

Energy, Agriculture, Patriarchy and Ecocide¹

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Introduction

This essay is an explanation of how our EuroAmerican civilization has become so effectively ecocidal. This is not a call to arms; this is not a “how to stop it.” I not only do not presume to know what is to be done, I believe that our problems stem from EuroAmerican men assuming they know what is best, for others and for the planet. Most of us have been egregiously misinformed and uninformed by our mass media, including our institutions of higher learning, about the inefficiency and destructiveness of past and present agricultural food production systems; about the privatization of land and women, especially during the last five centuries; about the human costs of civilizations, including our own; and about the principal human societies in the world today. Deconstructing these areas of misinformation and disinformation explain much about our current ecological crises.

Ten thousand years ago the earth was all common land, neither public nor private, and although human and other groups asserted territoriality, misuse of common land was surely apparent because those who misused it perished or moved on. The eight million humans at that time lived in thousands of small societies with as many distinctive ways of living on the earth, for centuries and millennia.² These hundreds of thousands of societies, some of which still exist today, had in common that they adopted the most efficient form of food procurement possible: They let nature grow food and store it until they ate it.³ Many of the gatherers moved seasonally, to take advantage of different foods produced at different times in different areas. They were (and at least the 50 million still living in forests still are (La Duke 1993)) in an extensive supermarket in which everything is free, new items are continually put on display, and they eat what they find, when they find it. They don’t even have to cart it out of the store through a checkout line. They may have to wait until certain of their favorite foods are in season, but they know which aisle they will be in.

Presently 6,000 million humans inhabit the earth, and patriarchal multinationals and the government bureaucracies and militaries of 190 “countries” assert sovereignty over the world’s 3,000 to 5,000 nations and peoples, all of the continents, 40 percent of the oceans, and even the lower reaches of space (Nietschmann 1987, 1,3). They dispute all claims of common land.⁴ Based in the northern industrialized countries of the planet, these organizations have been and contin-

ue to destroy our life-support systems. They control almost all the forces of organized violence in the world. They also control technologies, equipment, and payrolls. According to the World Bank, international financial institutions have resources of \$14 trillion, about the same as the total GNPs of the world.⁵ Governments have no control over their economies when capital of this magnitude can enter and leave at will.

These patriarchies also control most of the education systems and other mass media through which they promote mass destruction.⁶ These efforts are legitimated by using such labels as “development,” “jobs,” “national security,” “nuclear power,” “nation building,” “social progress,” “border security,” “eradicating drugs and drug traffic,” “terrorists,” “tribals,” “insurgents,” and “exploding populations.” To make matters even worse, the worldwide “population explosion” is almost entirely a consequence of patriarchal societies within which men exercise and promote their traditional and legal rights to torment, impregnate, abandon and/or murder women. Sex and reproduction are not under women’s control.

Patriarchal militaries, multinationals, and governments have acquired unprecedented power and pay at least 100 million of their employees to do the hands-on work of destroying and poisoning the earth’s habitat — logging, bombing, spraying, incinerating, extracting, burying, dumping, and so on.⁷ Those involved in the hands-on destruction of our life support systems do their jobs more completely and effectively by using machines powered by the extraordinary energy subsidies embedded in fossil fuels, and by creating, using and broadcasting substances against which the natural world has no defense. They do it for money. And they really do need the money because nearly all the commons of the earth have been privately appropriated. Billions of people are desperate to do anything for money because they cannot survive without it. And the militaries, multinationals, and governments are the sole purveyors of money.

The dominant ideology of the planetary rulers is bad enough: megalomaniacal, materialistic greed. But the more ominous danger these powerful men pose is their alienation from the real, living world. They are utterly divorced from reality. They do not care about or understand the life-threatening implications of their enterprises. So what we have is millions of people destroying our life support systems in the service of extremely powerful international organizations.⁸

What Happened? An Alternative Way of Understanding Agriculture and Other Forms of Food Procurement

A History of Agriculture

People began to domesticate plants and animals about 10,000 years ago, and today sedentary agriculturally based societies are almost universal. Horticulture, agriculture, fishing, and tending livestock take somewhat more work than gathering and hunting, but cultivating and fishing societies have more apparent control over their future food needs once they learn to store surplus food.⁹ Agriculture is the cultivation of single crops through plowing, as compared with horticulture, where many crops are cultivated with hoes and digging sticks. Agriculture involves replacing some area of a natural habitat with an artificial one. Agriculture therefore always means the destruction of habitat.

Studies of skeletons found at dozens of sites on all continents of the eastern and western hemispheres allow comparisons of pre- and post-agricultural well being. A general decline in well-being with the adoption of agriculture was evidenced by a precipitous decline in height — 5 to 6 inches less than their gatherer-hunter ancestors in ancient Greece and Turkey, a decline from which modern Greeks and Turks have yet to recover (Angel 1984, Table 3). Cohen and Armelagos say that studies “suggest fairly consistently that the adoption of farming was accompanied by a decline in the overall quality of nutrition” (1984, 587). Diamond (1987) put it more bluntly: agriculture was “the worst mistake in the history of the human race.”

Agriculture brought both ruling classes and the subjugation of women. Royal skeletons in Greek tombs are two to three inches taller than those of commoners, and have better teeth (Angel 1984, 66); royal Chilean mummies are taller and have a far lower rate of bone lesions caused by disease (Allison 1984, 525-527). Similarly, women suffered from diet deficiencies as evidenced by smaller skeletons and having more bone lesions from infectious disease than men, and more frequent pregnancies than their subsistence foremothers (Allison 1984; Angel 1984; Dickel et al. 1984; Larsen 1984; Smith et al. 1984).

Why does the adoption of agriculture result in socioeconomic inequality, patriarchy, malnutrition, and a decline in well being? The answer seems to follow from the fact that agriculture is inherently inefficient: clearing land, plowing, sowing, fertilizing, weeding, harvesting, storing and distributing single crops takes organization, which means hierarchy. Furthermore, distributing food surpluses invites the distributors to assume political and religious power, and to accumulate wealth and privilege (Lenski 1966; Boulding 1992, vol. 2, 299). At the same time, the practice of stratification leads

to power discrepancies between men and women (Holter 1970; Tinker 1990). And agriculture leads to an emphasis on women producing and caring for more children (Kolata 1974; Collier and Rosaldo 1981; Leacock 1987). Getting people to do all this extra work takes coercion: slavery, wage slavery, and/or religious-political socialization and ideological hegemony. Agriculture, patriarchy, and population growth are closely related. To begin to see these linkages we need to understand energy efficiency in relation to food procurement.

