Note: *I had planned on an in depth look at this with citations but it has been sitting a long time and I finally realized I just didn't have the energy to finish it. You will, however, get the point enough to understand where I am going with it. There are unexpected side effects to every rationalist attempt to control nature. In most instances, these side effects are either ignored or downplayed and certainly there is no attempt to take responsibility for them, quite the contrary. I have also not done a final proof reading. There are most likely a number of typos.*

IATROGENESIS TWO

Indirect Deaths and Illnesses Caused By The Medical Industry

Stephen Harrod Buhner

It is simply no longer possible to believe much of the clinical research that is published, or to rely on the judgment of trusted physicians or authoritative medical guidelines. I take no pleasure in this conclusion, which I reached slowly and reluctantly over my two decades as an editor of the New England Journal of Medicine.

Marcia Angell, MD

We would like to think we have health care that incidentally involved some wealth transfer; what we actually have is wealth transfer that incidentally involves some health care.

Timothy Snyder

What is essential to understand (if you really want to understand health care in the west) is that the medical industry/system in the United States and the western world is a grouping of interlocked cartels, each utilizing and supporting the others in order to maintain their control over health care. They do this in order to sustain and continually increase the enormous amount of money they make each and every year.

There are four of these cartels: physicians, hospitals (which are increasingly bundled together and owned by large corporations), pharmaceutical corporations, and medical device manufacturers. As a group, as I explored in "Iatrogenesis One," create direct harm to patients, including death and severe disability (iatrogenesis). But they also are responsible for indirect iatrogenesis that in its aggregate far outnumbers the costs, deaths, and disabilities of direct iatrogenesis. More directly, the medical industry is one of the most dangerous corporate industries on the planet, creating substantial harm to individuals, groups, the social structure, and the environment.

There are reasons why so few people know this, reasons why it rarely appears in the media, or on ecological activists' radar. We've been led to believe that physicians and western health care have our best interests at heart, that their behaviors are benign, that pharmaceuticals are generally beneficial when we take then, and that they are ecologically harmless. Nothing could be further from the truth. (There is an additional element: the belief that "modern" medicine is based on science, that it is the only kind of health care that ***is*** based on science, and that all other forms of healing are some form of quackery or a holdover from when people were governed by superstition and not reason. The belief is that if enough money and time is given, this form of health care, rationality itself, will eliminate all disease, perhaps even death itself.

This, too, is far from the truth.)

I have already written about direct iatrogenesis, which results (conservatively) in more than 700,000 deaths a year in the United States, making it the number one cause of death each year. This second installment looks at indirect harms and covers a number of topics, all of them relatively superficially since full coverage is impossible in a short monograph. To be clear, it is not possible to come up with an aggregate of death and disability figures for indirect iatrogenesis simply due to the fact that no one has been looking for them. Nor is it possible to come up with an aggregate figure for costs associated with its social harms. Nevertheless, as you look over the following material I think you will get a pretty good idea of the severity of both impacts and costs.

There are many aspects to indirect iatrogenesis (such as radioactive waste – which I cover to some extent in *The Lost Language of Plants* – and the funeral industry – embalming is very toxic but so are the many elderly bodies that are buried or burned, simply from the extreme amounts of chemical drugs in them at death. Also in *The Lost Language of Plants*.)

But here, I will only look at four: **pharmaceuticals** (in the most depth), **plastics** (next most depth), **the drug war**, and, as a group: **health care inequality, predatory pricing, and bankruptcy.**

First up: the pharmaceutical industry. (Note: this material was expanded and then incorporated into my book *Earth Grief: The Journey Into and Through Ecological Loss*.)

The Ecological Impacts of Pharmaceuticals and the Medical Industry

Pharmaceuticals are now major environmental pollutants, and are ubiquitous in

waters and soils. Unlike other environmental pollutants pharmaceutical pollutants are not yet regulated globally . . . . But the pitfalls of pharmaceutical pollutants extend beyond acute effects to delayed effects from bioaccumulation, amplified effects from drug-drug interactions, exacerbation of drug resistance, and reduction in aquatic and terrestrial food production.

Kamba, et al

What will it mean to raise our babies on water contaminated with low levels of birth control drugs and athlete's foot remedies plus Viagra, Prozac, Valium, Claritin, Amoxicillin, Prevachol, Codeine, Flonase, Ibuprofen, Dilantin, Cozaar, Pepcid, Albuterol, Naproxen, Warfarin, Ranitidine, Diazepam, Bactroban, Lotrel, Lorazapam, Tamoxifen, Mevacor, and dozens of other potent drugs, along with hair removers, mosquito repellents, sunburn creams, musks and other fragrances? No one knows, but evidently we're going to find out, learning by doing.

Peter Montague

What is the collateral damage of the pharmacist's pipette?

Dale Pendell

Few people know that one of the world's primary and most dangerous sources of ecological destabilization is the medical industry. While it's relatively common knowledge that agricultural chemicals possess deleterious side effects this same awareness has not extended itself to

pharmaceuticals (which are often identical to agricultural chemicals). People have simply bought into the belief that the medical industry is rather benign, that pharmaceuticals are one of the great innovations of the species, and oddly enough, that such drugs are ecologically free of harm. Nothing could be further from the truth.

> *Axiom Six: When a giant corporate industry that makes billions of dollars in profits every year tells you they have your best interests at heart, they are lying. In addition, they are **always** hiding things they don't want you to know. This usually involves the ways in which their business is and has always been deleterious for the health of democracies, people, the planet, and every life form on it. The only distinction to be made between such giant corporations is the degree of harm they cause.*

Here are some facts about pharmaceuticals and the medical industry that you will not have heard before . . .

* *Nearly all pharmaceuticals are made from petroleum.*

Thus, we will not be getting rid of oil. Ever. The entire medical system depends on petroleum for almost everything it needs to function, from the drugs it uses to the plastics that make its hypodermic syringes, tubing, IV bags, counter tops, and so on and on and on. This is not the way it was fifty years ago when nearly everything they needed was reusable or recyclable. (Hypodermic syringes, for instance, were made of glass and simply sterilized after use so they

could be used over and over again). Everything they used was made of glass and paper and cotton and metal, most pharmaceuticals were inexpensive, and there weren't very many of them.

* *Very few pharmaceuticals are biodegradable.*

Unless exposed to high heat, sunlight, or oxygen for extended periods, pharmaceuticals continue to be functionally active for decades or even centuries. Few drugs are exposed to either. Most of the time they are excreted from our bodies into the water in our toilets or thrown into landfills (sometimes a small portion of the world's expired drugs are incinerated which, of course, comes with its own problems). Most drugs travel into darkness where they are safe from harm, where they remain active . . . and eternal.

When pharmaceuticals enter the waste stream, sooner or later they become part of the streams, rivers, lakes, or underground aquifers of this planet. Sooner or later, those thrown into landfills contaminate groundwater as well. As only one example, researchers have tracked a plume of contaminated groundwater from a landfill at Jackson Naval Air Station in Florida that has been slowly moving underground for more than 40 years now. It still contains metabolically active drugs including pentobarbital, meprobamate, and phensuximide – a barbiturate, a tranquilizer and an anticonvulsant.

* *When people take pharmaceuticals, the largest portion of the ingested drugs, in either their pure form or their metabolized byproducts, are excreted into the toilet where they immediately enter the waste stream where they remain active indefinitely.*

Pharmaceuticals are not foods and most of the time the body does not use them similarly,

that is, the majority of them are not broken down and their molecules incorporated into our bodies the way that food is. They are either excreted unchanged or in metabolized form, meaning that as the body processes them it creates biological byproducts which are then also excreted. Fifty to ninety-five percent of the drugs (depending on the drugs) that people take are excreted chemically unchanged or unmetabolized into the waste stream. And they remain pharmacologically active once they are.

Nearly all medical drugs are intended to force the body to function within a certain range that researchers have decided is "normal." That is, drugs for high blood pressure force the high pressure to reduce by making the body behave. They do not cure the disease (or condition) which is causing the high blood pressure. You take the drug, the body is forcibly altered, the drug is excreted during the day, its actions slowly fall, blood pressure rises again, and you have to take the drug once more. That is why drugs have to be taken throughout the day – what determines how often you take it is the drug half life, that is, how quickly the drug leaves the body.

Many people take these kinds of drugs for the rest of their lives. And the pharmaceutical industry likes it that way. They love drugs which have to be taken for a lifetime in comparison to drugs such as antibiotics which are taken short term (and actually cure a disease condition). This is one of the main reasons that the world's drug companies are getting out of the antibiotic business.

Daily-use drugs make pharmaceutical companies money forever. And billions of people all over the planet are taking them and excreting them or their metabolites into waste streams every day of their lives – for years and years and years.

* *Water treatment facilities are unable to remove the hundreds to thousands of pharmaceuticals that enter the waste stream every day.*

Waste treatment is still locked into a late nineteenth-century, early-to-mid-twentieth-century mindset. It isn't very good nor is it ecologically oriented.

> *This is a main reason that innovation in waste treatment is extremely rare – the other big factor is the western world's people's extreme discomfort with (and fear of) poop and pee and menstruation. (There is a widespread belief that humans are angelic beings trapped on top of biological sewers.)*
>
> *The fanatical use of wet wipes instead of toilet paper these days is to get all that nasty poop off people's asses. The wipes are then flushed down the toilet in their millions along with additional millions of tampax every day of every week of every year. These combine with fats from cooking and become the source of all those fatbergs blocking sewer systems in cities around the world.*
>
> *Individual waste treatment systems do exist that are about the size of a home heating/air conditioning unit and can be placed in any house. They treat the water so well that it is purer than tap water; it is then recycled back into the home water supply. The solids are processed into a sterile powder. Systems like these are not allowed to be used. They don't pass building codes. And I don't know if they ever will. (Drinking old pee water? No way! We are a civilized people!)*

For the most part, waste treatment remains focused on the big stuff (floaters) and some common

infectious agents, not the thousands of drugs that have been created since waste treatment plants were invented.

Most people tend to think of waste treatment plants as treating household excretions and waste but at least half (and sometimes far more) of what goes into waste treatment plants now comes from industry. This includes all kinds of manufacturers such as chemical plants; hospitals (who dump massive amounts of drug-contaminated human waste, expired medications, and other wastes into the water and solid waste streams); other medical "care facilities" (physician, dentist, and veterinary offices and nursing homes flush as much as *250 million pounds* of expired or excreted pharmaceuticals down the drain every year in the U.S.); mortuaries (who liquify internal organs and flush them down the drains – organs that are often highly toxic from end-of-life medical treatments, as well as massive amounts of embalming fluids and cosmetics); and pharmaceutical manufacturing and bottling plants. Very few waste treatment plants are designed that can properly deal with either the chemicals that these sources dump into them or those from people's toilets. It is a case of nineteenth- and early twentieth-century technology meeting twenty-first-century waste. And as is true of all infrastructure in the United States now, no one wants to pay for upgrading the system.

