent, with expert findings free from intervention or alteration by the Chinese government."

An international group of scientists and researchers has issued an open letter calling for an independent investigation, separate from the WHO effort, which they say has lacked the independence, expertise, and access needed to adequately investigate the source of the pandemic, including the potential for a lab accident. "Efforts to date do not constitute a thorough, credible, and transparent investigation," the letter, published by *The Wall Street Journal,* said.

We might never know whether or not the Covid-19 pandemic started in one of Wuhan's laboratories. But what is known is that as the number of these kinds of high-security labs grows worldwide and more researchers are storing dangerous pathogens for experiments, the risk of laboratory accidents that could cause outbreaks of killer diseases also increases.

That's why every person in the world has a stake in knowing what is happening in these labs in the United States, China, and elsewhere.

So, after the WHO-led international scientific team's Wuhan field visit ended unsatisfactorily with WHO Director-General Dr. Tedros Adhanom Ghebreyesus suggesting further studies, and scientists worldwide also began calling for an independent investigation into the Wuhan outbreak, Gilles Demaneuf, an engineer and data scientist, in early spring 2021, began reading up on the origin of the deadly virus. The prevailing theory was that the virus had jumped from bats to other species before leaping to humans at Wuhan's Huanan wholesale market, where the disease first appeared in December 2019. The Huanan market a complex facility some 20km from WVI, sells seafood, meat, fruit, vegetables and wild animals and their parts for some of the exotic Chinese cuisines. So, if at all any virus had leaked out from WVI, it is feared that they could have contaminated the wild animals being sold at the market and then spread on to humans. China's unwillingness to grant the WHO team unfettered access for investigation clouded the mystery surrounding the origin of the pandemic.

Meanwhile, on February 19, 2020, *The Lancet,* one of the world's most respected and influential medical journals in the world, published a statement that roundly rejected the lab-leak hypothesis, effectively casting it as a xenophobic cousin to climate change denialism and anti-vaxxism. Signed by 27 scientists, the statement expressed "solidarity with all scientists and health professionals in China" and asserted: "We stand together to strongly condemn conspiracy theories suggesting that Covid-19 does not have a natural origin."

The Lancet statement effectively ended the debate over Covid-19's origins before it began. To Demaneuf, following along from the sidelines, it was as if it had been "nailed to the church doors," establishing the natural origin theory as orthodoxy. "Everyone had to follow it. Everyone was intimidated. That set the tone."

The statement in *The Lancet* struck Demaneuf as "totally nonscientific." To him, it seemed to contain no evidence or information. And so he decided to begin his own inquiry in a "proper" way, with no idea of what he would find.

Demaneuf began searching for patterns in the available data, and it wasn't long before he spotted one. China's laboratories were said to be airtight, with safety practices equivalent to those in the US and other developed countries. But Demaneuf soon discovered that there had been four incidents of SARS-related lab breaches since 2004, two occuring at a top laboratory in Beijing. Due to overcrowding there, a live SARS virus that had been improperly deactivated, had been moved to a refrigerator in a corridor. A graduate student then examined it in the electron microscope room and sparked an outbreak.

Demaneuf published his findings in a *Medium* post, titled *The Good, the Bad and the Ugly: a review of SARS Lab Escapes*. By then, he had begun working with another armchair investigator, Rodolphe de Maistre, a laboratory project director based in Paris who had previously studied and worked in China. De Maistre was busy debunking the notion that the WIV was a "laboratory" at all. The WIV housed numerous facilities that worked on coronaviruses, but only one of them had the highest biosafety protocol: BSL-4, in which researchers must wear full-body pressurized suits with independent oxygen. Others are designated BSL-3 and even BSL-2, roughly as secure as an American dentist's office.

Having connected online, Demaneuf and de Maistre began assembling a comprehensive list of research laboratories in China. As they posted their findings on Twitter, they were soon joined by others around the world. Some were cutting-edge scientists at prestigious research institutes. Others were science enthusiasts. Together, they

formed a group called DRASTIC, short for Decentralized Radical Autonomous Search Team Investigating Covid-19. Their stated objective was to solve the riddle of Covid-19's origin.

State Department investigators say they were repeatedly advised not to open a "Pandora's box."

At times, it seemed the only other people entertaining the lab-leak theory were crackpots or political hacks hoping to wield Covid-19 as a cudgel against China. For instance, President Donald Trump's political adviser Steve Bannon joined forces with an exiled Chinese billionaire named Guo Wengui to fuel claims that China had developed the disease as a bioweapon and purposefully unleashed it on the world. As proof, they paraded a Hong Kong scientist around right-wing media outlets until her manifest lack of expertise doomed the charade.

With disreputable wing nuts on one side of them and scornful experts on the other, the DRASTIC researchers often felt as if they were on their own in the wilderness, working on the world's most urgent mystery. But they weren't alone. Investigators inside the US government were also asking similar questions while operating in an environment as politicized and hostile to open inquiry as any Twitter echo chamber. When Trump himself floated the lab-leak hypothesis in April 2020, his divisiveness and lack of credibility made things more, not less, challenging for those seeking the truth.

"The DRASTIC people are doing better research than the US government," said David Asher, a former senior investigator under contract to the State Department.

The question is: Why?

A Can of Worms

Since December 1, 2019, the SARS-CoV-2 virus causing the Covid-19 pandemic has infected more than 200 million people worldwide and killed more than 5.5 million of them. Still, the world doesn't know how or why this scourge suddenly appeared to haunt humankind. Answering that question is more than an academic pursuit: Without knowing where it came from, we can't be sure

we're taking the right steps to prevent a recurrence.

And yet, in the wake of the *Lancet* statement and under the cloud of Donald Trump's toxic racism, that contributed to an alarming wave of anti-Asian violence in the US, one possible answer to this all-important question remained largely off-limits until the spring of 2021.

As people everywhere remained bewildered, in the US, national security and public health experts and officials across a range of departments in the executive branch were locked in high-stakes battles behind closed doors over what could and couldn't be investigated and made public.

A months long *Vanity Fair* investigation, interviews with more than 40 people, and a review of hundreds of pages of U.S. government documents, including internal memos, meeting minutes, and email correspondence, found that conflicts of interest, stemming in part from large government grants supporting controversial virology research, hampered the US investigation into Covid-19's origin at every step. In one State Department meeting, officials seeking to demand transparency from the Chinese government said they were explicitly told by colleagues not to explore the Wuhan Institute of Virology's gain-of-function research, because it would bring unwelcome attention to US government funding of it.

In an internal memo obtained by *Vanity Fair,* Thomas DiNanno, former acting assistant secretary of the State Department's Bureau of Arms Control, Verification, and Compliance, wrote that staff from two bureaus, his own and the Bureau of International Security and Nonproliferation, "warned" leaders within his bureau "not to pursue an investigation into the origin of Covid-19" because it would "'open a can of worms' if it continued."

There are reasons to doubt the lab-leak hypothesis. There is a long, well-documented record of natural spillovers leading to outbreaks, even when the initial and intermediate host animals have remained a mystery for months and years, and some expert virologists say the supposed oddities of the SARS-CoV-2 sequence had been found in

nature.

But for most of 2020, the lab-leak scenario was treated not simply as unlikely or even inaccurate but as morally out-of-bounds. In late March 2020, former Centers for Disease Control director Robert Redfield received death threats from fellow scientists after telling CNN that he believed COVID-19 had originated in a lab. "I was threatened and ostracized because I proposed another hypothesis," Redfield told *Vanity Fair*. "I expected it from politicians. I didn't expect it from science," he said.

With President Trump out of office, it should be possible to reject his xenophobic agenda and still ask why, in all places in the world, did the outbreak begin in the city with a laboratory housing one of the world's most extensive collection of bat viruses, doing some of the most aggressive research?

Dr. Richard Ebright, board of governors professor of chemistry and chemical biology at Rutgers University, said that from the very first reports of a novel bat-related coronavirus outbreak in Wuhan, it took him "a nanosecond or a picosecond" to consider a link to the Wuhan Institute of Virology. Only two other labs in the world, in Galveston, Texas, and Chapel Hill, North Carolina, were doing similar research. "It's not a dozen cities," he said. "It's three places."

Then came the revelation that the statement was not only signed but organized by a zoologist named Peter Daszak, who has repackaged US government grants and allocated them to facilities conducting gain-of-function research–among them the WIV itself. David Asher, now a senior fellow at the Hudson Institute, ran the State Department's day-to-day COVID-19 origins inquiry. He said it soon became apparent that "there is a huge gain-of-function bureaucracy" inside the federal government.

As months went by without a host animal to prove the natural theory, the questions from credible doubters have gained in urgency. To one former federal health official, the situation boiled down to this: An institute "funded by American dollars is trying to teach a bat virus to infect human cells, then there is a virus" in the same city as that lab. It is "not being intellectually honest not to consider the hypothesis" of a lab escape.

And given how aggressively China blocked efforts for a transparent investigation, and in light of its government's own history of lying, obfuscating, and crushing dissent, it's fair to ask if Shi Zhengli, the Wuhan Institute's lead coronavirus researcher, would be at liberty to report a leak from her lab even if she'd wanted to.

On May 26, 2021, the steady crescendo of questions led President Joe Biden to release a statement acknowledging that the intelligence community had "coalesced around two likely scenarios," and announce that he had asked for a more definitive conclusion within 90 days. His statement also noted, "The failure to get our inspectors on the ground in those early months will always hamper any investigation into the origin of Covid-19." But that wasn't the only failure.

In the words of David Feith, former deputy assistant secretary of state in the East Asia Bureau, "The story of why parts of the US government were not as curious as many of us think they should have been is a hugely important one."

A Cover-Up?

On December 9, 2020, roughly a dozen employees from four different bureaus of the State Department gathered in a conference room in Foggy Bottom to discuss an upcoming fact-finding mission to Wuhan organized in part by the World Health Organization. The group agreed on the need to press China to allow a thorough, credible, and transparent investigation, with unfettered access to markets, hospitals, and government laboratories. The conversation then turned to the more sensitive question: What should the US government say publicly about the WIV?

A small group within the State Department's Arms Control, Verification, and Compliance bureau had been studying WIV for months. The group had recently acquired classified intelligence suggesting that three WIV researchers conducting gain-of-function experiments on coronavirus samples had fallen ill in the autumn of 2019, before the Covid-19 outbreak was known to have started.

The officials at the meeting discussed what they could share with the public. According to documents of the meeting that *Vanity Fair*

obtained, Christopher Park, the director of the State Department's Biological Policy Staff in the Bureau of International Security and Nonproliferation, advised them not to say anything that would point to the US government's own role in gain-of-function research.

Only two other labs in the world, both in the US – located in Texas and North Carolina – were doing similar research. "It's not a dozen cities," Dr. Richard Ebright of Rutgers University said. "It's three places."

Some of those at the meeting were "absolutely floored," said an official familiar with the proceedings. That someone in the US government could "make an argument that is so nakedly against transparency, in light of the unfolding catastrophe, was…shocking and disturbing."

Park, who in 2017 had been involved in lifting a US government moratorium on funding for gain-of-function research, was not the only official to warn the State Department investigators against digging in sensitive places. As the group probed the lab-leak scenario, among other possibilities, its members were repeatedly advised not to open a "Pandora's box," said four former State Department officials *Vanity Fair* interviewed. One of them, Thomas DiNanno, who was formerly with the State Department said the admonitions "smelled like a cover-up," and I wasn't going to be part of it."

But Park told *Vanity Fair,* "I am skeptical that people genuinely felt they were being discouraged from presenting facts." He added that he was simply arguing that it "is making an enormous and unjustifiable leap…to suggest that research of that kind [meant] that something untoward is going on."

An Antibody Response

Two teams inside the US government were working to uncover the origins of Covid-19. One in the State Department and the other under the direction of the National Security Council. No one in the State Department had much interest in Wuhan's laboratories at the start of the pandemic. Still, they were gravely concerned with China's apparent cover-up of the outbreak's severity. The Chinese

government had shut down the Huanan market, ordered laboratory samples destroyed, claimed the right to review any scientific research about Covid-19 ahead of publication, and expelled a team of *Wall Street Journal* reporters.

In January 2020, a Wuhan ophthalmologist named Li Wenliang, who'd tried to warn his colleagues that the pneumonia could be a form of SARS was arrested. The authorities accused him of disrupting the social order, and he was forced to write his "self-criticism." The following month, Li died of Covid-19, and to the shock of authorities, the Chinese public lionized him as a hero and whistleblower.

"You had Chinese [government] coercion and suppression," said David Feith of the State Department's East Asia Bureau. "We were very concerned that they were covering it up and whether the information coming to the World Health Organization was reliable."

Miles Yu, the State Department's principal China strategist, noted that the WIV had remained largely silent as questions swirled. Yu, fluent in Mandarin, then began mirroring its website and compiling a dossier of questions about its research. In April, he gave his dossier to Secretary of State Pompeo, who soon publicly demanded access to Wuhan laboratories.

It is not clear whether Yu's dossier made its way to President Trump. But on April 30, 2020, the Office of the Director of National Intelligence put out an ambiguous statement whose apparent goal was to suppress a growing furor around the lab-leak theory. It said that the intelligence community "concurs with the wide scientific consensus that the Covid-19 virus was not manmade or genetically modified" but would continue to assess "whether the outbreak began through contact with infected animals or if it was the result of an accident at a laboratory in Wuhan."

State Department official Thomas DiNanno wrote a memo charging that staff from his bureau were "warned … not to pursue an investigation into the origin of COVID-19" because it would "'open a can of worms' if it continued."