Energy Efficiency of Food Procurement: The Principle of Least Effort

Planet Earth is solar-powered, and life on our planet has evolved to take full advantage of that. The First Law of Thermodynamics, that energy cannot be created or destroyed, puts all living creatures on notice to depend fundamentally on the sun's energy, which is unimaginably bountiful. Although in an unconcentrated form, the total amount of solar energy that continually falls on the United States is 10,000 times greater than the fossil fuel energy we now use (Wayne et al. 1986, 290).

The living world operates on the “principle of least effort” (Maupertuis 1750; Jeans 1905; Zipf 1949). Absent civilized control, no plants or animals work more than is necessary in order to live, reproduce, nourish their offspring, and maintain their own structures and the structures of their colonies.¹⁰ Given the enormous energy subsidy of the sun, the principle of least effort dictates that each organism maximizes energy efficiency by obtaining as much energy as it can while expending as little energy as it can. Efficiency is the ratio of work output to work input, which is the same as the ratio of energy output to energy input during a given period of time.¹¹ Plants and animals, including subsistence human societies with little hierarchy, have adopted the most efficient method of food production possible: They let nature grow food and store it until they eat it.

Lee and DeVore (1968) and Sahlin (1968, 1972) documented that producing members of subsistence societies put in about two to three hours each day procuring and preparing food, thus exemplifying the Principle of Least Effort. In my physiological model of food procurement strategies (Lough 1995b) I showed that the least effort spent in procuring food leads to the preservation of habitat. In contrast, the average producing adult in the market economy works 12-15 hours per day if unpaid women's labor is included.

Any colony or species that practices a food procurement technique that requires more work than is necessary, more work than it takes to go and eat the food that nature has grown and stored, is put at a disadvantage relative to other colonies and species that work less to obtain the same food energy. Nature automatically penalizes energy inefficiency

by reducing the energy return on energy invested (EROI). When the denominator (work done by the individual or colony) goes up, the efficiency goes down, and there is less energy available to the individual or species that works more than it needs to.

This doesn't mean that in the short-term a relatively low energy efficiency will be fatal for a species, society, or individual. Sedentary horticultural societies have "mixed" procurement strategies that sacrifice short-term efficiency in order to lay aside food and other supplies to carry them through droughts, floods, winters, and unforeseen variations in the environment. Over time, these calculated expenditures of effort keep their energy efficiencies high enough to stay afloat amongst others that maximize efficiency in the short-term. Also, diversity in any particular time and place involves inefficiency for some species and colonies in the short run. But as we will see, the overall efficiency of any species or society on earth, all of which are solar-powered in the long-term, cannot fall below the level needed to maintain their structures over time.

Energy Efficiency of Agriculture

Agriculture as a non-sustainable land use. Agriculture involves the destruction of habitat, replacing it with an artificial environment in which single crops are cultivated, typically through the use of plows, draft animals, and machines. Here is an example of the conventional wisdom about agriculture:

The use of [the plow] greatly improves the productivity of the land; it brings to the surface nutrients that have sunk out of reach of the roots of plants, and it returns weeds to the soil to act as fertilizers. The same land can be cultivated almost continuously, and fully permanent settlements become possible (Robertson 1987, 105).

All of this is incorrect. Cultivation and plowing oxidizes the reserves of organic matter in the soil and the balance of fertility is soon destroyed as they are carried away by wind and water runoff (Shiva 1989, 107). And just as in the case of industrialized agriculture, bringing nutrients to the surface by deep plowing amounts to an energy subsidy that the roots of the plants do not have to provide for themselves, and thus the plants become dependent on continual inputs of such energy in order to survive. The same is true for irrigation and the application of artificial pesticides and herbicides.

As for returning weeds to the soil, the subsistence farmer has a different conception of "weeds." Of course there are plants that the gardener has no use for, and these may be composted. But what for the agricultural monocropper is

"weeding" is instead a process of sorting for the gardener: varieties of deliberately intermixed and "volunteer" plants are sorted into those that are edible, those that are medicinal, those that are herbs and spices, those that keep pests and unwanted plants away, and so on.

Agriculture has never been as energy-efficient as subsistence gathering and gardening. Agriculture results in more food per person per unit of time, but only because a disproportionate amount of energy is exerted by the agricultural work force. Nor is the product as nutritious (Cohen and Armelagos 1984; Diamond 1987).

Modern high-yield agriculture is particularly disastrous. The so-called Green Revolution is nothing of the sort. It is wasteful of fossil energy and other nonrenewable resources (Pimentel 1991, 1992a). It threatens diversity because it involves monocropping and replacement of indigenous species (Paoletti et al. 1992). It is degrading the environment because it depends on polluting pesticides, fertilizers, machinery, and relatively large inputs of water (Pimentel 1992b). It has failed to benefit those who cannot pay for it (Editors of *The Ecologist* 1992; George 1977, 1979, 1984).¹²

And as Pimentel (1992b) has pointed out, topsoil, like water, is being mined.¹³ Topsoil is being depleted at a rate 16 times the rate of reformation, and this is due in large part to the agribusiness research industry, which focuses its efforts on marketable annuals that require pesticides, herbicides and financial assistance from banks every year, rather than hardy perennials that would require none of the above and require no tillage for years. Those who care for the vineyards of France and Germany are proud to point out that they have not replowed or replanted some of their vines for twelve centuries.

Charles A. S. Hall has summarized the shortcomings of high-yield plants from the standpoint of energy efficiency (1990, 103-104). He notes that modern agricultural technology provides energy subsidies that allow domesticated varieties to channel all of their production to the desired product. Thus the net yield of the marketable product is higher, but not the gross production. When farm products are treated with artificial supports, like tractors that dig up the ground, and irrigation systems that bring the water to the plant, and pesticides that make it so the plant doesn't have to defend itself, and fertilizers that mean the plant doesn't have to capture nutrients, it's as if the farm products were made of petroleum. The proportion of the plant's energy that it devotes to the part we use is increased, but the plant cannot make it on its own, and won't be there when we run out of these artificial subsidies. Further, not one step in this process is free; from seed to supermarket, food becomes available only through the market.

