

Eradicating Ecocide

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Laws and governance to prevent
the destruction of our planet

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DEDICATION

To my darling husband Ian, my serenissimus,
you are the sunshine of my life

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Introduction

It was 9:56 p.m on the 20th April when the fire started on the Deepwater Horizon oil drilling rig. Pressure mounted inside the marine riser and as it came up it expanded rapidly and exploded. The fireball could be seen 35 miles away. 11 men were killed, 17 others were injured in the blowout. Workers had less than 5 minutes to escape. After burning for more than a day, the rig sank on April 22nd 2010. That afternoon a large oil slick was observed and it was confirmed that the wellhead, a mile below the water, was damaged and pumping oil into the Gulf. Conservative estimates stand at +800,000 barrels a day pouring into the Gulf of Mexico. It is an environmental disaster of epic proportions, one of the largest in U.S. history. BP, the third largest corporation in the world, saw 42% of their share price collapse within 48 hours.

When the oil reaches the coastline it will seep into the surrounding marshland, destroying not only the habitat of wildlife but also the very roots of the grasses that bind the land together and prevent it from subsiding into the Mississippi River delta and the Gulf of Mexico. The importance of the survival of the marshlands is not only vital to wildlife but also to humans; it is the physical barrier that lessens the intensity of fierce storms like Hurricane Katrina. When that disappears, a lot more goes than just the death of the local fishing industry and surrounding aquatic wildlife.

Stemming the flow defeated BP for eight weeks. The Macondo well was eventually capped on 15th July 2010 when BP engineers performed a 'static kill'. BP claimed they would conclude final 'bottom kill' operations in the second week of September 2010.

This occurrence demonstrates a consummate failure on many fronts. Firstly of technology, reliance upon which betrays the hubris of an industry that believes technology provides all the

answers. Secondly, this has demonstrated a far larger abrogation of corporate responsibility not just to employees but to the wider ecological community. Thirdly, the failure to anticipate the potential failure of technology¹ led to the fourth failure, namely failing to have the means in place to stop the disaster. For BP and the other companies involved, their greatest fear is the final litigation bill arising from the individual and collective damages and lost income from local fisheries. The enormity defeats our comprehension, not just in size of disaster, but also in terms of identifying effective legislative controls.

It could have happened to any number of oil companies. The Deepwater Horizon tragedy is a warning of what can come in the future; for all the confidence of relying on technological innovation it just takes one small failure to result in catastrophe.

At the moment, aside from potential litigation for damages and loss to individuals there is no proper legislative mechanism that addresses the vast environmental impact of the oil spill. Quite simply the laws and governance we need to prevent such a disaster from happening again do not exist. The law as it currently stands, is not fit for purpose. Instead BP have the 'right to kill' the ocean without consequence.



Law can be employed creatively and constructively, effecting overnight change. Innovation can be nudged to suddenly flow in a very different direction, sometimes in unexpected areas. Law can close one door and open another. Law can inadvertently create a positive discrimination. Law can change our values and understanding. The inverse can also be true. Sometimes laws are put in place that directly or inadvertently cause damage and destruction. These are the laws that need to be rooted out and transformed. Change is what is required here, nothing less, if we are to change the current course of our trajectory of destruction. Sir David King, ex-chief scientific advisor to the former UK government, warns of a century of resource wars,² an era of ecocide.

By asset-raiding our natural capital we deplete our resources to such an extent that conflict and war over the remaining few spoils is inevitable. It is a certain and rapid escalation into anarchy, death and destruction of epic proportions.

Eradicating ecocide requires radical and bold decisions to be made. To eradicate ecocide, the means of doing so are embedded in the words themselves. We literally have to derail this unstoppable train of destruction that we have created. Applying the brakes gently is not going to work; it is a juggernaut that has acquired such powerful momentum that it is careering out of control. To stop it takes bravery, from those on the outside pulling up the railway track, and from those on the inside pulling the emergency cord. If both are done skilfully and quickly, very few will be hurt and the train will come safely to a sudden halt.

To eradicate means to pull up by the roots, to eliminate at source, overhaul. The Late Middle English origins of the word are derived from the Latin *radix*- 'root', *eradicat*- 'torn up by the roots'. We can pull up those roots, those railtracks. The word ecocide is prefixed with 'eco'; it derives from the 16th century Greek word *oikos* meaning 'house, dwelling place, habitation, family.' The suffix 'cide' means 'killer', from the use of the French *-cide*, from Latin *caedere* 'to strike down, chop, beat, hew, fell, slay.' To eradicate ecocide means to forcibly remove the systems that are killing and destroying our habitat.

Ecocide is like the virulent Japanese Knotweed – it spreads out of control, sucking the life out of all that comes in its way, strangling the life out of the very air we breathe. To stop it, it has to be eliminated literally at the roots. In oil industry terms, tackling the problem at the root is referred to as turning off the 'upstream', closing off the source. This means stopping the processes that extract and deplete the natural capital in its raw state. Do that and the downstream operations that are dependent on the life-force of the upstream operations shudder to a halt. In oil terms that includes the oil refiners, the product distribution terminals, the trucks, pipelines, marine transportation, the retail gasoline marketers. The wholesale, industrial and commercial customers

no longer have their commodity. Sounds radical, but all those downstream operators will be required for mobilizing mass innovation in the opposite direction. We need the constructive use of those skills to be applied elsewhere, and very fast.

Today we are faced with a collapsing habitat – threats of increasing instability of climate change and the breakdown of national economies inevitably lead to the conclusion that governance of our planet has failed. As we destroy this planet so our eyes are now set on the potential to pillage from other planets, governments racing to see who can be the first to extract uranium from Mars, water from the Moon. Somewhere along the way, we have lost sight of our role as stewards. Until we know how to clean up the mess we have created in our own house, surely it is presumptuous to believe we can merely take from another.