As the waste streams from homes and industry flow into and through treatment plants, two things come out: liquid and sludge. Both contain significant amounts of pharmaceuticals (including those from illegal drug labs as well as drug users – an unforeseen side effect of scientists and the medical industry which created those substances to begin with) and personal care products such as the sunscreens, lotions, perfumes, hair conditioners, and shampoo that wash off during bathing. The sludge is either put into landfills or spread on fields as fertilizer in

the U. S. (but not for human food as it traditionally was before the modern, western era). In many parts of Asia sludge is still used as fertilizer, sometimes in perfect safety (as it has been for thousands of years) but with the advent of western pharmaceuticals it is often no longer safe to do so, because . . .

Most of the world's pharmaceutical production has shifted to three countries: China, India, and Pakistan. As Muhammad Saif Ur Rehman, et al, comment:

> *These countries have made tremendous progress in the pharmaceutical sector but most of the industrial units discharge wastewater into domestic sewage networks without any treatment. The application of untreated wastewater (industrial and domestic) and biosolids (sewage, sludge, and manure) in agriculture causes the contamination of surface water, soil, groundwater, and the entire food web with pharmaceutical compounds (PCs) and their metabolites and transformed products (TPs), and multidrug resistant microbes.*

Though people in the United States (and most western nations) generally believe that wastewater treatments plants make the liquids ecologically safe, they don't. The liquids still contain hundreds to thousands of pharmaceuticals. And all of it flows into the nation's ground water. The water supplies of every major metropolitan area in the United States have been found to contain pharmaceuticals. When the associated press contacted 62 water suppliers, 34 of them reported that they do not and never have tested their water for the presence of pharmaceuticals. Those that did only tested for a few. (The machines that test need a "software library" to identify the various

chemical structures; the software is very expensive. Most treatment plants can't afford it or can only afford to identify a few.) As Mompelat, et al, note, "Through this review, it appears that the pharmaceutical risk must be considered even in drinking water where concentrations are very low. Moreover, there is a lack of research for by-products (metabolites and transformation products), characterization, occurrence, and fate in all water types and especially in drinking water."

The problems are pervasive: pharmaceuticals are in every water source across the planet. As Maryna Strokal, a scientist at Wageningen University and Research puts it, "In 2000, sewage was a source of pollution in about 50% of the rivers of the world. By 2010, sewage was a source of pollution in almost all rivers worldwide." (That ten year change gives a good idea of the exponential growth of pharmaceutical use and pollution; it's only going to get worse.)

* *Excreted and waste pharmaceuticals are altering the physiology and behavior of every organism on this planet. The full range of effects is unknown, neither the pharmaceutical nor the medical industry want it to be known, hence there is little money being set aside to fund research.*

Because all Earth organisms come from common roots, human drugs affect every life form on this planet. In other words if the drugs affect us they have impacts on the physiology and functioning of everything else, from microbes to insects to fish to birds to mammals. Because this is rarely a focus of ecological studies, it is not yet known how severely the life forms on this planet are going to be affected, especially the long term. As researchers Christian Daughton and Thomas Ternes note . . .

> *Although most pharmaceuticals are designed to target specific metabolic pathways in humans and domestic animals, they can have numerous often unknown effects on metabolic systems of nontarget organisms, especially invertebrates. Although many nontarget organisms share certain receptors with humans, effects on nontarget organisms are usually unknown. It is important to recognize that for many drugs, their specific modes of action even in the target species are also unknown. For these drugs, it is impossible to predict what effects they might have on nontarget organisms.*

And as Kolpin, et al, comment, "Surprisingly, little is known about the extent of environmental occurrence, transport, and ultimate fate of many synthetic organic chemicals after their intended use, particularly hormonally active chemicals, personal care products, and pharmaceuticals that are designed to stimulate a physiological response in humans, plants and animals."

Nevertheless, the effects that are already known are extremely frightening, pervasive, and extensive. They are also unexpected. For example, as Arnold, et al comment, "Pharmaceuticals are designed to alter physiology at low doses and so can be particularly potent contaminants. The near extinction of Asian vultures following exposure to diclofenac is the key example where exposure to a pharmaceutical caused a population-level impact on non-target wildlife."

All chemical manufacturers, including pharmaceutical companies, and most governments adhere to the Kehoe Paradigm when it comes to all chemicals, including pharmaceuticals. Thus, the majority of all manufactured chemicals (and all pharmaceuticals) are assumed to be ecologically safe until proven otherwise. (This is why the corporations hire scientists to

continually cast doubt on the harm they cause.)

Most people incorrectly believe that if the FDA determines a drug to be safe for human use it is then safe in the larger, more expansive sense of that word – that is, that it is ecologically benign. But drugs are not ecologically benign. They are some of the most dangerous substances on this planet.

* *Contrary to the beliefs of the majority of medical researchers, physicians, chemists, toxicologists, reductionists and the general population, the smaller the dose the more physiologically and ecologically damaging the drug becomes in the environment.*

Excreted drugs are heavily diluted by the water into which they are excreted or thrown. This means that when water (both wild and domestic) is analyzed for the presence of pharmaceuticals, the drugs are generally found to be present in parts per million (ppm), parts per billion (ppb), or parts per trillion (ppt). (As yet, no one is testing for parts per quadrillion though there is every expectation, based on what has been found so far, that they will also be physiologically active.) Even at these incredibly tiny amounts the drugs have significant physiological impacts.

For example, Chris Metcalf, a researcher at Trent University in Ontario Canada detected estrone (a type of estrogen) levels in wastewater effluent up to 400 ppt and the synthetic hormone ethinylestradiol (from birth control pills) up to 14 ppt. (He found anticancer agents, psychiatric drugs, and antiinflammatory compounds as well.) Metcalf exposed Japanese medakas (a type of fish) to concentrations typical of wastewater streams for 100 days. At concentrations of 0.1 ppt of ethinylestradiol and 10 ppt estrone the fish began to exhibit intersexual changes (showing both

male and female characteristics). At 1000 ppt all the males transformed into females. That is parts per *trillion*.

These kinds of effects are not uncommon. Louis Guillette, a reproductive endocrinologist and professor at the University of Florida, spent a lifetime studying endocrine-disrupting chemicals in the environment. One area of focus was pharmaceutical estrogens and estrogen-mimics in water supplies and streams. He found that the chemicals caused reproductive problems in a wide variety of animals: panthers, birds, fish, alligators, frogs, bats, and turtles. This included, in some instances, the complete feminization of males. Androgen levels, ratios, and the amount of free testosterone in the body were all significantly altered. And the amounts needed to do this were incredibly tiny. As he noted . . .

> *We did not [test] for one part per trillion for the contaminant, as we assumed that was too low. Well, we were wrong. It ends up that everything from a hundred parts per trillion to ten parts per million are ecologically relevant . . . at these levels there is sex reversal . . . [And the research] shows that the highest dose does not always give the greatest response. That has been a very disturbing issue for many people trying to do risk assessment in tocicology.*

There is every reason to believe that the many reproductive alterations and problems that the human species is now experiencing come in large part from pharmaceuticals and other chemicals that mimic our reproductive hormones and which we are ingesting in the water we drink. We are not exempt from the ecological realities of pharmaceuticals or any other chemical compounds

that are released into the soils, air, and water of this planet. We are ecological beings on an ecological planet.

* *The amount and variety of pharmaceuticals that are entering the soils and waters of the planet are massive in scope and are increasing yearly.*

In 1999 Americans filled 2.8 billion prescriptions covering roughly 66 classes of pharmaceuticals. By 2021 that had risen to 4.55 billion prescriptions a year. By 2025 it is expected to hit 5 billion per year. These include: antidepressants, tranquilizers and psychiatric drugs; cancer (chemotherapy) drugs; pain killers; anti-inflammatories; antihypertensives; antiseptics; fungicides; anti-epileptics; bronchodilators; lipid regulators, i.e. statins; muscle relaxants; oral contraceptives; anorectics (diet medication); synthetic hormones; antibiotics; and a great many more.

The most prescribed medications in the United States are lisinopril (an ACE inhibitor for high blood pressure – 105 million prescriptions, taken daily); atorvastatin (for reducing cholesterol, preventing stroke, and reducing chance of heart attack – 105 million prescriptions, taken daily. Note: many physicians want to see *every* American on statins, permanently); levothyroxine (for hypothyroidism – 102 million prescriptions, taken daily); metaformin (type 2 diabetes – 79 million prescriptions, taken daily); amlodipine (for high blood pressure, chest pain, coronary artery disease – 73 million prescriptions, taken daily); metoprolol (high blood pressure and chest pain – 68 million prescriptions); omeprazole (gastroesophageal reflux disease, GERD – 59 million prescriptions, taken daily); simvastatin (a statin – 57 million prescriptions, taken daily); albuterol (inhaler for asthma, COPD, airway disease – 51 million prescriptions, used

daily); gabapentin (for seizures – 46 million prescriptions, taken daily); sertraline (depression, OCD, panic attacks, PTSD, anxiety – 38 million prescriptions, taken daily); escitalopram (depression, anxiety – 26 million prescriptions, taken daily); alprasolam (panic, anxiety – 26 million prescriptions, taken daily). There are, of course, hundreds more. These are just some of the most commonly prescribed.

Until 1992, estrogens for menopause were the fourth most commonly prescribed pharmaceutical in the united states with 92 million prescriptions daily. While numbers have dropped significantly (once their long term side effects became known) they are still present and actively disrupting the ecosystems of the planet. They have not yet biodegraded.

These numbers apply only to the United States. And while Americans take far more pharmaceuticals (on average) than people in other countries, there are billions of people around the world that do take them right along with us, every day of their lives. As Francesco Bregoli, a researcher at the IHE Delft Institute for Water Education in the Netherlands and a leader of the team that developed methods for tracking drug pollution hot spots has said, “Technology alone will not solve the problem; we need a substantial reduction in consumption.”

Reduction, however, is not going to happen. As Tim aus der Beek, et al, comment, “The practice of modern medicine cannot be imagined without pharmaceuticals.” Or as this is better known, “Hey! We’re talking about survival here!” When people are scared about their survival, they don’t care about the environment. At all.