Energy Efficiencies of Food Procurement Strategies

Table 1 shows the energy efficiencies of various food procurement strategies — that is, the food energy return on the energy spent on getting the food. As noted in the table, according to my calculations, gathering societies of the past, today called subsistence societies, have had energy efficiencies of about 12.4 (Lough 1995b). That is, for every Calorie of energy that producing members of a subsistence society exert, the habitat yields 12.4 Calories in return. This is consistent with the now-classic findings of Steinhart and Steinhart (1974), who showed that preagricultural and milpa (swidden, slash-and-burn) agricultural societies realized energy efficiencies between 50-to-1 and 20-to-1.

Table 1. Energy efficiencies (energy return on energy invested, EROI) of food procurement strategies

Food Procurement Strategy	Calories Returned/ 1 Calorie Expended	Reference
Preagriculture	50	Steinharts 1974
Shifting agriculture	40	"
Subsistence model	12.4	Lough 1995b
Hunting/Gathering	10	Steinharts 1974
Traditional agriculture	1-5	"
Coastal fishing	1	"
U.S. food system, 1970	0.11	"
Feedlot beef	0.06	"
Distant fishing	0.06	"
U.S. food system, 1977	0.16	Lough ¹⁴
Vegetables	0.22	"
Fruits	0.16	"
Dairy products & Meat	0.14	"
Feed and grain	0.10	"
Minimum sustainable return on food procurement energy without fossil fuels or destruction of habitat	12.0	Lough estimate herein

For source and further information, see also ^{14, 15, 16}

The Steinharts found that for coastal fishing and grass-fed cows, the energy return equals the energy expended, which comes nowhere near even providing the food procurers with the energy needed to maintain their structures. There is a net loss for feedlot beef (15 Calories in for 1 out) and distant fishing (a 12-to-1 loss). Their estimate for the U. S. food system as a whole around the early 1970s was an inefficiency of about 9 Calories in for each 1 out.¹⁴ Based on energy analysis (Hannon et al. 1985; Lough 1995a) the energy efficiencies of the food sectors of the U.S. economy in 1977 was 16% (that is, about 6 Calories in for 1 out), and a lowly 10% for the feed and grain sector, which provides food for feedlot animals that have not yet become food.¹⁵

The ominous entries in the table are those that show that “modern” food procurement strategies are much less efficient than the minimums that are necessary without fossil fuel subsidies or the destruction of habitat. To understand the importance of modern agricultural inefficiencies, which are what is really driving environmental degradation, we need to understand the physiology of subsistence.

Physiology and Food

In order to meet the requirements of the Second Law of Thermodynamics, human beings need to take in about 3 to 6 times as much food energy as they spend in activities of all kinds, including getting and eating food. This is another way of saying that we use between 60 and 75 percent of our food energy maintaining our bodily structures (McArdle et al. 1991, Ch. 9). That is, a person who consumes 2,500 Calories of food in a day will use 1,500 to 1,875 of them maintaining structure and function for homeostasis (steady state).¹⁶ Only 625 to 1,000 Calories are available for work and leisure. As a general rule, stable subsistence and other societies have a ratio of producing to non-producing individuals of about two-to-three (Sahlins 1972, 21, citing Lee 1969, 67; Cohen 1977, 27-40). This means that on average, every five persons have available only 1,250 to 2,000 Calories of energy from the two productive adults in order to produce the total of 12,500 Calories the five will need, assuming that each needs 2,500.¹⁷

Continuing this numerical example, if every five people need 12,500 Calories of food every day (a figure commonly used by the World Health Organization and the Food and Agriculture Organization), and have only 1,250 to 2,000 Calories available to obtain that food energy, the food procurement strategy must be at least 625 to 1,000 percent efficient. Then in order to provide for people of leisure, or leisure for people, a society needs a food procurement strategy similar to that of subsistence gardeners and gatherers, which I estimated to be about 1,200 percent — 12 Calories out for each Calorie spent procuring food (Lough 1995b). Undisturbed forest peoples, if any survive, are probably still realizing robust efficiencies of 1,500 percent or more by working very little.

The averages and rounded figures used in this example obscure the fact that the human animal is uniquely energy efficient, ranging from an energy efficiency of perhaps 12% even in the case of a sedentary college professor, to 56% in the case of the lumberjack.¹⁸ In contrast, the efficiency of the horse “scarcely rises above ten percent and that of the ox is still lower” (Debeir et al. 1986/1991, 4). Thus, from an energy efficiency standpoint, a human work force is far more efficient than a team of draft animals; and human slavery, whether traditional slavery, wage-slavery, or religious-politi-

cal conversion, is the most efficient form of renewable energy conversion system. As was shown in Siberia and the Nazi slave labor camps, slavery is the energy of last resort when non-renewable energy systems are not available.

Agriculture and the Destruction of Habitat

How have human civilizations, all agriculturally based, managed to survive using non-sustainable food procurement strategies? By using up habitat. We've gotten along for thousands of years using non-sustainable agriculture (sustainable agriculture is small-scale gardening or milpa agriculture) because there was so much habitat to begin with, and relatively few people. At the origins of agriculture there were about 8 million people and 46 million square kilometers of forest; now there are 6,000 million people and 6 million square kilometers of forest (Matthews 1983). Agriculturally based human civilizations also got by for millennia using energy inputs from humans, the maximum energy efficiency of which are about 50 percent, and draft animals, the maximum energy efficiency of which is about 10 percent. In a subsistence society, the food energy the human or the draft animal eats comes from plants and animals in their habitat; and in order to make up for the energy deficit — at least 50 percent for the human, and 90 percent for the horse or ox — the food procurement technique must have an energy efficiency of 200 percent in the case of the human and 1000 percent in the case of the draft animal. (As we have just seen, a human society requires an energy efficiency of about 1,200 percent. The 200 percent would apply to an individual, probably a slave.) But if the food procurement strategy is inefficient, which translates into requiring more work energy than necessary, the habitat does not renew itself as fast as it is used; it is thereby destroyed or degraded. Put another way, when too many people need to eat too much to get enough food to feed themselves, or others, they are forced to eat up their habitat (Chase-Dunn and Hall 1994).

