Chapter 20
Dirt Day

The irony was painful.

On the 40th anniversary of the original Earth Day, a deep-water oil drilling rig, aflame in the Gulf of Mexico, sank to the bottom of the sea, triggering one of the worst environmental disasters in American history.

Two days earlier, the rig, called Deepwater Horizon and owned by the oil giant British Petroleum (BP), exploded and caught fire. Fifteen oil workers were injured in the blast, which was caused by a sudden rush of methane gas up from the well site. Eleven others were reported missing and are now presumed dead. At the time, BP had been drilling an 18,000-foot exploratory well in the Macondo Prospect, an oil-and-gas deposit located 13,000 feet below the sea floor. Although the precise cause of the explosion is not yet clear, the failure of a so-called 'blowout preventer' to seal the broken well after the explosion means that an unknown amount of crude oil is now pouring directly into the Gulf. When and how the broken well might be capped and what damage it might do ecologically and economically to the region is unknown at this point, but the potential for devastation is high.

When early attempts to shut off the flow of crude came up woefully short, one BP executive complained to the media that working with robots at a depth of 5000 feet below sea level was like "working in outer space."

Welcome to the Age of Consequences, where our unquenchable appetite for oil now requires us to drill in 'outer space' – a place where when things go wrong, they go *tragically* wrong (the BP executive's comment recalled a famous poster for a 1980s science-fiction movie thriller whose tag line was: "In space, no one can hear you scream"). The tragedy is unfolding now, as images of oil-soaked wildlife and angry fishermen, their livelihoods destroyed, dominate the daily news. Outrage across America is palpable, especially as the scale of this disaster grows, and all manner of finger-pointing has already begun. Where it will all lead is anyone's guess.

If it all feels eerily familiar…well, it is. Part of the painful irony of the Deepwater Horizon spill is that *another* oil spill played a key role in goosing the original Earth Day into existence.

On January 29, 1969, a Union Oil drilling rig located six miles off the coast of Santa Barbara, California, suffered a similar natural gas "blowout." Unlike BP, however, Union Oil was able to cap the blowout quickly (because they weren't working in 'outer space'). Unfortunately, high pressure in the oil field caused ruptures in the ocean floor, causing 200,000 gallons of crude to leak into the ocean, whose currents quickly spread thick, oily tar across miles of pristine southern California beaches (the BP spill, in comparison, leaked 200,000 gallons of oil in only a few hours). After eleven frenetic days, Union Oil stopped the leak. But the damage had been done.

Seabirds were especially hard hit – approximately 3600 died as a consequence of the spill. Worse for Union Oil, images of dead birds, seals, and dolphins were repeatedly played on television sets

across the nation, causing a storm of outrage. People burned Union Oil credit cards, boycotted their gas stations, and gathered 100,000 signatures on a petition that called for a ban on off-shore oil drilling. "I am amazed at the publicity for the loss of a few birds," is how Union Oil chief Fred Hartley responded. "Never in my long lifetime have I ever seen such an aroused populace at the grassroots level," said Thomas Storke, editor of a Santa Barbara newspaper.

And this from President Richard Nixon: "The Santa Barbara incident has frankly touched the conscience of the American people."

As if on cue, a few months later the highly polluted Cuyahoga River in Cleveland, Ohio, burst into flames.

The following spring, Earth Day rocked the nation.

A blizzard of landmark federal legislation followed in the wake of these events, including the National Environmental Policy Act (1970), an extension of the Clean Air Act (1970), the Clean Water Act (1972), the Endangered Species Act (1973), and the creation of the Environmental Protection Agency, all signed into law by President Nixon.

In a speech in 1970, Nixon told the nation "The great question… is, shall we make our peace with nature and begin to make reparations for the damage we have done to our air, our land and our water? Restoring nature to its natural state is a cause beyond party and beyond factions.… It is a cause of particular concern to young Americans – because they more than we will reap the grim consequences of our failure to act on programs which are needed now if we are to prevent disaster later…"

Nixon continued: "The argument is increasingly heard that a fundamental contradiction has arisen between economic growth and the quality of life, so that to have one we must forsake the other. The answer is not to abandon growth, but to redirect it…
I propose, that before these problems become insoluble, the nation develop a national growth policy. Our purpose will be to find those means by which federal, state and local government can influence the course of … growth so as positively to affect the quality of American life."