* *Pharmaceuticals in their aggregate effects are not generally additive but synergistic. That is, they combine together to produce unusual and generally unknown ecological effects. And those*

combined effects produce impacts that are not predictable from knowledge of the individual drugs alone.

This is a common problem in medicine itself – the prescribing of multiple medications to patients with no awareness by the physician of their synergistic effects. Every year this leads to a significant number of deaths in the people physicians treat. (According to the *Journal of the American Medical Association* about 2.2 million people are permanently disabled or hospitalized each and every year from properly prescribed pharmaceuticals, more than 100,000 die).

The ecological impacts are far worse. Since World War II, literally, trillions of pounds of pharmaceuticals of every sort (as well as a multitude of other pharmaceutical and agricultural chemicals) have been dumped into the soils and waters and air of this planet. That they produce a wide range of unexpected effects when combined is known. What those combined effects are, how extensive they are, how serious it is . . . all of that is unknown. No one is studying the synergistic effects of combined pharmaceuticals in any depth. We, and the Earth itself, are all lab animals in a vast, uncontrolled experiment for which no scientist, physician, researcher, company, or government is taking responsibility.

***** *Pharmaceuticals are not a regulated pollutant in the united states or, for the most part, anywhere else. In consequence, manufacturers, hospitals, and mortuaries are exempt from the ecological impacts of their waste, most of which they intentionally put into waste water streams.*

Because the medical industry is the source of "modern medicine" it is almost always exempt from ecological oversight. (This is a perfect example of the conflict between competing goods, human health versus planetary health.) In one West Virginia factory, for instance, owned

by the generic-drug manufacturer Mylan (which is infamous for is owners raising the cost of epi-pens 400 percent), huge machines mix drug ingredients, press them into tablets, and fill capsules. As Natasha Gilbert in her article "Dump it Down the Drain," reports, "By the end of each run, the walls, ceilings, floors, and nearly every nook and cranny of the intricate equipment were caked in powdery drug residues." The powder was in fact everywhere. As she continues, "It was standard practice, the former workers said, to then hose down some of the rooms and machines for up to eight hours and then spray them with alcohol to clear the remaining residues, and the wastewater would flow down a drain the center of each room."

The pharmaceutical wastewater from that manufacturing plant flows into the local municipal treatment facility but as is commonly true, it is not equipped to remove the contaminants from the wastewater stream. Researchers analyzing water downstream from the treatment facility found that, among other things, one anti-seizure medication was "90 times the amount considered safe for wildlife."

Hydrologists at the United States Geological Survey (USGS) found "substantially elevated amounts of 33 different drugs in their wastewater after testing water downstream from the factories they studied." The USGS commented that "pharmaceutical manufacturing facilities are a significant source of pharmaceutical ingredients in the environment." In fact drugs downstream from the manufacturing plants were often thousands of times higher than that found in rivers without such plants. (To be clear here, *all* rivers studied have been found to have pharmaceuticals in them, just as they do plastics. They are just at lower concentrations than the amounts found downstream from waste treatment plants.)

All those pharmaceuticals tend to bio-accumulate in aquatic insects. As one researcher

noted, These insects “can have drugs at concentrations thousands of times higher in their body than in the water. They are basically small pills crawling about on the bottom of the water waiting to get eaten by fish.” And the bio-accumulation just moves up the food chain, from insect to fish to what eats the fish to people.

There are thousands of drug manufacturing plants worldwide. This story is repeated in every one, across the globe. For example, at a Pfizer plant in Puerto Rico, the USGS measured fluconazole, a fungicide, at 2000 times the levels considered safe for wildlife. (Note: the safety levels that academics come up with are guesses only. They are not actual, real world impact safety levels. Quite often, years into their research, they find that the safety levels were not stringent enough.)

Fluconazole, a triazole antifungal, is very similar to agricultural triazoles used on agricultural crops as well as plants that are part of, for instance, hospital landscaping. It turns out that triazoles in the environment, fluconazole or otherwise, cause resistance among fungal organisms such as *Candida auris* which infects people and for which no known treatment exists. In one hospital outbreak, researchers found that the landscaping around the hospital was being sprayed with the same antifungal that patients were being treated with. When they had an outbreak of *Candida auris*, they closed off the hospital rooms that were infected, placed machines in the rooms which vaporized hydrogen peroxide, left them on for several days, and then retested the rooms. Every previously found infectious organism was gone except for *Candida auris*. It remained unaffected. And all these drugs? They cause system-wide alterations in behavior, from microbes upward.

For instance, carbamazepine, an anti-seizure medication, is commonly found downstream

from the manufacturing plants that make it. It has been found to interfere with the ability of parent fish to protect their offspring, leading "male fish to perform worse when defending their offspring from predators." As one researcher noted, "We observed higher mortality from predation . . . [the parent fish] were sluggish, so their offspring were eaten more often."

Pharmaceutical manufacturers continue to deny that any of the effects being seen are from their manufacturing plants. The causes, they say, are probably hospitals and individuals pouring their medications down their toilets.

* *The ecological impacts are pervasive and extensive.*

While the pharmaceutical companies and their minions are still denying that humans are being affected by pharmaceutical pollution (in a tobacco and climate warming kind of way) it is already common knowledge in environmental journals (though not widely reported in the media) that every other life form on this planet *is* being affected. What follows is just a rough run through of available data (a full treatment would need a very large book in and of itself).

Benzodiazepines (anti-anxiety, insomnia, and panic disorder medications) bind to neuroreceptors in the brain and enhance the effect of a neurotransmitter called GABA. (We are not the only organism on the planet with GABA receptors in our neural system.) Fish that are exposed to this drug in the waters they live in bio-accumulate it in their bodies; levels are often six times that of the water they swim in. The drugs interfere with the normal predator surveillance behaviors of the fish as well as their social behavior with each other. The fish are less social, more active, aggressive, and bold. They are less concerned with avoiding their usual predators – which has an effect on their survivability. They eat more, and eat more quickly and

aggressively as well, which is impacting the delicate food webs in which they live.

Steroid estrogens in water are now known to "correlate with widespread sexual disruption in wild fish populations." But they are not limited to impacts on fish. Environmental chemical contaminants, including estrogenic pharmaceuticals, are altering epigenetic programming in species from plants to alligators. There are "perturbations of the reproductive system including abnormal ovarian morphology, decreased robustness of sexually dimorphic gene expression with the gonad, and altered levels of circulating sex steroids." Organisms from frogs to fish to alligators to panthers are showing reproductive abnormalities. Male bass in the Potomac river, for instance, are now regularly producing eggs, not just the females. As Guillette, et al comment, "Reproductive disorders in wildlife include altered fertility, reduced viability of offspring, impaired hormone secretion or activity, and modified reproductive anatomy."

Rebecca Giggs in *The Atlantic* reports that "a platypus living in a contaminated stream in Melbourne is already likely to ingest more than half a recommended adult dose of antidepressants every day. . . . Amphetamines change the timing of aquatic insect development. Antidepressants impede cuttlefish's learning and memory, and cause freshwater snails to peel off rocks. Drugs that affect serotonin levels in humans cause shore crabs to exhibit 'risky behavior,' and female starlings to become less attractive to males (who in turn sing less). Dosed with Prozac, shrimp are more likely to swim toward a light source . . . and Atlantic salmon smelts exposed to benzodiazepines – medications such as Valium and Xanax . . . migrate nearly twice as quickly as their unmedicated counterparts. . . . arriving at the sea in an undeveloped state and before seasonal conditions are favorable" for their survival.

Benzodiazepines are extremely pervasive; they are some of the most commonly

prescribed medications in the United States. They are often halogenated which means that a halogen molecule is included as part of their chemical structure. This enhances their effects in the body but it also makes them far less biodegradable when they enter the waste stream. And, similar to other pharmaceutical pollutants, they have potent effects at tiny levels. As Hughes, et al, comment, "Antidepressants appear to pose particular risk to all taxa except bacteria with effective concentrations ranging from *u*g to mg L^{-1}. Invertebrates and fish show chronic toxic effects at sub mg L^{-1} levels for cardiovascular drugs and Others; fish also appear susceptible to painkillers with median effects manifesting at 40 *u*g L^{-1}."

During the past four decades researchers have found that many aquatic organisms, especially bottom feeders and filter feeders (e.g. shrimp, flounders, oysters), possess a special excretory system called the multixenobiotic transport system (MTS). It is composed of proteins (such as Pgp) that facilitate the removal of toxic substances from inside their cells. Because of their nature both filter feeders and bottom feeders encounter large numbers of toxins in their diet. (One of the crucial ecological actions of filter feeders (such as oysters) is to clean the Earth's water ways of toxins.) These types of aquatic dwellers depend heavily on the MTS otherwise toxins would build up to insupportable levels in their bodies. But it is a nonspecific system; it recognizes many pesticides, drugs, and natural toxins alike as substances that need to be sequestered and removed. This has led to serious problems.

Drugs such as verapamil (a cardiac calcium ion influx inhibitor) directly binds to the receptor cite of Pgp thus limiting the effectiveness of the MTS system and its cellular pumping mechanisms. As a result toxins become more dangerous to many aquatic organisms at lower levels. Daughton and Ternes note that "Exposure to verapamil at micromolar concentrations and

lower greatly increases the toxicity of a number of drugs or other xenobiotics for many aquatic organisms as the toxicant cannot be readily removed from the exposed organism." Other drugs that have been shown to inhibit the MTS include reserpine (antihypertensive), trifluoroperazine (antipsychotic tranquilizer), cyclosporins (immunosuppressants), quinidine and amiodarone (anti-arrythmics), anthracyclines (noncytotoxic cytoxin analogs), and progesterone (steroid).

Selective serotonin reuptake inhibitors (SSRIs) like Prozac, Zoloft, Luvox, and Paxil, have exceptionally strong impacts on aquatic organisms as well – even in tiny amounts of parts per billion. Serotonin is important in invertebrate and vertebrate nervous systems but it also plays key roles in physiologic regulatory activities in many life forms. Among shellfish serotonin regulates reproductive activities (such as spawning, egg maturation, and hatching), heartbeat rhythm, feeding, biting, swimming patterns, cilia movement, and larval metamorphosis. Among crustaceans it stimulates the release of many different neurohormones which affect such things as glucose uptake, shell color, molting, egg maturation, and levels of neuroactivity.