It is no coincidence that the word economy has its roots in the Greek word *oikonomos*, which when taken in its constituent parts of *oikos* and *nomos* provides us with the etymology of the word. *Nomos* means ‘manager, steward;’ *oikonomos*, or economy, is stewardship of our dwelling place. Our largest habitat is, of course, the planet itself. Where our habitat is damaged and destroyed, humans suffer. Critics of environmentalists who claim we are failing to consider human needs are missing the point. Without the wellbeing of the ecology of our planet, our wellbeing suffers.

On a smaller scale, each of us mirrors our global habitat. Our bodies are our most immediate dwellings, composed of over 70% water, and so too is planet earth covered by over two-thirds water. As we contaminate our own internal systems we start to suffer. Outbreaks, rashes, fevers are all indications of the body trying to rebalance and purge the poison. More serious and long-term abuse and exposure to toxins can lead to cancer, long-term disease. An acidic environment leads to loss of health and can result in pollution of our blood cells, the very life force our body depends on. This in turn opens us up to fatigue, infection and a downward spiral of illness with all its attendant symptoms if matters are left unchecked. Attending to our health and the health of others, not just human but of all life, is crucial if we are to optimize our wellbeing.

Therefore, as we do locally, so too we must do globally for the larger habitat we inhabit. For example, pollute the waterways by dumping toxic waste and the result is acidification; marine life is compromised and/or dies, the tributaries carry the contaminated water that seeps into nearby land poisoning the foodstuffs grown therein. We eat the fish and food, we drink the water, taking it all into our own habitats knowingly or unknowingly. The damage is pervasive: what is damaged here, comes out over there and remains in the system. Everything has consequences, and destructive practices come back to affect us and cause harm, if not locally then elsewhere and to others. Pollution created in one place can affect another quite randomly – Inuit women of Alaska have high levels of DDT in their breast milk but until notified, they had no knowledge of it.³ DDT was banned 15 years ago, yet its impact on future generations is playing out today in many ways. Pollution, transboundary in nature, does not adhere to man-made borders.

Nothing less than a radical and rapid shift from protection of private interests to protection of public interests is what I call for. We can rebalance the scales of justice by implementing laws to ensure the wider community is provided for, not just humans but also other species who are (or are at risk of being) adversely affected in a given territory. To remain rooted in protecting the private is to set apart, whereas a shift in focus to the community as the central determinant is to give voice to the many.

TEETERING ON THE BRINK

As a global society we stand at the precipice, teetering on the brink of shifting from independence to interdependence. Just as that moment comes when a teenager becomes an adult and starts to take responsibility for the consequences of his or her actions, so now is civilization as a whole poised to step into that space. Sometimes the moment of transition is identifiable – it can be triggered by an event, or series of events; often it is not. Just as with the teenager who seemingly overnight has become an adult, so there is that recognition that the shift in consciousness has somehow taken place. The teenager has become an adult, no longer

striving for independence but now embracing interdependence, creating relationships, understanding the intrinsic value of the self and others.

A shift in consciousness is not a gradual process. Rather, it is akin to a build up of pressure, sometimes resulting in outbursts, tantrums, the attempt to cling onto practices that are of no long-term benefit, but guarantee short-term satisfaction. So it is with society, with our banking systems, our blind use of damaging extraction of fossil fuel, unaccountable practices, mistrust and short-term trading gains at the expense of people and planet. Our governments speak of the necessity of 'independence' and 'security' of supplies. Yet true resilience, as seen in nature, is found in forging interdependent relationships based on sharing and the creation of abundance. Security concerns will become obsolete. Very soon a tipping point will be reached. We do nothing and all systems, ecological and human-made, will implode and we become mere spectators of our own destruction. Or, we collectively step forward to take responsibility for our actions and put in place the means to ensure the well-being of our *oikos*. Once we have that shift in consciousness where we assume collective responsibility, we will take the latter route and that will be the true journey of social progress.

In legal terms this means the journey of moving away from laws premised, either deliberately or accidentally, on compromise. Laws that are often put in place with the promise of robust sounding enforcement restrictions. Such laws are often no more than a sop to appease public opinion or are weak instruments which have been watered down by intense corporate lobbying. They can have the appearance of being radical, or are touted as innovative, but the reality is that they ensure the status quo remains. These types of laws are dismissed by lawyers as 'compromise laws.'

These are often laws that have been put in place to minimize – but not prohibit – an activity. Instead, the problem continues, often in time worsening. History demonstrates that laws dealing directly or indirectly with the environment, for example pollution reduction

measures, have comprehensively failed where reliance is placed on incremental mechanisms, limitations, efficiency measures and permit allocations. In reality corporations simply deal with these measures by making any breach, and the consequence thereof, a part of the profit and loss account of its operations. Modern-day climate negotiations are a further example; it has spawned a rash of laws premised on compromise which serve only to advance the interests of industry, not the people and planet.

The very idea of negotiating our way out of climate change is a premise that we have accepted without question, despite the impossibility of succeeding. The Kyoto Protocol is a commodity document, a trading document; it has nothing to do with protecting people and planet and is quite simply not fit for purpose. We need new rules, ones that create barriers to halt the gambling of our planet. As a lawyer who has experience of protracted divorce proceedings where two people cannot agree on the division of goods, it occurs to me that trying to get 192 different countries, with all their vested interests and teams of negotiators to agree on a range of topics, is a recipe for years of fatal compromise and disagreement.

