

Classical Environmentalism and the Idea of Environmental Justice

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“Globalisation can be changed; indeed, it is clear it will be changed. The question is: will change be forced on us as the result of a crisis, or will we take control of the globalisation process? The former risks a backlash against globalisation or a haphazard reshaping in a way that only sets the stage for more problems. The latter holds out the possibility of remaking globalisation so that it can live up to its potential to improve living standards throughout the world.”¹

The age of globalization has brought with it a relentless competition for resources, labour, and an unending clamor for justice. Amidst the cacophony of claims and counter claims, it is evident that the world is witness to a strikingly significant phenomenon. Perhaps for the first time in several decades, there are, on just about every continent save Antarctica, passionate, live, evolving social movements, despite the absence of any single unifying philosophical principle. Indeed, unlike the ism based social mobilizations of the recent historical past, the anti-globalization struggles of today are, for the most part, protean, issue based networks.

Despite an absence of a manifesto or a party line, the ongoing globalization debate is framed by a set of core sensibilities, which are, in equal measure, either loci for alliances, or fissures for agonistic, or indeed, antagonistic disagreement. Some of these sensibilities are recognizably age-old utopias, such as human emancipation, justice, equality, and development. Others are equally well known dysopias - Faustian, Promethean, and

other. To complete the picture, there have also been a number of proposed alternatives, in venues ranging from village commons to social forums, the media, the proverbial ivory tower, and politics.

The purpose of this essay is to ponder one particular utopia – environmental justice – that has sprung up amidst this passion and fervor. Although it appears that the term has specifically US origins, the underlying concern – the relationship between environmental ideas and more traditional enlightenment ideas, such as fairness, equality, and indeed, justice – is resonant throughout the world. This however begs an important question: ‘What, exactly, does it mean to interject “the environment” into an almost three century old debate about human emancipation and well being?’ Or, for that matter, what does it mean to interject “justice” into three century old debate about the environment?

Although such questions, or exercises in intellectual history and speculation might seem a fanciful indulgence to some, they have, throughout history, served a number of important purposes. As Marius de Geus puts it:

A special power of utopias is their ability to present political and social ideas in an unusually imaginative way, planting unorthodox images and impressions in the mind of the reader. Utopias can function as a source of ideals, and offer inspiration for both action and taking control of one’s own life. They coincide with the everlasting desire to look forward and gain insight into a feasible, imaginable future. ...However, in my view, the greatest attraction of utopias is that they stimulate the reader to think actively, thus encouraging reflection. The utopian way of thinking almost inevitably leads the way to taking a stand and critically reconsidering one’s own opinions about human happiness, the meaning of life, and the most desirable way in which the economy, society and state should be organized. The reader is stimulated to carry out theoretical experiments, and to

actively join in the utopian game of breaking through fixed patterns of thinking and test unusual combinations of ideas.²

Conventionally speaking, environmentalist attitudes have taken one of two forms. On the one hand, there are the 'intrinsic-value' arguments. The keyword here is *inviolability*, which connotes the notion of the sacred, establishing boundaries that should not be crossed in humanity's use of nature. On the other hand, are the so-called 'instrumental' arguments, wherein nature is valued as a means to something else.³

Significantly, both of these classical valuation frameworks share a similar conceptual terrain. Both argue from the standpoint that environmental ethics is fundamentally about discovering the normative rules for negotiating the relationship between humanity and the rest of nature. They differ only in their purported solution to the problem. The concept of justice, however, is primarily about fairness *within* the human species.⁴ What, then, does it mean to talk about *environmental* justice?

In searching for an answer, it is useful to examine some of the basic claims made by environmental justice advocates in the United States, and most of environmental and social movements in the global south. One argument that emerges is that the *quality of the environment* in which people live is as fundamentally an issue of fairness and justice, as are questions of wages or rights. This is so because the nature of a human being's living or working environment has potential to either augment or diminish their net quality of life. For example, a person earning \$ 100 but living and working in an area with fresh air and

clean water is arguably better off than a counterpart earning the same wages, but exposed to foul air and inadequate water.

This paper attempts to spell out this argument in a simple, schematic manner. It has two parts. At the outset, it draws upon my book, *Modernizing Nature*, to sketch out what might be called, classical environmentalism, the framework of policy and practice that emerged in the mid eighteenth century, and entrenched itself during the subsequent two centuries. Doing so enables an appreciation of exactly where and how the emerging environmental justice framework departs. The second section attempts to provide concrete shape to the concept of environmental justice, as it applies to thought on environment and development.

I. Classical Environmentalism

An enduring dogma in contemporary environmentalist thought is the idea that modernity brought with it a domineering or imperial attitude toward the natural world. According to one, fairly widespread narrative, the notion of human beings as controllers of nature crystallized in Europe between the fifteenth and the seventeenth centuries.⁵ It was ostensibly born out of a marriage between the religious concept that the human species had dominion over the earth, and the idea that, with tools and knowledge, they were improving the earth as much as they were improving themselves.⁶ The narrative proceeds to make the claim that such attitudes ultimately set the stage for the twentieth century environmental crisis. Besides making the argument that can be caricatured by the phrase, 'modernity begat the death of nature,' the above narrative also draws up a

genealogy of philosophies of care and respect for the earth and its creatures, variously described as ‘arcadian,’ or ‘feminine.’ In effect, the argument goes, this counter trend constituted the very antithesis of the ‘imperial’ mindset and in doing so, provided the basis of the critique of industrial society.

Such narratives, however, fail to acknowledge two important facts, which produce a counter-argument – that the very same sensibilities that informed the so-called imperial nature also gave birth to modern environmentalism. Firstly, there was considerable acknowledgment, from at least as early at the thirteenth century, of the economic effects of environmental degradation. The evidence is enshrined in local laws: between 1535 and 1777, three hundred and twenty two forests were proclaimed protected by official ordinances.⁷ Secondly, the writings of George Perkins Marsh, John Croumbie Brown, Franklin Benjamin Hough, Élisée Reclus and several other luminaries of late nineteenth century eco-evangelism, make the case for the argument that from the early modern period onward, there had begun a systematic body of scientific observations and research programs that culminated, by the mid nineteenth century, in the recognition that human beings are geological agents, capable of making undesirable, and from the standpoint of human societies, catastrophic changes in nature.⁸ In my book, *Modernizing Nature*, I trace the history of this tradition over a two hundred year period. The following is a list of some of the prominent and illustrative examples:

1660s: John Evelyn’s book, *Sylvia*, (1664) argued, among other things, that grazing, glass-making, iron-smelting and naval-building posed great threats to forests.⁹ The forest ordinance of Jean Baptiste Colbert in France in 1669, was similarly sparked by concerns

with the consequences of deforestation.¹⁰ It is important to note here that important as economic considerations undoubtedly were, Evelyn and Colbert were acutely aware of the wider environmental effects of deforestation, especially, its impact on regional climates.¹¹

1760's - 80s: In 1764, a German scientific article claimed that there was a causal connection between forests and precipitation.¹² A number of scientists and explorers, including Fernando Colon, George Louis Leclerc, Comte de Buffon, and F.A.L. von Burgsdorf began investigating the consequences of forest clearance and deforestation.¹³ The French naturalist, Buffon, was in many respects illustrative of this cohort of proto-environmentalists. He contrasted the appearance of uninhabited with inhabited lands and argued that in inhabiting lands human beings destroyed woods, drained lakes and marshes, made mountains bare and soils less fertile. Buffon claimed further that deforestation led to climatic change and to the heating up of the earth; that lands with forests were cold; and that it was more difficult to cool than to heat the earth. In making his case, Buffon cited many examples of these effects from travel accounts from Quebec, Cayenne and the Guineas.¹⁴

1797: Jean Antoine Fabre, the chief engineer of bridges and highways in the Département du Var in France, pronounced that deforestation and forest clearance in the high Alps were the two main causes of the sudden and overwhelming Alpine torrents which flooded the farms and settlements of the lowlands.¹⁵ Almost reminiscent of a modern political ecological analysis, Fabre wrote that deforestation and forest clearance in high mountainous areas, brought about seven kinds of disaster:

The first disaster produced by the two causes of which we have just spoken is the ruin of our forests. The second disaster is the destruction in a great many places of the bed of vegetable soil with which our mountains were covered. The third disaster is the ruin of the domains which lie upon the rivers. The fourth disaster is the drainage, experienced in the navigation of the rivers, by the divisions in the water-courses, which are the consequence of great floods. The fifth disaster consists in the strifes and contentions, between the proprietors on opposite banks of the river, to which the divisions in these water courses give rise. The sixth disaster results from the deposits which they make at the mouths of the streams, which often intercept the navigation. In fine, the seventh disaster consists in the diminution of the sources which feed the streams and rivers in their ordinary state.¹⁶

Fabre's work sparked a series of French studies, pursued by foresters, engineers and agronomists, who were intimately associated with the reforestation efforts undertaken by the French government in the Hautes-Alpes during the late eighteenth and through the nineteenth century.¹⁷ By the early nineteenth century, a substantial body of literature on the relationship between deforestation and torrents had been produced.¹⁸

A related set of studies connecting deforestation with agrarian political economy involved lakes in the Alpine mountains in the late 1770s. These works posited an explicit connection between deforestation and decline in rainfall and consequently, in water tables. Of particular importance was the work of the French chemist J. B. Boussingault, who had studied De Saussure's materials and concluded that water levels had lowered in modern times due to the cutting of woods.¹⁹ 'My opinion,' wrote Boussingault, 'is that the felling of trees over a large extent of country has always had the effect of lessening the mean annual quantity of rain...Great clearings diminish the quantity of spring water in a country.'²⁰

Early to mid 19th Century: By early nineteenth century, the European scientific environmental tradition brimmed with the idea that clearing, grazing, transhumance, torrents, and declining water tables were all interrelated parts of the greater problem of deforestation. With these scientific findings providing a backdrop, Alexander von Humboldt, around the turn of the nineteenth century, devoted much time to studying the relation between forest clearance and climatic change, using the lakes of the New World and of Central Asia as examples. He wrote:

By felling trees which cover the tops and sides of mountains, men in every climate prepare at once two calamities for future generations— the want of fuel and the scarcity of water...Plants exhale fluid from their leaves, in the first place, for their own benefit. One of these is maintaining a suitable portion of humidity in the air. Not only do they attract and condense the moisture suspended in the air, and borne by the wind over the earth's surface, which, by falling from their leaves, keeps the ground below moist and cool; but they can, by means of their roots, pump it up from a very considerable depth, and, raising it into the atmosphere, diffuse it over the face of the country. Trees, by transpiration from their leaves, surround themselves with an atmosphere, constantly cold and moist. They also shelter the soil from the direct action of the sun, and thus prevent evaporation of the water furnished by rains. ²¹

In addition to research on the impact of forest clearance on water tables, shifting sand dunes, temperature and erosion, the nineteenth century also saw the emergence of another scientific issue concerning forest clearance: the effect of deforestation on vegetation. This new concern was spearheaded by a set of botanists whom a historian of ecology has called 'Humboldtian Plant Geographers.'²² The term owes its origins to Alexander von Humboldt's emphasis, in the first half of the nineteenth century, on studies of vegetation, especially the relation between types of vegetation and environmental conditions.²³ Humboldt

believed that the distribution of plants was directly related to climate and that every category of climate had one particular form of vegetation ideal for it. He wrote frequently about the 'physiognomy' of the landscape, or literally, its 'face': he argued that the face of the landscape was unique, as were human faces, and that they expressed the ideal qualities of that climatic region, just as human faces exemplified ideal racial characteristics.²⁴ Such concerns led to the emergence of a new scientific tradition in botany, and ultimately a new discipline – plant-ecology.²⁵ In addition to the plant geographers, the issue of the relation between deforestation and climate was raised by another genre of botanists concerned with questions of anatomy and physiology of trees.

It was widely believed among this botanical community that human beings in different parts of the world were causing a great deal of destruction of vegetation. Writing in the mid nineteenth century, the German botanist Matthias Jacob Schleiden stressed the influence man had in adversely altering the world distribution of vegetation. He wrote:

A broad band of waste land follows gradually in the steps of cultivation. If it expands, its centre and cradle dies, and on the outer borders only do we find green shoots... True it is that thorns and thistles, ill-favoured and poisonous plants, well named by botanists 'rubbish plants,' mark the tract which man has proudly traversed through the earth. Before him lay original nature in her wild but sublime beauty. Behind him he leaves a desert, a deformed and ruined land; for childish desire of destruction, or thoughtless squandering of vegetable treasures, have destroyed the character of nature; and man himself flies terrified from the arena of his actions, leaving the impoverished earth to barbarous races or animals, so long as yet another spot in virgin beauty smiles before him. Here again, in selfish pursuit of profit, consciously or unconsciously, he begins anew the work of destruction.²⁶

The concern with the destruction of vegetation, when combined with the Humboldtian idea of the relation between vegetation and climate, led to new perspectives on the impact of human actions on forests. Once a relationship between climatic change and vegetational patterns had been established, it began to be believed that changes in vegetation, which were, in effect, consequences of deforestation, would also result in changes in climate. It was therefore increasingly argued that such climatic alterations, when combined with declines in water tables, would result in droughts.²⁷ In 1847, Carl Fraas published an influential book on the destruction of the vegetation of Greece, Persia, Mesopotamia, Palestine, Egypt and southern Europe as a result of human activities.²⁸ Fraas argued that the original vegetation of these regions had been a response to climatic conditions and that human beings, mostly through deforestation, had changed the vegetation – which was now less useful to them – and also the climate.²⁹ Such theories also began to be interpreted in normative terms, in the sense of their ‘morals’ for human beings. To quote Humboldt again, ‘How foolish do men appear, destroying the forest cover without regard to consequences, for thereby they rob themselves of wood and water.’³⁰

1860s: By the time Marsh began his synthesis of the literature that culminated in his magnum opus, there were already apocalyptic ‘lessons’ to be drawn from a century of environmental science. An excellent illustration of these lessons is a short section in *Man and Nature* entitled, ‘General Consequences of the Destruction of the Forest.’ It is extraordinary in its combination of comprehensiveness with an apocalyptic tone:³¹

With the disappearance of the forest all is changed. At one season, the earth parts with its warmth by radiation to an open sky – receives, at another, an

immoderate heat from the unobstructed rays of the sun. Hence the climate becomes excessive, and the soil is alternatively parched by the fervors of summer, and seared by the rigors of winter... The soil is bared of its covering of leaves, broken and loosened by the plough, deprived of the fibrous rootlets which held it together, dried and pulverized by sun and wind, and at last exhausted by new combinations. The face of the earth is no longer a sponge, but a dust heap, and the floods which the waters of the sky pour over it hurry swiftly along its slopes, carrying in suspension vast quantities of earthy particles which increase the abrading power and mechanical force of the current, and, augmented by the sand and gravel of falling banks, fill the beds of the streams, divert them into new channels and obstruct their outlets... The washing of the soil from the mountains leaves bare ridges of sterile rock, and the rich organic mould which covered them, now swept down into the dank low grounds, promotes a luxuriance of aquatic vegetation that breeds fever, and more insidious forms of mortal disease, by its decay, and thus the earth is rendered no longer fit for the habitation of man.³²

Commentary

It is important to observe, that the European tradition of concern with deforestation was, from the earliest writers with their roots in Baconianism, part of an overall commitment to progress. The motivations underlying Evelyn's work were primarily economic, directed at showing that tree planting could raise the value of estates.³³ Similarly, the provisions in Colbert's Ordinance reveal an awareness of the relation of forest care to such practices such as grazing, mast feeding, and the gathering of forest litter. Again Buffon included a discussion of problems of forest management and utilization in his great encyclopaedia *Histoire Naturelle*.³⁴ Moreover, he undertook site evaluation observations on his estates, began experiments concerning tree growth, established hardwood plantings, cultivated conifers in his nurseries and also conducted pioneering research on wood technology, establishing a correlation between the density and the strength of wood for the first time.³⁵ Similarly, Humboldt was interested in using

science, which for him meant a commitment to accuracy in all instruments and observations, a new mental sophistication, including a set of conceptual tools including isomaps, graphs and the theory of errors, and the application of these not only to laboratory isolates but to studying the complex interrelationships of the physical, the biological and the human, for the efficient use of natural resources.³⁶ He therefore encouraged research and education in forest management and in particular, assisted in the establishment of the forest school at Eberswalde in 1830, an institution which became one of the important educational and research centres in forestry in Germany subsequently.³⁷

That approaches to conservation were framed by economic considerations should not surprise any historian of this period, for at least three reasons. First, the idea of improvement was one of the fundamental tenets of the enlightenment.³⁸ It is especially useful here to recall the many impacts of the 1755 Lisbon earthquake, and the consequent intellectual commitment by several thinkers ranging from Kant to Voltaire, to strive both recognize and overcome the power of ‘sublime’ nature. Secondly, many of the scientific practitioners who propounded environmental theories were either land owners, managers, or had held some other responsibility that related to well being and continued generation of wealth through cultivation. This concern with agrarian productivity resonated sharply with the doctrine of physiocracy, which was one of the important emergent frameworks of political economy during this period.