"It was pure panic," said former deputy national security adviser Matthew Pottinger. "They were getting flooded with queries. Someone made the unfortunate decision to say, 'We basically know nothing, so let's put out the statement.'"

Then, the bomb-thrower-in-chief weighed in. At a press briefing Trump contradicted his own intelligence officials and claimed that he had seen classified information indicating that the virus had come from the Wuhan Institute of Virology. Asked what the evidence was, he said, "I can't tell you that. I'm not allowed to tell you that."

Trump's premature statement poisoned the waters for anyone seeking an honest answer to the question of where Covid-19 came from. According to Pottinger, there was an "antibody response" within the government, in which any discussion of a possible lab origin was linked to destructive nativist posturing.

The revulsion extended to the international science community, whose "maddening silence" frustrated Miles Yu. He recalled, "Anyone who dares speak out would be ostracized."

Too Risky to Pursue

The idea of a lab leak first came to National Security Council officials not from hawkish Trumpists but from Chinese social media users, who began sharing their suspicions as early as January 2020. Then, the next month, a research paper coauthored by two Chinese scientists, based at different Wuhan universities, appeared online as a preprint. It posed a fundamental question: How did a novel bat coronavirus get to a major metropolis of 11 million people in central China, in the dead of winter when most bats were hibernating, and turn a market where bats weren't sold into the epicenter of an outbreak?

The paper offered an answer: "We screened the area around the seafood market and identified two laboratories conducting research on bat coronavirus." The first was the Wuhan Center for Disease Control and Prevention, which stood just 280 meters from the Huanan

market and had been known to collect hundreds of bat samples. The second, the researchers wrote, was the Wuhan Institute of Virology.

The paper came to a staggeringly blunt conclusion about Covid-19: "the killer coronavirus probably originated from a laboratory in Wuhan .... Regulations may be taken to relocate these laboratories far away from city center and other densely populated places." As soon as the paper appeared on the internet, it disappeared, but not before US government officials took note.

By then, Matthew Pottinger, Trump administration's deputy national security adviser, had approved a Covid-19 origins team, run by the NSC directorate that oversaw issues related to weapons of mass destruction. Pottinger, a longtime Asia expert and formerly a journalist, purposefully kept the team small, because there were so many people within the government "wholly discounting the possibility of a lab leak, who were predisposed that it was impossible," he said. In addition, many leading experts had either received or approved funding for gain-of-function research. Their "conflicted" status, said Pottinger, "played a profound role in muddying the waters and contaminating the shot at having an impartial inquiry."

As they combed open sources and classified information, the team's members soon stumbled on a 2015 research paper by Shi Zhengli and the University of North Carolina virologist Ralph Baric proving that the spike protein of a novel coronavirus could infect human cells. Using mice as subjects, they inserted the protein from a Chinese rufous horseshoe bat into the molecular structure of the SARS virus from 2002, creating a new, infectious pathogen.

This gain-of-function experiment was so fraught that the authors flagged the danger themselves, writing, "scientific review panels may deem similar studies…too risky to pursue." In fact, the study was intended to raise an alarm and warn the world of "a potential risk of SARS-CoV re-emergence from viruses currently circulating in bat populations." The paper's acknowledgments cited funding from the US National Institutes of Health and from a nonprofit called EcoHealth Alliance, which had parceled out grant money from the US Agency for International Development (USAID).

EcoHealth Alliance is run by Peter Daszak, a British-born zoologist who helped organize the *Lancet* statement.

That a genetically engineered virus might have escaped from the WIV was one alarming scenario. But it was also possible that a research trip to collect bat samples could have led to infection in the field, or back at the lab.

The NSC investigators found ready evidence that China's labs were not as safe as claimed. Shi Zhengli herself had publicly acknowledged that, until the pandemic, all of her team's coronavirus research–some involving live SARS-like viruses–had been conducted in less secure BSL-3 and even BSL-2 laboratories.

In 2018, a delegation of American diplomats visited the WIV for the opening of its BSL-4 laboratory, a major event. As a *Washington Post* columnist reported, they said in an unclassified cable that a shortage of highly trained technicians and clear protocols threatened the facility's safe operations. It also said, the issues had not stopped the WIV's leadership from declaring the lab "ready for research on class-four pathogens, among which are the most virulent viruses that pose a high risk of aerosolized person-to-person transmission."

On February 14, 2020, to the surprise of NSC officials, President Xi Jinping of China announced a plan to fast-track a new biosecurity law to tighten safety procedures throughout the country's laboratories. Was this a response to confidential information? "In the early weeks of the pandemic, it didn't seem crazy to wonder if this thing came out of a lab," Pottinger reflected.

Apparently, it didn't seem crazy to Shi Zhengli either. A Scientific American article first published in March 2020, for which she was interviewed, described how her lab had been the first to sequence the virus in those terrible first weeks. It also recounted how: [S]he frantically went through her own lab's records from the past few years to check for any mishandling of experimental materials, especially during disposal. Shi breathed a sigh of relief when the results came back: none of the sequences matched those of the viruses her team had sampled from bat caves.

As the NSC tracked these disparate clues, US government virologists advising them flagged one study first submitted in April 2020. Eleven of its 23 coauthors worked for the Academy of Military Medical Sciences, the Chinese army's medical research institute. Using the gene-editing technology known as CRISPR, the researchers had engineered mice with humanized lungs, then studied their susceptibility to SARS-CoV-2. As the NSC officials worked backward from the date of publication to establish a timeline for the study, it became clear that the mice had been engineered sometime in the summer of 2019, before the pandemic even started. Thus, the NSC officials were left wondering: Had the Chinese military been running viruses through humanized mouse models, to see which might be infectious to humans?

Then, the NSC investigators began reaching out to other agencies, believing they had uncovered important evidence in favor of the lab-leak hypothesis. That's when the hammer came down. "We were dismissed," said Anthony Ruggiero, the NSC's senior director for counter proliferation and biodefense. "The response was very negative."

Sticklers for Accuracy

By the summer of 2020, Gilles Demaneuf was spending up to four hours a day researching the origins of Covid-19, joining Zoom meetings before dawn with European collaborators and not sleeping much. He began receiving anonymous calls and notice strange activity on his computer, which he attributed to Chinese government surveillance. "We are being monitored for sure," he says. He moved his work to the encrypted platforms Signal and ProtonMail.

When the DRASTIC researchers posted their findings, they attracted new allies. Among the most prominent was Jamie Metzl, who launched a blog on April 16, 2020 that became a go-to site for government researchers and journalists examining the lab-leak hypothesis. Metzl, a former executive vice president of the Asia Society, sits on the World Health Organization's advisory committee on human genome editing. He had previously served in the Clinton administration as the NSC's director for multilateral affairs. In his

first post on the subject, Metzl made clear that he had no definitive proof and he believed that Chinese researchers at the WIV had the "best intentions." Metzl also noted, "In no way do I seek to support or align myself with any activities that may be considered unfair, dishonest, nationalistic, racist, bigoted, or biased in any way."

On December 11, 2020, Demaneuf–a stickler for accuracy–reached out to Metzl to alert him to a mistake on his blog. The 2004 SARS lab escape in Beijing, Demaneuf pointed out, had led to 11 infections, not four. Demaneuf was "impressed" by Metzl's immediate willingness to correct the information. "From that time, we started working together," said Demaneuf.

"If the pandemic started as part of a lab leak, it had the potential to do to virology what Three Mile Island and Chernobyl did to nuclear science," Demaneuf added.

Metzl was in touch with the Paris Group, a collective of more than 30 skeptical scientific experts who have been meeting by Zoom once a month for hours-long meetings to hash out emerging clues. Before joining the Paris Group, Dr. Filippa Lentzos, a biosecurity expert at King's College in London, was also in this group. Before joining the Paris Group, she had pushed back online against wild conspiracies. She believed that no Covid-19 was used as a bioweapon by the Chinese to infect American athletes at the Military World Games in Wuhan in October 2019. However, the more she researched, the more concerned she became that not every possibility was being explored. On May 1, 2020, she published a careful assessment in the Bulletin of the Atomic Scientists describing just how a pathogen could have escaped the Wuhan Institute of Virology. She noted that a September 2019 paper in an academic journal by the director of the WIV's BSL-4 laboratory, Yuan Zhiming, had outlined safety deficiencies in China's labs. "Maintenance cost is generally neglected," he had written. "Some BSL-3 laboratories run on extremely minimal operational costs or in some cases none at all."

Alina Chan, a young molecular biologist and postdoctoral fellow at the Broad Institute of MIT and Harvard University, found that early sequences of the virus showed very little evidence of mutation. Had

the virus jumped from animals to humans, one would expect to see numerous adaptations, as in the case of the 2002 SARS outbreak. To Chan, it appeared that SARS-CoV-2 was already "pre-adapted to human transmission," she wrote in a preprint paper in May 2020.

But perhaps the most startling find was made by an anonymous DRASTIC researcher, known on Twitter as @TheSeeker268. The Seeker, as it turns out, is a young former science teacher from Eastern India. He had begun plugging keywords into the China National Knowledge Infrastructure, a website that houses papers from 2,000 Chinese journals, and running the results through Google Translate.

One day in May 2021, he fished out a thesis a master's student in Kunming, China, wrote in 2013. It opened an extraordinary window into a bat-filled mine shaft in Yunnan province and raised some questions about what Shi Zhengli had failed to mention in the course of making her denials.

The Mojiang Miners

In 2012, six miners in the lush mountains of Mojiang county in China's Yunnan province were assigned an unenviable task: to shovel out a thick carpet of bat feces from the floor of a mine shaft. After weeks of dredging up bat guano, the miners became gravely ill, so were sent to the First Affiliated Hospital at the Kunming Medical University in Yunnan's capital. Their symptoms of cough, fever, and labored breathing rang alarm bells in a country that had suffered through a viral SARS outbreak a decade earlier.

The hospital called in a pulmonologist, Zhong Nanshan, who had played a prominent role in treating SARS patients and would go on to lead an expert panel for China's National Health Commission on Covid-19. According to the 2013 master's thesis, Zhong suspected viral infection. He recommended a throat culture and an antibody test. He also asked what kind of bat had produced the guano. The answer: the rufous horseshoe bat, the same species implicated in the first SARS outbreak.

Within months, three of the six miners died – the oldest among them, 63, first. "The disease was acute and fierce," the thesis noted.

It concluded, the bat that caused the six miners to fall ill "was the Chinese rufous horseshoe bat." Blood samples were sent to the Wuhan Institute of Virology, which found that they were positive for SARS antibodies, a later Chinese dissertation documented.

But there was a mystery at the heart of the diagnosis. Bat coronaviruses were not known to harm humans. What was so different about the strains from inside the cave? To find out, teams of researchers from across China and beyond traveled to the abandoned mine shaft to collect viral samples from bats, musk shrews, and rats.

In the October 2013 *Nature* study, Shi Zhengli reported a key discovery: that certain bat viruses could potentially infect humans without first jumping to an intermediate animal. By isolating a live SARS-like bat coronavirus for the first time, her team had found that it could enter human cells through a protein called the ACE2 receptor.

In subsequent studies in 2014 and 2016, Shi and her colleagues continued exploring samples of bat viruses collected from the mine shaft, hoping to figure out which one had infected the miners. The bats were bristling with multiple coronaviruses. But there was only one whose genome closely resembled SARS. The researchers named it RaBtCoV/4991.

On February 3, 2020, with the Covid-19 outbreak already spreading beyond China, Shi Zhengli and several colleagues published a paper noting that the SARS-CoV-2 virus's genetic code was almost 80% identical to that of SARS-CoV, which caused the 2002 outbreak. But they also reported that it was 96.2% similar to a coronavirus sequence in their possession called RaTG13, which was previously detected in "Yunnan province." They concluded that RaTG13 was the closest known relative to SARS-CoV-2.

In the following months, as researchers around the world hunted for any known bat virus that might be a progenitor of SARS-CoV-2, Shi Zhengli offered shifting and sometimes contradictory accounts of where RaTG13 had come from and when it was fully sequenced. Searching a publicly available library of genetic sequences, several teams, including a group of DRASTIC researchers, soon realized

that RaTG13 appeared identical to RaBtCoV/4991–the virus from the shaft where the miners fell ill in 2012 with what looked like Covid-19.

As questions mounted, Shi Zhengli told *Science* magazine that her lab had renamed the sample for clarity. But to skeptics, the renaming exercise looked like an effort to hide the sample's connection to the Mojiang mine.

Their questions multiplied in the following month when Shi Zhengli, Daszak, and colleagues published an account of 630 novel coronaviruses, which they had sampled between 2010 and 2015. DRASTIC researchers combing through the supplementary data were stunned to find eight more viruses from the Mojiang mine closely related to RaTG13 had not been flagged in the account. Molecular biologist Alina Chan of the Broad Institute of MIT and Harvard said it was "mind-boggling" that these crucial puzzle pieces had been buried without comment.

In October 2020, as questions about the Mojiang mine shaft intensified, a team of journalists from the BBC tried to access the mine itself. They were tailed by plainclothes police officers and found the road conveniently blocked by a broken-down truck.

Shi Zhengli, who by now facing growing scrutiny from the international press corps, told the BBC: "I've just downloaded the Kunming Hospital University's student's master's thesis and read it .... The conclusion is neither based on evidence nor logic. But it's used by conspiracy theorists to doubt me. If you were me, what would you do?"