Some commercial shellfish farmers have long added serotonin to their crops of shellfish to stimulate spawning. Researchers, however, have found that Prozac and Luvox are the most potent such compounds ever produced, having *significant* effects at parts per billion. Extremely low doses of Prozac initiated significant spawning activity in mussels while Luvox was even stronger – dosages magnitudes smaller produced significant effects. SSRIs have also been found to significantly affect fingernail claims, mussels, fiddler crabs, crayfish, snails, squids, and lobsters with wide-ranging effects at extremely low doses. Pharmaceutical SSRIs are some of the most widely dispensed drugs in the industrialized nations. But they are not the only drugs that have been found to affect crustacean reproduction.

Fenfluramine, a sympathomimetic amine, once popularly prescribed as a diet drug (removed from the market in 1998 because of heart valve damage in patients) has also shown strong reproductive system activity in crustaceans at low doses: it triggers ovary-stimulating hormones in crayfish and gonad-stimulating hormones in male fiddler crabs. And retinoids, prescribed in large quantities for such things as acne (Accutane), cancers such as leukemia (Vesanoid), and wrinkles (Retin-A or tretinoin an anti-aging prescription and one of the top 200 most widely prescribed drugs in the U.S.), have been shown to have profound effects on amphibian embryonic systems. Constant exposure can produce deformities in the offspring of frogs and other amphibians.

* *But the most dangerous of all are the antibiotics that are being released into the environment and they are pervasive and are disturbing ecological systems that are foundational to the entire functioning of this planet. They are also stimulating the emergence of antibiotic resistant organisms at an exponential rate. As a number of researchers have said, "The Age of Antibiotics is over. We now face the rise of pathogenic organisms more terrible than any known before.*"

Most people are now aware that all of us possess a microbiome in our intestines, that is, we have a microbial community inside us upon which our health depends. When it is healthy, the bacterial organisms in our gastrointestinal tract help us digest our food, provide substances that we need to be healthy, keep our immune system strong, and keep our organ systems functioning well, including our brains. (We also have a microbiome in our lungs and on our skin which provide similar benefits.)

The bacteria that make up our microbiome have been part of human bodies since human

beings have been; they have been transferred from mother to child from the beginning. Without them we would not be healthy, we would not even be alive. They are essential to our lives and existence. They are in fact part of us just as we are part of them. The truth is that nearly all bacteria are friendly. Of the millions of different kinds of bacteria only a few are pathogenic to human beings.

However when people take antibiotics their microbiome is disturbed. More plainly, large numbers of friendly bacteria are killed and the entire community and its functioning is damaged. This is why antibiotics cause so many problems in the gut: nausea, indigestion, bloating, vomiting, severe cramping, diarrhea, and blood or mucus in the stool. Usually, when the antibiotics are stopped, the intestinal microbiome, after a few weeks, rebuilds itself. It recovers.

However, if people keep taking the antibiotics, the microbiome cannot recover and more side effects will occur. This includes such things as fever and chills, out of control infections as pathogenic organisms take advantage of the loss of the protective function a healthy microbiome provides, generalized pain throughout the body, light sensitivity, rapid heartbeat, skin rash, dizziness, swelling, wheezing, coughing, difficulty breathing, low blood pressure, fainting, seizures, and the emergence of long term, chronic diseases such as diabetes, obesity, inflammatory bowel disease, asthma, rheumatoid arthritis, depression, and alteration of mental functioning which includes things like brain fog, forgetfulness, trouble concentrating, depression, depersonalization, suicidal tendencies, and a large variety of other disturbed mental states.

What most people do not know is that Earth itself has a microbiome. It extends from miles below the planet's surface to miles upward into the atmosphere. It covers the entire surface of the Earth as well and every organism on it, including, like us, their interiors. Similarly to

people, the Earth depends on its microbiome for healthy functioning as does every complex life form on this planet. When those microbiomes are disturbed by antibiotics, the same kinds of disease and malfunction begins to occur throughout the Earth's ecosystems and its life forms. And over the past 75 years every microbiome, including that of the planet, has been disturbed. Significantly so.

Human beings discovered antibiotics prior to World War II but they did not become part of standard practice medicine until 1946. In 1942 the world's entire supply of penicillin (the first antibiotic) was 64 pounds. By 1949, 156,000 pounds a year of penicillin and a new antibiotic, streptomycin (from soil fungi), were being produced. By 1999, in the United States alone, this figure had grown to 40 million pounds a year. By 2009 it was 60 million pounds a year and, of course, millions of pounds more in countries around the world. This is *every year, year in and year out.* And these numbers are increasing all the time. And similarly to other pharmaceuticals, antibiotics are not easily biodegradable.

In an extremely short period of geologic time the Earth has been saturated with several *billion* pounds of non-biodegradable, often biologically unique pharmaceuticals designed to kill bacteria. Most antibiotics (literally meaning "against life") are what are called "broad-spectrum," meaning they do not discriminate in their activity, but kill broad groups of diverse bacteria whenever they are used. The worldwide environmental dumping, over the past 75 years, of such huge quantities of synthetic antibiotics has initiated the most pervasive impacts on the Earth's bacterial underpinnings since oxygen-generating bacteria supplanted methanogens 2.5 billion years ago. As bacterial researcher Stuart Levy comments, "It has stimulated evolutionary changes that are unparalleled in recorded biologic history." In other words, the entire microbiome of the

planet and every life form on it is experiencing a severe and unremitting disturbance. The antibacterial disturbance that "modern medicine" has caused to Earth's microbiome is one of the most dangerous technological impacts that unrestrained corporate industry has created. It is far more serious than climate change for it is a direct threat to every life form on this planet, including Earth itself. The tip of this iceberg, the one that most people have heard about, is the rise of antibiotic resistant bacteria.

The story that is most commonly told about the rise of resistant organisms is terribly over simplified and in many respects inaccurate. What you have probably heard is that when we take an antibiotic, the antibiotic kills off the susceptible bacteria but there are always a few that are resistant for one reason or another and these survive to have offspring and thus we have the rise of resistant organisms. (And then of course, there is the inevitable mutation that happens every so often.) These stories are not accurate, in fact they come from a deep misunderstanding of what bacteria are and what they can do (it is in fact a remnant of late nineteenth- and early twentieth-century beliefs). What is really happening is far more complex and dangerous to human beings.

In response to the billion of tons of antibiotics flooding the ecosystems of the planet bacteria have responded with highly sophisticated alterations in their physiology and behavior. They have literally begun rearranging their genomes in order to make their bodies resistant to the antibiotics. As their genomes shift, bacterial physical structures alter, sometimes considerably. They are, literally, remaking themselves and their communities so they can better respond to this threat to their existence. And it is happening all over the planet, to every bacterial organism there is. In consequence, the entire microbiome of the planet, relatively stable for 2.5 billion years, is altering itself in ways that are shifting the entire microbiome functioning of the planet. No one

knows what our world is going to look like as it does. But the last time this happened, 2.5 billion years ago, the very nature of life on the is planet changed and it never went back to the way it had been before.

Bacteria, as soon as they encounter an antibiotic that can affect them, however minutely, begin actively generating possible solutions to it. The variety and number of the solutions they can generate are immense, from inactivating the part of the bacterial cell that the antibiotic is designed to destroy, to pumping the antibiotic out of their cells just as fast as it comes in, to altering the nature of their cellular wall to make them more impervious, even to using the antibiotic for food. And these solutions? They are passed on to their descendants. In essence, it's the passing on of acquired characteristics, something Lamarck insisted was possible and that the neoDarwinians have ridiculed ever since.

Ironically enough, it was Alexander Fleming, the discoverer of penicillin, who first warned of bacterial resistance. He noted as early as 1929 in the *British Journal of Experimental Pathology* that numerous bacteria were already resistant to the drug he had discovered and by 1945 he warned in a *New York Times* interview that improper use of penicillin would inevitably lead to the development of resistant bacteria.

At the time of his interview just 14 percent of *Staphylococcus aureus* bacteria were resistant to penicillin – by 1953, as the use of penicillin became widespread, 64%-80% of the bacteria had become resistant and resistance to tetracycline and erythromycin were also being reported. (In 1995 an incredible 95% of staph organisms were resistant to penicillin.) By 1960, resistant staph had become the most common source of hospital-acquired infections worldwide. (This is known as an exponential growth curve.)

So, physicians began to use methicillin, a *B*-lactam antibiotic that they found to be effective against penicillin-resistant strains. Methicillin resistant staph (MRSA) emerged within a year. The first severe outbreak in hospitals occurred in the U.S. in 1968 – only eight years later. Eventually MRSA strains resistant to all clinically available antibiotics except the glycopeptides (vancomycin and teicoplanin) emerged. But by 1999, fifty-four years after the commercial production of antibiotics, the first staph strain resistant to all clinical antibiotics had infected its first three people.

This rate of resistance development was supposed to be impossible. Evolutionary biologists had insisted that evolution in bacteria (as in all species) could only come from spontaneous, usable mutations that occur with an extremely low frequency (one out of every 10 million to one out of every 10 billion mutations) each generation. That bacteria could generate significant resistance to antibiotics in only thirty-five years was considered impossible. That the human species could be facing the end of antibiotics only sixty years after their introduction was ludicrous.

Bacteria are the oldest forms of life on this planet and they have learned, during that time span, how to respond to threats to their well being. Among those threats are the thousands if not millions of antibacterial substances that have existed as long as life itself has. The world is, in fact, filled with antibacterial substances, most produced by other bacteria, fungi, and plants. As Steven Projan of Wyeth Research puts it, bacteria "are the oldest of living organisms and thus have been subject to three billion years of evolution in harsh environments and therefore have been selected to withstand chemical assault." And our antibiotics? Most of them are actually just slight alterations of antibacterial substances which are already common throughout the natural

world – substances that bacteria have long been aware of.

Once a bacterium develops a method for countering an antibiotic, it systematically begins to pass the knowledge on to other bacteria – not just its offspring – at an extremely rapid rate. Under the pressure of antibiotics, bacteria are interacting with as many other forms and numbers of bacteria as they can. In fact, bacteria are communicating across bacterial species, genus, and family lines, something they were never known to do before the advent of commercial antibiotics. And the first thing they share? Well, it's resistance information.

Bacteria can share resistance information directly, or simply extrude it from their cells, allowing it to be picked up later by roving bacteria. They often experiment, combining resistance information from multiple sources in unique ways that increase resistance, generate new resistance pathways, or even stimulate resistance forms that are not yet necessary. Even bacteria in hibernating or moribund states will share whatever information on resistance they have with any bacteria that encounter them.