Radical law, on the other hand is law that completely changes the landscape. Sometimes it is a law in a totally different arena that can do this. For instance, the first British Canal Enabling Act in 1759 opened the door to cheap commercial transport. Another, this time in the States, was the 1862 American Revenue Act, which placed an excise tax on alcohol. Both of these pieces of legislation, innocuous enough in themselves, removed a block and opened the floodgates respectively in each country (and subsequently throughout the world) to rapid uptake of coal and oil. Such laws are acupuncture points, the levers which facilitate the smooth flow of energy (in this case literally as well as metaphorically) in a completely different direction for innovation, investment and policy. At other times it is new law (and new language) that has had to be invented to prohibit destructive practices. The international law of Genocide is the most telling example of the 20th century.

JUST CALL ME TRIM TAB

Walking through Lincoln Inns Fields behind London's Royal Courts of Justice on a spring afternoon with Victoria, a wonderful and wise friend of mine, I was discussing application of a law of Ecocide. "What we need are trim tabs", she said. Not knowing what this was, she explained to me that a trim tab button is to be found on cruise liners, to be pressed when the ship needs to turn in the opposite direction very fast. While everyone else is flailing around in the water expending enormous amounts of energy trying to push the ship around manually, in the cruise liner the only energy that is expended is that which it takes for one person to press the button. The cruise liner turns without anyone else needing to push. The law of Ecocide, Victoria explained, is a trim tab.

Buckminster Fuller, (1895–1983) a self-described 'comprehensivist' who took a long view of history, had this to say when interviewed by *Playboy* in 1972:

Something hit me very hard once, thinking about what one little man could do. Think of the Queen Mary – the whole ship goes by and then comes the rudder. And there's a tiny thing at the edge of the rudder called a trim tab. It's a miniature rudder. Just moving the little trim tab builds a low pressure that pulls the rudder around. Takes almost no effort at all.

Fuller had been a naval officer in World War I and so experienced the use of a trim tab first hand. The slightest pressure on the trim tab moves the rudder, which in turn directs the ship. He applied the metaphor to our lives. We are all trim tabs, tiny pivots affecting the overall direction of humanity. As Fuller advised, it is time to take a long view. Zoom out, look at where we've been and where we might be going. Fuller urged leaders of government and industry to focus not on weaponry, but on what he called 'livingry' – the tools necessary to promote peace and prosperity for the entire planet's population. Cooperation, not competition, would signify the next step of human evolution. The law of Ecocide is a trim

tab to take us to 'livingry.' The epitaph on Bucky's gravestone was fitting: just '*call me trim tab*.'

HUMAN RESPONSIBILITIES

Over time as our understanding expands of the impact our activities have, so too comes the recognition of an expanding responsibility. The shift in consciousness required here is an espousal of our collective responsibility for the ecology of our planet.

We are only one of many millions of species, but our role as humans is particular. Whilst we are not the world's largest species in terms of numbers, our impact on our environment has been by far the most influential. We have built a world of beauty, but in the process destroyed far more in pursuit of our perceived path to progress. For life to reintegrate rather than disintegrate requires us to redefine our role.

When we step into the space that defines us as fully matured human beings, and fully embrace the meaning of being a *homo sapiens* (Latin: wise or knowing human), we shoulder with ease our individual and collective responsibilities. Our role shifts from conqueror to provider, from corporation to co-operation, from owner to steward. Competition, all too often bolstered by scarcity, blame and fear, is replaced by collaboration fostered by love, abundance and, most importantly, trust.

We can remedy all of this. We are learning to apply different language and different laws. Time has demonstrated that some laws work, some laws do not. Time has demonstrated the need to shift our emphasis from property laws to the use of existing trusteeship laws, conferring upon us duties, responsibilities, obligations. For those of us who live in a world of governance by written laws, we need bridges to take us to this new world. Law has an important role in providing some of the crossings to get us there. Some new laws, such as the law of Ecocide, will need to be created to provide the footpaths in our new responsible world. Some existing mechanisms that have been lying defunct such as the United Nations Trusteeship Council can be dusted down,

taken out of abeyance and put to good use once again. We can do all of this and so much more.

The implications of the proposals set out here for society, the environment and climate change strategy are enormous, both at international and national level. By applying both new and existing laws, we can impose upon international corporate activity, banking and governments a global standard of care, a pre-emptive obligation of ecological responsibility and accountability for and of our natural capital. International regulatory framework can be simplified, finance can be mobilized and infrastructure strategy can be exponentially accelerated. In so doing, a rapid transition to a cleaner world can be assured, without undue reliance on carbon markets, failed voluntary (and non-voluntary but unenforceable) mechanisms and compromise legislation.

At time of writing, the world is grappling with one of the largest manmade ecological disasters known to man. The tragic Deepwater Horizon Gulf oil disaster has served to demonstrate a shortcoming that all – banks, governments as well as corporations and society in general – have until now underestimated. Existing laws are deficient. This singular event has challenged our basic and fundamental assumptions on what is now deemed to be acceptable destruction of our ecology.

This book is applying Bucky's advice; it zooms out, to explain where we've been in our application of law to prevent ecocide in its various manifestations and where we might be going. It zooms back in to examine set examples and to set out guidance and legislative recommendations for use with immediate effect. All that is set out here is applicable to all nations and to all peoples, not only at an international level but also regional, national and local. This is a book not only to read but to be put to good use; to be used by decision-makers, policy-makers, law-makers and co-creators of the new world. Whether you are a Member state representative in the United Nations, an activist, a judge in an international court, a community spokesperson, a congressman sitting on an enquiry into an oil spill, a lawyer, an MP, a town councillor, a concerned parent – all of us have our role to play.

Trim tabs each and every one of us. In short, anyone who has a say in decision-making processes that have an impact on the community, be it with regard to one's own local community or the global community. In microcosm and macrocosm, the principles are universal and applicable to us all.

