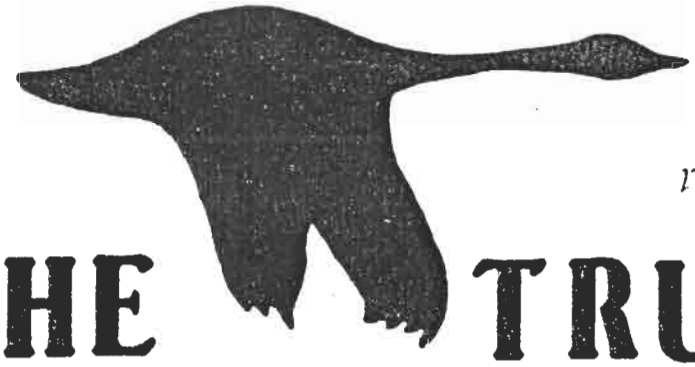

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THE TRUMPETER

Voices From the Canadian Ecophilosophy Net Work

CONTENTS

In this issue of **The Trumpeter** we continue to focus on agriculture. So far we have reviewed the main problems plaguing agriculture in contemporary North America. We have not gone into details about the global problems of agriculture, but they are in many respects the same, except where what we will call traditional agricultural practices using such strategies as polyculture, mixed cropping, the use of animal manures for fertilizer, crop rotation, small field size, open pollinated plants, have survived. Wherever traditional practices have been displaced by the industrial model, conditions of declining soil fertility, soil loss, depopulation of rural communities, water pollution, and a host of other problems have followed. The Worldwatch Institute's latest report, **State of the World—1985**, details these matters on a global scale. It illustrates the interconnections between population, economics and ecological disruption, and it makes the point that non-industrial nations cannot industrialize without a sound agricultural base.

The articles in this issue continue the exploration of a new philosophy of agriculture which brings together valuable practices and knowledge of traditional agricultures, with knowledge and skills developed in science, especially ecology. Mark Shapiro's article "Seeds of Disaster" is reprinted here to illustrate how industrialism has sought to control biological processes, even to the extent of developing patented hybrids. The implications of these developments for the future, if they are not countered by wider use of open pollinated crops and a diversity of crop species and varieties, are quite evident. Margaret Merrill's article traces the history and sketches the philosophy of the sustainable, alternative ecoagriculture movement. Wendell Berry's article explores in depth the cultural and agricultural implications and conditions of good husbandry. He shows the importance of tacit knowledge and of community vitality in the support of a sustainable, ecologically sound agriculture. Finally, my article compares two philosophies of agriculture, the conventional, industrial approach based on fossil fuels, and the ecoagricultural approach of sustainable agriculture, which relies much less on external sources of energy and stresses diversified, smaller scale, less mechanized, non-chemicalized farming.

Human culture probably began in food gathering groups, which eventually developed hunting. Hunting and gathering came to characterize ways of life that were stable for thousands of generations. Herding and gardening emerged, and out of these traditions agriculture developed. With the establishment of agriculture there is the birth of the large ancient civilizations. Agricultural civilization gave rise to craft culture with its own particular kind of oral traditions, many of which are still alive, even in western industrial nations. In the west this craft culture, coupled with the rise of modern science and technology gave rise to industrial culture. Industrial culture has become more and more aligned with applied science, and its technological culture seems to be leading us toward an information based craft-science culture. Information based technologies are hard to centralize and retain under exclusive control. Information is something that is not depleted by sharing. No one knows what shape the new culture will take, whether new age, cybernetic-mechanistic, or sustainable, decentalized, community centered bioregionalism. No one future is inevitable. There is now a great deal of opportunity in North America to make choices that could create a humane, environmentally sound, sustainable culture, but this will take wide participation at every level.

In the Summer issue we will conclude our discussion of agriculture and will explore in more detail a **revised version of the chain of being** referred to in earlier issues of **The Trumpeter**, and we will tie this into the ecology of consciousness and consciousness of ecology. We will show how this version avoids the hierarchy of dominance that corrupted the traditional interpretation of the chain of being. The fall issue will (finally!) begin the discussion of wilderness.

Some Statistics on Agriculture

*From 1940 to 1975 farm output increased 90%, while fertilizer use increased 900%. (K. Sales, **Human Scale**, Perigee, New York, 1980.)