The Gain-of-Function Debate

On January 3, 2020, Dr. Robert Redfield, the director of the US Centers for Disease Control and Prevention, got a phone call from his counterpart Dr. George Fu Gao, the head of China's Center for Disease Control and Prevention. Gao described the appearance of a mysterious new pneumonia, apparently limited to people exposed at a market in Wuhan. Redfield immediately offered to send a team of specialists to help investigate.

Nevertheless, whenRedfield saw the breakdown of early cases, some of which were family clusters, the market explanation made less sense. Had multiple family members become sick from contact with the same animal? Gao assured him, said Redfield, that there was no human-to-human transmission. Still, Redfield, urged Gao to test more widely in the community. That effort prompted a tearful return call. Many cases had nothing to do with the market, Gao admitted. The virus appeared to be jumping from person to person, a far scarier scenario.

Former deputy national security adviser Matthew Pottinger said the "conflicted" status of leading experts who had either approved or received funding for gain-of-function research "played a profound role in muddying the waters and contaminating the shot at having an impartial inquiry."

Redfield immediately thought of the Wuhan Institute of Virology. A team of specialists could test researchers at the institute for antibodies and determine if the institute is the source of the outbreak in just a few weeks. So he formally reiterated his offer to send specialists. Chinese officials didn't respond to his overture.

Redfield, a virologist by training, was suspicious of the WIV in part because he'd been steeped in the years-long battle over gain-of-function research. The debate engulfed the virology community in 2011, after Ron Fouchier, a researcher at the Erasmus Medical Center in Rotterdam, announced that he had genetically altered the H5N1 avian influenza strain to make it transmissible among ferrets, who are genetically closer to humans than mice. Fouchier calmly declared that he'd produced "probably one of the most dangerous viruses you could make."

In the ensuing uproar, scientists battled over the risks and benefits of such research. Those in favor claimed it could help prevent pandemics, by highlighting potential risks and accelerating vaccine development. Critics argued that creating pathogens that didn't exist in nature ran the risk of unleashing them.

In October 2014, the Obama administration imposed a moratorium on new funding for gain-of-function research projects that could

make influenza, MERS, or SARS viruses more virulent or transmissible. But a footnote to the statement announcing the moratorium carved out an exception for cases deemed "urgently necessary to protect the public health or national security."

In the Trump administration's first year, the moratorium was lifted and replaced with a review system called the HHS P3CO Framework (for Potential Pandemic Pathogen Care and Oversight). It put the onus for ensuring the safety of any such research on the federal department or agency funding it. As a result, the review process became shrouded in secrecy. "The names of reviewers are not released, and the details of the experiments to be considered are largely secret," said the Harvard epidemiologist Dr. Marc Lipsitch, whose advocacy against gain-of-function research helped prompt the moratorium. (A spokesperson of the National Institute of Health (NIH) told *Vanity Fair* that "information about individual unfunded applications is not public to preserve confidentiality and protect sensitive information, preliminary data, and intellectual property."

Inside the NIH, which funded such research, the P3CO framework was met mainly with shrugs and eye rolls, said a longtime agency official: "If you ban gain-of-function research, you ban all of virology," he said. "Ever since the moratorium, everyone's gone wink-wink and just done gain-of-function research anyway," he added.

The New York City-based EcoHealth Alliance, a nonprofit with Peter Daszak – who helped organize the Lancet statement – as its president, and also with the laudable goal of preventing the outbreak of emerging diseases by safeguarding ecosystems, secured a NIAID grant of roughly $3.7 million in May 2014, five months before the moratorium on gain-for-function research was announced. The grant was not halted under the moratorium or the P3CO framework. EcoHealth allocated some of that money to various entities engaged in collecting bat samples, building models, and performing gain-for-function experiments to see which animal viruses were able to jump to humans.

By 2018, EcoHealth Alliance was pulling in up to $15 million a year in grant money from an array of federal agencies, including

the Defense Department, the Department of Homeland Security, and the US Agency for International Development, according to 990 tax exemption forms it filed with the New York State Attorney General's Charities Bureau. Shi Zhengli also lists US government grant support of more than $1.2 million on her curriculum vitae: $665,000 from the NIH between 2014 and 2019; and $559,500 over the same period from USAID. At least some of those funds were routed through EcoHealth Alliance.

EcoHealth Alliance's practice of divvying up large government grants into smaller sub-grants for individual labs and institutions gave it enormous sway within the field of virology. The sums at stake allow it to "purchase a lot of omertà" from the labs it supports, said Richard Ebright of Rutgers.

As the pandemic raged, the collaboration between EcoHealth Alliance and the WIV wound up in the crosshairs of the Trump administration. At a White House Covid-19 press briefing on April 17, 2020, a reporter from the conspiratorial right-wing media outlet *Newsmax* asked Trump a factually inaccurate question about a $3.7 million NIH grant to a level-four lab in China. "Why would the U.S. give a grant like that to China?" the reporter asked.

Trump responded, "We will end that grant very quickly," adding, "Who was president then, I wonder."

A week later, an NIH official notified Daszak in writing that his grant had been terminated. The order had come from the White House, Dr. Anthony Fauci later testified before a congressional committee. The decision fueled a firestorm: 81 Nobel Laureates in science denounced the decision in an open letter to Trump health officials, and 60 Minutes ran a segment focused on the Trump administration's shortsighted politicization of science.

Daszak appeared to be the victim of a political hit job, orchestrated to blame China, Dr. Fauci, and scientists in general for the pandemic, while distracting from the Trump administration's bungled response. "He's basically a wonderful, decent human being" and an "old-fashioned altruist," said the NIH official. "To see this happening to him, it really kills me."

In July 2020, the NIH attempted to backtrack. It reinstated the grant but suspended its research activities until EcoHealth Alliance fulfilled seven conditions, some of which went beyond the nonprofit's purview and seemed to stray into the tinfoil-hat territory. They included: providing information on the "apparent disappearance" of a Wuhan Institute of Virology researcher, who was rumored on social media to be patient zero, and explaining diminished cell phone traffic and roadblocks around the WIV in October 2019.

But conspiracy-minded conservatives weren't the only ones looking askance at Daszak. Ebright likened Daszak's model of research–bringing samples from a remote area to an urban one, then sequencing and growing viruses and attempting to genetically modify them to make them more virulent–to "looking for a gas leak with a lighted match." Moreover, Ebright believed that Daszak's research had failed in its stated purpose of predicting and preventing pandemics through its global collaborations.

Based on emails obtained by a Freedom of Information group called US Right to Know, it soon emerged that Daszak had not only signed but organized the influential *Lancet* statement, with the intention of concealing his role and creating the impression of scientific unanimity.

Under the subject line, "No need for you to sign the "Statement" Ralph!!," he wrote to two scientists, including UNC's Dr. Ralph Baric, who had collaborated with Shi Zhengli on the gain-of-function study that created a coronavirus capable of infecting human cells: "you, me and him should not sign this statement, so it has some distance from us and therefore doesn't work in a counterproductive way." Daszak added, "We'll then put it out in a way that doesn't link it back to our collaboration so we maximize an independent voice."

Baric agreed, writing back, "Otherwise it looks self-serving and we lose impact."

Baric did not sign the statement. In the end, Daszak did. At least six other signers had either worked at, or had been funded by, EcoHealth Alliance. The statement ended with a declaration of objectivity: "We declare no competing interests."

Daszak mobilized so quickly for a reason, said Jamie Metzl: "If zoonosis was the origin, it was a validation…of his life work…. But if the pandemic started as part of a lab leak, it had the potential to do to virology what Three Mile Island and Chernobyl did to nuclear science." It could mire the field indefinitely in moratoriums and funding restrictions.

Dueling Memos

By the summer of 2020, the State Department's COVID-19 origins investigation had gone cold. Officials in the Bureau of Arms Control, Verification, and Compliance went back to their everyday work: surveilling the world for biological threats. "We weren't looking for Wuhan," said Thomas DiNanno. Then, that fall, the State Department team got a tip from a foreign source: Key information was likely sitting in the US intelligence community's files, unanalyzed. In November, that lead turned up classified information that was "absolutely arresting and shocking," said a former State Department official. Three researchers at the Wuhan Institute of Virology, all connected with gain-of-function research on coronaviruses, had fallen ill in November 2019 and appeared to have visited the hospital with symptoms similar to Covid-19, three government officials told *Vanity Fair*.

While it is not clear what had infected them, "these were not the janitors," said the former State Department official. "They were active researchers. The dates were among the absolute most arresting part of the picture, because they are smack where they would be if this was the origin." The reaction inside the State Department was, "Holy shit," one former senior official recalled. "We should probably tell our bosses." The investigation roared back to life.

An intelligence analyst working with David Asher, the State Department contracted investigator who later ran the department's day-to-day Covid-19 inquiry, sifted through classified channels and turned up a report that outlined why the lab-leak hypothesis was plausible. It had been written in May 2020 by researchers at the Lawrence Livermore National Laboratory, which performs national security research for the Department of Energy. But it appeared to have been buried within the classified collections system.

Now the officials were beginning to suspect that someone was actually hiding materials supportive of a lab-leak explanation. "Why did my contractor have to pore through documents?" DiNanno wondered. Their suspicion intensified when Department of Energy officials overseeing the Lawrence Livermore lab tried, but unsuccessfully to block the State Department investigators from talking to the report's authors.

In December, their frustration crested when they finally briefed Chris Ford, acting undersecretary for Arms Control and International Security. He seemed so hostile to their probe that they viewed him as a blinkered functionary bent on whitewashing China's malfeasance. But Ford, who had years of experience in nuclear nonproliferation, had long been a China hawk. Ford told *Vanity Fair* that he saw his job as protecting the integrity of any inquiry into Covid-19's origins that fell under his purview. Going with "stuff that makes us look like the crackpot brigade" would backfire, he believed.

There was another reason for his hostility. He'd already heard about the investigation from interagency colleagues, rather than from the team itself, and the secrecy left him with a "spidey sense" that the process was a form of "creepy freelancing." He wondered: Had someone launched an unaccountable investigation to achieve a desired result?

He was not alone with concerns. As one senior government official with knowledge of the State Department's investigation said, "They were writing this for certain customers in the Trump administration. We asked for the reporting behind the statements that were made. It took forever. Then you'd read the report, it would have this reference to a tweet and a date. It was not something you could go back and find."

After listening to the investigators' findings, a technical expert in one of the State Department's bioweapons offices "thought they were bonkers," Ford recalled.

The State Department team, for its part, believed that Ford was the one trying to impose a preconceived conclusion: that Covid-19 had a natural origin. A week later, one of them attended the meeting

where Christopher Park, who worked under Ford, allegedly advised those present not to draw attention to US funding of gain-of-function research.

With deep distrust simmering, the State Department team convened a panel of experts to confidentially "red team" the lab-leak hypothesis. The idea was to pummel the theory and see if it still stood. The meeting took place on the evening of January 7, 2021, one day after the insurrection at the Capitol. By then, Ford had announced his plan to resign.

Twenty-nine people logged on to a secure State Department video call that lasted three hours, according to meeting minutes obtained by *Vanity Fair*. The scientific experts included Ralph Baric, Alina Chan, and the Stanford microbiologist David Relman.

Asher invited Dr. Steven Quay, a breast cancer specialist who'd founded a biopharmaceutical company, to present a statistical analysis weighing the probability of a lab origin versus a natural one. Scissoring Quay's analysis, Baric noted that its calculations failed to account for the millions of bat sequences that exist in nature but remain unknown. When a State Department adviser asked Quay whether he'd ever done a similar analysis, he replied there's "a first time for everything," according to the meeting minutes.

Though they questioned Quay's findings, the scientists saw other reasons to suspect a lab origin. Part of the WIV's mission was to sample the natural world and provide early warnings of "human capable viruses," said Relman, the Stanford microbiologist. The 2012 infections of six miners were "worthy of banner headlines at the time." Yet those cases had never been reported to the WHO.

Baric added that, if SARS-CoV-2 had come from a "strong animal reservoir," one might have expected to see "multiple introduction events," rather than a single outbreak, though he cautioned that it didn't prove "[this] was an escape from a laboratory." That prompted Asher to ask, "Could this not have been partially bioengineered?"

Ford was so troubled by what he viewed as the panel's weak evi-

dence, and the secretive inquiry that preceded it. So, he stayed up all night summarizing his concerns in a four-page memo. Then, after saving it as a PDF so it couldn't be altered, he emailed the memo to multiple State Department officials the next morning.

In the memo, Ford criticized the panel's "lack of data" and added, "I would also caution you against suggesting that there is anything inherently suspicious–and suggestive of biological warfare activity–about People's Liberation Army (PLA) involvement at WIV on classified projects. [I]t would be difficult to say that military involvement in classified virus research is intrinsically problematic, since the U.S. Army has been deeply involved in virus research in the United States for many years."

Thomas DiNanno, the former State Department official, sent a five-page rebuttal to Ford's memo the next day, January 9 (though it was mistakenly dated "12/9/21"). He accused Ford of misrepresenting the panel's efforts and enumerated the obstacles his team had faced: "apprehension and contempt" from the technical staff; warnings not to investigate the origins of Covid-19 for fear of opening a "can of worms"; and a "complete lack of responses to briefings and presentations." He added that Quay had been invited only after the National Intelligence Council failed to provide statistical help.

A year's worth of mutual suspicions had finally spilled out as dueling memos.

The State Department investigators pushed on, determined to go public with their concerns. They continued to declassify information that the intelligence community had vetted. On January 15, five days before President Joe Biden's swearing in, the State Department released a fact sheet about activity at the Wuhan Institute of Virology, disclosing critical information: that several researchers there had fallen ill with Covid-19-like symptoms in autumn 2019, before the first identified outbreak case; and that researchers there had collaborated on secret projects with China's military and "engaged in classified research, including laboratory animal experiments, on behalf of the Chinese military since at least 2017."