Thirdly, climatic environmentalism was, in many significant ways, connected with the dominion myth, based on which, many among the proto-environmentalists of this period

believed that human environmental misdeeds could be undone. One example is the following passage, written by the botanist, Matthias Jacob Schleiden:

...it is not impossible, it is only difficult, for man without renouncing the advantage of culture itself, one day to make reparation for the injury which he has inflicted: he is appointed lord of creation...But we see, too, that the nobler races, or truly cultivated men, even now raise their warning voices, put their small hand to the mighty work of restoring to nature her strength and fullness in yet a higher stage than that of wild nature; one dependent on the law of purpose given by man...³⁹

Significantly, nature, in this modernist interpretation of the dominion myth, was meant to be improved upon or cultivated to serve higher ends determined by the children of the enlightenment.⁴⁰ Put differently, the new relationship between humanity and the rest of nature was, in effect, a contract with nature. It consisted, in essence, of a quid pro quo - conservation, in exchange for sustained, long-term yield. This contract formed the basis for the idea of development and the essence of classical environmentalism, and was also the bedrock for regimes ranging from forestry to mining and irrigation.

During the third part of the twentieth century, new ideas emerged, both about humanity's relationship with the environment, and about the idea of human development. The next section focuses on one particular concept, environmental justice.

II. Environmental Justice

As outlined in the introduction, the idea of environmental justice has two elements: environmental quality, on the one hand, and fairness within the human species, on the other. In the wider project of which this paper is a sketchy summary, I attempt to characterize environmental justice with reference to three attributes: sustenance, security, and suffrage. In this section, I'll restrict myself to the first two.

Sustenance

According to the Oxford English Dictionary Online, the word, sustenance, has roots in the thirteenth century, and refers, for the most part, to the means of sustaining human life. Although many of the etymological examples provided by the OED refer to the provision of food or livelihood, defined in principally economic terms, the broader sense allows for an expanded interpretation of the meaning of the word. Indeed, it is very consistent with the spirit of its historic usage to define sustenance as including all the attributes that make for human livelihood, including, of course, environmental factors such as clean air and water, the means to grow food, or have access to land for agriculture and pasture. Sustenance, then, is about access to what may be called ‘good’ environments.

Significantly, many of the social movements around the world, and especially in the global south, that describe themselves as ‘environmental,’ are fundamentally struggles for ‘good’ environments. This insight, is by no means novel to political ecologists, or audiences such as at the Yale Agrarian Studies Program. Given this assumed familiarity, I am going to restrict myself in this sub-section, to simply sketch out, rather than describe or illustrate in any degree of detail, some of the central themes in the concept of sustenance.

It is useful to start with the term, ‘frontier alienation,’ coined by Leonard Guelke and Robert Shell in fascinating paper entitled, ‘Landscape of Conquest.’⁴¹ Therein, Guelke

and Shell describe the changing relations between European Settlers and the Khoikhoi, a pre-colonial people in seventeenth and eighteenth century Southern Africa. They also make an argument that resonates across the literature in political ecology in other contexts, historical periods, and parts of the world. In essence, Guelke and Shell present a process that has five sequential components:

1. The ousting of the Khoikhoi by European settlers by the use of a combination of technology, bureaucracy and firepower.
2. The legitimization of the new acquisitions by means of legal regimes and institutions.
3. The acquisition of productive frontiers – such as fertile land and fresh water sources.
4. The denial of these resources to the Khoikhoi, who found it ‘increasingly difficult to sustain themselves in a land in which access to limited water resources was necessary for their survival.’
5. The consequent result of the Khoikhoi getting squeezed out, and becoming clients of the Europeans settlers.

This, rather familiar narrative, which has been caricatured so wonderfully by Timothy Weiskel, however does not map simply with the history of European imperialism.⁴² Rather, it began to manifest itself almost as a corollary of classical environmentalism in Europe in the eighteenth century. A case in point is forest law, one of the first disciplinary formulations that accompanied the birth of modern, sustainable forestry, itself a product of the contract with nature described earlier. As forestry began to be established as a professional practice, foresters began to argue that most rights of forest use were harmful and their regulation, highly desirable.⁴³ As a consequence, new legal

regimes emerged, creating four different kinds of regulation, defined as ‘the definite restriction in respect to time or duration of rights, or with respect to the areas subject to them.’⁴⁴ They included *conversion (Umwandlung)*, in which the ‘beneficiary’ was assigned another product in place of the one taken; *reduction (Einschraenkung)* or *diminution (Ermaessigung)*, a temporary reduction below the normal use-quota in cases when the encumbered forest could not produce the necessary material as a result of changes in system of management such as deterioration of soil, fire, and insect attacks; *settlement (Fixierung)*, in which the extent of rights, hitherto vaguely defined, is fixed definitely on the basis of the need for the material; and *transformation (Verlegung)*, according to which the rights of use were shifted to another part of the forest.⁴⁵ In addition to regulation, German forestry also allowed for *extinction (Abloesung)*, which involved the complete abolition or annulment of rights in return for suitable compensation paid to the ‘beneficiary.’⁴⁶ German forest law gave forest officials the right to enforce these provisions which they did with a great deal of force and authority. Their uncontrolled harshness engendered a great deal of resentment among local populations and led to many protests over access to forest resources.⁴⁷

Such legal regimes were replicated in other sectors, such as mining, and river development. In each case, the emergence of a new resource frontier brought with it new varieties of legally justified dispossession, and of course, various forms of resistance. This is a phenomenon that, in the modern period, started within Europe, went everywhere that European methods of resource use spread. This latter point is quite important – and offers an alternative to standard, subaltern narratives.⁴⁸

Dispossession, however, is fundamentally unfair to those who loose, and indeed, much of social protest today is fundamentally about this particular form of injustice, of which there are at least three kinds:

1. *Exclusion*, or the forced displacement of people consequent to a large development project;
2. *Marginalization*, which is a slower paced process, such as described by Guelke and Shell, and which has consequences ranging from the generation of strains on the ability to subsist, to a full fledged long-term dependency; and
3. *Appropriation*, of which a good example, is the commodification of local technologies in exclusionary regimes of intellectual property.

There is of course a great deal of literature about the underlying dynamics of such processes, which, in my book, I describe as 'predatory economies.' To summarize quickly, they include:

1. Exploitation of resources by corporations, often unaccountable, especially in sectors that speak to human sustenance.
2. The perpetration of predatory economies by the backing provided by states to corporations that engage in such activities. Examples of corporate consolidation, control, and eventually, frontier alienation, are replete and widespread throughout the world.
3. Subsidy systems that advantage first world producers and disadvantage their third world counterparts.

4. The perpetration of international debt structures that further poverty, and the destruction of sustaining ecosystems; and
5. Petty grab by local and regional elites all over the global south; and the emergence of a new wave of resource exploitation, both within and across nations; along with the concomitant support of oppressive and exploitative political regimes in Africa and parts of Latin America – this time, joined by emerging industrial economies such as China, and India.