*Per capita consumption of additives went from 2 lbs in 1960 to 10 lbs in 1978. (Sales)

*Traditional agriculture used 1 calorie of energy to produce 10 calories of food; industrial agriculture uses 30 cal to produce 1. (R. Rodale, **The Regeneration Papers**, Rodale Press, Emmaus, 1985.)

*High yield hybrids are in many cases less nutritious than many traditional crops. (W. Berry, **The Gift of Good Land**, North Point Press, San Francisco, 1981; and M. Shapiro, "Seeds. . .")

*In 1949 11,000 tons of chemical fertilizer were used per unit of crop produced; in 1968 57,000 tons were used for the same yield, and in 1975 95,000 tons were used. (Sales)

*Although many industrial farms have increased to 900 acres or more, studies show that the family farm of 100 to 300 acres is the most effective at producing quality food, saving energy and preserving soil fertility. A 900 acre industrial farm can consume 9,000 gallons of fuel per year. (Sales; See also: **Meeting The Expectations of the Land**, edited by W. Berry, W. Jackson and B. Coleman, North Point Press, San Francisco, 1985.)

* In the 1970's agriculture accounted for more than 25% of Canadian economic activity. (Canadian Federal Reports)

*Cross cultural data show that the smaller farms that are more labor intensive have much higher per acre yields, and preserve soil fertility. Many such crop lands have been farmed for centuries. (F. H. King, **Farmers of Forty Centuries**, Rodale Press, Emmaus.)

*In Canada in 1951 farmers were 21% of the work force, but by 1971 they made up only 6%. (J. Warnock, **Profit Hungry**, New Star Books, Vancouver, 1978.)

*Also by 1971 50% of all Canadian farmers were working off the farm (most by necessity) for 40% of their income. (Warnock)

*From 1946-1967 the average cost increase for all goods and services in Canada was 7-8%, but agricultural products only increased 2%. (Warnock) Wheat prices in the US in 1985 were about $3.15 /bushel, exactly what they were in 1919. (TV News Report)

*Emphasizing productivity in North American agriculture has depleted and harmed much land that should not have been plowed. It mines the soil on some land, and creates surpluses that undermine the farm culture and rural communities. Through various subsidies it has cost taxpayers a great deal of money, which has hidden the true costs of food from them. In addition, export of surpluses at low prices has disrupted and harmed many traditional agricultural communities in less developed countries. Lester Brown estimates (Rain, May/June 1985) that if all of our seriously eroding land were taken out of grain production, we would have no surpluses and could even have a shortage of some commodities.

*1,000 calories of energy are expended for each calorie of processed food we eat. This is one of the reasons that fresh potatoes can cost .29/lb, while potato chips will cost 2.58/lb. (**Empty Bread Basket**, The Cornucopia Project, Rodale Press, Emmaus, 1981.)

*2700 food additives are now in use. (EBB)

*50% of all US food tested contains detectable levels of pesticide residues. (EBB)

*In the past 15 years pesticide use has increased 140%, at the same time crop loss to insects has increased 40%. (EBB)

*In Canada there are fewer and fewer food companies with more and more control of the market. (Warnock)

*For every $2.00 we spend producing food, another $1.00 is spent transporting it. (Meeting...)

*5% of the landowners in the U.S. control almost 50% of the farm acreage. (Meeting...)

*Over 50% of U.S. farmland is owned by non-farmers. (Meeting...)

*Between 1910 and 1971 there was a 50% increase in per capita consumption of sugar in Canada to over 100 lbs. per year. (Warnock)

*In 1977 Canada imported 4.4 billion dollars in agricultural goods and exported 7.2 billion.

*None of these statistics tell us anything about the ethical issues related to agribusiness confinement stock raising, land abuse and water exploitation.

Additional Observations

*Factory farming had its roots in the 1733 publication of Jethro Tull's **The New Horse-Houghing Husbandry**. Tull advocated the use of row cropping, and horse hoe cultivation to eliminate weeds. He developed and patented a number of inventions that enabled traditional horse technology to extend more power over the land. Industrialization and the development of petroleum resources led to farm mechanization. Justus von Liebig's work set the stage for the chemical phase of industrial agriculture and the development of factory, chemicalized farming. (Rodale) As Margaret Merrill points out, the big impetus to large scale industrial farming did not get up full steam until the 1950s, and although she does not go into this, it was promoted by federal policies, the agriculture schools and, as she notes, by the petro-chemical and equipment companies.