These words are amazing and depressing words to read today, four decades later, and not simply because they are the words of a *Republican* president. They are amazing because they were so prescient, and depressing because we didn't act on them, and now must bear the consequences, as Nixon warned. As the Deepwater Horizon disaster demonstrates, America never developed a national growth policy, unless you consider unchecked growth a policy. And Deepwater Horizon is just the tip of the iceberg, to mix crisis metaphors.

I came across Nixon's remarkable words in the transcript of a speech given this past January by Gus Speth, a leader in the environmental movement and former aide to President Jimmy Carter, who recently retired as the Dean of Yale's famous School of Forestry. In the past few years, Speth's attention has focused on our converging planetary crises and how the shortcomings of

the environmental movement failed to prevent them. In fact, he argues that the movement, catapulted into the front lines of American politics and society during the original Earth Day, is now dying – and doing so precisely at the wrong moment. Paradoxically, it is dying not as a result of a lack of environmental crises, or because of a reduction of corporate malfeasance, or because of a lack of popular support. Rather, it is dying *in spite* of these things.

"The environmental movement," he said in his speech, "has grown in strength and sophistication, and yet the environment continues to go downhill, fast. If we look at real world conditions and trends, we see that we are winning victories but losing the planet, to the point that a ruined world looms as a real prospect for our children and grandchildren."

He believes the specter of failure is haunting environmentalists. That's because the only valid metric of success that matters is the condition of the planet, not the size of membership in conservation organizations, the size of their staffs, or even the number of putative victories in Congress or state legislatures. And on this score, disaster looms.

He cites the evidence from the United States:

- We are losing 6000 acres of open space every day and 100,000 acres of wetlands every year.
- Since 1982 we have paved or otherwise developed an area the size of New York State.
- Forty percent of U.S. fish species are threatened with extinction, a third of plants and amphibians, twenty percent of birds and mammals.
- Since the first Earth Day, we have increased the miles of paved roads by 50 percent and tripled the total miles driven.
- Solid waste generated per person is up 33 percent since 1970.
- Half our lakes and a third of our rivers still fail to meet the fishable and swimmable standard that the Clean Water Act said should be met by 1983.
- EPA reports that a third of our estuaries are in poor condition, and beach closings have reached a two-decade high.
- A third of Americans live in counties that fail to meet EPA air quality standards.
- And we are still releasing truly vast quantities of toxic chemicals into the environment – over five billion pounds a year, at least.

And the global news is even grimmer:

- Half the world's tropical and temperate forests are now gone, with the rate of deforestation in the tropics continuing at about an acre a second.
- Half the planet's wetlands are gone.
- An estimated ninety percent of the large predator fish are gone, and 75 percent of marine fisheries are now overfished or fished to capacity.
- Almost half of the world's corals are either lost or severely threatened.
- Species are disappearing at rates about 1,000 times faster than normal. The planet has not seen such a spasm of extinction in 65 million years.
- Over half the agricultural land in drier regions suffers from some degree of deterioration and desertification.

- Persistent toxic chemicals can now be found by the dozens in essentially each and every one of us.
- Despite stern warnings now thirty years old, we have neglected to act to halt the buildup of greenhouse gases in the atmosphere and are now well beyond safe concentrations.
- Industrial processes are fixing nitrogen, making it biologically active, at a rate equal to nature's; resulting in the development of hundreds of documented dead zones in the oceans.
- Human actions already consume or destroy each year about 40 percent of nature's photosynthetic output, leaving too little for other species.
- Freshwater withdrawals are now over half of accessible runoff, and soon to be 70 percent.
- The following rivers no longer reach the oceans in the dry season: the Colorado, Yellow, Ganges, and Nile, among others.

He notes one important success: the global effort to protect the ozone layer.