The statement withstood "aggressive suspicion," as one former State Department official said, and the Biden administration has not walked it back. "I was very pleased to see Pompeo's statement come through," said Christopher Ford, who personally signed off on a draft of the fact sheet before leaving the State Department. "I was so relieved that they were using real reporting that had been vetted and cleared."

Fact-Finding Mission to Wuhan

In early July 2020, the World Health Organization invited the US government to recommend experts for a fact-finding mission to Wuhan, a sign of progress in the long-delayed probe of Covid-19's origins. Questions about the WHO's independence from China, the country's secrecy, and the raging pandemic had turned the anticipated mission into a minefield of international grudges and suspicion.

The U.S. government submitted three names within weeks: an FDA veterinarian, a CDC epidemiologist, and an NIAID virologist. None were chosen. Instead, only one representative from the US made the cut: Peter Daszak, who organized the *Lancet* statement that cast doubts about the lab-leak theory.

It had been evident from the start that China would control who could come and what they could see. In July, when the WHO sent member countries a draft of the terms governing the mission, the PDF document was titled, "CHN and WHO agreed final version," suggesting that China had preapproved its contents.

Part of the fault lay with the Trump administration. It had failed to counter China's control over the scope of the mission when it was being hammered out two months earlier. The resolution, forged at the World Health Assembly, called not for a full inquiry into the origins of the pandemic but instead for a mission "to identify the zoonotic source of the virus." The natural-origin hypothesis was baked into the enterprise. "It was a huge difference that only the Chinese understood," said Jamie Metzl, who sits on the World Health Organization's advisory committee on human genome editing. "While the [Trump] administration was huffing and puffing, some really

important things were happening around the WHO, and the US didn't have a voice."

On January 14, 2021, Daszak and 12 other international experts arrived in Wuhan to join 17 Chinese experts and an entourage of government minders. They spent two weeks of the month long mission quarantined in their hotel rooms. The remaining two-week inquiry was more propaganda than probe, complete with a visit to an exhibit extolling President Xi's leadership. The team saw almost no raw data, only the Chinese government analysis of it.

They paid one visit to the Wuhan Institute of Virology, where they met with Shi Zhengli, as recounted in an annex to the mission report. One obvious demand would have been access to the WIV's database of some 22,000 virus samples and sequences, which had been taken offline. At an event convened by a London organization on March 10, Daszak was asked whether the group had made such a request. He said there was no need: Shi Zhengli had stated that the WIV took down the database due to hacking attempts during the pandemic. "Absolutely reasonable," Daszak said. "And we did not ask to see the data .... As you know, a lot of this work has been conducted with EcoHealth Alliance .... We do basically know what's in those databases. There is no evidence of viruses closer to SARS-CoV-2 than RaTG13 in those databases, simple as that."

In fact, the database had been taken offline on September 12, 2019, three months before the official start of the pandemic, a detail uncovered by Gilles Demaneuf and two of his DRASTIC colleagues.

After two weeks of fact finding, the Chinese and international experts concluded their mission by voting with a show of hands on which origin scenario seemed most probable. Direct transmission from bat to human: possible to likely. Transmission through an intermediate animal: likely to very likely. Transmission through frozen food: possible. Transmission through a laboratory incident: extremely unlikely.

On March 30, 2021, media outlets around the world reported on the WHO releasing of the mission's report. Discussion of a lab leak took up less than two pages of the 120-page report. Calling the re-

port "fatally flawed," Jamie Metzl tweeted: "They set out to prove one hypothesis, not fairly examine all of them."

The report also recounted how Shi Zhengli rebutted conspiracy theories and told the visiting team of experts that "there had been no reports of unusual diseases, none diagnosed, and all staff tested negative for SARS-CoV-2 antibodies." Her statement directly contradicted the findings summarized in the January 15 State Department fact sheet. "That was a willful lie by people who know it's not true," said a former national security official.

An internal US government analysis of the mission's report, obtained by *Vanity Fair*, found it to be inaccurate and even contradictory, with some sections undermining conclusions made elsewhere and others relying on reference papers that had been withdrawn. Regarding the four possible origins, the analysis stated, the report "does not include a description of how these hypotheses were generated, would be tested, or how a decision would be made between them to decide that one is more likely than another." It added that a possible laboratory incident received only a "cursory" look, and the "evidence presented seems insufficient to deem the hypothesis 'extremely unlikely.'"

The report's most surprising critic was the WHO's director himself, Dr. Tedros Adhanom Ghebreyesus of Ethiopia. With the credibility of the World Health Organization on the line, he appeared to acknowledge the report's shortcomings at a press event the day of its release. "As far as WHO is concerned all hypotheses remain on the table," he said. "We have not yet found the source of the virus, and we must continue to follow the science and leave no stone unturned as we do."

His statement reflected "monumental courage," said Metzl. "Tedros risked his entire career to defend the integrity of the WHO."

By then, an international coalition of roughly two dozen scientists, among them DRASTIC researcher Gilles Demaneuf and EcoHealth critic Richard Ebright of Rutgers, had found a way around what Metzl described as a "wall of rejections" by scientific journals. With Metzl's guidance, they began publishing open letters in early

March 2021. Their second letter, issued on April 7, condemned the mission report and called for a full investigation into the origin of COVID-19. It was picked up widely by national newspapers.

A growing number of people were demanding to know what exactly had gone on inside the Wuhan Institute of Virology. Were the claims in the State Department's fact sheet–of sick researchers and secret military research–accurate?

Jamie Metzl had managed to question Shi Zhengli directly a week before the release of the mission report. At a March 23 online lecture by Shi, hosted by Rutgers Medical School, Metzl asked if she had full knowledge of all the research being done at the WIV and all the viruses held there, and if the US government was correct that classified military research had taken place. She responded:

"We – our work, our research is open, and we have a lot of international collaboration. And from my knowledge, all our research work is open, is transparency. So, at the beginning of Covid-19, we heard the rumors that it's claimed in our laboratory we have some project, blah blah, with army, blah blah, these kinds of rumors. But this is not correct because I am the lab's director and responsible for research activity. I don't know any kind of research work performed in this lab. This is incorrect information."

A major argument against the lab-leak theory hinged on the presumption that Shi was telling the truth when she said the WIV was not hiding any virus samples that are closer cousins to SARS-CoV-2. In Metzl's view, if she was lying about the military's involvement, or anything else, then all bets were off.

Inside the Wuhan Institute of Virology

In January 2019, the Wuhan Institute of Virology issued a press release hailing Shi Zhengli's "distinguished and pioneering achievement in discovery and characterization of important bat-borne viruses." The occasion was her election as a fellow of the prestigious American Academy of Microbiology – just the latest milestone in a glittering scientific career. In China, the celebrated "Bat Woman" was easily recognizable from photos showing her in a full-body

positive-pressure suit inside the WIV's BSL-4 lab.

Shi was a fixture at international virology conferences, thanks to her "state-of-the-art" work, said James LeDuc, the longtime director of the BSL-4 Galveston National Laboratory in Texas. At the international meetings he organized, Shi was a regular, along with Ralph Baric from UNC. "She's a charming person, completely fluent in English and French," said LeDuc. Sounding almost wistful, he added, "This is how science works. You get everyone together, they share their data, go out and have a beer."

Shi's journey to the top of the virology field had begun with treks to remote bat caves in southernmost China. In 2006, she trained at the BSL-4 Jean Merieux-Inserm Laboratory in Lyon, France. She was named director of the WIV's Center for Emerging Infectious Diseases in 2011, and its BSL-3 lab director in 2013.

It's hard to think of anyone, anywhere, who was better prepared to meet the challenge of Covid-19. On December 30, 2019, at around 7 p.m., Shi received a call from her boss, the director of the Wuhan Institute of Virology, according to an account she gave to *Scientific American*. He wanted her to investigate several cases of patients hospitalized with a mysterious pneumonia: "Drop whatever you are doing and deal with it now."

The next day, by analyzing seven patient samples, her team became one of the first to sequence and identify the ailment as a novel SARS-related coronavirus. By January 21, she had been appointed to lead the Hubei Province Covid-19 Emergency Scientific Research Expert Group. At a terrifying moment, in a country that exalted its scientists, Shi Zhengli had reached the pinnacle.

But her ascent came at a cost. There is reason to believe she was hardly free to speak her mind or follow a scientific path that didn't conform to China's party line. Though Shi had planned to share isolated virus samples with her friend James LeDuc in Galveston, Beijing officials blocked her. And by mid-January 2020, a team of military scientists led by China's top virologist and biochemical expert, Major General Chen Wei, had set up operations inside the WIV.

She began lashing out at critics under scrutiny from governments including her own, with bizarre conspiracy theories and legitimate doubts swirling around her. "The 2019 novel coronavirus is a punishment from nature for humanity's uncivilized habits," she wrote in a February 2 post on WeChat, a popular social media app in China. "I, Shi Zhengli, guarantee on my life that it has nothing to do with our lab. May I offer some advice to those people who believe and spread bad media rumors: shut your dirty mouths."

Though Shi has portrayed the WIV as a transparent hub of international research beset by false allegations, the State Department's January fact sheet painted a different picture: of a facility conducting classified military research, and hiding it, which Shi adamantly denies. But a former national security official who reviewed US classified materials told *Vanity Fair* that inside the WIV, military and civilian researchers are "doing animal research in the same fricking space."

While that, in and of itself, does not prove a lab leak, Shi's alleged lies about it are "absolutely material," said a former State Department official. "It speaks to the honesty and credibility of the WIV that they kept this secret.... You have a web of lies, coercion, and disinformation that is killing people."

Vanity Fair sent Shi Zhengli and the director of the Wuhan Institute of Virology detailed questions. Neither responded to multiple requests for comment by email and phone.

As officials at the NSC tracked collaborations between the WIV and military scientists–which stretch back 20 years, with 51 coauthored papers–they also noted a book flagged by a college student in Hong Kong. Written by a team of 18 authors and editors, 11 of whom worked at China's Air Force Medical University, the book, Unnatural Origin of SARS and *New Species of Man-Made Viruses as Genetic Bioweapons*, explores issues surrounding the development of bioweapons capabilities.

Claiming that terrorists using gene editing had created SARS-CoV-1 as a bioweapon, the book contained some alarming practical trade craft: "Bioweapon aerosol attacks are best conducted during

dawn, dusk, night or cloudy weather because ultraviolet rays can damage the pathogens." And it cited collateral benefits, noting that a sudden surge of hospitalizations could cause a healthcare system to collapse. One of the book's editors has collaborated on 12 scientific papers with researchers at the WIV.

The University of North Carolina virologist Ralph Baric collaborated with Shi Zhengli on a gain-of-function coronavirus experiment in 2015. Then, in February 2020, he privately expressed support for Peter Daszak's *Lancet* statement dismissing the lab-leak theory. More recently, he signed a letter calling for a transparent investigation of all hypotheses.

The book's dramatic rhetoric could have been hype by Chinese military researchers trying to sell books, or a pitch to the People's Liberation Army for funding to launch a bio-warfare program. When a reporter with the Rupert Murdoch–owned newspaper *The Australian* published details from the book under the headline "Chinese Held Talks on Bioweapons Benefits," the *Global Times*, a Chinese state-owned media outlet, ridiculed the article, noting that the book was for sale on Amazon.

The inflammatory idea of SARS-CoV-2-as-bioweapon has gained traction as an alt-right conspiracy theory, but civilian research under Shi's supervision that has yet to be made public raises more realistic concerns. Shi's own comments to a science journal, and grant information available on a Chinese government database, suggest that her team has tested two novel but undisclosed bat coronaviruses on humanized mice in the past three years to gauge their infectiousness.

In April 2021, in an editorial in the journal *Infectious Diseases & Immunity*, Shi resorted to a familiar tactic to contain the cloud of suspicion enveloping her: She invoked scientific consensus, just as the *Lancet* statement had. "The scientific community strongly dismisses these unproven and misleading speculations and generally accepts that SARS-CoV-2 has a natural origin and was selected either in an animal host before the zoonotic transfer, or in humans following the zoonotic transfer," she wrote.

But Shi's editorial had no muzzling effect. On the contrary, in a statement published in the *Science Magazine,* on May 14, 2021, 18 prominent scientists called for a "transparent, objective" investigation into Covid-19's origins. The scientists said, "We must take hypotheses about both natural and laboratory spillovers seriously until we have sufficient data."

Among the signers was the North Carolina University virologist Ralph Baric, who had worked behind the scenes fifteen months earlier to help Peter Daszak stage-manage the *Lancet* statement.

The so-called scientific "consensus" had been smashed to smithereens.

Out of the Shadows

By spring of 2021, the debate over Covid-19's origins had become so noxious that death threats were flying in both directions.

In a *CNN* interview on March 26, 2021, Dr. Redfield, the former CDC director under Trump, made this candid admission:

"I am of the point of view that I still think the most likely etiology of this pathogen in Wuhan was from a laboratory, you know, escaped." He added that he believed the release was an accident, not an intentional act. In his view, nothing that happened since his first calls with Dr. Gao changed a simple fact: The WIV needed to be ruled out as a source, and it hadn't been.

After the interview was aired, death threats flooded his inbox. The vitriol came not just from strangers who thought he was being racially insensitive but also from prominent scientists, some of whom used to be his friends. One said he should just "wither and die."