These underlying dynamics besides, the idea of sustenance also involves some sensibilities that are as old as modernity itself. One of these, terribly misused as it undoubtedly was by the Nazis, is Friedrich Ratzel's idea of *raubwirtschaft*. A more positively stated version of a similar point is fairly widespread in a number of traditions, such as the Gandhian. An example in point is J.C. Kumarappa's contrasting what he called the economies of permanence and transience. Having argued, following Kropotkin, that creatures in nature coexist in such a way that each fulfilled its necessary role, he argues that:

In this way, nature enlists the co-operation of all its units, each working for itself and in the process helping other units to get along their own too. When this works out harmoniously and violence does not break the chain, we have an economy of permanence... In an economy of permanence, everybody helped each other out. In contrast, there was the economy of transience, in which everyone tried to do well only for him/herself. An economy of transience was violent; it chewed up nature.⁴⁹

Kumanrappa's writings are remarkably similar to those of the English nineteenth century reformers such as Robert Owen, who was interested not just in physical poverty

but in the breakdown of the spiritual aspects of people's lives and the destruction of their cultures. Owen's utopia was an alternative organization of industrial production based on mutual respect and cooperation. Owen was also a springboard for Karl Polanyi, who offers a set of principles that help anchor the idea of sustenance conceptually. The following is a summary of the particularly salient contributions of Polanyi to the concept of sustenance.

1. **Substantivism:** Polanyi was particularly interested in the disembedding of the economy from its social context, causing widespread cultural alienation among people, and leaving society and the environment without protection. His idea of substantivism, which drew upon Aristotelean ethics, held that 'economics' can be conceived of in either of two ways. It could, on the one hand, be built upon the formalist idea that social decision-making is principally as rational choice between the alternative uses of limited, scarce, means. His alternative, or substantive approach, rejected the idea of rational decision-making amidst conditions of scarcity, and argued instead that human beings make a living from their social and natural environment. Drawing upon the then economic anthropology, he argued that livelihood strategy involves its adaptation to its environment and material conditions, a process which may or may not involve utility maximisation.

2. **Commodification:** Polanyi argued that 'What we call land is an element of nature inextricably interwoven with man's institutions. To isolate it and form a market out of it was perhaps the weirdest of all undertakings of our ancestors.'⁵⁰ In essence, he argued

that land is part of nature, and that the economic function of land is just one of the many vital purposes land it has for human communities. To make land into a fictitious commodity and subject it to the laws of the real estate market, he argued, threatens to shatter the cultural bases of human existence. He wrote, further, that 'the impact of the commodification of land was seen most clearly in the European colonies. We saw there a brief, dramatic presentation of what happened in Europe over a longer period of time: the social and cultural system of native life had to be shattered.'⁵¹

3. *The Double Movement.* Polanyi described the consequences of formalist and substantivist impulses, respectively, as blind 'economic improvement,' and an embedded process protecting 'habitation.' He argued that modern society constantly attempts to protect itself against the forces that undermine its social solidarity and threaten to distort its relationship to the natural environment. To quote Polanyi:

The double movement can be personified as the action of two organizing principles in society, each of them setting itself specific institutional aims, having the support of definite social forces and using its own distinctive methods. The one is the principle of economic liberalism, aiming at the establishment of a self regulating market, relying on the support of the trading classes, and using largely laissez-faire and free trade as its method; the other is the principle of social protection aiming at the conservation of man and nature as well as productive organizations, relying on the varying support of those most immediately affected by the deleterious action of the market – primarily, but not exclusively, the working and the landed classes – and using protective legislation, restrictive associations, and other instruments of intervention as its methods."⁵²

To bring this section to a close, the concept of sustenance has the following components:

1. The semantic expansion of the word to include not just wages and food, but wider environmental attributes;
2. The recognition of: a) the intellectual connections between modernism and various forms of frontier alienation and b) the underlying political economic dynamics underlying historical and contemporary dispossessions.
3. An appreciation of the idea of the economics of transience, and the move, intellectually and institutionally, to think of provisioning within ecologically and economically substantivist frameworks.

Security

To return to the OED Online, the first of many meanings of the word, security, is ‘ The condition of being protected from or not exposed to danger; safety.’ In the context of the present discussion, the term, security refers specifically to dangerous, or violent, environments. In this section, I’ll excerpt from one, of a few cases that I draw upon in the book to make my argument. I draw, in particular, to the Bhopal Gas Tragedy.

On the night of December 2-3 1984, an estimated two thousand people perished in Bhopal, India. They were killed by a plume of toxic gas that leaked out of a pesticides factory owned by the Union Carbide Corporation.⁵³ Of those who survived, at least half a million people sustained injuries that continue to plague them, and their progeny, to this day.⁵⁴

In my wider analysis of Bhopal and other, similar events, I draw out five key elements that make them violent environments, and help frame the problem of security. These are: (a) technological - acute, chronic, and emergent; (b) Corporate; (c) Distributive; (d) Bureaucratic; and (e) Discursive. In this section, I will restrict myself, in brief, to the middle three.

Corporate violence, or the violence of irresponsible capital

One way to perceive what is entailed in this type of violence is consider the work of the public relations Company, Burston-Marsteller (B-M), which was hired by Union Carbide Corporation in the aftermath of the Bhopal accident to manage its public image. Founded by Harold Burston and Bill Marsteller more than 40 years ago, B-M had previously been hired by Babcock and Wilcox in the aftermath of the Three Mile Island nuclear accident and by A.H. Robins during its problems with the Dalkon Shield contraceptive device. B-M had also advised Eli Lilly over the Prozac controversy, and Exxon after the oil spill.

According to B-M's corporate brochure,

Often corporations face long term issue challenges which arise from activist concerns (e.g. South Africa, infant formula) or controversies regarding product hazards... B-M issue specialists have years of experience helping clients to manage such issues. They have gained insight into the key activists groups (religious, consumer, ethnic, environmental) and the tactics and strategies of those who tend to generate and sustain issues. Our counselors around the world have helped clients counteract activist-generated ... concerns.⁵⁵

To deal specifically with environmental issues, B-M established a Worldwide Environmental Practice Group (EPG) – an international network of professionals who ‘specialize in various aspects of environmental communications’⁵⁶

B-M’s outlook to such communications has been laid down clearly in a paper by Harold Burston, Chairman of Burston-Marsteller, in which he argues that ‘being the professional corporate conscience is not part of the job description of other executives. It is part of the job description of the Chief public relations officer.’⁵⁷ Burston goes on to add that: ‘A corporation cannot compensate for its inadequacies with good deeds. Its first responsibility is to manage its own affairs profitably,’ and that ‘We should no more expect a corporation to adopt a leadership role in changing the direction of society than we should expect an automobile to fly. The corporation was simply not designed for that role.’⁵⁸

Herein lies the nub of this type of environmental violence – the violence that stems from corporate negligence. The case of Union Carbide is striking in this regard. First, it has a long record of environmental negligence includes the infamous Hawk’s Nest Tunnel Incident in the 1930s and the Oak Ridge Mercury contamination problem from the 1950s. It also includes the Temik poisonings on Long Island in the 1970s, the Kanawaha Valley pollution controversy in the 1970s and 1980s, and several other such incidents in the United States, Puerto Rico, Indonesia, Australia, France and India.⁵⁹

Secondly, Union Carbide also seemed to have a long established record of dealing with disasters, should they occur. In an earlier case involving pollution in New York State,

the company had, according to one account of that case, deployed a five-pronged strategy to deal with the situation. First, it attempted to deny the problem. An example of denials included statements such as: 'Minute traces of...TEMIK aldicarb have been recently detected in wells in the vicinity...in amounts measurable only by ultra modern technology.' Second, the company attempted to put the problem 'in perspective' by arguing that: 'it is well known that much larger residues of other agricultural chemicals...have been found in the same water for many years.' Third, the company attempted to re-direct the focus of the problem by blaming 'a hysterical public' with statements such as: 'some people have an unarticulated worry over the possibility of unspecified future health impairment...however unjustified.' In the same breath, the company also overtly blamed the victim: 'Victims mislead in claiming that TEMIK is a poison although it is they who have 'refused to take prophylactic measures to protect themselves.' Fourth, Union Carbide attempted to divide and conquer the plaintiffs in the lawsuit against it by telling farmers and developers that they had conflicting interests and would do better by settling with Carbide. Finally, it attempted to settle with the government when it became less expensive to do so.⁶⁰ Strikingly, the story was almost identical in Bhopal.⁶¹