"And so here we are, forty years after the burst of energy and hope at the first Earth Day," he said in the speech, "on the brink of ruining the planet. Indeed all we have to do to destroy the planet's climate and biota and leave a ruined world to our children and grandchildren is to keep doing exactly what we are doing today, with no growth in the human population or the world economy."

And he said this *before* BP's oil rig exploded and sank into the Gulf of Mexico.

He includes the environmental movement in the Business-as-Usual paradigm that is destroying the planet for a simple reason: it has been ineffective in stopping these developments. Doing more of the same, Speth says, won't cut it (recalling Einstein's famous definition of insanity: doing the same things over and over while expecting a different result.) What is needed now, he says, is a *new environmentalism*, one that confronts our destructive economy head on.

I won't go into the details of his argument. Instead, I want to shift gears somewhat and talk about one of Speth's crisis bullets – and do so in the context of our failure to keep ourselves from entering the Age of Consequences. It's the bullet about how over half the agricultural land in Earth's drier regions suffer from some degree of deterioration and desertification.

I'll start by stating that I think 'Earth Day' should now become 'Dirt Day.'

The idea came to me after reading "*Dirt!: the Erosion of* Civilizations, by David Montgomery, a professor of geology at the University of Washington. Although ostensibly a history of dirt, it's really a book about the failure of modern society to learn lessons and avoid repeating mistakes that hastened the demise of past civilizations. Most modern crises, Montgomery observes, have an element of speed to them: rapidly rising temperatures, an accelerating rate of species extinction, and so on. Dirt is different. Its crisis timescales are slow – in fact, almost too slow for humans to see. Erosion, for example, can be going on for decades before it's noticed. And by then, it is often too late.

Dirt is created naturally by the weathering of solid rock over time, usually at the rate of about one inch per thousand years. In some agricultural systems (of the sustainable variety), this rate can be speeded up to one inch per hundred years, largely by the employment of manure and other natural fertilizers that help to create rich, thick humus. Unfortunately, we are eroding our soil in many places around the planet at the alarming rate of an inch per *decade*. This, obviously (or should be anyway), will result in serious trouble ultimately.

The reason is simple: there is no substitute for dirt. Oil and natural gas can perhaps be replaced by other energy sources, preferably renewable ones, but plants and animals – and us by extension – require dirt for our existence. Nothing else does what dirt does. In addition to being the medium in which our food grows, dirt provides drinking water, recycles dead material into new life, circulates essential nutrients, stores carbon, and even remediates waste. Montgomery calls it our most underappreciated and yet essential natural resource. If we wash it away, then we pay the consequences.

As a crisis, however, dirt is to hard to fathom. That's because it never *feels* like a crisis; instead it just quietly slips away, one particle at a time. In this way, it is similar to the climate crisis, in which the steady 'drip-drip' of greenhouse gas buildup in the atmosphere isn't noticed on a daily or monthly basis, unlike an oil spill, until its cumulative effects can be detected – often too late. As Montgomery notes, it is this type of 'drip-drip' crisis that poses our greatest challenge.

"Mortgaging our grandchildren's future by consuming soil faster than it forms," he writes, "we face the dilemma that sometimes the slowest changes prove the most difficult to stop."

Few places on Earth produce soil fast enough to sustain industrial agriculture over human time scales, he argues, which means we are slowly running out of dirt. This isn't a new phenomenon, of course. As the Sumerians, Greeks, Romans, Mayans, Chinese, and early settlers in America could tell you, dirt matters. In fact, the history of dirt suggests that how people treat their soil can impose a life span on civilizations. That's because dirt is required for food production and water retention – activities mandatory for a healthy civilization. Time and again over the course of human history, social and political conflicts grow when there are more people to feed than can be supported by the land.

Civilizations don't disappear overnight and they don't choose to fail. More often they falter and then decline as their soil disappears over generations. Rome didn't so much collapse as it crumbled, says Montgomery, wearing away as erosion sapped the productivity of its homeland.