Peter Daszak was also getting death threats too, some from QAnon conspirators.

Inside the US government, meanwhile, the lab-leak hypothesis had survived the transition from Trump to Biden. On April 15, the director of the National Intelligence Avril Haines told the House Intelligence Committee that two "plausible theories" were being

weighed: a lab accident and natural emergence.

Even so, lab-leak talk mainly was confined to right-wing news outlets through April, gleefully flogged by Tucker Carlson on his Fox talk show, and avoided by most mainstream media. In Congress, the Energy and Commerce Committee's Republican minority had launched an inquiry. However, there was little buy-in from Democrats, and the NIH didn't respond to its lengthy list of demands for information.

The ground began to shift on May 2, 2021, when Nicholas Wade, a former *New York Times* science writer known in part for writing a controversial book about how genes shape the social behavior of different races, published a lengthy essay on *Medium*. He analyzed the scientific clues for and against a lab leak, and criticized the media for failing to report on the dueling hypotheses. Wade devoted a full section to the "furin cleavage site," a distinctive segment of SARS-CoV-2's genetic code that makes the virus more infectious by allowing it to enter human cells efficiently.

Within the scientific community, one thing leaped off the page. Wade quoted one of the world's most famous microbiologists, Dr. David Baltimore, saying that he believed the furin cleavage site "was the smoking gun for the origin of the virus." Baltimore, a Nobel Laureate and pioneer in molecular biology, was about as far from Steve Bannon and the conspiracy theorists as it was possible to get. His judgment, that the furin cleavage site raised the prospect of gene manipulation, had to be taken seriously.

With questions growing, NIH director Dr. Francis Collins released a statement on May 19, 2021, asserting that "neither NIH nor NIAID have ever approved any grant that would have supported 'gain-of-function' research on coronaviruses that would have increased their transmissibility or lethality for humans."

On May 24, 2021, the WHO's decision-making body, the World Health Assembly, openede a virtual edition of its annual conference. In the weeks leading up to it, a string of high-profile stories broke, including two front-page reports in *The Wall Street Journal* and a long post in *Medium* by a second former *New York Times*

science reporter. Not surprisingly, China's government fired back during the conference, saying that it would not participate in further inquiries within its borders.

On May 28, 2021, two days after President Biden announced his 90-day intelligence review, the U.S. Senate unanimously passed a resolution, which Jamie Metzl had helped shape, calling on the World Health Organization to launch a comprehensive investigation into the origins of the virus.

Will we ever know the truth? Dr. David Relman of Stanford University School of Medicine has been advocating for an investigation like the 9/11 Commission to examine Covid-19's origins. But 9/11 took place in one day, he said, whereas "this has so many different manifestations, consequences, responses across nations. All of that makes it a hundred-dimensional problem."

The bigger problem is that so much time has passed. "With every passing day and week, the kinds of information that might prove helpful will have a tendency to dissipate and disappear," he said. "The world ages and things get moved, and biological signals degrade."

China obviously bears responsibility for stonewalling investigators. Whether it did so out of sheer authoritarian habit or because it had a lab leak to hide is, and may always be, unknown.

The United States deserves a healthy share of the blame as well. Thanks to their unprecedented track record of mendacity and race-baiting, Trump and his allies had less than zero credibility. And the practice of funding risky research via cutouts like EcoHealth Alliance enmeshed leading virologists in conflicts of interest at the exact moment their expertise was most desperately needed.

Now, at least, there appears to be the prospect of a level inquiry–the kind Jamie Metzl and Gilles Demaneuf had wanted from the start. "We needed to create a space where all of the hypotheses could be considered," Metzl said.

If the lab-leak explanation proves accurate, history may credit Demaneuf and his fellow doubters for breaking the dam–not that they

have any intention of stopping. They are now knee-deep in examining the WIV's construction orders, sewage output, and cell phone traffic. The thought driving Paris Group cofounder Virginie Courtier forward is simple: "There are unanswered questions," she says, "and a few human beings know the answers."

A great time to meet up with my editor Hari Kumar, at the FCC Main Bar, for lunch to discuss the manuscript, analyze and structure a particular chapter, politics of the day, local, regional and global. The Covid-19 virus fight was the common thread to all politics at every level.

Hari is a journalist who was based in Hong Kong at the height of the pandemic working successively with the *South China Morning Post* and Radio-Televison Hong Kong *(RTHK)* before launching the online newsletter, *Thinksight,* and returning to his homeland, Kerala in India.

He was horrified at how the pandemic was being reported, except for *Vanity Fair* and some other publications; and how it was being mishandled and managed by politicians in America, Europe and India. "Bloody stupid!"

Hong Kong, the Best Place During Pandemic

An opinion piece Hari wrote for the *Sunday Morning Post* on May 2, 2021, generated a great deal of buzz. Titled *Airborne transmission must not be overlooked in virus fight*, he pointed out, as we had discussed and agreed, that thankfully, since the outbreak started, masks, disinfectants, social-distancing regulations and hand sanitation have been the main protective measures recommended by the Hong Kong authorities. Measures that have been effective as Hong Kong has, time and again, dodged the bullet of a mass outbreak, but it has not been able to stop the virus that causes Covid-19 at bay.

After a cluster broke out at a local restaurant in February 2021, the government ordered all operators of restaurants and bars to ensure their premises had at least six air changes per hour or install air purifiers to remove stale air was removed as customers were not wearing masks during the time they were there. Being in Hong Kong

during the pandemic with no lockdowns was a relief considering some of the lockdown nightmares elsewhere.

Hong Kong tackled the pandemic better than most, if not all, countries worldwide. Definitely, better than the US. No lockdowns. A flatter epidemic curve than most – which is remarkable given its status as an international transport hub. Hong Kong achieved zero local Covid-19 cases for many weeks in a row during the pandemic. Everyone wore masks, respected social distancing, even though many Hongkongers, like people everywhere, refused to get vaccinated.

The Hong Kong government's early deployment of vaccines and prudent actions, kept global capital flowing into the city-state, a mark of confidence in the city's status as an international financial hub established during its days under British rule. The city was the second-largest fundraising center in the world in 2020, after Nasdaq! Most of its key industries – financial services, trading and logistics, professional and producer services – have continued to grow even after the British vacated, handing the territory back to China in 1997. And the city is now evolving as a technology and innovation center.

WHO Proposes Lab Audit

In July 2021, The World Health Organization called for a second stage international probe that should include audits of Chinese lab – including the biotech lab in Wuhan. WHO chief Tedros Adhanom Ghebreyesus proposed "audits of relevant laboratories and research institutions operating in the area of the initial human cases identified in December 2019" – referring to Wuhan.

The proposal "shocked" China's vice-minister of the National Health Commission, Zeng Yixin. The proposal, said the minister, showed "disrespect for common sense and arrogance towards science."

Chinese officials have also amplified theories that the virus may have been imported with frozen food.

Unfrozen Tundra

In July 2019, I visited Iceland and Greenland. Before returning to Hong Kong via Scotland and Istanbul, I posted a blog sharing my concern about corpses of victims of the Spanish flu of 1918 – thrown overboard from ships sailing to North America from Europe – surfacing as the glaciers melted and the tundra defrosted. Titled: *Greenhouse Gases Turning Greenland Green and Deadly, it said:*

Anyone doubting climate change should visit Greenland, something I decided to do and see first-hand since I was close by in Iceland. Flying in to land in Kulusuk airport, built by the U.S. military in WWII, one sees more brown mountains with patches of snow that were once glaciers, than glaciers – with floating icebergs slowly drifting away…

Greenland's landscapes are alive and ever-changing as the glacial ice is in a constant battle for survival. The ice is retreating but it is not leaving quietly. In the summer, the constant calving of the region's landlocked and fjord glaciers can be heard for miles away. When close by, the echoes of the loud cracks and collapsing ice are so clear that they cannot be ignored.

The sheer scale of the glaciers that have not melted and the intricate and unique details of the glacial sediment and the bright blue ice cracks brought to light by the sun is a mind-blowing visual feast!

….

On the flight there I met Iris, a despairing climatologist from Austria, who was going back to Greenland to measure the increasing levels of greenhouse gases.

"It's depressing and shameful," summed up her professional opinion about climate change and what was happening in Greenland.

Greenland's ice is melting faster than it has in 350 years because of greenhouse gases.

In the Norse saga, it is said that Erik the Red was exiled from Ice-

land for murder. He settled in a land Northwest of Iceland covered in ice and glaciers and named it Greenland to attract people to settle there.

"You Americans and Chinese should be exiled to Greenland for murder of the environment," I was told by Hauker, an Icelandic glass mate I met at the bar at the Eyja Guldsmeden Hotel. We were exchanging pleasantries and discussing the history and current state-of-affairs in Greenland until I introduced myself as an American political writer living in Hong Kong. He is right.

As global warming temperatures melt Greenland's ice sheets, glaciers and its Arctic ice caps and permafrost are thawing at unprecedented depths, a small army of deadly microbes – dormant in some cases for millennia – are being reanimated and could rise from the slush to infect humanity. These include anthrax, small pox, bubonic plague and any other number of deadly diseases trapped in the permafrost and ice.

"Deadly Spanish Influenza as well," Dr. Colin Johnston, an Ayr physician and friend with whom I shared my concerns when we caught up back in Scotland, told me.

"When it was discovered that people on a ship from Spain or Europe, on its way to America back in the 1920's, died of Spanish Influenza, they were buried in the permafrost off Greenland," Dr. Johnston told me as I listened in disbelief.

Spanish Influenza was an unusually deadly flue pandemic – the deadliest in history – that infected an estimated 500 million people worldwide between1918-1920, about a third of the planets population. It killed an estimated 20-50 million people, including 675,000 Americans. A death toll far worse than the bubonic plague. It was the first of two pandemics involving the H1N1 influenza virus.

An international group of researchers, including pathologists, virologists, molecular biologists, geologists and archeologists are carefully exhuming seven bodies found in a mass grave encased in a tomb of ice in Norwegian permafrost in the islands of Spitsbergen in the high Arctic between Norway and Greenland, to determine

what caused the contagion.

Greenland's ice is melting fast and releasing toxic fumes and deadly microbes.

Wake up climate change deniers, before it is too late!

Reflecting on that trip, the blog and different variants of Covid-19 being traced to frozen seafood and its packaging, not only in China, but also in Europe and the America's, I recalled my cough and hard time breathing, and sleeping upon my return to Hong Kong that July 2019. The respiratory doctor I went to see, treated it as a local Hong Kong respiratory pollution cough, gave me some medication. A couple of weeks later, the cough stopped, and I was breathing normally again. That doesn't add up. Because during that time I was in polluted Hong Kong. I am convinced I picked up some virus in Greenland or Iceland, thankfully not Covid-19, that I tested for, after we all became aware of the new pandemic.

I did eat a lot of seafood in Iceland – in fact I ate only seafood – including seal and whale and wondered if any of it was somehow infected with a virus from the bodies of victims of the Spanish flu pandemic that were thawing as a result of the melting frozen tundra, and found their way into the local seafood.

The same frozen seafood is delivered to markets across the world. Again, not being a scientist – just saying, and sharing.

Coronavirus was in the US in 2019

A US government study published on June 15, 2021 by the *Clinical Infectious Diseases* journal suggests that the coronavirus was infecting people in the US before causing a deadly outbreak in Wuhan.

The outbreak hit Wuhan in late 2019. Officially, the first case of infection identified in the US was a man in Washington state who returned from Wuhan on January 15, 2020, and sought help at a clinic on Jan 19.

The study's results suggested that the virus might have been circulating in Illinois as early as December 24, 2019, although the first case in that state was confirmed a month later.

A team including NIH researchers conducted the study. They analyzed blood samples from more than 24,000 people across the country. The samples were collected in the first three months of 2020 as part of a long-term NIH research program called *All of Us* that seeks to track one million people in the US over the years to study their health.

The researchers found evidence of infection in just nine out of 24,079 participants whose blood samples were taken between January 2, 2020, and March 18, 2020, for the NIH research program. Seven of the samples came from blood donated before the date of the first diagnosis in their states-Illinois, Wisconsin, Pennsylvania, Mississippi and Massachusetts. A couple of the participants had mild symptoms. One of those in Illinois was infected as early as November 24, said Keri Althoff, an associate professor at the Johns Hopkins Bloomberg School of Public Health and the study's lead author.

Chinese Foreign Ministry spokesman Zhao Lijian told the daily news briefing the next day that the study proves once again that tracing the origin of the virus is a complicated scientific issue involving different countries and places.

He said it should be handled by collective efforts of global scientists to better prevent potential risks in the future and to protect the safety and health of people across the world.

"We hope other countries can act like China to conduct cooperation with the WHO on virus origin-tracing study with an open, transparent and scientific attitude, so as to make due contribution to boosting global anti-virus cooperation and saving more lives," he said.

The NIH researchers haven't yet followed up with study participants to see if any had traveled outside the US before they were infected. But they found that the seven whose samples came from blood donated before the date of the first diagnosis in their states didn't live

in or near New York City or Seattle, where the early US cases were concentrated.

Some experts also said the new study is flawed because the researchers didn't have travel information for any of the patients, and such information could have helped explain the test results.

Josh Denny, chief executive of the *All of Us* program, told the *New York Times* that "it's still very possible that some of them might be false positives," but that all of them being false positives "seems pretty unlikely with what we've done."

William Hanage, a Harvard University expert on disease dynamics, told the *Associated Press*, "While it is entirely plausible that the virus was introduced into the US much earlier than is usually appreciated, it does not mean that this is necessarily strong enough evidence to change how we're thinking about this."