The food energy that was (and is) absolutely necessary to power humans and draft animals had to have been at least 1,000 percent, and that energy had to have come from habitat for a long time. Coal, the first fossil fuel used to power our present civilization, was not used as an energy source until the eighteenth century (Debie et al. 1986/1991, Ch. 5). Current agro-industrial food production technologies, as noted above, achieve energy efficiencies of less than 10 percent. (Comparing the United States with other societies on the basis of its efficiency in producing food, the U.S. has achieved an all-time low — less than 2 percent.) That these technologies produce any food at all is due to massive inputs of fossil and nuclear energy. But this cannot continue much longer; the world's petroleum is expected to be exhausted within about 45 years (British Petroleum 1993, 2).

Now let's look at an uncommonly understood explanation of how agricultural societies and civilizations have gotten us into this endless war between humans and habitat. Just as we deconstructed agriculture, we now need to deconstruct agricultural societies, and then the civilizations that developed from them.

A Deconstruction of Agricultural Societies

Large-scale agriculture is a relatively inefficient way of obtaining food, compared with horticulture, fishing, and/or gathering. Being relatively inefficient means it takes more work to produce a given amount of food, and even more work to produce a surplus of food. So in order to practice agriculture, and certainly to produce food surpluses from this inefficient procedure, human energy had to be captured and organized to do the extra work.

Basically, more human energy comes in two forms: individual humans working longer and harder, and/or more humans working. In either case the humans must be persuaded to do more work than is necessary; and historically, the only conditions under which humans work harder than necessary are when they are pushed to do so by coercion, greed, and/or ideology (Tilgher 1929/1958; Lough 1987, Ch. 7). When the strategy is to increase the number of humans in the work force, it is necessary to capture slaves and/or effect an increase in fertility of women already caught within the system. Both of these strategies involve coercion.

According to Maria Mies' analysis (1986, Ch. 2), pastoralist nomad societies played a significant role in the development of patriarchal societies. Following Fisher (1979) Mies suggests that pastoralist men discovered that their flocks and herds could be increased by breeding the animals — a new mode of production — and then used similar practices in domesticating and breeding women in their own societies. The pastoralists also invaded agricultural communities to appropriate women to breed children. Thus were women and females of other species subjected to sexual coercion, based on breeding, with the object of increasing the sizes of herds, families, and labor forces. There is no inconsistency between Mies' analysis and that presented here. Insofar as pastoralists increased productivity at the expense of habitat, and privatized women within patriarchies, both processes would result in similar outcomes over time, and would be mutually supportive.

There have been both gathering (sometimes called foraging) and agricultural societies that produced surpluses of food that were shared equitably (Leacock 1977, 1987). But the surplus generating societies we know most about, the great civilizations, produced other surpluses as well — material surpluses in the form of implements, ornaments, roads, temples, and so on. These surpluses are the "works" and the

wealth of a society, and when they reach a certain quantity and quality we call the society a civilization.¹⁹

The combination of the need for more people to do the work, the hierarchy to organize and make people work, and the surpluses generated as the wealth of the ruling classes, create and reinforce patriarchy. The need for more workers to till the fields and staff the hierarchy becomes a demand on women to produce more children than is necessary for replacement. The accumulation of wealth (surplus) by the ruling classes means that the paternity of women's babies has to be controlled in order to keep the wealth within the ruling classes, through inheritance. Therefore, women need to be privately owned. This requires patriarchal monogamy.

What Happened? An Alternative Understanding of Civilizations

Deconstructing Civilizations: Hierarchies, Work, and Power

Civilizations always sacrifice energy efficiency for power. A civilization is a hierarchy of power within which human and other sources of energy are organized so as to work longer and harder than they would in the absence of the hierarchy.²⁰ In accordance with the Second Law of Thermodynamics (every organism must continually capture energy in order to maintain its structure), people within a civilization must work to maintain the hierarchy and sustain those who toil within it.

Social power can easily be translated into the amount of work (expenditure of energy) that one or more individuals or groups cause to be done in a period of time. Appropriately processed, a source of energy can be mobilized to serve the purposes of the system that "has" them. Note that the process of mobilizing energy involves the expenditure of energy — that is, the use of power. Clearly, the use of fossil and other nonrenewable sources of energy increases enormously the power of those who direct the activities of those in subordinate positions in the power structure. As Gever et al. put it, "The primary function of people in an industrial economy is to control and direct fossil fuel energy, or to manage other people who do" (1986, 17).

People within a hierarchical system of power we call a civilization must also work to produce and maintain the "works" of the civilization. A civilization is known by its works, and these works are the wealth of those in power. Those who can be converted by slavery, coercion and/or socialization (or inspiration) into comprising work forces, which Lewis Mumford named megamachines (1966), create the works of the civilization, including pyramids, irrigation systems, temples, roads, war, automobiles, and government

and financial bureaucracies, as well as works of art, literature and science.²¹

Thus hierarchies generate work, and in so doing, sacrifice efficiency. Efficiency and hierarchical power are inversely related: the greater the hierarchy, the more work is done, and the less the efficiency. Lough (1995a) showed that even in the case of industrial organizations, larger organizations are less energy efficient than smaller organizations, as measured in Btu per employee-year.²² Harris (1979) and Ponting (1991b) point out repeatedly that with the growth of hierarchies, more and more work is required to provide more wealth and food for all involved. Many of us have been misled to confuse the considerable accomplishments of civilizations — their works — with efficiency.

It is commonly argued that if a fair and just access to valued resources could be realized for the peoples of the world (especially for women), many of the planet's miseries would be ameliorated. As I noted earlier, I will not presume to offer solutions to our predicament. But I do note that the thousands of societies on earth have many different definitions of resources and their needs for them, and the technological enterprises now in place act quite independently of people's needs and claims on resources.