Bacteria experiment and innovate. Their main laboratories for developing resistance are places where ill people congregate: hospitals, nursing homes, prisons, schools. The massive use of antibacterial substances in hospitals and nursing homes allow multiple species of bacteria exposure to them, plenty of time to innovate, and the easy transference of resistance information to one another. When new bacteria take up encoded information on resistance, they weave it into their own DNA and this acquired resistance becomes a genetic trait that will be passed on to their descendants forever. As Earth systems researchers Williams and Lenton comment, "Microbe transfer between local populations carries genetic information that changes species composition and thus alters the nature of each community's interaction with its local environment." And those

altered interactions? They are occurring worldwide and no one knows what it will mean to life on this planet.

Bacteria are not competing with each other for resources, as standard evolutionary theory predicted, but rather, promiscuously cooperating in the sharing of survival information. They are responding as a whole to the threat to their existence. Anaerobic and aerobic bacteria, Gram-positive and Gram-negative, spirochetes and plasmodial parasites, every kind of bacteria there is, all are exchanging resistance information. Something that, prior to antibiotic usage, was never known to occur.

Bacteria are acting in concert so well in response to the human "war on disease" that it has led Levy to remark that "One begins to see bacteria, not as individual species, but as a vast array of interacting constituents of an integrated microbial world." Former FDA commissioner Donald Kennedy echoes this when he states that "The evidence indicates that enteric microorganisms in animals and man, their R plasmids, and human pathogens form a linked ecosystem of their own in which action at any one point can affect every other." Or as Lynn Margulis once put it, “Bacteria are not really individuals so much as part of a single global superorganism.”

Bacteria are, in fact, responding socially, as a community. As writer Valerie Brown notes: “In a series of recent findings, researchers describe bacteria that communicate in sophisticated ways, take concerted action, influence human physiology, alter human thinking and work together to bioengineer the environment.”

Worryingly for the medical establishment, bacteria are also generating resistance to antibiotics researchers haven’t even thought of yet. For example, after placing a single bacterial

species in a nutrient solution containing sub-lethal doses of a newly developed and rare antibiotic, researchers found that within a short period of time the bacteria developed resistance to that antibiotic *and* to twelve other antibiotics that they had never before encountered – some of which were structurally dissimilar to the first. Stuart Levy observes that "it's almost as if bacteria strategically anticipate the confrontation of other drugs when they resist one."

There are billions, perhaps trillions of different kinds of bacteria on this planet. All of them are ecologically relevant. All are important to the functioning of this planet and its life forms. Very, very few of them are dangerous to us. But they are not taking corporate creation and environmental release of antibiotics lightly. And this has serious implications for the human species.

Human death rates from resistance organisms are rising exponentially. While the CDC's website insists that only around 23,000 resistant infectious deaths occur every year, researchers Burham, et al (2019) estimate that the true figures are at least 7-fold higher, or 162,044 deaths per year. (Worldwide, it is several million each year at minimum and projected to reach 10 million a year by 2050 – these are *very* conservative estimates.) By this analysis this is now the third leading cause of death in the United States. And it is only going to get worse. As Mark Lappe' has said, "The period once euphemistically called the Age of Miracle Drugs is dead." Or as David Livermore, MD, of the Antibiotic Resistance Monitoring and Reference Laboratory in London, England says it, "It is naive to think we can win." We in fact face the emergence of pathogenic, pandemic organisms more terrible than any our species has known before. And there is no escape, no safe harbor, for the bacteria; the entire planet is massively polluted with antibiotics.

As Natasha Gilbert reveals in her article for *The Guardian* (World's Rivers awash with dangerous levels of antibiotics), "Hundreds of sites in rivers around the world from the Thames to the Tigris are awash with dangerously high levels of antibiotics, the largest global study on the subject has found. Antibiotic pollution is one of the key routes by which bacteria are able to develop resistance to the life-saving medicines, rendering them ineffective for human use."

The truth is that bacterial resistance is growing at an exponential rate. Bacterial researchers around the world are quite clear that we are very close to the point when antibiotics are going to fail entirely. Once they do even simple surgeries will become dangerous, infectious pandemics will arise (such as ones from *Candida auris* which has no known treatment), "Modern medicine" will collapse, for its entire success rests on the use of antimicrobials. And once resistance begins, it spreads everywhere and it spreads fast.

The bacterialiologist John Prescott comments that, "There is essentially no gene in any bacterium that cannot be moved to another bacterium." Create superbugs in a waste stream and their resistance genes are going to move, create them in farm animals and they are going to move, create them in hospitals and they are going to move. And they do move. Hospitals (and other treatment locations from medical offices to nursing homes), agribusiness farms, and pharmaceutical manufacturing plants are creating resistant genes faster than researchers can keep up with them. "Medical professionals around the world," as Sasha Chapman comments, "warn of a post-antibiotic era, when bacteria will be resistant to all the drugs we can throw at them. The prospect is scary enough to be called a 'crisis' (by the WHO), a 'nightmare' (by the CDC), and a 'catastrophic threat' (by UK chief medical officer Sally Davies)."

While the rise of resistant organisms, and the repercussions we face, in and of

themselves, are terribly frightening, the thing to keep in mind is that if bacteria had not developed resistance, *all life on this planet would already have died*. Every form of life here depends on the bacterial microbiome of this planet and the microbiomes inside and on their bodies. Because scientists, corporations, and physicians insisted that bacteria were unintelligent and not highly adaptable, they believed they could create antibiotics and spread them around the world without consequence. The only outcome would be the end of infectious disease. But in doing so they created one of the greatest threats they could have to all life on this planet. *It is not all about us.* We are not alone here.

Every time you take a pharmaceutical for your health, to treat disease, to extend your life span or to save it, remember: you are affecting every other life form on this planet and every ecosystem that exists – and that includes us, the human species. And what's more, there are some eight billion people doing that right along with you every day of the week, every week of the month, every month of the year, year after year after year. Our medical system (and your health care) is not exempt from the ecological realities of this planet.

The medical system is in fact one of the most dangerous environmental polluters on the planet, the least known but one of the most powerful, and one that will fight endlessly to prevent its regulation in order to protect the environment. The medical system and its pharmaceuticals are undermining the entire ecological functioning of the planet. The only way to stop its effects is the immediate, significant reduction, by at least 90 percent, of the use of pharmaceuticals worldwide. Which is not, of course, going to happen.

Pharmaceuticals should be understood as what they are, an extremely dangerous ecological poison and systemic disruptor. Our world civilization cannot and will not survive their

ecological impacts.

(Note: the following material on plastics was also expanded and incorporated into my book *Earth Grief*.)

Plastics

Polymers are forever!

Alan Weisman

Unlike refusing a straw at a restaurant, it's difficult to cut down on plastic while strapped unconscious to an operating table.

Sarah Gibbons

Fuck it! We're talking about survival here!

Everybody, when they're scared of dying

To begin with, it is important to get an idea of plastics in general to understand just how pervasive and dangerous they are. I will be more specific as to the contributions of the medical world to plastic pollution at the very end of this section.

I recently stumbled across a YouTube video of the interior of a store in rural Canada. It had been in business since the late 1880s, closing in the early 1960s . The elderly owner, a descendant of the founders, had died (while working at the counter as it happens) and her family did not want to take over the store. So, it closed and the contents were left in place where they

have remained now for some 60 years.

As the camera panned around the store and its shelves it was soon obvious that there was not one thing made of plastic in the entire store. *Everything* was either glass or metal or wood or paper or wool or made from plants and plant fibers of one sort or another. *Everything* was biodegradable or reusable, *everything* was made from what would is now considered to be simple technology. There was very little chemical modification of natural compounds involved.

To get an idea of what it is like now, just go into any store and look around. Nearly everything in the place will have plastic as part of it in one way or another. Plastics are everywhere and in or on everything that people buy, even our food.

> *I remember when every store in the united states – and their contents – were like the one in Canada that I saw on YouTube. It wasn't so very long ago in people years, the blink of an eye in Earth years.*

Now, consider America's national obsession with single use plastic bags. How, because of environmental activists' lobbying they are being "phased out." And all that popular uproar about what they are doing to the environment . . .

> *I remember when environmental activists and tremendous public pressure convinced legislatures to outlaw paper bags, forcing businesses to switch to plastic in order to save the forests from paper bag manufacturing ("An entire forest is cut down every day to make your grocery bags!" the headlines went). As*

usual, the cure people created to "save the environment" was far worse than the disease.

Nevertheless . . . take a minute, go into your kitchen and look around. You will find that plastic, in whole or part, is included in the manufacture of everything you see . . . okay, not the glassware . . . yeah, yeah, okay, not the silverware either . . . now stop it.

The hysteria over single use plastic bags is just a form of ecological theater (just as plastic recycling is). It won't do much about plastic pollution in the long run – it just diverts attention from where it should really be going – on the incredibly dangerous ecological impacts that come from the manufacture and use of plastics in any form at all. The thing is, there are millions of plastic products now. They are so ubiquitous that people no longer notice how pervasive they are. They are just a part of life, like coastlines and the sea.

And . . . what about all those millions of single use plastic gloves that are used in the world's hospitals every day of the week which are just thrown in the trash? (And the millions more used during the covid crisis by hospitals and the general public.)What happens to them? No one talks about that very much, do they?

What is true is that all of the plastic that is incorporated into your kitchen – *every single bit of it* – is single use plastic – despite the fact that some of the products that contain it might be used for a decade or more. (Even the fruit we buy has little tiny plastic stickers on it now.) *None* of that plastic is truly biodegradable. All of it will last for a very long time in the environment. Centuries

in fact. (And no, bioplastics are not the droids you are looking for.) As Alan Weisman so succinctly put it: Polymers are forever.

If you then extend your plastic perception outward (say to automobiles, for instance), you will find that plastic is in pretty much everything that is manufactured. It has penetrated every aspect of our lives. The electrical wires in our homes are plastic coated (they used to be wrapped in fabric), the pipes are plastic (they used to be metal), the lamps have plastic turn-on knobs (used to be metal pull chains), computers and printers and televisions are all manufactured around plastic (and shitty plastic at that). Shopping carts are coated in plastic, rugs are plastic, flooring is plastic, windows in houses have plastic frames, doors are often plastic or plastic coated, paint is plastic, clothes are plastic, shoes are plastic, paper clips are plastic coated, pens are plastic, cups are plastic or have plastic tops, eye glasses are plastic, and our automobiles contain an average of 400 pounds worth per car and all of that goes into the trash when all those millions of cars no longer work. Everything we buy is wrapped in plastic or comes in a plastic container, pill bottles are plastic, tubing is plastic, gallon jugs are plastic, five gallon buckets are plastic, "rubber" tubing and tires are plastic, astroturf is plastic, children's toys are plastic, cell phones are plastic, and so on and on and on.