In late 2020, researchers at the CDC and the American Red Cross reported that there could have been isolated cases of Covid-19 in the US as early as mid-December 2019. The researchers said they found evidence of infection in a young man who gave blood in Northern California at that time, and in an individual who donated in Connecticut on January 10, 2020.

Another study published in the scientific journal *Nature Communications* in June 2021 spoke of New York City experiencing sporadic coronavirus cases a month before the city's first officially documented case in March 2020 and subsequent pandemic wave.

Lack of US Spy Capabilities in China

Some of the top US spymasters have warned for years, mostly behind closed doors, that one of their most critical components for gathering information, the human intelligence – known in spy parlance as "humint" – has been decimated by Beijing's aggressive efforts to shut down these networks.

"We should have Wuhan wired six ways from Sunday," said Charles Faddis, former chief of the CIA's weapons of mass destruction directorate, in June 2021. "And yet 18 months into this, we're still trying to figure out what happened."

China maintains that the virus originated in nature and claimed initially that it probably came from a "wet market." US officials, and scientists, said there hadn't been a single documented case of animal-to-human transmission.

Beijing has refused to fully cooperate with outside health officials. Though the World Health Organization said in March 2021 that a lab leak was an "extremely unlikely pathway," its on-site investigators were allowed only limited access to labs studying similar viruses or data about the earliest cases.

Privately, few, if any, US officials believe China is going to cooperate. That's where US spies come into play.

Since the 9/11 attacks, the National Security Agency and other high-tech intelligence units have grown more powerful with each innovation. At the same time, the CIA has seen a massive shift of resources – on orders from Congress and successive administrations – away from the conventional stealing of secrets to paramilitary operations aimed at killing terrorists.

All the while, China methodically beefed up its own human intelligence networks targeting the United States.

In 2003, the FBI's most prized China asset, Katrina Leung of Los Angeles, was accused of being a double agent who was sleeping with two of the bureau's top China hands. For a decade, Leung allegedly funneled top-secret information to Beijing and gave her FBI handlers with misinformation for a decade that was deemed essential to be piped right into the White House.

More devastating setbacks followed, including three senior American officials convicted of spying for China. One of them, a former top CIA Beijing case officer named Jerry Chun Shing Lee, was suspected of giving China the identities of many of the CIA's most valuable covert assets. He was convicted of conspiring and sentenced in 2019 to 19 years in prison.

The CIA discovered that China had figured out how to eavesdrop on its most top-secret communications with its network of agents.

The twin counterintelligence coups enabled China to roll up a human intelligence network that the CIA had built for years, if not decades. By 2013, Chinese authorities had killed at least a dozen CIA assets in China.

"It's rare that one source of intelligence tells the entire story," says Larry Pfeiffer, who directs the Michael V. Hayden Center for Intelligence, Policy, and International Security at George Mason University. Pfeiffer had previously spent 32 years in leadership roles at the CIA, NSA and the White House Situation Room.

"The best intelligence reports come from as many sources as possible," he pointed out.

Pfeiffer sees parallels between what has happened in China since the initial outbreak of SARS-CoV-2 and officials in the Soviet Union covering up the 1986 nuclear disaster in Chernobyl for a multitude of reasons – incompetence, slavish devotion to the leader and not wanting to offend them, and people high up instructing on the basis, 'we can't let this out because we can't look bad.'

The CIA "presumably is doing some useful work collecting information the old-fashioned way but rightly not publicizing it," says Grant Newsham, a former Marine Corps intelligence officer who worked closely with the CIA in Asia for years.

"But the fact that we didn't know from the beginning what was going on in the Wuhan lab – or even in Zhongnanhai (where the State Council of the central government, and the headquarters of the Chinese Communist Party are based), both targets of prime importance to the USA, is prima facie evidence the CIA isn't doing its job," Newsham said.

We Have to Learn to Live With COVID-19

"We as a country are willing to tolerate a certain level of risk and still go about a normal level of life," said Dr. Aaron Carroll, a pediatrician and professor of pediatrics at Indiana University School of Medicine. "It's becoming clear that that's likely what we're going to have to do with Covid. We're going to have to learn to live with it."

In a "good" flu season, nearly 100 Americans a day might die of influenza, Carroll said at an American Public Health Association panel in early 2021.

That 100 deaths a day during flu season is what Americans tolerate, said Dr. Monica Gandhi, an infectious disease expert at the University of California, San Francisco. "So it's probably what we'd accept for Covid," she said.

According to the Centers for Disease Control and Prevention, as of June 3, 2021, Covid-19 was killing an average of 363 Americans a day, according to the Centers for Disease Control and Prevention. That's down from more than 3,000 a day at the height of the pandemic in January 2021. With vaccinations increasing, the daily death toll continues to fall.

Experts note the SARS-CoV-2 virus that causes Covid-19 could be almost entirely controlled in the US with near universal vaccination, if Americans were willing. That's how smallpox was eradicated in 1990.

Nevertheless, the waning of the Covid-19 pandemic will be spotty. Look at the differences between San Francisco and Nashville.

In San Francisco County, no one died of Covid-19 for nearly a month in the May-June 2021 period, according to the local health department. But in Davidson County, Tennessee, home to Nashville and 185,000 fewer people, eight have died in the same two week period at the end of May and the beginning of June 2021.

The reason for the difference is vaccination rates. In San Francisco, 78% of people over age 12 have had at least one shot. In Davidson County it's 47%.

"We're sending vaccine that's been allocated to us back to the CDC," said Dr. William Schaffner, an infectious disease expert at Vanderbilt University in Nashville. "It makes our hearts cry."

To an epidemiologist, a pandemic is the worldwide spread of a new disease. An epidemic is an unexpected increase of a disease in a giv-

en geographic area. A disease becomes endemic when it is always present but limited to a particular group or region.

Right now, Covid-19 is a pandemic globally, an epidemic in the US and on the cusp of being endemic in highly vaccinated areas.

There are two Americas: one vaccinated, the other not. For the unvaccinated, if they get sick, "there's just as much chance of them getting severely ill or dying from Covid-19," Schaffner said.

In many regions of the US, the SARS-CoV-2 virus that causes Covid-19 will fade into the background. It will remain a significant source of outbreaks in others, said Dr. Robert Wachter, chairman of the University of California, San Francisco's department of medicine.

The wild card is whether new variants against which current vaccines are ineffective would emerge, thus requiring booster shots.

"Assuming there is no variant that comes out that is truly vaccine-resistant, I'm going to expect mild surges, probably in the winter, in places with low vaccination rates," Wachter said.

Besides, as long as Covid-19 rages in other countries, the virus could keep mutating, no matter how low transmission rates become in the United States.

"COVID is a reminder that we should care about equity, but even if you don't want to care about it, you need to care because we're so interconnected globally," said Anne Rimoin, a professor of epidemiology at the UCLA Fielding School of Public Health.

If the vaccines remain effective, boosters may never be required, or perhaps only every two or three or more years. But that in itself, Wachter thinks, could become a problem because people will forget how bad things could be and won't be motivated to be protected.

"It's going to recede in people's memories, and then when they're asked to take a booster, you can't presume they'll get the shot," he said.

In the end, only high levels of vaccination will truly allow the entire country to return to normal, said Dr. Walter Orenstein, associate director of the Emory Vaccine Center, former director of the immunization program at the CDC.

"This virus," he told public health officers, "will not eradicate itself."

China Recast Covid as a Victory

The Chinese Communist Party was on the verge of its biggest crisis in decades when the coronavirus brought the city of Wuhan to a standstill. The government's efforts to conceal the pandemic would become public, sparking an online backlash of the kind the Chinese internet hadn't seen in years. The Chinese propaganda machine seemingly could not handle the outrage, so, several liberal-minded Chinese began to think the unthinkable. Perhaps this tragedy, some thought, would impel the Chinese people to push back. After decades of thought control and worsening censorship, perhaps this was the moment that the world's largest and most powerful propaganda machine would crack.

But, it wasn't.

A year after the outbreak and the beginning of the crisis, the party's control of the narrative became absolute. In Beijing's telling, Wuhan stands not as a testament to China's weaknesses but to its strengths. Memories of the horrors of police-state lockdown seem to be fading, at least judging by what's online. Even moderate dissent gets shouted down.

People in China should be bowing their heads on the anniversary of the outbreak, in memory of those who suffered and died. Instead, the internet in China is afire over the scandal of a Chinese actress and her surrogate babies, a tabloid controversy egged on by Chinese propaganda.

Anyone looking for lessons about China in the coming years needs to understand the consequences of what happened in 2020. The tragedy showed that Beijing could control what people in China should see, hear and think to surpass even what pessimists believed. During the next crisis – disaster, war or financial crisis – the par-

ty has shown it has the tools to rally the people, no matter how ham-handedly Beijing deals with it.

During the week of January 25, 2021, a year after the pandemic surfaced globally, Li Yuan, a *New York Times* correspondent in China, looked through her Chinese social media timelines and screenshots from a year ago. She was shocked by how many posts, articles, photos and videos had been removed. She was also surprised to remember the sense of hope at that moment despite intense anger and grief.

The shift was especially palpable the night that Dr. Li Wenliang, who was silenced after warning of the outbreak in late 2019, died of the virus.

That night, numerous Chinese people waged what amounted to an online revolt. They posted videos of the "Les Misérables" song "Do You Hear the People Sing?" They shared one of Dr. Li's quotes repeatedly: "A healthy society should not have just one voice."

Even one of China's propaganda directives warned that Dr. Li's death was an "unprecedented challenge." Young people told Yuan that the official news media had lost credibility.

One of her followers on Weibo, the Chinese social media platform, apologized for attacking her before. I used to think that people like you were evil, he wrote. Now, he added, I know that we were fooled.

A middle-aged intellectual told Yuan that he expected the population of liberal-minded Chinese people – those who want greater freedom from Beijing's controls – to expand from his estimate of five-ten percent of the total population to 30-40 percent.

As these hopes rose, others tried to tamp down enthusiasm. One political scientist guessed the share of liberal-minded Chinese internet users would shrink, not grow. In three months, she predicted, the Chinese public would be celebrating the glorious victory over the outbreak under the leadership of the great Communist government.

Unfortunately, she was correct, said Yuan.

To reclaim the narrative in the early days of the pandemic, the Chinese government began a tremendous behind-the-scene effort to make sure that the censors took control at even the most local level. They listened and read just about everything people posted. Then the censors either addressed the problems or silenced the dissenters. Chinese officials say the police investigated or otherwise dealt with more than 17,000 people who they said had fabricated or spread fake pandemic-related information.

After 11 weeks, the lockdown in Wuhan ended. By the summer, a photo of a crowded Wuhan swimming pool appeared on the home pages of many websites. The shift was especially palpaple the night that Dr. Li Wenliand died.

The Chinese Communist Party has a long history of controlling history. In the US, historical narratives shift and compete, leading to arguments and sometimes even violence, but constantly illuminating new perspectives and bringing greater understanding of what underpins the national identity. In China, by contrast, the government has successfully taught its people that the country is nearly ungovernable unless a strong hand controls the narrative.

The Communist Party has strict narratives about its most serious mistakes, including the Great Leap Forward, the Cultural Revolution and the Tiananmen Square crackdown. Immediately after the Cultural Revolution, the so-called scar literature – memoir-style novels by those who suffered during that troubled time – became a popular genre. The party quickly realized the danger of letting the public share its individual traumas and banned the books.

Under Xi Jinping, the party has become even less tolerant of unorthodox historical ideas. In 2016, *Yanhuang Chunqiu,* a monthly history magazine in which moderate-minded retired officials published articles, was forced to surrender its editorial power to the authorities.

The narrative about the current pandemic is no exception. Journalists, writers and bloggers whose portrayals of the outbreak differ from the official version have been jailed, silenced or disappeared.

Fang Fang, a Wuhan-based novelist, became the most vilified figure on the Chinese internet in 2020. Her crime? Documenting her lockdown experiences in an apolitical account in an online diary.

People online call her a liar, a traitor, a villain and an imperialist dog. They accuse her of maligning the government and causing the Chinese people to lose face in the world by publishing an English translation of her diary in the United States. One man called on the government to investigate her for the crime of subverting the state power. One high-ranking medical scientist chastised her for lacking patriotic emotions.

No publisher is willing or able to publish her works in China. The social media posts and articles that support her are often censored. A few people who spoke up for her publicly were punished, including a literature professor in Wuhan who lost her right to teach and Communist Party membership.

"I think Fang Fang wrote about what happened," said Amy Ye, the organizer of a volunteer group for disabled people in Wuhan. "In fact, I don't think she included the most serious situations. Her diary is very moderate. I don't understand why even something like that couldn't be tolerated."

This demand for a single narrative carries risks. It silences those who might warn the government before it does something foolish, like stumble into a conflict or interfere with China's economic growth machine.

It also conceals the true feelings of the Chinese people. On the street, in person, most Chinese will be happy to tell you what's on their minds, perhaps in exhaustive details. But China became a more opaque place in 2020. Online censorship became even harsher. Few Chinese people are willing to take the risks of speaking to Western news media. Beijing expelled many American journalists.

This single narrative also means that people who don't fit into it risk getting left behind.

Ms. Ye, the Wuhan volunteer group organizer, doesn't believe that Wuhan could claim a victory over the pandemic. "My whole world has changed, and it will probably never go back to what it used to be," she said.

She's still struggling with depression and is afraid to go out of her apartment. An outgoing person before the pandemic, she has attended only one social gathering since the end of the lockdown in April 2020.