The upshot of Union Carbide's post disaster strategy is palpably visible in the settlement ledger. In the aftermath of the accident, victims organizations in Bhopal made a claim of US \$ 10 billion, based on standards in the United States. The Indian government meanwhile claimed \$ 3.3 billion. Union Carbide's initial offer was \$300 - \$350 million and the final settlement was worth \$470 million. The cost to Union Carbide was a mere 43 cents a share. In its annual report following the settlement, Union Carbide boasted

that ‘The year 1988 was the best in the 71 year history of Union Carbide, with a record \$ 4.88 earnings per share which included the year-end charge of 43 cents a share related to the resolution of the Bhopal litigation.’⁶²

Distributive Violence

Corporate violence, such as the case of the Bhopal disaster, is often caused by the existence of vertical power gradients wherein corporate entities are vastly more powerful than communities of citizens, and in many cases, local and national governments. Such violence, however, is often accompanied by what is perhaps best described as ‘distributive violence.’

In Bhopal, the people most exposed to the gas leak were those who were economically and politically marginal. At the outset, those who lived near the Carbide plant did so because it was the only place they could afford. Being in an industrial location, with the associated problems of noise, air and water pollution meant that the land around the Union Carbide plant was the least desirable, and consequently, the least expensive. Moreover, the people who were most exposed to the gas were those who lived in semi-permanent dwellings. These were shanty houses whose windows and doors did not seal tightly enough to keep the gas out in any effective manner. The upshot of these factors was that the economic status of those who became gas victims, forced them to live in an explicitly violent environment.

Another facet to the environmental justice issues in Bhopal centered on the political marginality of those who were affected by the gas leak. When Union Carbide built its

MIC plant in 1979, it did so within its existing facility, which was located next to a densely populated neighborhood and a heavily used railway station. In doing so, it violated the 1975 Bhopal Development Plan which had stipulated that hazardous industries such as the MIC plant ought to have been located in the northeast end of the city away from and downwind of the heavily congested areas. According to M.N. Buch, one of the authors of the plan, UCIL's initial application for a municipal permit for the MIC plant was rejected. The company however managed to procure the received approval from the central governmental authorities and went ahead to build the MIC unit in the midst of a dense urban settlement.⁶³

Underlying the correlation between environmental injustice and economic and political status in Bhopal, thus, was a political economy that manufactured both a physical and a moral metaphysic of environmental violence. This metaphysic, as the foregoing account has shown, had structurally built-in potentialities for serious risk to the workers and the community. When not physically actualized, the agents responsible for creating the metaphysic were morally lucky.⁶⁴ However, when the potentiality was actualized, as happened in December 1984, the moral metaphysic underlying the environmental injustice in Bhopal produced a catastrophic disaster.⁶⁵ Since this moral metaphysic was based on distributive inequity, the type of violent environments it engenders is perhaps best described as distributive violence, or the violence of environmental justice.

Bureaucratic Violence

Distributive violence in Bhopal got exacerbated by yet another, everyday form of violence, that was perpetrated by the bureaucrats and technocrats assigned by the state

machinery to help put together a rehabilitation program for the victims in the aftermath of the gas leak.

To begin with, there was what is perhaps best described as the violence of absence. At the outset, effective regulation was, for the reasons associated with distributive violence, almost non-existent. Besides, there was no pre-emptive program that prepared the community near the plant to respond adequately in the event of an accident. Nor was there any co-ordinated or systematic contingency plan drawn up, leave alone rehearsed, whereby some designated agency of the state could respond effectively in emergencies.⁶⁶ Moreover, the violence of absence was compounded in the days after the immediate accident when the state bureaucracy failed to adequately cope with tasks as basic as removing carcasses from the streets. Perhaps the most palpable illustration of this violence lay in the fact that it took forty hours for the secretaries and heads of departments to set up the first coordination meeting to take stock of the relief process.⁶⁷

Another manifestation of bureaucratic violence was the violence of the routine. In the aftermath of an enormous disaster, all that the bureaucracy could muster by way of a rehabilitation program were schemes dusted off the shelves of the secretariat. Initially, during the first six months after the disaster, this meant implementing the standard models of disaster relief used in floods and cyclones – ex-gratia payments and the distribution of rations. Later, as it became clear that there would be a chronic disaster needing a long-term rehabilitation strategy, the bureaucracy's response was to bring to Bhopal a standard poverty alleviation program which involved providing small loans that would help victims set up businesses either in the retail or service sectors.

Bureaucratic violence also involved a sort of concealment and lack of transparency. It began long before the December 1984 accident. Far from ensuring public debate and consensus about the risks involved in siting a highly hazardous facility within a dense urban settlement, the communities involved were provided with little of no information about the plant and the threats it potentially posed. During the accident, as pointed out earlier, the affected community was not provided with basic information on how to respond to the gas. In the immediate aftermath of the accident, when a major decision on detoxifying the plant was made, the public was once again not made privy to the details of the process or the risks involved.

Finally, bureaucratic violence concerned what might best be described as the violence of scientism.⁶⁸ One illustration of this type of violence was the language used by the doctors to describe the claims of the gas victims. The origins of women's medical problems, for example, were attributed to a variety of factors including 'faking'; 'psychological'; or 'due to poverty and poor hygiene.' Men, in turn, accused of 'compensation neurosis.'⁶⁹ In essence, like in the case of the certificate and the form, the only method of accepting the authenticity of the pain of the victim was some "objective" measure of truth. For the doctors, nothing but "objective" physical measurements could count. The obsession with "objective" evidence and the simultaneous rejection of subjective testimonies by suffering victims of their pain was widely prevalent within the medical research establishment. An example is some of the work conducted by the Indian Council of Medical Research which focused on assessing chromosomal aberrations and the mutagenic effects of the chemicals that entered the body by using sentinel phenotypes, protein markers and

cytogenic studies. In addition to the various Duhemian problems posed by these studies (such as the fact that numerous factors other than chemical mutagens - e.g. viral infections and specimen handling procedures, can cause somatic chromosome breakage or rearrangement), these methods were tremendously time consuming, expensive, and required enormously large samples of data. An alternative and less expensive way of assessing mutagenic effects, however, was examining the incidence of spontaneous abortion rates, which in Bhopal, had, in the admission of the ICMR doctors themselves, clearly increased. This method, however, relied on interviews with affected women. In September 1985, the Medico Friends Circle, a medical NGO, conducted a study that showed a significantly high increase in spontaneous abortion rates. When this study was presented to the medical profession, its response was: 'the study is quite useless because... memory recall can never be relied upon in a disaster situation...the population would definitely exaggerate its symptoms.'⁷⁰

Each of these five types of violence associated with the administrative and medical bureaucracy was embedded within the social stratification endemic to the society at large in Bhopal. The interactions between the bureaucracy and the gas-affected community were thus almost always mediated via the wider societal prisms that included class, caste, gender and religion. At the same time, these interactions were informed by what Kleinman, Das and Lock call the 'rationalized bureaucratic apparatus of the modern state,' and especially, the obsessive demand for objectively certifiable authenticity, as opposed to the acknowledgement of subjective pain and suffering.⁷¹ These two factors, combined with the nature of the local political and moral economy, produced a mosaic of violence described here as 'bureaucratic.'

An important facet of bureaucratic violence is what may be described as ‘missing expertise. For purely heuristic reasons, it is useful to classify missing expertise under three categories – contingent, conceptual, and ethnographic.

Contingent Expertise

Contingent expertise refers to an administration’s preparedness to respond immediately and effectively to a potential hazard. It is concerned, therefore, with the conscious adaptive mechanisms and institutions built by governments prior to cataclysmic events. Such institutions include warning systems, evacuation procedures, and other measures that help mitigate the societal impact of the disaster in the immediate aftermath.