*Industrial agriculture involves specialization and large scale farming, using powerful, heavy machines, chemical fertilizers, antibiotics, herbicides, pesticides, hormones, segregation of stock from pasture, the removal of biotic mass from the farm, great inputs of external energy such as fossil fuels, enlargement of fields by removing wind breaks, and removal of natural biological barriers to the spread of insects and disease. Each one of these carried to extremes creates problems that are further exacerbated by technological fixes. For example, the use of tractors and heavy machines causes soil compaction, and eventually one has to increase tractor size and power; this seems to be an escalating process. The use of antibiotics is (in part) the result of feeder type of operations, involving close confinement, and raising stock on the same ground year after year. Under these conditions the probability of disease increases. Antibiotics fed daily produce changes in biological organisms so that antibiotic resistent strains are produced. These become a hazard to human health as well. Hybrid annuals, of a single genetic make-up, planted in rows (so they can be easily "managed" with machinery), on a large scale, on soils farmed year after year with the same crop, become more vulnerable to disease and insect damage. Pesticides and herbicides do not solve the problem, because the disease organisms and insect's are altered by these interventions. The ecological approach to these problems involves such practices as mixed cropping, crop rotation, grassy water courses, strip planting, contour planting, smaller fields, lower levels of mechanization, growing open pollinated plants, using more perennials, polycultures, fallowing, and so on. It is important to realize that the top soil

is part of a biological process. It is a living community, interwoven in symbiotic ways with the communities of plants and animals. It cannot be reduced to merely an anchorage for plants and a carrier for petro-chemicals. Rats fed bread made with refined, bleached, white flour become unhealthy and prone to disease. If we add antibiotics, crowded conditions, and large doses of sugar in their diet, and a touch of herbicides and pesticides, we are going to see disease rates and "behavioural" problems soar in our rat population.

* In the Scandanavian countries World War II brought home the realization that large scale, industrial agriculture involving few hands would be highly vulnerable to disruption, as well as being destructive of the land. These countries have sought to preserve the rural culture and practice of agriculture by an extraordinary series of measures. (Meeting...)

*"Most of the progressive and dynamic civilizations of mankind started on new land--on land that had not been the center of a former civilization. Each civilization flourished and grew for a few centuries on the land that gave it birth. The people who evolved it became more and more civilized during this period of growth. Then they found that their native land would no longer support them, so they began to conquer and take the land of some of their neighbors. With the new land thus acquired, they held their gains in civilization for a few more centuries. After they reached their limits of conquest, their civilization began to decline. Eventually it was engulfed by the surrounding barbarians, and a dark age ensued. After that, a new civilization arose on new land among some of the semicivilized barbarians. Then the pattern was repeated." (V. G. Carter and T. Dale, **Topsoil and Civilization**, University of Oklahoma, Norman, 1974.)

*". . .(M)aterial wealth was concentrated in the hands of a few while the masses were generally poverty stricken in most dying civilizations. . .Of course, concentration of the land and other resources in the hands of a few may hasten resource destruction and thus contribute indirectly to the decline of a civilization." (Carter and Dale)

Seeds of Disaster

by Mark Schapiro*

When Sir Walter Raleigh returned from the New World in 1588 with a mysterious new plant called the potato, no one could have foreseen that he was carrying the seed for the greatest natural disaster since the black plague. The potato took well to the fog-soaked soil of Ireland. Within 50 years, it was the universal staple of the Irish diet. Then came the blight. The first signs appeared late in the summer of 1845, when the tops of unripe potato plants turned an ugly black. A stench hung over the fields. Underground, the potatoes shriveled and began to rot. That year, half the Irish crop was ruined by the same fungus; the next year, almost the entire crop was devastated. The primary strain, known as "Lumper," had no resistance to the new disease. Over the next three years, one million Irish people (most of them peasants) -- nearly one in every eight -- died from starvation or disease. One and a half million more emigrated.