"All of a sudden we were locked up at home for many days. So many people passed away. But nobody was held accountable," she said. "I would probably feel better if someone could apologize that they didn't do their job."

"I can't forget the pain," she said. "It's engraved in my bones and my heart."

Preventing Future Pandemics

What is abundantly clear is that the world has to plan how to prevent the next pandemic or manage, if unable to prevent it. China and the US must lead this initiative and set up a new global body and system – independent of the WHO – politically neutral to respond faster to future virus outbreaks that can lead to a pandemic. A body with international scientists headed by a team of American and Chinese scientists working together, based in both countries top labs and regionally, in Africa, Europe, Middle East, South and East Asia, North and South America, that have a surveillance and alert system in place, publish full findings without delay, impose travel restrictions, prepare hospitals, and distribution of pre-paid subsidized protective equipment and medicines.

It is also imperative that China and the US work together to curb bacterial resistance to antibiotics, a growing danger that has been widely flagged. Antibiotic resistance could prove "the death knell of modern medicine" and lead to an "antibiotic apocalypse," warned Sally Davies, England's former chief medical officer, on July 9, 2021, ahead of the European Congress on Clinical Microbiology and Infectious Diseases.

Antibiotics are only effective against bacterial infections, not viral infections such as Covid-19.

An agreement must be made with drug companies to fund and license technology transfers to ensure sufficient vaccine production to get global herd immunity as quick as possible against both bacterial and viral infections.

US-China New World Order

The US-China debate about the origin of the Covid-19 outbreak that triggered a global pandemic, combined with the trade war and sanctions both countries imposed, has produced an unintended outcome. It pushed China to position itself as the main challenger to the US-led international order based on the principles of democracy, respect for human rights, and adherence to the rule of law.

While politicians debate the political issues, firms across the world – especially in the US – are rethinking supply chains with China. Bottle-necks and choke-hold backups at US ports, lack of warehouse space for goods shipped from China, or drivers to deliver the goods from the warehouses, highlighted the critical weaknesses: the fragility of supply chains, particularly the crucial role of logistics in the supply chain – delivering components to production plants and moving finished products to markets. Across all sectors – electronics, consumer goods, automotive parts, medical equipment, pharmaceuticals, and so on – they rely on supply chains linked to the world's leading manufacturer, China. American industrialists who moved their manufacturing to China to take advantage of its cheap and ununionized labor will realize the benefit of moving back to the US when they begin to take a closer look at their situation and ponder how to prepare for the next crisis.

My friend, Nelson Wong, the vice-chairman of the Shanghai Centre for RimPac Strategic and International Studies, was a speaker at the 2021 Special Session of the 18th annual meeting of the Valdai Discussion Club – a Moscow-based think tank established in 2004 and linked to the Russian president, Vladimir Putin, and the Russian elite. We discussed his speech and take on the post-pandemic-geo-

political world and why the post-pandemic world will not be determined by the outcome of the confrontation between the US and China, or by splitting the world into two competing camps.

"For quite some time, since before the pandemic, China has found itself being dragged into a trade war with the US, which constantly blames China for almost everything that goes wrong in America. The pandemic simply adds fuel to the US expressed frustration," said Nelson in one of our evening chats.

"So what has actually gone wrong?" he asked. "People start to wonder about the conflicts between the US and China and question whether they can be avoided," he added before I could answer. And he continued: "My take on this is that if we all believe that the rising of China is unstoppable, then conflicts between China and the US may be unavoidable for many years to come. Judging from what has been happening … it is clear that both countries are sailing into unchartered waters. Both need to navigate carefully along the way to manage their differences properly, and prevent them from developing into major conflicts and confrontations. But it takes two to tango. The most worrying part right now seems to be the difference in the perceptions of one towards the other," Nelson said as we were getting ready to sign-off.

"Yeah, just like the nuclear attack submarine USS Connecticut that hit 'an unchartered seamount' on October 2nd, believed to be in the South China Sea," I said as we both laughed and said goodnight.

The threat of a US-led coalition challenging China's authoritarian policies has only bolstered Beijing's ambition to be a global leader of nations that oppose Washington and its allies. It also shows an increasingly confident and unapologetic China, one that not only rejects American criticism of its internal affairs, but, presents its values for others in the post-pandemic new world order.

The New Normal

The pandemic has disrupted the working lives of people worldwide. Some of us – usually white, highly educated people with relatively

well-paying jobs – have been able to take up telecommuting. Millions of other workers, especially many low-paid service workers, simply saw their jobs disappear when consumers stopped eating out and traveling.

When the economy begins to recover, that process is likely to continue despite the spread of new variants of the coronavirus. But would communities and nations want to return to the situation that was normal before the pandemic? All indications suggest that many – Americans in particular, don't want to go back to how they were. After nearly two years of working from home, they don't want to face the stress of the daily journey between home and work again. Some of the people who were forced to accept unemployment have come to realize how unhappy they were with their low-wage jobs and precarious working conditions, and are reluctant to return to their previous stations.

Something is in the making. Employment data indicates that the number of unfilled vacancies is much more than we would normally expect to see, given the current level of relatively high unemployment. This situation is particularly evident in the sector most affected by the pandemic, leisure and hospitality, especially in the US.

Employment in the sector remains well below the pre-pandemic level. But to bring workers back, the industry had to offer a large wage increase, which meant values significantly higher than the trend prevailing before the pandemic. In other words, some workers don't really seem willing to go back to their old jobs unless they are offered substantially more money and better working conditions.

Why is this happening? And should we consider the trend as bad?

Conservatives insist it is indeed bad: Workers, they claim, are refusing to take jobs because government assistance is making unemployment too comfortable. But they would always say that, wouldn't they? Remember, they said the same after the financial crisis, claiming the unemployed were being spoiled; the destructive austerity policy imposed by Congressional Republicans was the real reason the recovery took longer than it should have.

That said, the reasons for concern about the incentive effects of unemployment benefits seem more compelling now than in the past. Assistance to the unemployed during the pandemic was far more generous than during the Great Recession. The $300 a week supplement to existing unemployment benefits, approved in December 2020 and extended in March 2021, although less than the $600 a week supplement in effect for part of 2020, is enough, when combined with regular unemployment benefits, to replace most of the normal income of less well-paid workers.

But did unemployment benefits have a significant adverse effect on employment? No. State-based employment figures in the US support the findings of previous studies that negative impact, if any, was minor.

This time, Republicans inadvertently provided the data necessary to refute what they claimed. Many of the conservative-ruled states rushed to cancel expanded unemployment benefits before September 2021, when they would expire. If these benefits were a significant disincentive for job creation, these states would have seen employment growth noticeably faster than the Democratic states, which kept the benefits. It did not happen.

But if government benefits weren't responsible, what explains the reluctance of some workers to return to their old jobs? There can be several factors. First, fear of the virus has not disappeared. Second, taking care of children, as many schools remain closed and day care services have not fully recovered.

My guess, though–and it's just a hunch, but some of the best-known experts in the field have similar views–is that the mess of work the pandemic has caused was a learning experience.

What we are seeing is good, not a problem. But, perversely, the pandemic may have given many people, especially Americans, the opportunity to determine what really matters to them. Some of them now realize the money they receive for doing crippling jobs is not enough.

Lying Flat – Tangping

Lying flat, *tangping* in Mandarin, is celebrated by Chinese millennials as an anti-consumerist manifesto – and a broader statement about Chinese society. Young Chinese fed up with what they see as limited prospects in the face of grueling work hours, conspicuous consumption and skyrocketing home prices are choosing to do the bare minimum. To lie flat means to forego marriage, not have children, stay unemployed and eschew material wants such as a house or a car.

From white-collar workers to university students, an army of frustrated young people in China are taking to social media and Internet message boards to declare themselves "lying flat youth."

The movement's roots can be traced back to an obscure Internet post called "lying flat is justice," in which a user named Kind-Hearted Traveler combined references to Greek philosophers with the experience of living on 200 yuan (US$31) a month, with two meals a day and not working for two years.

"I can just sleep in my barrel enjoying a sunbath like Diogenes, or live in a cave like Heraclitus and think about 'Logos," the poster wrote. "Since there has never really been a trend of thought that exalts human subjectivity in this land, I can create it for myself.

"Lying down is my wise man movement."

According to the poster, this existence leaves one physically healthy and mentally free.

According to economists and social commentators, in the long run, lying flat could not only affect national consumption and economic and political growth, it could also lower the birth rate that is already eating up the country's demographic dividend and threatening its social welfare system.

"China is at one of the most important stages of its long road to national rejuvenation. Young people are the hope of this country, and neither their personal situation nor the situation of this country will allow them to 'collectively lie flat'," said an editorial in the *Global Times*, a newspaper controlled by the Communist Party.

Although the original post has been scrubbed from the Internet by Chinese censors, copies have been spread quickly online, sparking lively discussions and videos that have garnered millions of views each.

Painful Cost of Isolation

The feeling of loneliness caused by quarantine and necessitated by the Covid-19 pandemic has left many people mentally and physically handicapped – not to mention the more than five million deaths worldwide. Suicides are yet to be counted as the lethal impact of the pandemic.

The psychological fallout of the pandemic will take years for public health officials to address and remedy. Meanwhile, mental health issues, will cause significant problems, especially among the most affected – the youth – who have also experienced one way or another the 1/6 attack on the Capitol, anti-vaxers, racism, Black-Asian-White, anti-Semitism, chaotic US withdrawal from Afghanistan, domestic violence, alcoholism, siblings and friends dying from drug overdoses.

A few months into the pandemic, the Centers for Disease and Control and Prevention (CDC) in the US warned that mental health diagnosis – anxiety, depression, thoughts of suicide – were on the rise. By the year-end of 2020, a government survey found that the nation's mood had continued to darken.

Steven Petrow, wrote a great piece in February 2021, in *The New York Times* titled: *Covid-linked depression? Reaching out can help* about his pandemic depression and how he dealt with it honestly.

Extended periods of remote learning have exacerbated inequalities in teaching, educational achievement, motivation and aspirations. Doubly so with underprivileged youth. Left unaddressed, this will have long-term secondary consequences for the labor market.

Isolation during lockdowns gave people endless hours to watch news – both real and fake – witness whatever turned them on, and re-enforced their identity persona and politics – cancel culture.

Strikes

Data collected by the School of Industrial and Labor Relations at Cornell University in New York, shows the number of workers on strike in the US increased in October 2021, to more than 25,000, compared to the previous three-month average of 10,000.

"Labor market leverage and the fact that workers have been through incredibly difficult working conditions over the past year and a half with the pandemic are combining to explain a lot of this labor activism now," said Johnnie Kallas, a doctoral student and the project director of Cornell's Labor Action Tracker.

Large companies continue to command considerable power, and it is not clear that the fall 2021 job actions point to a period of widespread labor strikes. On the other hand, there have been instances of workers and management edging towards a labor strike but agreeing at the last minute for a negotiated settlement. For example, the strike threat of 60,000 film and television production employees was defused at least temporarily when their union reached a tentative agreements with production studios. Meanwhile, whatever is in store, the future doesn't seem too bleak. Even doubling or tripling of labor militancy would not compare to the strikes in the 1960s and 70s. I know this because I had worked in a machine-shop making auto parts for Ford and General Motors in Detroit and Pontiac in Michigan in 1964-65, and as a miniature prop carpenter on studio sets in Hollywood, California in 1967-68, while studying for my Bachelor's degree in political science.

The US economic recovery from the pandemic has eroded management's advantages. Employers had great difficulties hiring in the second half of 2021. In the summer of that year, the US Labor Department recorded the highest number of job openings since recording such data began in 2000. And for many companies, supply-chain disruptions have taken a toll on the bottom line.

In a 2021 survey by IPC, a global trade association representing the electronics industry, nine out of ten manufacturers complained that the time it takes to make their goods had increased. Nearly one-third reported delays of eight weeks or more.

Many workers justifiably complain that their employers have not cared to share the enormous pandemic-era profits with the workers who sometimes risked their lives to make those earnings possible. Striking workers at John Deere, whose union announced a tentative agreement with the company in October 2021, pointed out that Deere is on pace for a record profit of nearly $6 billion in its 2021 fiscal year. Yet it tried to end traditional pensions for new workers. On November 2, 2021, United Automobile Workers members rejected the proposed contract and went on strike.

Why not include workers in the company's profit-sharing plan that is now restricted to the management team?

The Future of Work

We exist to do more than work. The pandemic has given people the opportunity to evaluate their core values.

We need that truth now, when millions are returning to in-person work after nearly two years of mass unemployment or working from home. From the sanctity of the 40-hour week to the ideal of upward mobility, the conventional approach to work led us to widespread dissatisfaction and seemingly ubiquitous burnout even before the pandemic. Now, the moral structure of work is up for grabs. And with labor-friendly economic conditions, workers have little to lose by making creative demands on employers. We now have space to reimagine how work fits into a good life.

I remember going through that mental exercise as a lawyer in the late 1970's. I had built a successful law firm, de Krassel, Tierney & Cohen, with three offices in California – Beverly Hills, Newport Beach and San Jose – making good money, at the expense of my family as a father and quality of life. One day I walked into the office and asked my partners to buy me out. I had decided I no longer wanted to pursue the workaholic lifestyle. A decision I do not regret, notwithstanding the personal and professional hardships I have endured as a result – a practice I kept repeating after starting successful media companies in print, radio, and television.