All these things, and a great deal more, are being made in their millions, their billions, their trillions for all the billions of people on the planet. And most of them are intentionally manufactured to be of limited duration. (It's called planned obsolescence.) Corporations long ago gave up making products that would last and work well for decades. They make far more money if people have to replace everything on a set schedule. (The corporations design in how long most of their products will last and thus how many will need to be replaced every year.) In

contrast, my grandmother's blender, refrigerator, toaster, and stove, all bought when she married as a young woman were made of metal and glass. All worked well for a half-century, *fifty* years. They were still working when she died. The most recent toaster I bought lasted three years. The computer six, the printer five.

Again: none of this plastic is biodegradable. And that is a very serious problem. All of this plastic, one way or another goes into the environment. Over time it breaks down into what is called microplastics (which you may have heard of) and over time those microplastics break down even further into nanoplastics. Both of them are very, very dangerous.

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"Every human on Earth," as Tim Dickinson says in his *Rolling Stone* article "Planet Plastic, "is ingesting nearly 2,000 particles of plastic a week. These tiny pieces enter our unwitting bodies from tap water, food, and even the air, according to an alarming academic study sponsored by the World Wildlife Fund for Nature, dosing us with five grams of plastics, many cut with chemicals linked to cancers, hormone disruption, and developmental delays."

This is not new information; it's been known for a long time – at least to the companies making the plastic. So has the fact that plastics are not easily biodegradable, if at all. (Plastic manufacturers and the oil companies are insisting that while it is true that micro- and nanoplastics affect other living organisms, there is no proof they are harmful to people. This is a specific strategy, based on what is called the Kehoe Paradigm which states that all manufactured chemicals are considered to be benign unless definite harm can be proved. In consequence, the

companies continually create scientific uncertainty in order to keep their products from being regulated – as they have done with tobacco and so many other things.)

Plastics are chemically generated, made of long molecular chains that do not exist in nature. (There are a very few naturally-generated plastics in the ecosystem. There isn't very much of it and it's far different than laboratory created plastics.) There are no existent natural systems (from the micro to the macro) that can biodegrade these unusual chemical compounds as they do everything else. While Earth systems will eventually figure out how to do so, it won't be anytime soon.

> *And no, all those techno-utopianistic proclamations (that you see from time to time in the news) that this or that process or microbe can be created or tweaked or modified to biodegrade the world's plastic wastes ("Scientists create bacteria that can turn plastic waste into vanilla! Thus solving the world's plastic problems!") and so make them a non-problem is* ***never*** *going to happen. And even if such a thing were created, at most it will only create other, more terrible, and unforseen side effects. Like . . . what happens if they do actually genetically modify a bacteria that can live by eating plastics? What happens if it gets loose in the human world? Or, say, in a plastics factory. Or in the world's computers? Cars? Medical equipment? Clothing? (And no, they won't be able to contain it, haven't you seen the movie?)*

It's going to take centuries for the planet to recycle all the plastic waste which now exists and

which will continue to be manufactured for the foreseeable future. Further, it's not just the plastics that the system must deal with. A ten pound bag of plastic waste contains more than a thousand discrete chemical additives. And all that plastic? It begins with what are called nurdles.

Nurdles are tiny plastic beads about the size of a lentil. They are what all plastic products are made from. Nurdles are made by petrochemical plastic manufacturers and then sold to every plastic product maker on the planet. Some of the most powerful corporations on Earth are involved: Exxon, Dow, Shell, Coca-cola, Nestle, Unilever. (This is business as big as it gets and trillions of dollars are involved – they are never going to give up the money.) These monster corporations make water and soda bottles, plastic packaging, single use plastic bags, pill bottles, hypodermic syringes, medical tubing, and so on and on and on. As Dickinson puts it, "Big plastic isn't a single entity. It's more like a corporate supergroup: Big Oil meets Big Soda – with a puff of Big Tobacco, responsible for trillions of plastic cigarette butts in the environment every year." (He left out Big Medicine, as is often the case.)

Most of the plastic that is now polluting the world has only been created since 2002, a mere 20 years ago. Another way to look at this is that in two decades this one chemical product went from virtually no ecological impact to one of the most damaging on the planet. What that translates to is a dump load of plastic waste going into the oceans of the world *every* minute of every day or every week, month, and year. As one researcher noted, "This is a much bigger problem than 'just' an ocean issue, or even a pollution issue. We've found plastic everywhere we've ever looked. It's in the arctic and the antarctic and in the middle of the Pacific. It's in the Pyrenees and in the Rockies. It's settling out of the air. It's raining down on us." It has been found on the highest mountains, the remotest locations, and in the mariana trench, the deepest

region of the sea.

Again, nearly all, and I mean *all*, of the plastics that are made are single use plastics, they are neither biodegradable (at least in any of the next eight generations' lifetimes) nor recyclable. As environmentalist Jim Puckett comments, "They really sold people in the idea that plastics can be recycled because there is a fraction of them that are. It's fraudulent. When you drill down into plastics recycling, you realize it's a myth."

In the last twenty years, corporations have created *14 trillion pounds* of plastic waste, 91 percent of which has never been recycled (it can't be). And the small percentage that has been recycled? It can only be recycled once. (As an aside, plastics are so ubiquitous now that they are becoming part of the geological record, being compressed into a distinct stratum in the geologic layers of the planet. They have formed a new kind of rock called plastiglomerates.)

Most of this plastic waste is simply deposited in the world's waters, much of it ending up in the ocean – about 17 billion pounds of it each and every year. And those numbers will only escalate as gasoline becomes less important to transportation (because plastics and not gasoline is where the companies know their future growth and profits lie).

Only about one percent of the plastic deposited in the ocean ever reaches the shore or surface of the sea. This is what you are seeing in those photographs of ocean plastic waste. The rest remains under the surface, unseen, out of sight, out of mind. Just increase, in your imagination, the waste that the photographs capture on the world's beaches or floating on the ocean in great garbage patches, 100 times – if you can. You will then get a sense of just how much plastic is in the ocean. (And this doesn't include all the micro- and nano-plastics in the worlds' seas; these are not visible to the eye. Those tinier plastics? They dwarf the amount of

plastic that is visible to the eye.)

They are in the soil, in the air, in fresh water lakes, in streams, in arctic ice, in our drinking water. Everywhere. (The filters in water treatment plants, by the way, are also plastic; they degrade from friction during use, adding more micro- and nano-plastics even as they purportedly clean our drinking water.) As Dickinson says, "The pollution is planet wide, impossible to fully remediate, and threatens to disrupt [actually, already is disrupting] natural systems." Or as researchers comment in *Science Advances*, Corporations "are conducting a singular uncontrolled experiment on a global scale in which billions of metric tons of material will accumulate across all major terrestrial and aquatic ecosystems on the planet."

Despite increasing scientific and public concern, big plastic has no intention of stopping production. As Beth Gardiner comments in *Yale Environment 360*, "While individuals fret over images of oceanic garbage gyres, the fossil fuel and petrochemical industries are pouring billions of dollars into new plants intended to make millions more tons of plastic than they now pump out." As she continues, "Companies like ExxonMobil, Shell, Saudi Aramaco are ramping up output of plastic – which is made from oil and gas, and their byproducts – to hedge against the possibility that a serious global response to climate change might reduce demand for their fuels."

Plastic production is expected to make up half of oil demand in the near future and this is only going to increase over time. To truly correct the problem, we need to, as a species, return to glass and wood and stone and metal and natural fibers – something that is obviously not going to happen. There is simply too much money and power involved to reverse course now. And at this point, too much of the world industry and infrastructure depends on plastic to shift back. Instead we are going to have to live in the midst of more and more plastic waste . . . or perhaps I should

more accurately say: plastic waste is going to live in us.

Plastics, when they enter the environment, don't break down, they just become ever smaller as exterior forces have their ways with them. (Friction breaks them down, just as it does with rocks and shells, making sand.) The smaller the plastic particles get, the more easily they enter the bodies of living organisms, including us.

Plastic has been found in the stomachs of at least 220 marine species, from the smallest to the largest (over 200 pounds was once found in the stomach of a dead whale). The smaller the waste is, the smaller the organisms are who ingest it. Nurdles, for instance, are considered a microplastic due to their small size. They are both clear and colorless (so they can become any color a manufacturer desires). They happen to look very much like fish eggs. And so, when nurdle manufacturers have their inevitable spillage into the world's waterways, nurdles in their billions are then eaten by a large, diverse grouping of fish and birds.

Even tinier microplastics are eaten by even smaller organisms: plankton, nematodes, roundworms, springtails, and mites, for instance. Plastic waste is incorporated, one way or another, into the bodies of everything that consumes them and there they remain. Living organisms' bodies have no way to get rid of them. So they are incorporated into fat and the body's cellular structures. From there they move up the food chain as larger organisms eat smaller ones.

Microplastics are very tiny (less than 5mm in size) and they have been found in every living organism in which researchers have looked. This includes all plants (which absorb microplastics through their roots and which then enter the plant itself, you know like carrots, apples, and lettuce); algae and phytoplankton (where they interfere with those plants absorption

of sunlight and hence reduce their health and usefulness as food for other animals); yeasts, fungi, and bacteria; mussels, clams – all shellfish; all fish (North America's salmon are dying from it); animal muscle tissue (such as turtles and panthers); most if not all veterbrates; and of course, us.

On average, human beings either eat or breathe in around 50,000 particles of microplastic every year. These tiny particles then move rather easily through lung and GI tract membranes deeper into the body via the circulatory system (blood and lymph). From there they become part of our bodies (Plastics R Us). They have been found in most human organs, the lungs, liver, spleen, testes, ovaries, heart, and kidneys for example; in our muscles; in every part of our bodies that has been examined. These tinier microparticles are easily incorporated into our cells (and, yes, they have been found there) where they exert a wide range of effects.

The intake of both micro- and nano-particles causes a generalized inflammation throughout the body of every organism that has been studied. These tiny plastic particles interfere with the intestinal barrier in the gut and, as well, alter the microbiome of the entire GI tract. Both micro- and nanoplastics are taken inside cellular tissues, including bacterial where they alter behavior and microbiome community make up. (In other words, the healthy ecological function of the human microbiome is disrupted.) In the intestinal tract the plastics cause inflammation and oxidative damage, destruction of the gut epithelium, reduction of the protective mucus layer that lines the GI tract, and immune cell toxicity (in other words, irritable bowel syndrome, Crohn's, and so on).

Immune cells are disregulated system wide, starting with the immune responses and cells in the GI tract and moving outward from there. Immune cell counts are reduced, activity decreases, and function is impaired. There is an increase in the production and activity of

neutrophil extracellular traps (NETs which in and of itself causes systemic problems), myeloperoxidase activity, and leukocytes. The complement system is impaired, inflammatory cytokines increase and their activity heightened.