The year is 1970. It is hot but rainy in Iowa, unusual weather for August. Row upon row of green corn stalks vibrate in the still air. In a couple of months the corn, one of the two largest food crops in North America, will be ready for harvest. But in Story County, Iowa, farmers are uneasy. From the early spring reports in Florida, at the southern edge of the Corn Belt, plant pathologists learned that a fungus was causing trouble. It was a new strain of an old fungus, and it was spreading with a virulence never seen before. The blight destroyed up to half of the crop in parts of the south, and scientists feared the infestation would spread north. By summer it did; and it spread quickly.

Fred McLain, a 61-year old corn farmer in Story County, remembers: "We'd hear reports in the news. Then it hit us. We began to notice little brown spots; then the ears turned brown and black." By August, farmers all over Iowa were helpless, their crop scarred with small inklike spots. In October, when the infested fields were harvested, black spores sailed over nearby towns like locusts.

Millions of plants -- 15 percent of the nation's total corn crop, more than 50 percent of the yield in some regions of the country -- were killed by the leaf blight. Farmers were hard hit, and the price of corn and meat (corn being the primary feed for livestock) surged. No one starved in the United States, but in a more compact country, like Guatemala or Kenya, where corn provides half the calories in the population's diet, the results might have been similar to the Irish potato famine.

The corn seeds planted in tens of millions of acres across the U. S. contained "Texas male cytoplasm". This ingredient made the male plants genetically sterile, eliminating the need for expensive hand-detasseling to prevent cross-pollination. But breeding the new strain to solve

that problem caused a larger one. By 1970, 75-80 percent of the seed corn in the U.S. contained the cytoplasm. The plants were, as the National Academy of Sciences noted in a 1972 study of the incident, "as alike as identical twins". The analogy used by the academy in its warning: the Irish potato famine of 1845-48.

What the Irish potato crop of 1845 and the American corn crop of 1970 had in common was an overriding uniformity -- the seeds for both crops were from a single genetic strain and were sown over very large areas.

(There were 5000 plus varieties of potato in the Peruvian Andes, of which only two or three were introduced into Ireland. -- Feather Anderson)

In both cases the seed strains had some real agricultural advantages. But also in both cases, the crops were vulnerable to diseases that might not have struck other strains. Had Sir Walter brought home three or four varieties of potatoes, and had corn farmers from Florida to Iowa planted different strains of corn, alternating them from field to field, neither blight would have caused as much damage as it did, and both would today be only minor footnotes in agricultural history.

The 1970 corn blight was by no means America's first experience with genetic vulnerability. In 1917 Herbert Hoover's Food Administration declared two "wheatless days" a week, in response to the destruction of two million bushels of wheat by stem rust. Retrospective analysis suggests that the uniformity of the 1916 wheat crop made it particularly vulnerable to stem rust. In 1953 and 1954 it happened again: up to 75 percent of the durum wheat crop was destroyed by a blight that affected only that strain.

And in the late 1970's, after older, pest-resistant varieties of wheat had been replaced in western American wheatfields, Hessian flies attacked and destoyed an alarmingly large portion of the crop. In 1978, South Dakota alone lost one and one-quarter million acres of wheat, worth about $50 million because of the flies, which had never before been a major problem in the state's spring wheat.

Yet there appears to have been little heed paid to these ominous warnings. The concentration of genetic strains has continued to such a point that now only six varieties of corn account for 71 percent of the U. S. crop; four varieties of rice account for 65 percent of the crop; nine varieties of wheat, for 50 percent; and four varieties of potatoes, for 72 percent.

The International Board for Plant Genetic Resources, an autonomous organization loosely associated with the United Nations' Food and Agriculture Organization (FAO), has recently issued warnings that wheat, rice, sorghum, millet and barley are crops whose genetic diversity is imperiled. The National Academy of Sciences states that America's major crops were "impressively uniform genetically" and are vulnerable to widespread attack by blight or pests. The proliferation of hybrid and heavily inbred seeds has indeed caused huge leaps in agricultural productivity since 1945, but the wonder seeds have also laid the groundwork for disaster. A growing number of scientists, government officials, plant breeders and farmers are beginning to realize that the corn blight of 1970 may have been one more lurching step toward a nationwide, perhaps even global, agricultural crisis.