Polly Higgins

London

30th July 2010

The International Year of Biodiversity

*The International Decade for the Culture of Peace and
Non-Violence for the Children of the World 2000–2010*

Part 1

HOW LAW CAUSED THE COMMERCIAL TAKEOVER OF THE WORLD

*'Nobody made a greater mistake than he who did nothing
because he could do only a little.'*

EDMUND BURKE, Irish statesman, author, orator, British
politician, and philosopher (1729–1797)

Chapter 1

TAKING STOCK

SOMEWHERE along the way, like a train that meets a forking of tracks, the decision is made to take one route over another. A simple shift in the direction of the track points and the train will take the left fork resulting in a destination many miles away from the other. One little decision can lead to a completely different route being taken – and a different end-point. The decision may seem insignificant at the time, but the small and almost imperceptible shift brings with it enormous ramifications. One train, two divergent routes. Two different outcomes.

ONE PLANET, TWO DIVERGENT APPROACHES.

View the planet as an inert thing and a monetary value can be imposed. In one fell swoop the planet becomes a commodity. The planet becomes property to trade, an asset upon which a price has been imposed. As a consequence, (wo)man's dominion over land, his/her right to extract and diminish the capital of the planet as he/she wishes, guarantees the asphyxiation of life.

This approach has informed our environmental legislation almost exclusively¹ since the 1970s. Permit allocation, soft industry requirements and inadequate enforcement provisions are the modus operandi. Businesses that damage the planet continue apace, hand-in-hand with ecological devastation – at a price. In real terms the price is far higher than the nominal pecuniary fines levied against those caught exceeding their allocated limits. By reducing the planet to a commodity and ensuring industry

is legislatively cushioned, damaging business practice is legally protected. The value of life is of no consequence but value of profit is. In the UK, as in many other countries, the duty to act in the interests of profit above other interests is enshrined in law. Section 172 of the Companies Act 2006 is the legal duty to promote the success of the company. When exercising this duty the director is required to 'have regard' to various non-exhaustive list of 'factors' listed in s.172. To 'have regard' is a far lower legal standard to attain than to 'prioritize.' The difference is determinative: the former can be given the most cursory of considerations, whilst the latter demands a determination according to the importance of the factor. 'Success' is not defined in the Act. The Department of Trade and Industry's guidance to the Bill suggests that a success in relation to a commercial company is considered to be its "long-term increases in value". It is suggested by the DTI that a director will exercise the same level of care, skill and diligence as he carries out any other functions in deciding which 'factors' he will take into consideration when making a decision subject to his overall responsibility to the success of the company. The implication is that if a factor is deemed a conflict of interest, then it can be disregarded.

Current climate negotiations reinforce customary rights for business – the right to emit, the right to be inequitable, the freedom to destroy the planet. These are the cushions upon which industry sits; soft governance ensures profits remain secure. The Kyoto Protocol is a document that actively facilitates trading on these terms (permits to pollute, carbon trading mechanisms). Thus an international business has been created to address one symptom (the escalation of greenhouse gases) rather than the problem (the damage we are wreaking on the planet). Twelve years on from its instigation and we know that both the mechanism applied and the ascribed rights have comprehensively failed to stop damaging practices. Instead, we have enslaved the planet for our own ends.

THE INDUSTRIAL REVOLUTION

Treating the planet as a commodity became firmly established as the norm in the Western World with the advent of the Industrial

Revolution. Rapid expansion of industry spread throughout the UK into Western Europe and North America, then onto much of the rest of the world. Agricultural based manual and animal labour shifted towards large-scale use of steam-powered machines, fuelled by abundant and cheap coal. The steam engine took over from the water wheel thereby enabling the powering of a wide range of manufacturing machinery. Commercial activity was no longer restricted to locations where water wheels or windmills could be used. Coal burning to heat water and create steam opened the door to new opportunities; coal could be transported and crucially could be used for transport. Burning coal created energy to power ships and railway locomotives. Increased mobility increased speed of transaction and trade activity. There was an explosion of activity; textile industries were mechanised and iron-making techniques developed exponentially assisted by the introduction of canals, improved roads and railways. Coal was the common denominator; it liberated the expansion of trade and transport.

‘Canal mania’ had grabbed the imagination of the nation in the mid-18th century. Transport had until now been a costly affair, not to mention dangerous. The upkeep of roads, horses, carriages and men as well as the turnpike toll payments made movement of heavy goods cumbersome and expensive. Proving to be an enormously effective means of transport, an innovative Duke decided to set up his own canal to link his mine to Manchester some 42 miles away. Suddenly every entrepreneur saw the potential for transforming the movement of goods.

It took very little to convince Parliament. Government stepped in and provided the necessary political support. Canal Acts and Navigation Acts were hastily written and implemented as each new canal was conceived. Outside of coal mining, it was the largest job-creation scheme of its time. Thousands of workers were employed, larger and greater canal trade routes were planned across the country, links were made to existing city rivers. Within an incredibly short period the geographical and economical landscape of Britain had changed dramatically. Brewers were no longer confined to selling their ales locally: a horse drawn barge

loaded with barrels could be delivered into the heart of London within two days. The fragile porcelains of Josiah Wedgwood, free from the risk of being shattered as wheels clattered over unpaved rough roads, could now be floated serenely and safely downstream to arrive in one piece in the shops of all the major cities.

The public directly benefitted too. The reduction in transport costs resulted in the price of coal dropping dramatically which in turn facilitated the switch from wood as the predominant fuel (the forests of Britain were by now vastly depleted). Coal was the number one cargo for canals. The savings were astounding: one horse could haul up to 400 times as much as a single pack-horse.² Coal was now readily accessible, readily available and readily used. Parliament took a pro-active policy of implementing enabling laws for all canals requested. The Canal Enabling Acts provided the necessary legislative leverage required to ensure coal became the new fuel of choice. The first of many enabling Acts was passed in 1759, triggering a decade of enormous activity. It was the trim tab that immediately unlocked the availability of coal at vastly reduced price.