In discussing the absence of contingent expertise, it is instructive to compare the Bhopal case with governmental responses to more conventional disasters, such as famines, floods and cyclones. There are indeed a number of examples wherein state governments have been able to respond reasonably efficiently. The reason for this is that in such successful cases, there was a prior systemic recognition of potential threats and a concomitant erection of reactive mechanisms, in addition to effective training at various levels of the governmental bureaucracy. Such recognition and institution building, in turn, was a consequence of the politicization of vulnerability, and consequent societal mobilization.⁴

The absence of contingent expertise is most evident in two specific types of contexts. One of these involves novel hazards, such as industrial and technological accidents. Bhopal is a prime example in this regard. The other context is that wherein the scale of the disaster

is immense. The Orissa cyclone of 1999 and the Gujarat earthquake of 2001 are infamous examples that illustrate this trend. In both novel accidents and large-scale calamities, the absence of contingent expertise is a consequence of the scope of the hazard exceeding existing state capacity to cope with it. Critically, in each of these two types of cases, three critical features present in the successful adaptive systems set up to meet the threat of low scale conventional disasters, are missing. The first of these is hazard awareness. The administration in Bhopal, for example, did not know the full potential of the hazard posed by the Union Carbide pesticides factory. Likewise, the Orissa state government did not have prior knowledge that a storm of such intensity could strike. Again, the administrations in Gujarat and U.P. were unaware of the underlying seismic threat. In each case, the respective governments failed to scope out potential hazards and generate systematic data on possible threats.

The second missing feature involves efforts, on the basis of such awareness, to minimize either the onset of the threat or its impact when a cataclysmic event occurs. Effective monitoring of the plant in Bhopal, building early warning systems and shelters in Orissa, and enforcing building codes in U.P. and Gujarat, are examples in this regard. The third missing feature is the absence of the infrastructure needed to effectively respond to a disaster, should one ensue. Such infrastructure includes the deployment of appropriate technological systems; the provision of adequate training to designated staff; and effective risk communication procedures in the wake of a hazardous event.⁵

The experience of erecting functional institutions to deal with conventional disasters of low intensity however indicates that there is no apriori reason why novel and large-scale

disasters can not equally be subject to effective contingent planning. Missing expertise, in such contexts, therefore reflects a wider absence of societal and cultural prioritization of the need to build such expertise. Such absences speak to a wider problem in India, and indeed elsewhere, as Katrina showed, which concern the cultures of risk and the political economy of hazard in society as a whole. In this sense, the Bhopal gas disaster is indeed a canary in the mine, pointing to a more entrenched and perhaps intractable set of social factors that underlie how risk and vulnerability are framed and tackled.

Conceptual Expertise

Conceptual expertise is about the kind needed to devise long term rehabilitation strategies, and to trouble shoot them in practice. Unlike the case of contingent expertise, the problem of the absence of conceptual expertise needs to be addressed with much more than rehearsed responses. To begin with, it demands a dynamic and pragmatic approach to governance, especially one that builds institutions that expand the role of government from beyond the traditional domains of preserving law and order and collecting taxes. Effecting such types of governance, in turn, demands investment in a wide range of training for civil officials. At the same time, the absence of conceptual expertise in Bhopal points to the need to augment the capacity of the social scientific and policy institutions.

An illustration of this issue is the appeal made by the state government, when it first attempted to establish a rehabilitation program, to various Indian universities and institutions of higher learning to help them in this process. This call was responded to with an extraordinary amount of silence.⁷² Although anthropologists and political

scientists decried the discourse of development, the nature of the world capitalist system, and the “econometrics of suffering” produced during the course of the state rehabilitation process, they did very little tangibly to help address and solve the complex problems associated with the problem of rehabilitation. No social scientist, for example, committed to conduct long-term research toward this end. Even those institutions that did respond, such as the Tata Institute of Social Sciences, which the government commissioned to conduct a socio-economic survey, could not adequately deliver. These material absences are symptoms of a wider phenomenon, described elsewhere as the politics of missing expertise.⁷³ There was no middle ground between the heady discourse of technocratic optimism, on the one hand, and the equally vehement anti-developmental pessimism and a social scientific discourse obsessed with describing power gradients and discourses of governmentality, on the other. Crucially, there was no prevalent culture of material practice in the social science that could tangibly intervene in the thicket of pragmatic detail that putting together a rehabilitation program demands.⁷⁴

Unlike the case of natural scientific and technological institutions, Indian social science has suffered from both an absence of defined mission, as well as poor funding. As a result, there has been little systematic investment in building the kinds of conceptual expertise needed to address complex problems such as post-disaster rehabilitation. However, if the recent successes in the forestry and water sectors are indicators, such expertise can be built, provided there is concerted interest and funding. For this to happen, however, it is important, first, to recognize the absence of conceptual expertise as a critical issue worthy of national attention.

Ethnographic Expertise

Ethnographic expertise refers to an ability to gain a contextual and grounded understanding, and to act on the basis of such experience. In Bhopal, for example, the existence of ethnographic expertise could have engendered a radically re-designed claim form, or a change in the nature of the doctor-patient interaction. Attention to small details such as these could have altered the life-worlds of the victims in tangibly positive ways. Unlike contingent and conceptual forms of expertise, which, as issues of contention do periodically enter the public and political arena, ethnographic expertise has rarely made it into the pantheon of what is considered the criteria of good governance. Indeed, it is a specific insight provided by anthropological studies of disasters.⁷⁵ However, translating the idea of ethnographic expertise into an explicit set of practices requires the development of novel innovations and iterative experimental alliances between anthropologists, and bureaucracies. For this to happen, it is critically important for anthropologists to stake their expertise and be willing to break the barrier between the pure and the applied and the descriptive and the prescriptive modes of thinking. Unfortunately, this did not happen in Bhopal.

To conclude, the idea of security is primarily about the issues posed by dangerous environments. It has to do with recognizing some of the dynamics that make these environments the way they are, and undertake the political, conceptual, and institutional work that needs to be done to make them safer.

Conclusion

Rather than undertake a long-winded conclusion in a document that is already way over the prescribed limit, I'll do two things. First, a quick summary of the argument presented in this paper. In essence, the thrust has been to argue that either the absence of good environments or the presence of bad environments, produces environmental injustice. Implicit, everywhere, is the contention that merely emphasizing some of the traditional parameters of either economic development or environmental protection are inadequate to grapple with the challenge posed by environmental injustice. Rather, the task, going forward, must involve both a utopian re-conceptualization, drawing upon traditional political economic theory, starting with physiocracy, as well as contemporary environmental and ecological economic, and social and development theory. At the same time, it is important to re-conceptualize institutions and governance structures, based upon the empirical evidence about environmental justice throughout the world.

This brings up my second concluding element. In addressing these two tasks in my book, I am asking three broader questions:

1. The meaning of substantivism: What, specifically, does it take to build substantive economies in our world. This is important because one of the fundamental insights of the environmental justice framework is that formalist economics has become too de-contextualized. (Interestingly enough, Hayek makes a very similar argument, in his case, leading up to the justification of markets.). Related to this is the question of scale and 'local' governance, and I am particularly influenced here by the manner in which Jim Scott finished his book, *Seeing Like the State*.

2. Institutions: Related to this is the question of the character of institutions, that will substitute or augment traditional ones, in the environmental justice utopia.

3. Last, but by no means the least, I try to theorize contingency and process, as important themes, to contrast with traditional measures, that include goals and targets. Rather than think of human development as a set of goals to be achieved, can governance be conceptualized in terms of contingent aims and fundamental processes, which incorporate, into governance, some of the insights of the environmental injustices?

Notes

¹ Joseph Stiglitz, "We have become rich countries of poor people." *Financial Times*. September 8, 2006.

² Marius de Geus, *Ecological Utopias: Envisioning the Sustainable Society*, Utrecht, 1999. pp. 38-39.

³ For a discussion of intrinsic and instrumental arguments, see Ronald Dworkin, *Life's Dominion*. 1995, and Ben Rogers. Ed., *Is nothing sacred?* 2004.