"A common lesson of the ancient empires of the Old and New Worlds," he writes, is that even innovative adaptations cannot make up for a lack of fertile soil to sustain increased productivity. As long as people take care of their land, the land can sustain them." Conversely, neglect of the basic health of the soil accelerated the downfall of civilization after civilization even as the harsh consequences of erosion and soil exhaustion helped push Western society from Mesopotamia to Greece, Rome, and beyond.

It's not just ancient history either. In America today, millions of tons of topsoil are eroded annually from farm fields in the Mississippi River basin into the Gulf of Mexico. America's farms erode enough soil every year to fill a pickup truck for every family in the country. An estimated 24 billion tons of soil are lost annually around the world – several tons for each person on the planet.

Worldwide, over two billion acres of virgin land have been plowed and brought into agricultural use since 1860. Until the last decades of the 20th century, clearing new land compensated for loss of agricultural land. In the 1970s the U.S. lost four billion tons of soil each year – a billion tons a year more than in the 1930s. At that rate it will take only a century to lose the remaining topsoil. Recently, the USDA estimates that the rate has dropped to just under two billion tons – still far ahead of soil production,

The United Nations estimates that 38% of global cropland has been seriously degraded since WWII. In the agricultural era, nearly a third of the world's potentially farmable land has been lost to erosion, most of it in the past forty years. According to Montgomery, this happens because cultivating a field year after year without effective soil conservation is like running a factory at full tilt without investing in maintenance or repair. Good management can improve agricultural soils just as easily as bad management can destroy them, though once soil is lost recovery generally lies beyond history's horizon. With just a couple of feet of soil standing between prosperity and desolation, Montgomery says, civilizations that plow through their soil vanish.

Perhaps just as importantly, technology will not save us. It can't create more dirt, only nature can. This is the Big Lesson of dirt, Montgomery says: when you depend on a resource that is difficult to renew, eventually you wind up in serious trouble.

"Modern society fosters the notion that technology will provide solutions to just about any problem," he writes. "But no matter how fervently we believe in its power to improve our lives, technology simply cannot solve the problem of consuming a resource faster than we generate it: someday we will run out of it."

According to Montgomery, even a casual reading of history shows that under the right circumstances any one, or any combination of political turmoil, climate extremes, or resource abuse can bring down a society. Alarmingly, he says, we face the potential convergence of all three in the upcoming century as shifting climate patterns and depleted oil supplies collide with accelerated soil erosion and loss of farmland. Should world fertilizer or food production falter, political stability could hardly endure.

We must do things differently.

"Clearly, more of the same won't work," he concludes, sounding very Nixon-like. "Projecting past practices into the future offers a recipe for failure. We need a new agricultural model, a new farming philosophy. We need another agricultural revolution."

We need a Dirt Day.

Fortunately, a new farming philosophy is coming (just in time, I hope), but I'll leave that discussion for another day.

What's clear is this: on April 22, 2010, a new warning light quietly blinked into existence on the dashboard of the moving vehicle called *Civilization* (see the **Preface** to this Chronicle). It joined six others: a flashing, buzzing light in the shape of a thermometer indicating rising global temperatures, a unblinking low-oil light representing depleting oil reserves, a light in the shape of a hand-holding family indicating a decline in ecosystem services and their impact on human well-being, a broken arrow signaling limits to economic growth, a sheath of wheat representing inaccessibility to basic commodities, and a dollar bill sign indicating ongoing the financial crisis that began in the fall of 2008 with the meltdown on Wall Street.

Now a new warning light can be added: the broken column of a Roman ruin, signifying the dirt crisis – and the erosion of society.

While headlines are focused on the 'Crisis du Jour' – in this case the Deepwater Horizon disaster now befouling the Gulf of Mexico – the real crisis lurks in our dirt, and in our inability to see past our noses. Seven warning lights in our collective dashboard ought to be enough to goose us into action. At the very least, they ought to make us ease up on the accelerator, and maybe chase off the legion of cheerleaders on the sidelines urging the vehicle forward. They ought to, anyway.

There is an important lesson in dirt. Instead of encouraging us to take further risks in 'outer space,' it brings us back to earth, where we belong.