The dramatic upsurge of the use of coal, however, came at a price in other ways; increase in burning brought increase in pollution. Akin to a disease, the spread of coal pollution was detrimental and degenerative, both directly and indirectly affecting humans. This was no benign cancer; this was the beginning of over 200 years of large-scale damage, destruction and loss to the environment, contaminating the air, land and waterways.

The origin of this particular cancer was London. By the late 18th century no other city in the world consumed such enormous quantities of fossil fuel, unwittingly exposing the inhabitants to such high levels of pollution. In the year 1800 one million tons of coal were burned to satisfy the rapacious demands of a million Londoners, throughout the UK the number reached 15 million tons.³ The burning of coal unleashed a wave of pollution that was to engulf the world, fuelled by Britain's expansion as the most powerful manufacturing, trading and imperial power that the world had ever seen.

By the late 19th century technological development brought the internal combustion engine and electrical power generation. The impact of the use of coal on society was enormous. Within 100 years society's relationship with the planet had been changed irrevocably – certainly for those who were the pioneers of the industrial world. The emergence of factories and consumption of immense quantities of coal and other fossil fuels gave rise to unprecedented air pollution. The masses were mobilized; corralled into factories that were built near to coal mines creating urban centres and pollution hotspots. It was not only the well-to-do who could travel with greater speed and in greater numbers, and increased production was facilitated by the greater ease and speed of transporting merchandise. The availability of coal-fuelled heat and gas made from coal for indoor and outdoor lighting irrevocably altered the industrialized man's lifestyle. Profits were to be made directly or indirectly out of coal with little thought or concern for the health and wellbeing of the planet, nor initially for the people who were adversely affected by the damage and destruction wrought in the wake of industrialization.

Common understanding of pollution in 19th century initially did not make the causal link between fossil fuelled industrial activity and damage. Although smoke from the combustion of coal was visible to the eye, and particulates left their pernicious residue on skin, clothes and in the air, few viewed it as detrimental to either human health or the environment. Pollution was deemed to be something altogether far more sinister; it made you ill and was contagious. Noxious gases given off by decaying plant and animal matter were the danger (miasma, or 'bad air') and smoke from coal burning was viewed as an antidote. According to prevailing thought at the time, shaped by the fear of cholera and the Black Death, acids and carbon in smoke were powerful disinfectants. The pong of putrefaction was evidence enough of pollution. Pollution was airborne and smoke, it was believed, provided a blanket service in soaking up the offending odours.

The widespread view industrialized man and woman held, of nature as harmful, had successfully, if erroneously, long been

germinating among city dwellers; putrefaction and decomposition of animal and plant matter had brought infection and disease for centuries. Nature was thus to blame. Cesspools, sewers, marshes and canals – anywhere that decomposition of biomass was to be found was feared. For centuries people had been complaining that London's rivers were smelly and polluted. Tanneries discharged their toxic cocktail of fermented offal, skin scraps and dog faeces into the river, accompanied by rotting animal parts discarded by butchers, human sewage and other industry by-products. Sal ammoniac (ammonium chloride) was one of the first industrial applications of a chemical; it was used extensively in tanning and dying processes, also to dissolve metals and later, applied in fertilizers.⁴

In cities, nature as detrimental and something to be controlled had replaced the view of nature as beneficial. What was not understood was that it was humans' own desecration and inconsiderate disposal of nature that created the pollution. In addition to the polluted waterways, the burning of our natural resources created more of that which we feared the most: disease and ill-health.

The Discovery of Germs

On 31st August 1854 a major outbreak of cholera struck in Soho. It was not an isolated case, but it was the worst yet. Within three days 127 people on or near Broad Street died. In the next week, three quarters of the residents had fled the area. By 10th September, 500 people had died and the mortality rate was 12.8 percent in some parts of the city. By the end of the outbreak 616 people were dead.

A recent increase in migration of people into London in search of work triggered a serious problem with the disposal of human waste and a lack of proper sanitary services. Disease spread quickly through large conurbations around workhouses and factories; settlements that were cramped with no organized sanitation. Many basements had cesspools of nightsoil underneath their floorboards. The cesspools had reached capacity and were overrunning resulting in the government decision to dump the waste into the River Thames.

The physician John Snow was a sceptic of the miasma theory that declared 'bad air' as the cause of cholera and the Black Death. He decided to investigate. He identified the source of the outbreak as the public water pump on Broad Street (now Broadwick Street), and subsequent examination of the water and pattern of contamination led him to believe that it was not due to breathing foul air but from drinking the water. It was discovered later that this public well had been dug only three feet from an old cesspit that had begun to leak fecal bacteria. The pump handle was removed. By that time Snow suspected the contamination had already receded. Nevertheless, Snow's study proved to be a major event in the history of public health. His findings resulted in the replacement of the miasma theory with the germ theory.

Smog continued to fill not just the cities but also the lungs. By mid-19th century, and for the first time in world history, more people in Britain lived in cities than in the countryside. Coal burning continued to escalate exponentially both in the home and in the workplace. Soon doctors and physicians found their surgeries filled with patients suffering from respiratory diseases. Scientific breakthroughs and understanding of bacteria began to shape public opinion. Burning of coal released not only toxic ash, smoke and soot but also a whole range of impurities including sulphur dioxide, volatile hydrocarbons and carbon dioxide. Smoke, it would seem, could no longer be justified as beneficial. On the contrary, its detrimental impact was only beginning to be grasped. But the damage had already been done. The pollution train had metaphorically left the station to much fanfare and celebration, and with it the toxic plumes of smoke billowed their way down the line of time.