(Before the advent of corporate agriculture, the conscious planting and harvesting of plants for food over wide geographic areas helped create enormous natural, genetic diversity in crops, in response to different ecological conditions and human needs. Natural defenses evolved to the different pests and diseases encountered in each locality. F.A.)

The Corporatization of Seeds

Behind the genetic vulnerability of our major food crops is one of the most significant and sudden transformations in the history of American agriculture. Between 1972 and 1982 at least 60 U. S. seed companies were bought out by 20 Fortune 500 Corporations. A list of the new seed merchants reads like a Who's Who of multinational drug and chemical firms: Monsanto, Ciba-Geigy, Upjohn, Sandoz, Pfizer, Stauffer Chemicals, Occidental Petroleum, Atlantic Richfield, and Royal Dutch/Shell are now among America's emerging seed powers. (Shell Oil of Great Britain has bought 56 seed companies in England since the passage of plant patenting laws.)

One Upjohn official, Leo Zanoni, bluntly explained the corporate interest in controlling the seed market: "Farmers plant seeds every year. It's a meat-and-potatoes business." An L. William Teweles & Company official added: "It is a depression-proof growth industry . . . as long as you have a rising population with a need for food and fiber."

More significant than the corporatization of seeds, though, has been their patenting. The Plant Variety Protection Act (PVPA), passed in 1970, allows seed companies to obtain patent protection for their own seed varieties. The act represents a severe departure from American patent traditions, allowing, for the first time, a claim of ownership over living and sexually reproducing organisms. Protecting plant varieties with patents has made the seed business enormously profitable, as seed companies may now charge royalties on the sale of all patented varieties. Thus, royalties have contributed to making seeds, next to fuel, the most inflationary agricultural production factor, with prices rising more than 150 percent over the past ten years. And should the orgy of company buy-outs that has followed passage of the PVPA continue at the current rate, the seed trade could become the

most concentrated industry in agribusiness. (Ironically, the act was passed only a few months after the corn blight.)

Since the passage of the PVPA, the concentration of seed patent ownership has proceeded unabated. Today five corporations control more than one-third of America's wheat patents; four companies hold 79 percent of the bean patents; six companies hold 66 percent of the lettuce patents; and two companies control 43 percent of all barley patents.

The corporatization of seeds is threatening to alter forever the diversity of American and global agriculture. Seeds that were once bred to thrive in specific ecological pockets like the green belt of the Southeast or California's fertile Central Valley, are now bred for national, or even global markets. Many older, more regionally appropriate varieties, which cannot compete economically with new patented varieties, are often dropped from seed company catalogs.

What American farmers may be looking forward to can already be seen in Europe. Plant patenting there has been in effect even longer than in the U. S., and the seed industry is even more concentrated. The European Economic Community governs the seed trade with its "Common Catalog", which lists only the varieties that are legal to sell throughout the continent. In 1980 a revised catalog was issued that made more than 2,000 vegetable varieties "illegal" to sell in Europe. To sell them would be violating a patent owned by one of the new corporate see merchants.

A former senior staff member of the FAO's Crop Ecology Unit, Erna Bennett, has estimated that 75 percent of the vegetable varieties currently planted in Europe will be "extinct" by 1991 if current policies continue.

The Chemical Cover

Chemical companies involved in agricultural chemicals have moved into the seed business. To company officials this makes good sense, since they already have the setup for selling and marketing pesticides and fertilizers. Almost all of the top seed companies have offshoots in agricultural chemicals. Royal Dutch/Shell, now the world's largest seed company, has a large agrichemical division.

Anticipating the intersection between chemicals and seeds, Teweles & Company declared in 1978 that seeds could be coated and used "as a delivery system for chemicals and biologicals to the field." Chemicals now enter the growing cycle at the point of planting. Time-release pesticides or fungicides on the seeds slowly leech into the soil and, from there, may be absorbed by the plant. Marion Standish, a staff attorney with California Rural Legal Assistance in San Francisco, suggests the chemical coating of seeds is increasing dramatically as a way to avoid public outcry over the spraying of fields.