Also, many are loathe to fault hierarchies themselves. Don't plants, animals, and subsistence societies have divisions of labor and organizations? Yes, but not on scales that warrant the name hierarchy. Stephen Jay Gould points out that Nature has bushes, not ladders. The metaphor can as easily be applied to human societies; subsistence societies often develop minimal hierarchies (Leacock 1987 and her references, Note 8, 35-36).

Civilizations Destroy Habitat

Civilizations have been destroying the living systems of the earth for at least 5,000 years. Civilizations destroy habitat because the inefficiency of agriculture requires ever-expanding work forces to produce surplus food, which means converting ever-increasing areas of habitat into farmland. Further the material works of civilizations (roads, temples, automobiles, nuclear power plants, ships, etc.) are manufactured from materials extracted from habitat in quantities not sustainable over time (Debieer et al. 1986/1991).

Converting humans into work forces always involves environmental degradation because the humans are withdrawn from the practices that have sustained their societies for centuries and put to work on projects devised by people who are separated from the real world. The environment is thereby degraded because those who produce food are required to take more from the environment in order to feed those doing unproductive work, as well as themselves and their traditional dependents, i.e., children, elders, the infirm.

Furthermore, the specific projects to which work forces are committed involve the destruction of the life support systems directly, not only through logging, clearing, damming and irrigating for monocropping; but also war and preparation for war, extermination or assimilation of indigenous peoples, and the extraction and processing of materials, to name a few (Bunker 1985; Debier et al. 1986/1991; Mander 1991; Shiva 1989). Habitat is also destroyed indirectly, through the manufacture, distribution, consumption, and "disposal" of all that is produced by the civilization. Sometimes the destruction of habitat occurs in the present, as when a forest is logged or cleared, or an indigenous nation is assimilated and its people educated. Other times a process is set in motion that will destroy habitat for hundreds of thousands of years, as in the case of the by-products of the nuclear industry.

Civilizations' Rulers are Alienated from Life Support Systems

Because the rulers of civilizations are exempted from providing for their own necessities (food, water, air, and shelter) they are divorced and alienated from what is involved in living on the earth (Mainardi 1970, 451). The rulers are also alienated from humanity, both from those below them (particularly women) and those not part of "their" society. All but themselves are excluded from their universe of obligation (Gamson 1994). In fact, as Barstow (1994) and Millett (1994) have shown, the powerful demonstrate and exercise their power through cruelty. "Torture is practiced now on a scale the world has never seen before, diminishing even the centuries of the Inquisition" (Millett 1994, 15).

Ungrounded in the living world, and even in their own society, the rulers of civilizations usually do not stop at simply having the majority do their necessary work for them. Instead of doing nothing but rule, which is all they have to do once their survival needs are met by others, these ruling minorities often continue to act out their fantasies, and sometimes get majorities to do enormous amounts of additional work, such as fighting wars, building pyramids, castles, dams, railroads, and so on. So these fantasies end up as the accumulations of beliefs and artifacts called civilizations. Important among these belief systems are civilized ideologies and religions, the fantasies of the rulers that justify their rules.

Often the rulers of recent civilizations failed to maintain the works of their own civilizations, preferring instead to extend their empires or to proliferate their "works." This failure to provide for the maintenance of the structure of a civilization is contributing greatly to the disintegration in the backwashes of the technological society. The rulers of EuroAmerican civilization have built and laid to waste a sur-

plus of product so vast and deadly that the human labor force, even if it could be mobilized to do so, has not nearly the time or energy to take care of it.

What Happened? The Violent Privatization of Women

Wherever and whenever gender-egalitarian societies have occurred, women have not only shared power and status with men, but in the sexual division of labor (apparently a feature of human societies), women have usually been primary providers of food; and primary decision-makers on when and where to forage (gather); when, where, and what to cultivate; and when and where to provide and care for children. Women as well as men hunt and care for animals, and often when men are primarily the hunters, women have decided when, and where, and what was to be hunted.²³

Privatization of Women

Some egalitarian societies have survived for centuries (Leacock 1977, 1987), but most have become extinguished or rendered patriarchal. When societies become sedentary, destroy habitat, and replace it with agriculture, men take over and women do 70-80 percent of the work (Boserup 1965, 1970, 1983, 1990a, 1990b; Tinker 1990). Women ensnared in patriarchal societies have not only been the providers of the ever-increasing populations needed to supply the ever-increasing demand for labor; women have at the same time cared and provided for the children they bore, the men in their families and communities, and labored to produce the surplus goods and services that stratified societies demand. In general, women have also been made available for sex, both for procreation and for pleasure.²⁴

In the process of destroying habitat and subordinating women, women's prior knowledge of subsistence, nutrition, and healing in particular habitats was also lost, even as they were often reduced to slaves and sexual chattel in order to perpetuate inequalities of gender, wealth, and privilege. Put more plainly, women had to be "privatized" in order to make it customary and legal to invade, control, and exploit them, for profit and pleasure (Mies 1986, esp. Ch. 2).

Women bear and care for children; women heal and educate; women care about the future their children will experience. Women also abhor violence. With few exceptions, women have not waged war, and the issue that now unites all women of the world is that of ending violence against women, almost all of which involves rape. Yet there is no English word to describe a society whose members hold women's values of life, caring, and healing. Maria Mies introduced the word "matristic" to refer to such societies:

... I use the term "matristic" instead of "matriarchal" because "matriarchal" implies that mothers were able to establish a political system of dominance. But not even in matrilineal and matrilocal societies did women establish such lasting political dominance systems (1986, 72).

Most of the early gathering and present subsistence societies (that have escaped the ravages of missionaries, state militia, and developers) are thus matristic, although matristic must be a matter of degree. Gender egalitarian societies, accounts of which are cited above, have generally been matristic.

Four consequences of the subordination of women have been: (1) elimination of their vernacular knowledge, skills, and relationships that enabled their communities to sustain themselves in particular habitats over time (Boserup 1970; Shiva 1989, 1994; Editors of *The Ecologist* 1992; Tinker 1990); (2) reducing women's influence over preserving their environments; (3) reducing women's control over the number and spacing of children they bear and care for (Kolata 1974; Collier and Rosaldo 1981; Editors of *The Ecologist* 1992; Leacock 1987, 29-32; Sachs 1994); and (4) the nearly universal practice of violence against women.