These same impacts are seen in the lungs (the GI tract/lung microbiome is in fact a single system; what happens in Vegas does not stay in Vegas). There is disruption of the lung microbiome, its immune function and responses, its protective "mucus" layer, cilia activity, alveolar and alveolar macrophage activity and function. They are easily transported from the alveolar space into the blood where they, again, reach every organ in the body.

The alteration of gut and lung microbiota directly leads to system wide effects on health, including in the brain and central nervous system. The inflammation that the microplastics cause is not limited to the intestinal tract or lungs, it is system wide. In fact, ingestion of microplastics causes a continual, low level inflammation throughout the body, including the brain.

Because microplastics usually contain other toxic chemicals (coloring agents and so on), these chemicals also enter living cells. In essence the plastics act as a carrier for the movement of highly toxic chemicals into all living systems. Further, microplastics in the sea often float on the surface where they are colonized by a large range of bacteria, including cholera organisms. In other words, plastics act as carriers for microbial pathogens . . . and they enhance the toxicity of those pathogens. As Liang Lu, et al, comment, "MPs accumulated by viruses and bacteria are more biotoxic than ordinary MPs. After entering the organism, it is easy to cause organism infection." In other words, the microplastics are altering both microorganism infectivity and behavior.

Nanoparticles are even tinier, less than 0.001mm in size. And they are pervasive in the

human body as well. Nanoparticles have been found in pregnant mothers and their fetuses, in the human brain and central nervous system, inside our cells and inside the microbial members of our microbiome. They have been found in every organism that has been studied, including the microorganisms that are foundational to the functioning of this planet. As Tim Smedley, writing for BBC Future, comments, " The biggest [pollutant] killer of all never makes the headlines, isn't regulated, and is barely talked about beyond niche scientific circles (despite their best efforts to change that narrative); it's nanoparticles."

The impacts on the central nervous system are severe. Nanoparticles easily cross the blood/brain barrier – they also find their way into the brain via olfactory nerve endings, much the way Covid-19 does. Once in the brain they induce oxidative stress and damage its neuronal structures. They affect the mitochondria, thus disrupting the body's energy metabolism, alter acetylcholinesterase activity, and cause a wide range of neurobehavioral impacts. Astrocytes become reactive (astrocytosis). They then generate increased levels of lipocalin-2 and proinflammatory cytokines. The nanoparticles also enter the brain's neuronal cells where they cause shorter neuronal life spans and poorer function. Cleaved caspase-3 is significantly elevated within the brain. Nanoplastics stimulate cellular death, alter neurotransmitter levels, locomotor behavior, spatial recognition memory, cause impairment of learning and memory, and disregulation of glutamatergic signaling. Neuroinflammation is common.

Similarly to microplastics, nanoplastics cause a system wide inflammation in the body or every organism they enter. They easily enter a wide variety of cells where they act as genotoxins, that is, they cause genetic damage. They easily move across the placental barrier and into the fetus (often after being breathed in by the mother). As the fetus develops, the nanoparticles affect

the development of every organ due to their damage to the body's DNA. They have been found in the fetal liver, lungs, heart, brain, and spleen. Fetal and placental weights are lower. There are as yet no studies on the long term damage this may cause in children.

Micro- and nanoplastics negatively affect every ecological system on this planet, from the smallest to the largest (ecosystems and ecoranges). As Machado, et al, comment . . .

> *It is generally accepted that the impacts of pollution on ecologically relevant endpoints (such as migratory behavior, reproduction success, and mortality) are triggered by a cascade of changes initiated at the subcellular level that propagates throughout the biological hierarchy. In this context, contaminants with broader toxicity targets can affect potentially a larger number of species and their ecological functions. As plastic particles fragment they gain novel physical and chemical properties that increase their potential interaction with organisms causing direct and indirect toxicity.*

Micro- and nanoplastics are affecting every ecological being and structure on this planet, from viruses and bacteria to fungi to plants to the tiniest soil and ocean organisms to fish to every bird and mammal species on the planet. And a substantial part of it comes from the medical industry.

* * * * *

The total amount of plastic pollution from the medical industry is only a guess but most

researchers put hospital plastic waste at 25% to 33% of their waste stream. And hospitals produce about 6 million tons of waste each year; plastics make up two million tons, that is, in real life terms, *four billion pounds*, each and every year. This does not include doctor, dental, veterinary clinics, or home health care, the figures of which, interestingly enough, prove elusive to the most diligent search.

All of the plastic waste produced by hospitals and the various clinics is single use plastic. And there is a lot of it. Clinicians, in fact, cover themselves in single use plastic, multiple times, as they work during the day. They do it because it is easy and cheap; it lowers costs because there is less need to launder, less need to sterilize, less need for staff to take care of all the aspects of reusable medical care. And the bottom line (so scatalogical) is more important to the corporations and licensed professionals involved in health care than anything else. (In fact, health care should have been nationalized a long time ago. Only government has the power to force it to behave, to act *for* the people who are suffering instead of being focused primarily on lining their own pockets.) As the American Chemical Council (a plastics trade group, of course) puts it, "Single-use plastics are the cleanest, most efficient way to facilitate health and hygiene in hospitals."

> *Actually: no, they aren't; microbial contamination of plastic tubing, for instance, is a continuing problem in hospitals. And they are only efficient in that they don't need a support staff as glass and cotton does to keep them sterile. Mostly, they are cheap. But that is only in the short run, in the long run, ecologically and heathwise: single-use medical plastics are very expensive indeed.*

Similarly to your kitchen, plastic is incorporated into nearly everything in hospitals and medical clinics. From the flooring to the counters, face masks, gloves, tubing, IV bags, face shields, even many surgical instruments are plastic now. All of that goes into the plastic waste stream. Almost none of it is recyclable. And treating Covid-19 patients in their millions has increased the waste stream considerably.

When a physician gets ready to treat a new patient in the emergency room, they go through a lot of protective gear. First, a pair of gloves, a plastic gown, another pair of gloves, an N95 mask, a face shield. All of that but the face shield is discarded after seeing one patient. Most doctors see 20 patients a day and there are many doctors in every hospital in the world doing this every day of their working life. Hypodermic syringes are thrown away daily – in their millions. Even the needles have a plastic end with which to attach to the metal of the needle. (Some needles are now plastic as well.)

Once upon a time, not so very long ago, all hypodermics were glass and were sterilized. Needles, including their attachment head, were metal, and could be sterilized as well. Masks and gowns were cloth and could be cleaned (usually necessitating a hospital laundry to handle it). And physicians did not wear plastic gloves; they washed their hands, extensively and well. Research has found that due to the use of disposable gloves, physicians no longer wash their hands as well as they once did, nor do nurses or other hospital staff. Once upon a time, the medical industry was relatively ecologically benign. It no longer is.

The truth is that the medical industry as it is now structured cannot function without plastic and that plastic is affecting the health of every person on this planet as well as the functioning and health of every other life form and every ecosystem there is.

The Drug War

While generally hidden from easy sight, the drug war is based almost entirely on the creation of substances for use in the medical industry. Cocaine, heroin, methamphetamine, ketamine, fentanyl, all the various opiates, uppers and downers, and everything in between. (I am not focusing here on natural substances such as cannabis and psilocybin which I view as collateral damage in the drug war.)

In the latter decades of the nineteenth century and the first few years of the twentieth the American Medical Association began to gain control over medicine in the United States. They did this primarily through one mechanism: allowing pharmaceutical advertising in their trade magazine, the *Journal of the American Medical Association*. The used this war chest to lobby state governments to mandate licensure for physicians, to formalize medical training that was heavily oriented toward their paradigm (and thus outlaw other approaches), and joined with two other groups to lobby congress to restrict the access of drugs solely to people for whom licensed physicians wrote prescriptions. Prior to this, there was no regulation of drugs, all were available over the counter. (The country seemed to do okay for several centuries without this regulation.)

Physicians worked with two groups to gain control over health care and the prescribing of medicines: the prohibitionists (who had themselves come out of the abolitionist movement and were looking for new areas of activism) and those energized by Upton Sinclair's expose' of the meat packing industry. Together they managed to convince the U.S. government to outlaw private use of drugs and to form the Federal Drug Administration (FDA).

The prohibitionists were particularly focused on alcohol, tobacco (spittoons and smoking), opiates, and, to a lesser extent, cocaine. Their motivation came primarily from a

Puritan sensibility, that is, a religious focus on the evils of certain vices. A substantial portion of the American population (and the western world in general I suspect) was addicted to laudanum, an opium/alcohol combination that was used for everything from keeping babies quiet, to helping teething and dental pain, to helping massively overworked and unprotected workers deal with job injuries. (I have been curious but have never found a discussion of the massive national.

Alcohol prohibition didn't work out well, as most people in the U.S. now know. It has not worked out with the prohibition of drugs either . . . as most people in the U.S. are coming to understand. It has caused countless deaths, the massive increase in militarized police presence in the U.S., foreign interventions and the destabilization of democracy in other countries – which has cost numerous lives and billions of dollars, the undermining of civil rights in the U.S. through the passage of laws designed to make drug prohibition easier to enforce, and a massive increase in prisons and incarceration: On any given day, for instance, there are 450,000 people in jail for drug offences on any given day. None of this has done anything to stop the personal use of drugs.

By the Numbers

* Every 25 seconds someone is arrested for drug possession in the U.S., about 1.3 million arrests per year since 1980. This is six times the numbers of those arrested for drug sales.

* On-fifth of people in prison is serving time for drug offenses. Another 1.15 million are on parole. In 1980 there were only 50,000 people in jail for drug violations, now there are a half million.

* Incarcerating people for drug offences has been found to have no effect on stopping drug use.

* Since 1971, the war on drugs has cost the U.S. one trillion dollars. In 2015 the federal government spent over nine million dollars to incarcerate people charged with drug-related offences, some three billion dollars annually.

* State governments spend another seven billion in 2015 to incarcerate people for drug-related offences.

* Asset forfeiture laws, justified as a way to remove funds from drug barons, are now used against anyone and everyone, from the seizure of the boats of people who have caught too many fish in a lake, to the seizure of cash from people driving on the highway to purchase trucks at auction, to the homes of people whose child sold a minimal amount of marijuana to a friend.

* Law enforcement agencies get to keep all or a substantial portion of property and cash seized which stimulates them to focus on drug arrests more than community policing.