Work sits at the heart of Americans' vision of human flourishing. It's much more than how we earn a living. It's how we earn dignity:

the right to count in society and enjoy its benefits. It's how we prove our moral character. And it's where we seek meaning and purpose, which many of us interpret in spiritual terms.

Political, religious and business leaders have promoted this vision for centuries, from Capt. John Smith's decree that slackers would be banished from the Jamestown settlement to Silicon Valley gurus' touting work as a transcendent activity. Work is our highest good; "do your job," our supreme moral mandates.

But work often doesn't live up to these ideals. So, in our dissent from this vision and our creation of a better one, we ought to begin with the idea that each one of us has dignity whether we work or not. Our job, or lack of one, doesn't define our human worth.

This view is simple yet radical. It justifies a universal basic income and rights to housing and health care. It justifies a living wage. It also allows us to see not just unemployment but also retirement, disability, and caregiving as normal, legitimate ways to live.

When American politicians talk about the dignity of work, like when they argue that welfare recipients must be employed, they usually mean you count only if you work for pay.

The pandemic revealed just how false this notion is. Millions lost their jobs overnight. But, they didn't lose their dignity. Congress acknowledged this fact, offering unprecedented jobless benefits: a living wage for some not working.

The idea that all people have dignity before they ever work, or if they never do, has been central to Catholic social teaching for at least 130 years. In that time, popes have argued that jobs ought to fit the capacities of the people who hold them, not the productivity metrics of their employers. Writing in 1891, Pope Leo XIII argued that working conditions, including hours, should be adapted to "the health and strength of the workman," paraphrasing Karl Marx who said "From each according to his ability, to each according to his needs."

Leo mentioned miners as deserving "shorter hours in proportion as their labor is more severe and trying to health." Today, we might say

the same about nurses, or any worker whose ordinary limitations – whether a bad back or a mental health condition – makes an intense eight-hour shift too much to bear.

Because each of us is both dignified and fragile, our new vision should prioritize compassion for workers, in light of work's power to deform their bodies, minds and souls. As Eyal Press argues in his new book, *Dirty Work*, people who work in prisons, slaughterhouses and oil fields often suffer moral injury, including post-traumatic stress disorder, on the job. This reality challenges the notion that all work builds character.

Wage labor can harm us in subtle and insidious ways, too. The American ideal of a good life earned through work is "disciplinary," according to the Marxist feminist political philosopher Kathi Weeks, a professor at Duke and often-cited critic of the modern work ethic. "It constructs docile subjects," she wrote in her 2011 book, *The Problem With Work*. Day work means we feel pressure to become the people our bosses, colleagues, clients and customers want us to be. When that pressure conflicts with our human needs and well-being, we can fall into burnout and despair. I know I did when I decided to give up the active practice of law. Actually, at all jobs, I've had over the years.

To limit work's adverse moral effects on people, we should set harder limits on working hours. Dr. Weeks calls for a six-hour workday with no pay reduction. And we who demand labor from others ought to expect a bit less of people whose jobs grind them down.

In recent years, the public has become more aware of conditions in warehouses and the gig economy. Yet, we have relied on inventory pickers and delivery drivers ever more during the pandemic. Maybe compassion can lead us to realize we don't need instant delivery of everything and that workers bear the often-invisible cost of our instant gratification of cheap meat and oil.

The vision of less work must also encompass more leisure. For a time the pandemic took away countless activities, from dinner parties and concerts to in-person civic meetings and religious worship. Once they can be enjoyed safely, we ought to reclaim them as what

life is primarily about, where we are entirely ourselves and aspire to transcendence.

Leisure is what we do for its own sake. It serves no higher end.

It's true; people often find their jobs meaningful. But for decades, business leaders have taken this obvious truth too far, preaching that we'll find the purpose of our lives at work. It's a convenient narrative for employers, but look at what we actually do all day: too many of us, if we aren't breaking our bodies or brains doing a job, are drowning in trivial emails, Twitter, and social media messages. It is not the purpose of a life. And for those of us fortunate enough to have meaningful, enjoyable jobs that consistently provide us with a sense of achievement and satisfaction, anything from a sudden health issue to the natural effects of aging to changing economic conditions can leave us unemployed.

So we should look for a purpose outside our work and fit work around that purpose. We each have limitless potential, a unique "genius," as Henry David Thoreau called it. He believed that excessive toil had stunted the spiritual growth of the men who laid the railroad near Walden Pond, where he lived from 1845 to 1847. He saw the pride they took in their work, and he wrote, "I wish, as you are brothers of mine, that you could have spent your time better than digging in this dirt."

Pursuing our genius, whether in art or conversation or working out in a gym, will awaken us to "a higher life than we fell asleep from," Thoreau wrote. It isn't the sort of leisure, like culinary tourism, that heaps more labor on others. Instead, leisure allows us to escape the normal passage of time without traveling a mile. The mornings he spent standing in his cabin doorway, "rapt in a revery," Thoreau wrote, "were not time subtracted from my life, but so much over and above my usual allowance." Compared with that, he thought, labor was time wasted.

Dignity, compassion, and leisure are pillars of a more humane ethos, one that acknowledges that work is essential to a functioning society but often hinders individual workers' flourishing. In practice, this new vision should inspire us to implement universal basic

income and a higher minimum wage, shorter shifts for many workers and a shorter workweek for all at full pay. Together, these pillars and policies would keep work in its place, as merely a support for people to spend their time nurturing their greatest talents – or simply being at ease with those they love.

It's a vision we can approach from multiple directions, befitting America's intellectual diversity. Pope Leo, Dr. Weeks, and Thoreau criticized industrial society from the disparate, often incompatible traditions of Catholicism, Marxist feminism and Transcendentalism. But they agreed that we need to see each person's inherent value and keep work in check so everyone can attain higher goods.

These thinkers are hardly alone. We might equally take inspiration from W.E.B. Du Bois's contention that Black Americans would gain political rights through intellectual cultivation and not only relentless labor, or Abraham Joshua Heschel's view that the Sabbath day of rest "is not an interlude but the climax of living," or the "right not to work" advocated by the disabled artist and writer Sunaura Taylor.

The point is to subordinate work to life. "A life is what each of us needs to get," wrote Dr. Weeks, and you can't get one without freedom from work's domination. "That said," she continues, "one cannot get something as big as a life on one's own."

That means we need one more pillar: solidarity, a recognition that your good and mine are linked. When we interact with people doing their jobs, each of us has the power to make their lives miserable. If I'm overworked, I'm likely to overburden you. But the reverse is also true: Your compassion can evoke mine.

Early in the pandemic, we exhibited the virtues we needed to realize this vision. Public health compelled us to set limits on many people's work and provide for those who lost their jobs. We showed – imperfectly – that we could make human well-being more important than productivity. We had solidarity with one another and with the doctors and nurses who battled the disease on the front lines. We limited our trips to the grocery store. We tried to "flatten the curve."

Now that our trips are no longer limited to shopping locally, but traveling globally, again, I hope I don't run into passengers on any of my flights who refuse to wear masks and whose idea of flattening the curve is punching flight attendants or passengers asking them to mask-up.

The Future of Travel

The travel industry has been all but shuttered during successive lockdowns, only opening up briefly before rising infection rates forced authorities to close borders again. Companies have had to load up on debt or turn to governments for handouts. Tui, Europe's largest tour operator, has received €4.3bn in loans from the German state bank KfW since the onset of the pandemic, while US airlines received more than $60 billion in government aid. Even the stronger travel companies have had to raise cash, lay off staff, and shrink operations. Expedia reduced its global headcount by 3,000 people to about 19,000. British Airways cut its workforce by nearly a third. Hilton, traditionally seen as one of the outstanding hotel groups by analysts, has cut 2,100 jobs and issued $4.4 billion in bonds. The crisis has been felt unevenly across the world.

Successful vaccinations, however, means that most countries are now loosening restrictions, and businesses can begin to inch back to profitability. Even Australia, one of the first countries to introduce mandatory hotel quarantine for arriving travelers, has started to welcome vaccinated international arrivals without requiring an isolation period.

"The recovery has really taken shape as people have become comfortable and can do more in destinations," said Dan Wasiolek, an analyst at Morningstar, in the fall of 2021. "People had to get comfortable with flying again after 9/11. There was that pure aspect of fear in the same way there was that pure aspect of health this time."

According to the World Travel & Tourism Council, for an industry that has lost more than $6 trillion in the pandemic, according to the World Travel & Tourism Council, the critical stage in that recovery came on November 8, 2021, 33 countries, including the

UK and most European nations, announced the resumption of transatlantic flights.

Only select business travelers and US residents were allowed to traverse the Atlantic during the pandemic. So, the resumption heralded the revitalization of US and UK carriers that earned annually $9 billion in revenue before the pandemic from this world's most lucrative air routes. But beyond the hoopla from the travel industry over pent-up demand and future bookings, the fundamental questions over the speed and shape of the recovery are proving difficult to shift.

Technology can perhaps help to offset some of these factors, say industry experts, but many predict that overall revenues will not rise to pre-pandemic levels until 2025 at least.

There is a more urgent question among travel executives, analysts, and investors: how much will travel change?

"In our mind, the world is totally different because of the pandemic," says Brian Chesky, chief executive of Airbnb, the accommodation booking platform. He describes it as "one of the biggest changes to daily living since World War Two. This to me is a revolution, I don't think travel is going back to where it was because I don't think the world is going back to where it was."

Chief executive of London's Heathrow airport, John Holland-Kaye, expects a "reasonably steady" recovery but warns that travelers need to "get used to flying again." Still, expensive testing rules could prove a damper.

According to the UN World Tourism Organization recovery tracker, air reservations between January and October 2021 languished 86 per cent lower than in the corresponding period of 2019. Nearly half of the travel executives the tourism body surveyed in June did not think the industry would recover to pre-pandemic levels until 2024 at least.

In the years after the 9/11 attacks, successive terror threats and increased security at airports triggered greater anxiety among travelers and a marked fall-off in traffic. Yet, by the mid-2000s, the sector

was back to robust health. It hit another significant dip after the 2008 financial crash. Still, it was transporting 1.5 billion passengers, more than at any time in history, before the pandemic struck, according to the World Tourism Organization (UNWTO). The numbers were bolstered by growing middle classes in the developing world.

"The trouble is that when our industry suffers a shock, it tends to suffer a much bigger shock than other industries. But we are agile and things are coming back," says Julia Simpson, president of the World Travel and Tourism Council. "We are seeing light at the end of the tunnel and things are beginning to bounce back because people ultimately really, really want to travel."

Airbnb laid off 1,900 of its 7,500 staff in May 2020 before completing a blockbuster stock market listing in December that valued the company at $86 billion. In the post-pandemic world it is operating on the assumption that video conferencing and homeworking are here to stay and that travelers are changing their approach to trips, extending business jaunts into holidays and choosing to work from more exotic locations.

"We believe in a world where people have newfound flexibility they haven't had before," says Airbnb's Chesky. He, and others in the hotel industry, such as Marriott boss Tony Capuano, believe that this will drive people to take longer trips where they combine leisure and work and that business meetings will essentially move online. It hinges on remote working leading to a new form of business travel where employers organize off-site hotel meetings to bring employees from disparate locations together.

Chesky says that Airbnb, which on November 4, 2021, reported that stays of 28 days or more were its fastest-growing area, will go from being a short-term rental business to a "travel and living" company that hosts people for months at a time. It is upgrading its website and app to encourage longer stays and more hosts to sign up.

Some companies, including Procter & Gamble, Ford and PwC, have said they would make remote working an option for staff, while others such as Lloyds Banking Group and S&P Global have an-

nounced plans to cut carbon emissions by reducing business travel.

Holland-Kaye of Heathrow says that he has been "surprised by how strong the business market has been coming back", while British Airways has seen demand for corporate travel pick up since the US said it would reopen its borders. "The front end of the plane is the busiest, that's good news for airlines because that is the most profitable segment," he says. "But I think the mix that we have been used to, about a third business, a third leisure and a third visiting friends and relatives, I think that is probably where we will end up."

In the long term, many in the industry think the environmental damage of travel will prove a greater hurdle to overcome than even the ravages of the pandemic, with climate figuring in people's travel decisions as much as cost, location, and service in the future.

Expedia and its rival Booking.com are working on ways to show customers the environmental impact of their booking in the same way that websites show the star rating of hotels, while Google's flight search tool is already showing the carbon emissions of journeys alongside the price.

Ahead of the COP26 climate summit, flight operators and travel companies unveiled a blizzard of pledges and net zero commitments in an attempt to counter any argument that we should fly less or that governments should introduce carbon taxes to control demand.

British Airway's owner has promised to invest $400m in sustainable aviation fuels over the next 20 years to help the industry hit a 2050 net zero target, while even proudly penny-pinching Ryanair has opened a sustainable aviation research center.

Cruise lines such as Royal Caribbean and MSC have announced plans for hybrid-powered ships and carbon offsets.

Ever the optimist, Ryanair's chief executive Michael O'Leary believes that neither the pandemic nor climate change will have "any lasting impact" on flying: "The idea that post-Covid people will

never travel again, or post-COP people will stop flying or flight shaming? It's never going to happen."

What I do hope will happen when the pandemic subsides, is that we re-calibrate our business and leisure travel schedules – and our human, political and economic virtues.

Compassionate Capitalism, a subject I touched upon in the *Introduction*, is tackled and spelled out in *Chapter Seven*. Democratic Capitalism with Judeo-Christian Western characteristics, versus, Authoritarian Socialism with Buddhist-Taoist Chinese characteristics? How about blending the best of both? Fusion of political and economic models – Compassionate Capitalism.

It's the New Normal!