A particularly bizarre integration of seeds with chemicals can be found in a package deal marketed by Ciba-Geigy, the Swiss chemical and pharmaceutical conglomerate, now offers several herbicides to kill the weeds that plague sorghum crops. Unfortunately, the herbicides also injure the sorghum. So, the corporation sells another chemical, brand-named Consep, used to treat the sorghum seeds to protect them from the herbicies. The chemical is sold not to farmers but to seed companies, which in turn market the treated seeds. The new frontier for chemical-seed coordination can be found at the laboratories of Rohm and Haas. At the company's Springhouse Research Laboratories in Pennsylvania, agricultural scientists are working on a "chemical hybridizing agent" -- a sort of chemical birth control for male plants to create sterility. The motive, of course, is to accelerate the breeding of hybrids.

But the most insidious long-term effects of the chemical and seed conjunction are more subtle. Dr. Richard Harwood, an agronomist at the Rodale Research Center in Maxatawny, Pennsylvania, says that after generations of seeds are treated with chemicals, the plants are not able to develop a pest resistance of their own. In this way, naturally occurring immunities are slowly eliminated from the personality of the plant.

More Bulk -- Less Food

Just 100 years ago the world's farmers grew literally thousands of different grain and produce items. Today, 30 crops provide 90 percent of the world's calories. Four of these -- corn, wheat, rice and sorghum -- supply more than half of those calories. There's more food, to be sure, but fewer varieties. And the question has been raised recently as to whether or not there is as much nutrition in our food as there used to be.

Modern plant-breeding programs, according to agronomist D. G. Hanway of the University of Nebraska, "give little or no attention to the nutritional value of the product". The most commonly bred-for traits are associated with marketing: harvestability, color, ability to travel well and ripen on time, and yield.

The classic case of such breeding is the "square" tomato, developed in California to withstand rough treatment in harvesting, packing and shipping. In California, four-fifths of the farmers who grew conventional processing tomatoes are now out of business due to the prohibitive costs of mechanical harvesters designed for the new tough-skinned variety of tomato. Recent nutritional reports by M. Allen Stevens at the University of California at Davis and Dr. Harwood at the Rodale Research Center reveal that plant breeding and crop management for marketability have indeed caused a measurable decline in the protein and vitamin content of some of our more popular foods.

* Iceberg lettuce varieties, for example, have much less vitamin A than standard loose-leaf varieties such as romaine (or red-leaf).
* Other leafy vegetables have experienced as much as a 50-percent decrease in vitamin C.
* European and North American varieties of potatoes have, in many cases, much lower protein and vitamin C contents than the traditional varieties they are replacing in areas of South America.
* Delicious, Jonathan, McIntosh and Spartan apple varieties are measureably lower in vitamin C than many older apple varieties.

Quietly Strangling Diversity

This dangerous spin toward agricultural homogeneity could still be reversed with the infusion of new genetic material, or "germ plasm", into our breeding stocks. Germ plasm is the material contained in every seed that determines the personality of the plant, from the length of each leaf stem to its hardiness. The problem is that the new seed merchants literally lock up the germ plasm to keep it away from competitors. United Brands, for example, hordes and controls two-thirds of the world's banana germ plasm. Prior to passage of the Plant Variety Protection Act, the free exchange of germ plasm was one of the cornerstones of plant breeding, as was the open sharing of breeding science. But since 1972, according to congressional testimony heard in 1979, corporate breeders have been far more reluctant to release descriptions of breeding schemes. "While (plant patenting) may have been established to protect the rights of plant breeders, it has in fact contributed to an excessively monopolistic atmosphere. . ." (From an FAO memo).

If Americans were forced to live on crops native only to the U. S., we would starve. Most of the world's seeds evolved in a narrow belt of land, close to the equator, that stretches from the highlands of the Peruvian Andes through the Kirghiz Steppe to the tropical forests of Malaysia. The Russian botanist N. I. Vavilov first discovered these evolutionary wellsprings, where 90 percent of the earth's vegetable life forms evolved. They have, in fact, come to be known as Vavilov Centers. It is to these regions that plant breeders from around the world still go to obtain the materials needed to broaden the genetic base of seed stocks.

But the urban settlement of Third World agricultural lands and the exploitation of tropical forests are rapidly wiping out many of the ancient natural varieties indigenous only to Vavilov Centers.