* Programs, such as the Byrne Justice Assistance Grant Program, provides federal funding to hundreds of regional anti-drug groups which are at the center of numerous scandals including falsified records, witness tampering, fabricated evidence, false imprisonment, stolen property, racial profiling, and sexual abuse including rape.

* Drug prohibition has resulted in the formation of gangs throughout much of the world, in most countries, an increase in violence, and the creation of drug pipelines to supply drugs throughout the world.

* Home invasions by police have been normalized. Often innocent homeowners are killed or disabled by police forces in the process. No knock warrants are an especially egregious aspect of this.

* Surveillance technologies are widely used by police forces to monitor individuals and pursue

drug evidence, including location tracking devices, license plate readers, drones, social network monitoring, cell-site simulators, surveillance cameras, facial recognition software, and predictive policing software. This has vastly eroded fourth amendment protections in the U.S.

While half of the prohibition drive can be laid to the feet of religious groups in their drive to eliminate what they consider to be vice, the other half belongs to the American Medical Association. One hundred percent of the responsibility for the existence of drugs other than those naturally produced in the ecosystems of the planet, belongs to the medical industry, including physicians and medical researchers. Neither the medical industry nor the religious groups own any responsibility for the harm that has been caused. The drug war is in fact one part of the massive iatrogenic disease problems that exist in the U.S. and the world.

Technologists, corporatists, scientists, and researchers continually believe that what they create will not escape their control. It is and always has been an erroneous belief.

(Note: this where I began to lose steam, the rest of this material is mostly notes, thoughts, quotes, and comments that I have not coalesced into a coherent section, but you can get the gist.)

Health care inequality, predatory pricing, and bankruptcy

The American Medical Association is the strongest trade union in America.

Milton Friedman

The [medical] lobby shop has done an amazingly good job of limiting

competition, raising prices, and redistributing wealth upwards.

Matthew Yglesias

When the American Medical Association got control over health care, that is, when the were finally able to convince legislatures to outlaw all other forms of healing practice in the U.S., only their model (the allopathic) was legal. It is generally unknown that there were at least ten other forms of health care in the U.S. at the time. Besides allopaths there were he homeopaths, the largest and most respected of all; they were also the best paid and had the best outcomes, i.e., they didn't kill their patients from the side effects of treatment as the allopaths routinely did. There were at least three forms of medical herbalists: the eclectics, physio-medicalists, and Thomsonians. And then there were midwives, hydrotherapists, osteopaths, chiropractors, naturopaths, and the diet-based healers who focused on treating disease through the regulation of food, from fasting to vegetarianism. This doesn't include ethnic healing practices such as traditional Chinese medicine that was, at that time, part of the Chinese communities in the U.S., few people, including the allopaths, knew it existed.

All that came to an end with the exclusive licensure of the allopaths who immediately began making sure that their competitors were put out of business. This included massive public campaigns to bring all other approaches into disrepute. Only the osteopaths found a way to fold themselves into the allopathic model, the rest were hounded, driven out of business, many (such as the chiropractors) were routinely imprisoned.

The allopaths developed a number of strategies to increase their power and wealth. One main strategy, still in effect in the U.S., is limiting the numbers of physicians who were allowed

to gain entry to medical schools and subsequently license to practice in the country. The U.S. has one of the worst ratios in the developed world, 2.6 per thousand people (as of 2017). France is 3.3, Finland is 3.8, Denmark is 4.0, Cuba (who the U.S. likes to pick on) is 8.1, Austria is 5.2, the U.K. is 2.8, one of the lowest of the European countries. This low ratio is why the wait time to see a physician is often weeks or months; it is to keep physicians busy and rich. It is why so many people can't easily find a physician and why they spend so little time with them when they do.

hospital closures, hedge funds, etc

about 150 rural hospitals have closed in the past decade, leaving many people without hospital care or else having to drive long distances to get help.

Quotes from here down

"Exorbitant bills, underpaid and exhausted EMTs: why emergency medical services need to be public…"

"Nationwide, there is one massive monopoly, American Medical Response, which is kind of like the McDonald's of EMS, since they have branches all over that are fairly decentralized but still linked to the same capital distribution system. AMR runs a massive share of private EMS services, with over 6,000 ambulances and even 12 fixed-wing aircrafts."

"The private ownership model for ambulances is fundamentally at odds with its own purpose. In the beginning they were useful insofar as they were an ad-hoc option in a society that gave no

thought to whether or not speed was important in treating an illness or injury. However, this jumble of organizations across the nation creates big problems beyond figuring out billing logs. A key problem is the cost of doing business. A single ambulance can cost somewhere in the $500,000 to $1 million range, so any ambulance company's first priority is to reduce overhead as much as possible. Of course, if you read Current Affairs, you can probably guess what the implications are. They want to get the cheapest gear, the cheapest ambulances, and the cheapest workers. You will see EMS personnel make fast-food level wages, for what is ostensibly an extremely important job. Paying people by the hour in addition to having prohibitively expensive equipment means EMS corporations need to maximize the workload for a workforce that they keep as small as is feasible."

"So, you have EMTs pulling 60-hour workweeks to scrounge together a rent check, which means their free time is spent recovering from work. They essentially exist to work. Their day-to-day schedules are often determined by manpower needs, so they often don't know what their shifts look like from week to week, and every hour on shift is different from the last one. You could sit in the station for five hours before you get tasked out to transport someone from one hospital to another, or you could get a CPR call right as you punch in. You may get tasked to deal with a guy whose only problem is being stuck in the bathtub and feel frustrated as you listen to your partner units get dispatched to a car wreck."

"The irregularity is just one reason that health problems are rampant in EMS. Overworked EMTs have random meal schedules, eat unhealthy food often, and are too tired to exercise.About 1/3 of

EMTs work more than 40 hours a week, and the Bureau of Labor Statistics confirms that they have “one of the highest rates of injuries and illnesses of all occupations.” This has led to plenty of stories of EMTs and paramedics suffering health emergencies while they transport patients to the hospital. I know at least one EMT who had a heart attack while driving the ambulance(survived), and another one who was out for months due to pericardial tamponade. One of the most common injuries they get are back injuries due to lifting heavy patients- as a volunteer EMT every stretcher was battery operated, but in the private sector cost analysis demanded old fashioned pneumatic lever operated ones. We haven’t even talked about the psychological toll. The Journal of Emergency Medical Services reports “alarming rates of EMS provider stress and thoughts of suicide.” No wonder, then, that your average EMT lasts about two years before experiencing “burnout,” the psychological exhaustion that irreversibly damages your performance.”

“Recently, Nathan Robinson wrote about an incident he observed in a diner, where two EMTs were disdainful and uncaring towards a sick woman. She seemed to be homeless, a drug addict, or both, and passed out in the booth. When the EMTs arrived, Robinson said, they seemed to care little about her well-being, and were more concerned with figuring out who would pay her bill than with treating her.”

“I’m not going to justify their behavior. But it’s not necessarily a product of individually callous EMTs. It’s also a product of a medical system that creates indifferent and exasperated EMTs who are forced to work far too long for little pay.”

“Over the past decade, private equity firms like Blackstone, Apollo Global Management, The Carlyle Group, KKR & Co. and Warburg Pincus have deployed more than $340 billion to buy health care-related operations around the world. In 2019, private equity's health care acquisitions reached $79 billion, a record, according to Bain & Co., a consulting firm.”

“Private equity's purchases have included rural hospitals, physicians' practices, nursing homes and hospice centers, air ambulance companies and health care billing management and debt collection systems.”

“Partly as a result of private equity purchases, many formerly doctor-owned practices no longer are. The American Medical Association recently reported that 2018 was the first year in which more physicians were employees — 47.4 percent — than owners of their practices — 45.9 percent. In 1988, 72.1 percent of medical practices were owned by physicians.”

“In some parts of the health care industry, private equity firms dominate. For example, TeamHealth, owned by Blackstone, and Envision Healthcare, owned by KKR, provide staffing for about a third of the country's emergency rooms.”

“This has been a seismic shift. During the 1900s, most hospitals were owned either by nonprofit entities with religious affiliations or by states and cities, with ties to medical schools. For-profit hospitals existed, but it wasn't until recently that they became nearly ubiquitous.”

“For the past 20 years, private equity has been a source of immense wealth for the executives overseeing the entities. Most of those who head major private equity firms are reported to be billionaires, like the two men atop Blackstone: Stephen Schwarzman, a close adviser to President Donald Trump, and Hamilton "Tony" James, a major donor to Democrats.”

“The impact private equity has had on employees and customers of the companies it has taken over, however, isn't always beneficial. To finance the purchases, private equity owners typically load the companies they buy with debt. Then they slash the companies' costs to increase earnings and appeal to potential buyers down the road.”

“In the business of health care, the drive for profits can run counter to the goal of helping patients and protecting workers, critics say.”

“Research shows, for example, that when private equity firms acquire nursing homes, the quality of care declines markedly. And when COVID-19 hit, hospitals associated with private equity firms were early to cut practitioners' pay and benefits because the operations could no longer generate profits on elective surgical procedures postponed during the pandemic. The heavy debt loads typically associated with private equity-owned businesses hinder their ability to withstand profit downturns.”

“Finally, some medical professionals say, private equity's growing involvement in health care in recent years has contributed to shortages of ventilators, masks and other equipment needed to

combat COVID-19, because keeping such goods on hand costs money. And to private equity, that's like putting dollar bills on a shelf."

"Private equity firms have jumped into health care with both feet. Apollo Global Management, a $330 billion investment firm overseen by Leon Black, owns RCCH Healthcare Partners, an operator of 88 rural hospital campuses in West Virginia, Tennessee, Kentucky and 26 other states. Cerberus Capital Management, a $42 billion investment firm run by Steve Feinberg, owns Steward Health Care; it runs 35 hospitals and a swath of urgent care facilities in 11 states. Warburg Pincus, overseen by former Treasury Secretary Timothy Geithner, owns Modernizing Medicine, an information technology company that helps health care providers ramp up profits through medical billing and, to a lesser degree, debt collections. The Carlyle Group owns MedRisk, a leading provider of physical therapy cost-containment systems for U.S. workers' compensation payers, such as insurers and large employers."

"Private equity's laser focus on cost cutting and operational efficiencies can benefit consumers, economists say, if lower costs are passed on to end users. Problems arise, however, when the push for profits reduces quality. That can be especially harmful in health care, in which patients' lives are on the line and it is difficult for consumers to comparison shop by analyzing quality of care."

Put in data from book, an american sickness by Elizabeth Rosenthal

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An extensive bibliography of both pharmaceutical and plastic pollution are in *Earth Grief*.