⁴ The word, 'justice' is used here primarily in the Rawlsian sense. See John Rawls, *A Theory of Justice*. 1972, and Brian Barry, *Theories of Justice*, vol. 1. 1989.

⁵ Such ideas are usually linked in this literature with Bacon and Descartes, among others. See e.g. Merchant, *The Death of Nature*, D. Worster, *Nature's Economy: the Roots of Ecology* (Cambridge, 1977); J., 'Francis Bacon, the First Philosopher of Modern Science: A Non-Western View', in A. Nandy (ed.), *Science, Hegemony and Violence, A Requiem for Modernity* (New Delhi, 1990); V. Shiva, *Staying Alive: Women, Ecology and Development* (London, 1989); and Henryk Skolimowski. *Eco-Philosophy*. (New York, 1981).

⁶ Clarence Glacken, *Traces on the Rhodesian Shore: Nature and Culture in Western Thought from Ancient Times to the end of the Eighteenth Century*, p. 495.

⁷ Joseph Kittredge. *Forest Influences: The Effects of Woody Vegetation on Climate, Water and Soil*. New York. (New York, 1948). p. 6.

⁸ G. P. Marsh. *Man and Nature* (Madras, 1882); É. Reclus, *The Ocean, Atmosphere, and Life: Being the Second Series of a Descriptive History of the Life of the Globe* (New York, 1873); J. C. Brown, *Forests and Moisture; or the effects of forests on humidity of climate* (Edinburgh, 1877); Franklin Benjamin Hough. *Report on Forestry* (Washington 1878-80). I owe my awareness of this body of work primarily to the writings of Clarence Glacken and John Croumbie Brown, on which I drew considerably while writing my book, *Modernizing Nature*. By carefully tracing the footnotes of these authors, I came to the realization that these books were, in effect, elaborate literature surveys and thereby, captured the essence of the scientific work on the environmental consequence of various anthropogenic activities that had been conducted from the mid eighteenth to the mid nineteenth centuries.

⁹ Glacken. 'Changing Ideas of the Habitable World', p. 74; C. Webster. *The Great Insaturation: Science, Medicine and Reform, 1626-1660* (London, 1975), pp. 465-488; 495.

¹⁰ Glacken. 'Changing Ideas of the Habitable World', p. 74-75.

¹¹ Glacken. *Traces on the Rhodian Shore*, p. 487. It is important to note that Evelyn and Colbert were not outliers in making such arguments in the seventeenth century. Other, equally influential advocates included Ralph Austen, the author of *Treatise of Fruit Trees* (1653) and *The Spiritual Use of an Orchard* (1657). Moreover, there were many in Europe writing letters to governments and officials urging urgent action aimed at forest conservation. For a particularly impressive letter, dating back to 1608 in Venice, see Kittredge. *Forest Influences*, pp. 6-7. On the importance of early Modern Venice as a precursor to modern environmental policy sensibilities, see Karl Apuhn. 'Inventing Nature: Forests, Forestry, and State Power in Renaissance Venice.' *The Journal of Modern History* 72 (December 2000).

¹² F. Heske, *German Forestry* (New Haven, 1938), p. 173.

¹³ Heske, *German Forestry*, p.174 They were influenced in part by the writings of the ancients, especially of Theophrastus and Pliny. They were also influenced by the growing interest in climate in Europe. For an account of the impact of the climatic theories among 18th century European scientific communities, see the discussion on the influence of John Arbuthnot and Montesquieu in Glacken, *Traces on the Rhodian Shore*, pp. 551-622.

¹⁴ Glacken. 'Changing Ideas of the Habitable World', p. 76. See also Comte Buffon.. *Natural History, General and Particular...* Trans. from the French by William Smellie. New ed., corr., enl. (London, 1812). 20 vols.

¹⁵ J.A. Fabre. *Essai Sur la Théorie des Torrens [Sic] et des Rivères...* (Paris, 1797), cited in C. Glacken.. *Traces on the Rhodian Shore*, p. 698. An important historiographical controversy is brewing among Swiss and German historians over whether there was indeed a relationship between deforestation and torrents. Some, who deny such causal links, remark that such environmental complaints 'served as the means for the dominant Swiss Lowlands to gain control over the mountain forests.' See, for example, Joachim Radkau. 'Wood and Forestry in German History: In Quest of an Environmental Approach.' *Environment and History* 2(1996): 63-76. pp. 68-69. Without getting embroiled in this debate, it is adequate, for the purposes of this section, to remark that there was a long and sustained scientific tradition that did make such claims – and that this genealogy of thought eventually formed one important strain of the emerging conservationist impulse.

¹⁶ Fabre. *Essai Sur la Théorie des Torrens* cited in J. C. Brown. *Reboisement in France; or Records of the replanting of the Alps, the Cevennes and the Pyrennes with trees, herbage and bush, with a view to arresting and preventing the destructive consequences and effects* (London, 1878), p. 56.

¹⁷ Especially important was Alexandre Surrel. See J. C. Brown, *Forests and Moisture; or the effects of forests on humidity of climate* (Edinburgh, 1877), p. 230. Reforestation of mountains as a means of control of torrents was also practiced in Japan in the 1680s. See Kittredge. *Forest Influences*. P. 8.

¹⁸ In France, the work of Fabre and Surrel was followed up by Belgrand, Belancer, Collignon, Comoy, Darcy et Bazin, Dumont, Dupit, Fargue, V. Fournié, Graeff, Krantz, Lamairesse, Malézieux, Mangon, Monestier-Savignat, Nadault de Buffon, Patriot, De Passy, Plocq, and M.A. Poirée. In Austria, the key studies were conducted by Franz von Zallinger, 1778, Von Arretin, 1808, Franz Duile, 1826, and Hagen, 1826. Important among the Germans were Franz Duile, 1826, Edmond von Berg, 1844, Gustav Heyer, 1852, Joseph Wessely, 1853, J. Van den Brinken, 1854, Franz Müller, 1857, and H. Berlepsch, 1862. In Italy, scientific research on deforestation and torrents was conducted by Castellani-Torino, 1818-1819, Guisippe Cereni-Milano, 1844, Antonio Giovanni Batti Villa-Milano, 1850, Pietro Caimi-Milano, 1857, and G. Rosa, 1861. [Brown, *Reboisement in France*, pp. 129-133.]

¹⁹ Glacken. 'Changing Ideas of the Habitable World', p. 78.

²⁰ Boussingault.. cited in Brown, *Forests and Moisture*, pp. 159-160.

²¹ A. von Humboldt, *Aspects of Nature in Different Lands and Different Climates; with Scientific Elucidations* (Philadelphia, 1849), p. 232.

²² M. Nicolson. 'The Development of Plant Ecology 1790-1960'; PhD. Thesis (University of Edinburgh, 1984), p. 14. Also, M. Nicolson, 'Alexander von Humboldt and the geography of vegetation', in A. Cunningham and N. Jardine (eds.) *Romanticism and the Sciences* (Cambridge, 1990), pp. 169-188.

²³ Nicolson. 'The Development of Plant Ecology', p. 14.

²⁴ R. C. Tobey. *Saving The Prairies: The Life Cycle of the Founding School of American Plant Ecology, 1895-1955* (Berkeley, 1981), p. 50.

²⁵ Before Humboldt's emphasis on the study of vegetation as a study of the collective phenomena of plants, the dominant botanical tradition was that of floristics.

²⁶ M. J. Schleiden. *The Plant: A Biography* (London, 1848), p. 306.

²⁷ While historians of ecology (e.g. E. Cittadino, *Nature as the Laboratory: Darwinian Plant Ecology in the German Empire, 1880-1900* (Cambridge, 1990); Tobey, *Saving The Prairies* and Nicolson, 'The Development of Plant Ecology') have written about the scientific contributions of the Humboldtian plant geographers, their work as botanical critics of deforestation, and thus as environmental commentators and eco-evangelists, has been totally ignored. This important gap has however been addressed in S.R. Rajan, 'Botanists as Environmental Evangelists: Fraas, Schouw, Schleiden and the ecological critique of "Civilisation"', Unpublished Paper, 1993. See also W. R. Woodward, 'Writings on the Philosophy of Science (Review of T. Glasmacher, *Fries, Apect, Schleiden - List of Primary and Secondary Literature, 1789-1988*). in *Ivis*, Vol. 84, No. 3 (1993).