The violence visited against women has been used so as to render them submissive and seize their property. This has perhaps been more often discussed than the other topics with which I deal. In the next section I offer a brief account of the witchburnings that occurred primarily in Europe between the fifteenth and eighteenth centuries that can serve as an example of the process of violent coercion.

The Witchburnings

The patriarchal monotheisms "emerged" over the last thousand years and now claim as adherents half the world's population. During the thirteenth century the Roman Catholic church invented the Inquisition to exert power over the French aristocracy. The torture and murder of heretics, however, was such a successful political tool that the practice spread throughout Europe. Pope Innocent VIII pronounced a Papal Bull against the newly discovered crime of witchcraft, which he said was an organized conspiracy of the Devil's army. In 1486 two Dominican monks, Heinrich Kramer and Jakob Sprenger, published *Malleus Maleficarum: The Hammer of Witches*, which became the official handbook of the witch-hunters, translated into many languages and enjoying a dozen reprintings. Thus was launched a war against women as a diversionary tactic to keep the Christian papacy in power through sheer terror. The Protestant clergy also joined in.

European societies were experiencing unprecedented turmoil during these centuries, beginning with bankruptcies caused by the Crusades (eleventh, twelfth, thirteenth cen-

turies) and the Hundred Years War (between England and France, 1337-1453). The Black Death killed an estimated one-fourth to one-third of the population of Europe in the fourteenth century, and capitalism was in its early stages. Scapegoats were needed, and women became an obvious and seemingly limitless source.

Estimates vary on the number of people accused and the number convicted and tortured to death (Daly 1990; Karlsen 1989; Merchant 1990; Mies 1986; Sjöö and Mor 1991). Barstow (1994) puts the number of accused at 200,000 over two centuries, and the number tortured to death at 100,000. Harris (1974) says 500,000. Ehrenreich and English (1978, 35) give some sense of the extent of the terror:

One writer has estimate the number of executions at an average of six hundred a year for certain German cities — or two a day, "leaving out Sundays." Nine hundred witches were destroyed in a single year in the Würzburg area, and a thousand in and around Como. At Toulouse, four hundred were put to death in a day. In the Bishopric of Trier, in 1585, two villages were left with only one female inhabitant each. Many writers have estimated the total number killed to have been in the millions. Women made up some 85 per cent of those executed — old women, young women, children.

Historian Gerhard Schormann claims that the killing of witches was "the largest mass killing of human beings by other human beings, not caused by warfare" (*Der Spiegel*, No. 43, 1984, cited in Mies 1986, 110).

During these centuries identifying women who were to be raped, tortured, and burned alive became an industry, as did the production and use of instruments of torture. Many victims were tortured to death before thousands of onlookers. This provided sadistic hands-on sexual entertainment for the jailers, torturers, and clergymen, and sheer horror for onlooking women (old, young, and children). Men and boys were also tortured to death for being related to the women being sacrificed, or objecting to the witch-burnings, but there is common agreement that about 85 percent of those tortured to death were women. As the Editors of *The Ecologist* (1992, 18) noted:

A main objective of the witch-hunts was to remove women's control over their bodies, in particular, their knowledge of contraception, abortion and childbirth. There was also an economic motivation: the rising class of merchant traders felt threatened by independent women involved in trade and commerce, while entrepreneurs, landowners and the emerging nation-state benefited from confiscated witch property.

The sadistic, prolonged, and usually public torture and murder of even one hundred thousand women, children, and their sympathizers over a 300-year period averages out to a rate of one torture-death per day, enough to keep women as a class in abject, mortal terror for some time. Yet this fact is not a prominent feature in (patriarchal) EuroAmerican history. "By the 19th century, many women had little option but to depend on a male breadwinner, a position reinforced by marriage and property laws. They were confined to the home to bear children, be sexually available, and consume industrial products and imports from the colonies" (Editors of *The Ecologist* 1992, 138).²⁵

The Larger Context of the Witchburnings

The domination of women in sedentary societies was underway 10,000 years ago.²⁶ Between the Paleolithic and the present, the neglect, abuse, and domination of women has been documented repeatedly. And although this paper is not meant to survey the domination of women through time, some startling little-known information provides a context for the next section on population.

Most African slaves were women, and "women were given away as wives, pawned in times of famine, or used as payment of debt. Women were also presented to ruling lineages in exchange for political exemptions or influence and used to pay fines or reward soldiers" (Tadesse 1988, 360; Wright 1975; Strobel 1982; Robertson and Klein 1983). Slavery — traffic in women, and particularly girls — is known to occur in Asia (Jacobson 1992) and in Pakistan. Ponting (1991b, Ch. 10) shows that there have been (and are) many ways in which people are legally enslaved; these practices have many different names, but they have the same outcome, slavery.

The worldwide extent of misogyny is shown by Amartya Sen's survey of sex ratios in all regions of the world. He finds that "a great more than 100 million women are 'missing.' These numbers tell us, quietly, a terrible story of inequality and neglect leading to the excess mortality of women" (1990b, 61). Sen shows that these missing women are not due to differences between "East" and "West," or to economic underdevelopment alone, but rather to women's lack of access to health care, medicine, nutrition, political participation, and employment, as well as to policies restricting the size of families (in China). These "missing women" are just the tip of the iceberg. The iceberg itself is worldwide violence against women. (See also, Sivard 1985, forthcoming; Sen 1990a, 1992, 1993.)

How are so many women missing? Besides abuse, neglect, and inequality, there is new technology. "[In 1988] In the Delhi area and in Punjab, clinics do amniocentesis testing primarily to determine the sex of the fetus and then perform

abortions if the sex is not the desired one. Since estimates that up to 99 percent of such abortions are on female fetuses, some women activists have demanded the prohibition of amniocentesis" (Ramusack 1988, 31).

Deconstructing the Population Explosion: Men at Work

"Overpopulation" threatens habitat in an escalating circle of violence that involves the disempowerment of women at every stage. All accounts of subsistence societies that have not adopted agriculture (and thus hierarchical patriarchy) point to the absence of gender inequality. Most accounts point out that women tend to play a fundamental role in decisions on when and where to plant and gather food, and when and whether to bear children.