The train is one of the great symbols of progress of the industrial era, and indeed it was. Great railways were built, and stations to match: grand and beautiful edifices celebrating the arrival of a new era in the major metropoli. They were the palpable expression of the success of technology, design and man's dominion over his land. The 1830s were the golden era of

travel: George Stephenson (1781–1848) was the genius behind the construction of the Liverpool to Manchester railway, the first to be floated across a vast tract of peat bog, and his locomotive, the Rocket. Both the train and the railway track were engineering triumphs that spawned thousands of miles of railway construction across the UK and the world.

Trains fuelled by the very coal they were transporting brought the black gold to the centres of commerce, stoking the fires of industry which in turn discharged their industrial chemicals into the already burdened and polluted waterways, poisoning the nearby lands. Cities and urban centres of industrial activities became increasing malodorous and noxious. People, property and land visibly deteriorated. The connection between industrial activity and pollution finally began to dawn, as the smog filled the air and the acid rain poured down. Blocking sunlight and nasal passages of politicians and people alike, from the mid-1840s several attempts were made to introduce laws to require owners of furnaces to reduce smoke emissions. However the recently acquired power and wealth of the new industrialists, who effectively lobbied Parliament, was not to be easily relinquished. The first pollution control Act, the Smoke Nuisance Abatement (Metropolis) Act, was only passed in 1853, but its effect was limited.

Parliament's response to pollution in general was tardy, cautious and piecemeal but one piece of legislation proved pivotal. In 1863 the Alkali Act was passed. Initially it addressed just one substance; gaseous hydrochloric acid from the Le Blanc alkali works (whose soda served the soap industry). At the time, severe problems were experienced near industrial plants manufacturing alkalis such as sodium carbonate and sodium hydroxide: emissions included hydrogen chloride, which was converted into hydrochloric acid in the atmosphere, causing extensive damage to vegetation. The Alkali Act required that 95% of the emissions should be arrested, and the remainder diluted. This had a dramatic effect: prior to the Act, emissions from alkali works were almost 14,000 tons annually, but after it came into force this was rapidly

reduced to only 45 tons. Manufacturers were required to condense their gas and a team of inspectors were put in place to ensure they did.

In 1874, under a second Alkali Act, an Inspectorate was created to police all heavy chemical industry that emitted smoke, grit, dust and fumes. Although the extent of application widened, responsibility was watered down. Instead of applying strict and near 100% emission prevention (which had proven enormously successful in regulating the soda industry), industrialists were simply to apply '*the best practicable means*' to tackle pollution problems. This Act provided the foundation of air pollution policy in the UK for the next century. The Inspectorate was not very effective throughout most of the 20th century: between 1920 and 1967 there were only three prosecutions under the Act. Even in the early 1970s, a time of much increased environmental awareness, there were only 20. The message sent out to industry was one of leniency and complicity in their polluting activities. Industry requirements to use the '*best practicable*' environmental option, or the '*best available techniques not entailing excessive cost*' to control emissions led to a liberal interpretation of the law. Together with amendments, the Alkali Act became the first large-scale legislative control of industrial pollution in the UK. Its journey from near zero-tolerance application to loosely defined requirements fostered an atmosphere of acceptance of protecting industry's interests, with soft policing becoming the accepted norm.⁵

The journey of the Alkali Act demonstrates two crucial aspects that apply to all legislation governing commercial activity. Firstly, the intent of the legislation was to ensure complete eradication of a problem. The outcome desired was the elimination of the destructive practice. Industry could either implement a solution or stop using alkalis. In this case, it applied a solution to the problem; it passed the acid vapours through water.

Secondly, the subsequent Alkali Act of 1874 demonstrated a very different approach. The intent to eliminate pollution was replaced with a compromise. Within a decade the legislative language of prohibition had been replaced with the reasonability

test. '*Reasonably practicable*' provisions are relative at best and never absolute, advocating efficient use rather than removal of the problem. Instead, cost becomes the determining factor in deciding the outcome. If industry determines that a risk is too far removed from the cost of preventing it happening, the company has a valid defence for not putting in place any further safeguards. In other words, a company can argue it was not reasonably practicable to pay out additional money to ensure health and safety concerns were addressed, as at the time of making the decision they had assessed the risk of damage as very small (although subsequent events may, and often does, prove the initial analysis to be wrong). Prohibition of a damaging or destructive practice was instead replaced with unspecified conditions of trade. What constitutes '*reasonably practicable*' provisions is largely determined by industry built on existing practice, which in time improves slowly through natural evolution rather than necessity. Prohibition laws, in contrast, impose necessity and industry reinvents its wheels speedily in response. Prohibition of a damaging practice, as demonstrated by the first Alkali Act, was an absolute protection of society's and environmental interests, whereas the subsequent drafting in of '*reasonably practicable*' provisions to the second Act dramatically altered the landscape. Business interests were protected; in this case ensuring the continued, albeit modified, 'right to pollute'. The move from protecting public (and environmental) to business interests was the shift from protection of public concerns to protection of private interests. Corporate profit was therefore valued over people.

In 1874 the pendulum had swung in the opposite direction and the train changed tracks. The implications were enormous; not only in terms of pollution regulation in the UK. As the first large-scale legislative control of industrial pollution, its influence reverberated across time and in due course across the world, influencing pollution laws in many nations. Legislation to enforce the prohibition of damaging practices to protect the greater good had been successfully smothered by the industry lobby. It may have seemed like a small victory at the time, but in fact it was

huge. It was to set the approach taken not only by governments but also those appealing for remedy. Radical and rapid change was replaced by an incremental approach to preventative laws. Piecemeal and compromised, they were the slow creep towards ever more damage and destruction. A hundred years later, when environmental legislation started to take shape in America, the Alkali Act of 1874 more than any other, had already shaped the consciousness of legislators, politicians and industry.