Another major threat, according to the United Nations Environment Programme, may come from the replacement, in the Vavilov Centers, of native seeds by patented seeds promoted by the development programs of the Green Revolution. It is no longer uncommon to find a Peruvian farmer planting a hybrid corn seed sold to him by an American chemical firm, a Tibetan farming cooperative ordering (barley) seeds from a Scandinavian plant-breeding station. Strong lobbying by the American and European seed industries is under way to carry plant-patenting programs into Vavilov Center countries.

(Already new rice varieties have come to occupy over 70 million acres in Asia in less than a decade. In Turkey, many priceless relatives of cereal grains are now found only in graveyards and castle ruins. F.A.)

By the year 2000, the FAO estimates, two-thirds of all seeds planted in the Third World will be of uniform strains. Thus, we are losing what amounts to our genetic reservoirs, our built-in protection against unforeseeable changes in the varied ecologies of our world's food-growing lands.

Dr. James Reveal, a University of Maryland botanist and plant explorer points out that when we lose germ plasm, we lose the "only source of material for introducing new characteristics.., a potential that can never be replaced. We're throwing away our future."

As the importance of seed diversity to the future of life on the planet becomes more clearly understood, biologists, environmentalists, economists and government officials around the world express greater alarm. And there is a growing awareness in the Vavilov Centers of how precious this genetic diversity really is. In the fall of 1981, at a conference in Rome, representatives from a group of Third World countries, led by Mexico, proposed new strategies for protecting their genetic resources. What emerged from the conference was the beginning of a new OPEC-like cartel, pitting the gene-rich (but generally less-developed) countries encompassing the Vavilov Centers against the gene-poor countries of the West.

The germ plasm cartel, however, unlike OPEC, has a vital urgency to it. Synfuels and other energy resources can replace oil, but there is no synthetic or natural material that can take the place of germ plasm, and no amount of genetic engineering can mimic the biological mosaic that arises from a diverse genetic pool.

A Glimmer of Hope

Despite corporate efforts to monopolize seeds and control nature, steps are being taken to abate this slide into genetic uniformity. The International Board for Plant Genetic Resources coordinates a worldwide network of seed storage

facilities that have become centers for innovative agricultural research. The U. S. Department of Agriculture runs a National Plant Germ Plasm System, with five major cold-storage vaults around the country, where thousands of different seed varieties, a great many of them directly from the Vavilov Centers, are stored and made available to public and private plant breeders. Fortunately, this conservation network was among those few federal programs outside of the military to receive an increase in funding for 1983.

Groups like the National Sharecroppers Fund, the International Coalition for Development Action, the Environmental Policy Center, the U.N. Environmental Programme and the U.S. State Department are also proposing strategies for conserving and enriching the diversity of our seed stocks.

Back in Iowa, Fred McLain, whose farm survived the 1970 corn blight... (comments): "You'd think that some of these companies would be looking into the future because it could wipe them out... It's damn scary. If people in this country knew how close they were to starving, they'd pay more attention to how their food is grown."

Since the domestication of agriculture some 8,000 years ago, perhaps 90 percent of all plant varieties have developed through the forces of nature; 9.9 percent by the efforts of humanity, up to the present century; and 0.1 percent by modern breeding methods. Yet today's modern corporate breeders, in barely a wink on the evolutionary time scale, have turned that one-tenth of one percent into a living threat to the rest of our genetic base. What Fred McLain does know is that seeds are not like any other business. The plant that grows from the seed converts the vast, invisible ocean of nutrients in the soil and gases in the air into the food that we all consume. At the base of every slice of bread, every ear of corn, every apple and pear, there rests the seed.

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Eco-Agriculture: Its History and Philosophy

by Margaret C. Merrill*

Agriculture the world over is in trouble. Increasing costs of production, declining revenues, soil fertility, and plant and animal health, as well as erosion, desertification and high property taxes continue to force farmers off the land and into the cities and towns. In direct competition with industry for raw materials and urban areas for land, agriculture generally finds itself low on the priority list when society, dominated by an urban-industrial point of view, allocates these resources.