As communities are destroyed by development, so are the collective powers of women. Some women are driven toward the patriarchal extended or even nuclear family. Wage earning in the money economy provides the only possible mode of survival. Some employers prefer male over female laborers, believing men to be less encumbered by family affairs and children than women, which becomes a self-fulfilling prophecy as men leave their families to work for money. Other employers in "feminized" industries prefer unskilled women to unskilled men, particularly younger women who can be paid even less than men, are docile and less likely to protest appalling work conditions and are available for sexual harassment (Joeke 1985; Villalva 1986).

It is also true that women's vernacular knowledge of habitat and subsistence is much less relevant after their particular habitats are confiscated and destroyed. And once the preferential treatment of men is in place, women are left relatively less knowledgeable than men about their new, nonreflexive environments. As subsistence communities and their habitats have been destroyed, and women disempowered, patriarchal power has led to worldwide violence against women, a substantial amount of which is rape. Within patriarchal families (which result from the destruction of communities and habitat) it is normal for men to decide when and how often to have sex and children. Men in several Third World countries surveyed want significantly more children than do women; and, by age 50, men in all countries surveyed have had between 15 and 69 per cent more children than women over 50, in part by "over-using" younger women (Sachs 1994).

Sachs (1994, 15) notes that "The reality in many developing countries is that if a man's wife resists childbearing, he will often simply withdraw his financial support and marry another woman. Even worse, many men have resorted to violence in order to keep their wives from using contraception. One recent study showed that more than 50 percent of Mexican women using state-sponsored birth control services

do so secretly, for fear of being physically abused by their husbands.”

The population control industry also threatens violence, presumably against women. (Hartmann 1987, 122, citing Berelson and Lieberman 1979, 609), quotes two leading writers on population: “The degree of coercive policy brought into play should be proportional to the degree of seriousness of the present problem and should be introduced only after less coercive means have been exhausted, . . . Thus, overt violence or other potentially injurious coercion is not to be used before noninjurious coercion has been exhausted.”

The EuroAmerican-sponsored population control industry has responded to the “population explosion” by offering male-oriented and male-designed population-prevention devices like foam, implants, and pills, that are only available through the EuroAmerican market economy and which further disempower women, instead of barriers such as condoms, which men often refuse to use. These devices, all of which are administered to women through male-dominated institutions, hardly “give” women what they had prior to the raging witch-hunts of the past five centuries — knowledge of contraceptives, abortifacents; choices about childbirth; and relative equality and, if necessary, independence from males.

As The Editors of *The Ecologist* point out, “. . . non-invasive ways to limit the number of births were and still are used in some cultures. A prolonged period of breast-feeding can prevent conception because ovulation is reduced during lactation, leading to longer intervals between births. In addition, in polygynous marriages in Africa, for example, coitus is taboo while a woman is breast-feeding, often for up to two years. Other cultural patterns also influenced the stability of the numbers of people, including sexual abstinence, the segregation of the sexes, a later age for marriage and restrictions on widows remarrying” (1992, 171; see also Fisher 1979; Hartmann 1987; Wichterich 1988).

So, five centuries of the violent empowerment of men and the equally violent disempowerment of women — of shoveling power from women to men — has now had its predictable effects. Much of women’s vernacular knowledge of habitats has been erased, together with the habitats they tended. Much of women’s traditional knowledge of contraceptives and abortifacents was lost centuries ago in Europe (as a consequence of the witch-hunts, enforced Christianity, and the development of male EuroAmerican science and medicine) and more recently in colonized countries. Shiva notes that there is a tendency to “blame the victim”:

Extraction of surplus and exploitation and destruction of resources have left people without livelihoods. Without access to resources for survival, the poor have been forced to generate security through large families. . . . However, instead of seeing these

multifaceted problems as caused by global domination of certain narrow interests of the North, they are selectively transformed from consequence to cause. Poverty and population are turned into causes of environmental degradation. Diversity is turned into a disease and identified as a cause for ethnic conflict — A problem caused by an irresponsible chemical industry is converted into a problem caused by fertility rates in the poor countries of the South. The 1991 cyclone in Bangladesh was similarly linked causally to babies in Bangladesh (Shiva 1993, 28).

The preceding sections have been an attempt to piece together an explanation for the simultaneous crises of environmental destruction, overpopulation, and mad leadership. We turn finally to a deconstruction of the private ownership of the world. Land, like women, needed to be privatized before it could be invaded, controlled, and exploited. This process continues today (as does the violent subjugation and exploitation of women).

What Happened? The Violent Privatization of the World

Nations and States

Based on the estimate of about 8 million humans 10,000 years ago and that subsistence human societies averaged 40 to 50 individuals, I estimated there were about 180,000 societies at that time. Using distinctive languages and dialects as indicators of different societies, there are now about 5,000 societies (Sachs 1992; Nietschmann 1987).²⁷ The number of societies is declining rapidly, as they are rendered literate and their habitats are destroyed.

We are led to think of the world as consisting of 30 rich countries and 160 poor ones. A more useful (and more historically and geographically accurate) way of envisioning the world’s societies begins by noting that the state is a purely Western notion, one that until the 20th century applied only to countries that covered 1½ percent of the earth’s surface (but decided the rest of it belonged to them). The other 98½ percent were occupied by nations, tens of thousands of distinct societies that lived in particular places on the earth, most of them for centuries and some for millennia. Except as corrupted by civilizations and agriculture, each of these societies had figured out how to live in their particular commons, whether forests, wetlands, coasts, lakes, tundra. Each developed a sustainable lifestyle. Each society figured out how to live in its particular environment: what foods grow, when; what to plant, and when; what foods and medicines contribute to health and well being. Each has/had art, philosophy, and science.

We should distinguish between nations and states, because the peoples of nations, and particularly the women of nations, are best positioned by language, spirit, and their relationships with habitat (even badly degraded habitat) to understand what sustainable living involves. Peoples of states are not. Tilly (1992, 1-2) suggests:

Let us define states as coercion-wielding organizations that are distinct from households and kinship groups and exercise clear priority in some respects over all other organizations within substantial territories. The term therefore includes city-states, empires, theocracies, and many other forms of government, but excludes tribes, lineages, firms, and churches as such.