NATURE IN DECLINE

Let us backtrack to 1866. The first Alkali Act had been in place three years and had almost completely eliminated emissions from alkali works, much to the relief of nearby farmers and workers. The ineffectual Sanitary Act of 1866, on the other hand, promised only to fine factory owners whose chimneys emitted black smoke. It was an ominous omen for the future policing of pollution. Many prosecutions failed when faced with the ‘shades of grey’ defence: although their smoke was indeed dark, it was not actually black. Even when successful, the resulting fines were nominal, often no more than half a pound sterling. Unhampered by law, the use of coal continued to escalate unabated and the pea soup smog of London became thicker and darker.

Jevons’ Paradox

The year was 1865: *The Coal Question: An Inquiry Concerning the Progress of the Nation, and the Probable Exhaustion of Our Coal-Mines* had just been published. William Stanley Jevons (1835–82), an English Economist, examined the UK’s reliance on coal and questioned the sustainability of reliance on a finite, non-renewable energy resource: ‘Are we wise,’ he asked rhetorically, ‘in allowing the commerce of this country to rise beyond the point at which we can long maintain it?’

Jevons’ central thesis was that the UK’s supremacy over global affairs was transitory, given the finite nature of its primary energy resource. In propounding this thesis, Jevons covered a range of issues central to survival including limits to growth, overpopulation,

overshoot, post-global relocalization, energy return on energy input, taxation of the energy resource, renewable energy alternatives, and resource peaking (this last subject widely discussed today under the rubric of peak oil). He was to become famous for predicting that Britain would run out of coal within decades (it peaked in 1913). He claimed that the nation's industrial and imperial ascendancy came not so much from hard work and sound government as from its coal. Crucially, Jevons explained that improving energy efficiency typically reduced energy costs and thereby increased rather than decreased energy use, an effect now known as Jevons' paradox and exemplified in many areas of manufacturing, car use being the most obvious one. Increase of efficiency results in increase of use. Policy based on imposing energy efficiency targets to reduce use has precisely the opposite effect; use escalates.

Identifying one of the key weaknesses of reliance on fossil fuel as being non-renewable and pre-empting many of modern day arguments surrounding peak oil, Jevons used a simple but effective analogy to explain the consequences of collapse:

*A farm, however far pushed, will under proper cultivation continue to yield forever a constant crop. But in a mine there is no reproduction, and the produce once pushed to the utmost will soon begin to fail and sink towards zero. So far then as our wealth and progress depend upon the superior command of coal we must not only stop – we must go back.*⁶

Like a lobster that is lured into a complacent slumber who eventually dies as the pot of water slowly heats, so the masses failed to comprehend the growing extent of the damage and destruction to their health and the health of the environment around them. It takes effort and determination to speak on behalf of the masses, so often so much easier to be lulled into accepting the prevailing norm even when the norm is set on a destructive trajectory. Few spoke out on behalf of the masses. Yet, recognition of the natural world in decline was tangible; trees were encrusted with soot and

stunted by acid rain, the sunshine was clouded by grey particle filled skies that stretched as far as the eye could see and spread wide over the countryside. It was the beginning of a recognition of the trans-boundary effect of pollution; the impact of coal smoke did not stop at the city edges, affecting many more than just those within the area of use. Only the privileged could buy better air by moving upwind from centres of population and industry.⁷

In response to 19th century industrial Britain, a 'back-to-nature' movement was born. Intellectuals such as John Ruskin, William Morris and Edward Carpenter, who were all against consumerism, advocated that pollution and other activities were harmful to the natural world. Their ideas in turn inspired various proto-environmental groups in the UK, including the Commons Preservation Society, the Kyrle Society, the Royal Society for the Protection of Birds and the Garden City movement, as well as encouraging the Socialist League and the Clarion movement to advocate measures of nature conservation.

Anti-smoke proponents targeted the smokestacks of industry, a potent symbol of the damage and destruction their belching fumes were causing. Industrialists retaliated by pointing the finger the other way, blaming home use – unfettered as it was from the mandatory restrictions that were already governing factory use. Any further restrictions, they complained, would be unfair and impossible to achieve. The Smoke Abatement Society was set up in London in 1898 with its own smoke inspector, and very quickly the idea took hold with similarly named groups in other cities coming together to fight against the undesirable fumes. In the USA, inspired by the activities of their counterparts in the UK, Smoke Abatement Leagues sprang up to focus on the health, cleanliness, aesthetic, and moral implications of smoke. In New York, the Anti-Smoke League led a crusade against the smoke cloud developing over Manhattan. As a result of public pressure and mounting evidence, the city launched dozens of cases against smoke offenders in the early months of 1906, with members of the league notifying Health Department officials of offending stacks so that the city might initiate legal proceedings.⁸ Upon reaching

trial, witnesses to the offending stacks were located by the league to testify on the detriment the smoke caused them.

The pro-active approach of the Anti-Smoke League made a significant difference. The frequent daily arrests had their effect; within a remarkably short period there were very few chimneys left belching black smoke. This was single-issue activism at its most successful; by keeping the smoke problem before the public, municipal action was guaranteed.

Britain's pressure groups also kept the smoke problem alive in the public arena, pressurizing for new fuel solutions. Frequent favourable coverage in the *Lancet* helped the group evaluate the claims of smoke-preventing fireplaces. Reformers set up education programmes to advance the benefits of clean air and promote gas cooking and heating appliances. Even with local support, some hurdles were insurmountable without stricter enforcement; some factories were owned by the very officials whose duty it was to enforce the smoke laws. Stringent application of the law by local authorities was rarely applied through fear of driving away industries and jobs. As was well understood at the time, until environmental standards were enforced uniformly throughout the country, polluting factory owners would continue flouting the laws and continue threatening to relocate whenever local authorities tried to make them reduce their smoke output. Fines in any event were modest, and some factories were content to pay, if and when successfully prosecuted, rather than invest in more efficient means. Uniform standards and unbiased enforcement simply did not exist.