- ²⁸ Brown. *Forests and Moisture*. p. 109. The book referred to was C. Fraas, *Klima und Pflanzenwelt in der Zeit, ein Beitrag zur Geschichte Beider* (Landshut, 1847).
- ²⁹ Glacken. 'Changing Ideas of the Habitable World', p. 79.
- ³⁰ Humboldt. *Ansichten der Natur*. 1849.
- ³¹ Marsh, *Man and Nature*. pp. 186 – 8.
- ³² Marsh. *Man and Nature*. pp. 186 – 87.
- ³³ K. Thomas, *Man and the Natural World: Changing Attitudes in England, 1500-1800* (London, 1983), p. 199.
- ³⁴ Mantel, 'History of the International Science of Forestry', pp. 26.
- ³⁵ Mantel, 'History of the International Science of Forestry', pp. 26-27.
- ³⁶ Michael Dettelbach. 'Romanticism and administration: mining, galvanism and oversight in Alexander von Humboldt's global physics.' Cambridge University. Ph.D. Thesis. 1993. For other good analyses of Humboldtian science, see Susan Faye Cannon, 'Humboldtian Science' in *Science in Culture: The Early Victorian Period*, (New York, 1978), pp. 73-110; Nicolson, 'Alexander von Humboldt and the geography of vegetation' and Anne Margaret Macpherson, 'The Human Geography of Alexander von Humboldt' (Ph.D. Thesis, University of California, Berkeley, 1971), pp. 35-112; 153-354. It is important to note here that historians of ecology such as Donald Worster are not entirely right in locating Humboldt as an 'Arcadian' scientist. In addition to his theoretical interests, Humboldt was actively interested in practical applications of science, especially for natural resource use: he thus attended the Freiburg School of Mines from June, 1791 to March 1792 among many others to obtain practical training. (MacPhearson, 'The Human Geography of Alexandre von Humboldt, p. 94.).
- ³⁷ Fernow, *A Brief History of Forestry*, p. 101.
- ³⁸ For a wonderful history of the idea of improvement and perfectibility, see John Passmore, *The Perfectibility of Man*. 1970.
- ³⁹ Schleiden, *The Plant: A Biography*, pp. 306-7.
- ⁴⁰ For a comprehensive discussion of the evolution of the Dominion Myth, see John Passmore. *Man's Responsibility for Nature: Ecological Problems and Western Traditions*. Gerald Duckworth & Company; 2nd edition (June 1, 1974).
- ⁴¹ Leonard Guelke and Robert Shell, 'Landscape of Conquest: Frontier Water Alienation and Khoikhoi Strategies of Survival, 1652-1780.' *Journal of Southern African Studies*. Vol. 18, No. 4., 1992. pp. 804 – 824.
- ⁴² Timothy C. Weiskel, 'Agents of Empire: Steps Toward an Ecology of Imperialism,' in *Environmental Review* (Winter, 1987), p. 275.
- ⁴³ Heske, *German Forestry*, p. 244.
- ⁴⁴ Heske, *German Forestry*, p. 244.

⁴⁵ Heske, *German Forestry*, p. 244.

⁴⁶ Heske, *German Forestry*, p. 244.

⁴⁷ Fernow, *A Brief History of Forestry*, pp. 52-53.

⁴⁸ The point has been made substantively in *Modernizing Nature*.

⁴⁹ J.C. Kumarappa. *Economy of Permanence: A Quest for Social Order based on Non-Violence*.

⁵⁰ Karl Polanyi. *The Great Transformation*. p. 178.

⁵¹ Karl Polanyi. *The Great Transformation*. p. 178.

⁵² Karl Polanyi. *The Great Transformation*. p. 132.

⁵³ Throughout this paper, "Union Carbide Corporation" refers both to the U.S. based company and its Indian subsidiary, Union Carbide India Limited.

⁵⁴ For an account of the death toll in the immediate aftermath of the accident, see Center for Science and Environment, New Delhi. *The State of India's Environment 1984-85: The Second Citizen's Report*, p. 210. Although the precise figure of the total number of survivors is disputed, most sources put it at about half a million.

⁵⁵ Greenpeace. *The Greenpeace Book of Greenwash*, Greenpeace International, available on the internet at <http://www.greenpeace.org> 1992.

⁵⁶ B-M internet website, <http://www.bm.com> Insert access date.

⁵⁷ Burston nd. Provide full cite.

⁵⁸ Burston nd. Provide full cite.

⁵⁹ David Dembo, Ward Morehouse, and Lucinda Wykle, *Abuse of Power, Social Performance of Multinational Corporations: The Case of Union Carbide*, 1990., pp. : 46 – 68.

⁶⁰ David Dembo, Ward Morehouse, and Lucinda Wykle, *Abuse of Power, Social Performance of Multinational Corporations: The Case of Union Carbide*, 1990., pp. 46-52.

⁶¹ See Ravi Rajan, 'What Disasters tell us about Environmental Violence: The Case of the Bhopal Gas Disaster.' in Michael Watts and Nancy Peluso eds. *Violent Environments*, Cornell University Press, 2001.

⁶² Union Carbide Annual Report, 1988.

⁶³ Center for Science and Environment, New Delhi. *The State of India's Environment 1984-85: The Second Citizen's Report*, p. 216.

⁶⁴ Moral luck refers to cases when luck makes a moral difference. The idea of moral luck poses a philosophical problem in that it sets up a clash between the apparently widely held intuition that cases of moral luck should not occur with the fact that it is arguably impossible to prevent such cases from arising. For an introduction to this concept, see B. Williams, *Moral Luck*, 1981; and Thomas Nagel, 'Moral Luck,' in Daniel Statman ed. *Moral Luck*. 1993. pp. 57-71.

⁶⁵ The terms, 'potentiality and 'actuality' have been adopted from Aristotle's discussion of motion. See especially, Aristotle's *Physics*. Jonathan Barnes. ed., *The Complete Works of Aristotle: The Revised Oxford Translation* 1983.

⁶⁶ Center for Science and Environment, New Delhi. *The State of India's Environment 1984-85: The Second Citizen's Report*, p. 216.

⁶⁷ Center for Science and Environment, New Delhi. *The State of India's Environment 1984-85: The Second Citizen's Report*, p. 206 - 211.

⁶⁸ "Scientism" refers to "to a belief in the omnipotence of scientific knowledge and techniques; also to the view that the methods of study appropriate to physical science can replace those used in other fields such as philosophy and, esp., human behaviour and the social sciences. (OED Online edition).

⁶⁹ Sathyamala, 'The Medical Profession and the Bhopal Tragedy,' *Lokayan Bulletin* v. 6, n ½. p. 50.

⁷⁰ Sathyamala, 'The Medical Profession and the Bhopal Tragedy,' *Lokayan Bulletin* v. 6, n ½. p. 49.

⁷¹ Arthur Kleinman, Veena Das and Margaret Lock. eds. *Social Suffering*. 1997. p. xix

⁷² Conversations with Dr. Ishwar Das, then Commissioner of Gas Relief, 1996.

⁷³ Ravi Rajan, 'What Disasters tell us about Environmental Violence: The Case of the Bhopal Gas Disaster.' in Michael Watts and Nancy Peluso eds. *Violent Environments*, Cornell University Press, 2001.

⁷⁴ For a more comprehensive discussion of this issue, see S. Ravi Rajan., 'Missing Expertise, Categorical Politics and Chronic Disasters – the Case of Bhopal.' In Susanna Hoffman and Anthony Oliver-Smith (eds.) *Catastrophe and Culture: The Anthropology of Disaster*. 2002. pp. 237 - 260.

⁷⁵ Anthony Oliver Smith. 'Anthropological Research on Hazards and Disasters.' *Annual Review of Anthropology*. 1996. 25: 303–28