In contrast, a nation is a group of people who consider themselves to belong together in one place by virtue of birth, common culture, territorial heritage, language, religion, and ideology. Unlike a state, a nation does not require a central military-political bureaucracy to create nationality, nationalism or national territory; to force people to obey one set of institutions and laws; to enforce the use of one language, or the practice of one religion that the nation did not previously acknowledge. Nations already adhere to their own institutions, laws (if any), language and religion (if any), and so need no centralized military enforcement. Sachs' (1992, 102) argues:

At present, roughly 5,100 languages are spoken around the globe. Just under 99 per cent of them are native to Asia and Africa, the Pacific and the American continents, while a mere 1 percent find their homes in Europe. In Nigeria, for instance, more than 400 languages have been counted; in India 1,682; and even Central America, tiny as it is geographically, boasts 260. A great number of these languages cling to remote places. They hide out in isolated mountain valleys, far-off islands and inaccessible deserts. Others govern entire continents and connect different peoples into a larger universe. Taken together, a multitude of linguistic worlds, large and small, covers the globe like a patchwork quilt. Yet many indicators suggest that, within a generation or two, not many more than 100 of these languages will survive. . . . Transistor radios and 'Dallas', agricultural advisers and nurses, the regime of the clock and the laws of the market have triggered an unprecedented transformation. — Whichever way one looks at it, the homogenization of the world is in full swing. A global monoculture spreads like an oil slick over the entire planet.

As Nietschmann (1987) points out, media and academia are anchored in the state. Their tendency is to consider struggles against the state to be illegitimate or invisible. Those who end up in the media and the universities of the states have been educated in state- and corporate-controlled media and schools, have been taught the dominant state version of history, science, politics, war, and all the rest. They have not been made aware that states are a fairly recent form of violent exploitation of the planet and the peoples of the world, and that when the states have not exterminated peoples and their habitats, the peoples remaining have far more legitimate claims to "sovereignty" in their habitats than the states that seek to overcome and exploit them.

In the global struggles with militaries, multinationals and governments, the terms rebels, separatists, extremists, dissidents, insurgents, terrorists, tribals, minorities, or ethnic groups substitute state-related, nonpeople identification for the actual names that nation peoples call themselves and their countries. These terms define these groups as illegitimate and dangerous to the stability of the state. This allows the state to exterminate them, take their resources, their traditional lands, their commons by treating them as formless non-people, described in any terms the invading state chooses to apply to them.

It is as if there is a quarantine on peoples' identities, an embargo on who nation peoples say they are and the name of the place they say is their country. States define nation peoples as "ethnic groups" and "minorities" as a tactic to annex their identities in order to incorporate their lands and resources. Nietschmann also points out that the ideological hegemony of states is so complete that there is nowhere even a listing of the nations of the world.²⁸

Privatizing the World

During the last 500 years, subsistence societies have been systematically exterminated by the minions of the Christian men in Europe and more recently North America, and by EuroAmericans based in Japan and Asia as well. The commons that sustained these societies has been developed (i.e., rendered into private/state property and ruined). Colonial boundaries were imposed during the 19th and 20th centuries. Christian men in Europe decided they owned the rest of the world. The invention of the chronometer (1761) allowed a longitude-latitude grid to be superimposed on maps of the world, to be "filled in" (i.e., deeded over to the Christian men for exploitation) by explorers, surveyors, and missionaries, all backed up by military forces (Anderson 1991, 173, 184).

Thus have the various civilizations of the past been succeeded by the military industrial states, third world states, and religious empires that now lay claim to all the world. The

global mass media (including schools, churches, science, art, architecture) have distanced us from the real world and from thousands of still-existing nations.

Concluding Observations

Since the appearance of civilizations, indigenous people have struggled to preserve the commons that sustain them: usually the forests, which provide food, soil, water, clean air, medicine, and fuel. Today, even many indigenous families are split as women try to protect the forests that sustain them from their husbands who are intent on logging them for money (Shiva 1989; Bunker 1985).

Over the last ten thousand years the life support system of the earth has been reduced by about one-third (Postel and Heise 1988, 5) while the number of humans who seem to be willing to destroy the remainder has increased by at least one thousand fold. One of the brightest instances of possible sustainable *de*-development is in present-day Cuba. In the absence of trade with the former USSR, the Cuban people have suffered drastic food shortages and cutbacks in imports of the petroleum, pesticides and herbicides that fueled their high-tech agricultural exports of sugar and coffee. In response to this life-threatening national crisis, Cuban leaders have within months converted to organic food production, subdivided large agricultural areas into many small plots of land, and initiated incentive programs to get urban dwellers to go back to the land. In Cuban cities, the premises of hospitals, schools, and other institutions are being planted with vegetable gardens (Perfecto 1993).

Wage-earning is clearly a life-threatening institution. People in work forces are still degrading the environment, and now the cumulative effects of 10,000 years of hierarchically-driven work forces are apparent. Our problem is not to find jobs for everyone, but to stop many people from working

at all, and to convince the rest not to work as long and as hard as they're used to thinking they must. We need to pay (for starters) the military, monocroppers, loggers, and developers their usual salaries, provided they agree to do nothing, or at least to stop doing what they're doing. There is ample precedent for this practice in the instance of our support for the wealthy, who do nothing for lots of money. Another historical precedent is featherbedding — the practice of hiring (during the 1920s, under pressure from unions) those whose jobs were rendered obsolete by the advance of technology, and who therefore had nothing to do. Today, there may be a revival of this practice in connection with the impending shutdown of the Fermi II nuclear reactor in Monroe, Michigan. The Detroit Edison management is considering abandoning the plant if they can thereby be assured a substantial financial profit that would be borne by rate-payers.

I am arguing that it is prudent to pay people not to destroy our life support system. Who disagrees? What is your life support system worth? What about the life support system of your community, loved ones, family, children or grandchildren?

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Endnote

1. Footnotes and references can be found at: members.aol.com/tdietzvt/HER_lough.html