Smoke activists mobilized in cities across the country, forming the Smoke Abatement League of Great Britain in 1909. The following year a deputation met with the president of the Local Government Board. They argued that the only way to solve the smoke problem was through more active government involvement. William B. Smith, the acting president of the Glasgow and West of Scotland branch of the league, repeated a common refrain among reformers, namely that each locality *'could only take action with regard to works within its own area, whilst it often happened that*

*there were works just beyond the city or borough which poured out smoke continually, yet no action could be taken.*⁹

An international conference was held in 1911 and American reformers joined their British counterparts. Information, reports and scientific data were shared and disseminated. Conversations about strategy, tactics and insights stoked the fire of reform and change. Industry argued for efficiency and technological fixes. Jevons' paradox was quietly ignored and engineers were put to the task of researching and inventing more efficient installations. The government faced two choices; ban the use of coal or impose further restrictions. Yet again the choice was between protecting public or private interests. It was the concern of a few for the public wellbeing that had galvanized so much activity. Something had to be done, and the government knew it. So the government stalled for time and proposed an enquiry.

An enquiry was indeed set up in 1913, but external events played their hand. The intervention of World War I brought the death of thousands, which curbed the appetite for the fight against coal. Concerns about coal were put on the backburner as more immediate concerns took precedence.

It took death in peace-time to finally halt the visible pollution of the skies. The Great London Smog of 1952 still holds a strong memory for those who experienced it. The very high use of coal due to the cold weather and a lack of wind to disperse the toxic smoke led to a deadly cocktail of the deepest and darkest of smogs. It hung silently over London for just four days. Although not considered unduly alarming at the time, it proved for some to be deadly. Within the weeks that followed 4,000 deaths were recorded as a direct result of the air pollution. The final death toll reached 12,000. Finally it was understood that the burning of coal was lethal. It took the deaths of thousands finally to trigger a decision to stop the pollution. In 1956 the Clean Air Act was enforced and London's pea soup smogs were relegated to history. One of the outcomes was the designation of Smoke Control Areas where the use of certain fuel burning is either prohibited or only allowed in special appliances. Subsidies were given to householders to cover

costs of adapting fireplaces in private dwellings, grants made available to churches and charities. Coal-filled boilers in factories and household coal burning fireplaces were replaced with gas and electricity, boats and trains switched to diesel engines. The coal mines closed: from over a million men working in the industry in 1913, the numbers had reduced to 10,000 by the end of the 20th century.¹⁰

On closer examination, what seemed like a victory for the Smoke Abatement Leagues was in truth very limited. Significantly, the use of coal itself was not fully prohibited, just where it was used and how. The Clean Air Act legislated zones where smokeless (i.e. non-visible) fuel had to be burnt and relocated power stations (that were exempt) to rural areas. The Clean Air Act of 1968 introduced the use of tall chimneys to disperse air pollution for industries that were allowed to continue burning coal, liquid or gaseous fuels. The problem had not been fully understood, and thus the problem had not been fully eradicated. The problem as it was understood to be, namely the smog, was deemed fixed. But smog was just a tangible outcome of the use of coal itself. To be truly rid of pollution, the source had to be correctly identified and prohibited – at source.

The prohibition of dark smoke had a dramatic impact that was immediate and tangible. For instance, vulnerable individuals such as patients in hospitals witnessed a direct and measurable improvement in terms of health and safety. Smoke from furnaces was crucially required only to '*be so far as practicable*' smokeless. The compromise terminology of the noxious gases Alkali Act (as further amended in 1906) was deployed. The '*reasonably practicable*' provisions and defence, whilst spawning a Clean Air Council and a whole new industry to handle Health & Safety and measurement requirements, once again sidestepped prohibition upstream. The Clean Air Act of 1968, after consulting with industry, firmly embedded the premise that smoke pollution should be controlled (raising the height of chimneys) not eliminated, and deemed it generally impracticable to remove sulphur dioxide. Industry's 'right to pollute' remained securely

in place. The reality was that the pollution had been rendered invisible and displaced to elsewhere; out of sight and out of mind. With the advent of 'clean coal', the door remained open for the acceptable and continued use of coal, not just in the UK but throughout the world. An opportunity to usher in the changes that were seriously needed was missed.

Pollution can be both visible and invisible. Coal – soot and grime – was viewed as a visible pollution that had to stop. Coal combustion was considered harmful primarily because of the unoxidised particles it produced.¹¹ Make the combustion process more efficient, it was reasoned, and the pollution would disappear. In other words, clean up the sooty particles and coal could still be used. If no visible pollution could be seen, the problem would, it was reasoned, cease to exist. The focus very soon shifted to the fix, not the need for change.

OUT OF SIGHT OUT OF MIND.

Coal is not just a hydrocarbon, breaking down into hydrogen and carbon dioxide when burned; it is a complex compound. It also contains sulphur, arsenic and mercury. Poisonous substances that do not disappear when burned. Instead they combine to create toxic acid that corrodes all it touches, plants, trees, stone, iron and our lungs. These substances have to go somewhere; either they remain in the ash or they go up the chimney. Taller chimney-stacks certainly did not solve the problem, as we were soon to discover. All this did was displace the toxins into the atmosphere at a higher level, where it travelled across national boundaries, falling eventually on Northern Europe. What disappeared up the chimney literally came back to haunt us, causing disputes over acid rain between the UK and Germany in the 1980s. It is little realized that we continue to burn mountains of coal, albeit no longer coal dug from our own mines. 60 million tons of coal is imported into the UK on an annual basis today and burned in centralised power stations, accounting for a third of our electricity supply.

The Clean Air Act, hailed as a milestone in the history of pollution prevention, marked a point in time where we could have

shifted tracks. Instead, all we did was remove a few carriages, clean the windows, put in some filters and continue down the same route. This time we are expelling invisible pollution, much much more of it.