Given this situation and the fact that conventional agriculture does not appear to have adequate solutions, it would seem logical to examine available alternatives. The impression is growing that if we are to have adequate quantities of high quality food and fiber in the future an agriculture system will have to be developed which:

1) does not require large quantities of fossil fuel inputs;

2) conserves existing topsoil and builds new topsoil;

3) controls weeds, insects, diseases and other pests without the frequent application of highly toxic biocides;

4) and maintains overall production levels.

Impossible? Perhaps not. A growing number of people -- scientists and laymen, producers and consumers -- are actively engaged in refining an alternative system of agriculture. Although it has been given a variety of names, most of them are now used more or less interchanteably. For the sake of convenience -- and because I think that it is most accurate -- this system will be referred to as Eco-Agriculture throughout this paper.

Before discussing the history and philosophy of Eco-Agriculture it would perhaps be helpful to very briefly describe it's methodology. An Eco-farmer's first objective is healthy, fertile soil -- on that base the rest of the farm ecosystem is built. In order to do this the farmer must know his soil's cation exchange capacity; he must manage the soil pH to optimize the availability of mineral nutrients; he must balance the minerals so that they exist in the soil in fairly specific ratios to each other; he must manage soil organic matter and humus so that there is enough but not too much; he must optimize conditions for the friendly soil organisms and he must not only encourage but often rebuild the natural nutrient cycles, such as nitrogen, carbon, and sulfur. If done properly this soil balancing will result in a stable, fertile soil which will produce healthy plants and animals. Eco-farmers use a tremendous variety of materials to build soil fertility but tend to avoid the soluble salt fertilizers, particularly anhydrous

ammonia, because they are not designed for a biologically active soil. Crop rotation, overall farm diversification and integrated pest management are other important aspects of the Eco-Agricultural method. In general eco-farmers avoid the use of biocides as being inconsistant with ecologically sound farming, but under emergency conditions many will use some of the most biodegradable ones.

Although facets of Eco-Agriculture can be traced to man's prehistory, the origins of the movement itself are found in the ferment of the late 1800's. By the turn of the century, western civilization was riding high on the crest of the scientific and industrial revolutions. Popular opinion saw no reason why technology could not solve any problem which might arise. Under the influence of chemistry and technology agriculture seemed to be better off than ever before. Certainly production was up. In spite of this euphoria, there were indications that agriculture should be dominated by biology and ecology rather than chemistry and technology. Research on earthworms, mycorrhiza fungi, pulverized rock powders and the growth of the many biological subspecialties undoubtedly contributed. In 1924 Rudolf Steiner's agricultural lectures were one of the first conscious calls for an agricultural system based on biology and ecology. The catastrophic worldwide erosion of the 1930's and the correlations the medical profession was finding between diet and health added impetus to this call. By the 1940's, the trend in agriculture was to balance chemistry with biology and technology with ecology. Biological control of pests and soil conservation practices were beginning to be adopted by farmers around the world. Agricultural research was examining the incredibly complex nature of living, fertile soil; the interactions of soil minerals; the role of soil organisms; the role and nature of humus; and the relationship between soil fertility and plant susceptibility to disease and insect attack. Soils and Men, the 1938 Yearbook of Agriculture is still considered to be an outstanding example of this trend towards an ecologically sound agriculture. Interest in a biologically and ecologically sound system of farming was not confined to research scientists. Farmers, convinced of the basic appropriateness of this approach, were adopting the methods being developed. Some became so actively involved that they undertook inumerable experiments and demonstrations -- sometimes on their own, sometimes with an agronomist.

According to Eco-Agriculturalists, had this trend continued we would not be facing another period of massive erosion and desertification, and agriculture today would be an ecologically sound system capable of sustaining optimum production indefinitely. However, in the mid-1950's there was a distinct and almost dramatic shift back to a predominately chemical and technological approach. For the next 20 years there were very few agricultural research projects or publications with an ecological or holistic point of view. What little there was, was done primarily by very determined individuals or private organizations, who pulled together and integrated bits and pieces of data from many scientific specialties.

Exactly why this 20 year hiatus occured will probably never be fully known. There is speculation among Eco-Agriculturists that the petrochemical and munitions industries simply found agriculture to be the logical new market for their products, once the Korean War had come to a close. Certainly it is true that by the late 1950's substantial sums of money were available from both industry and government for research into the usefulness and efficacy of erstwhile war materials. It is also true that the type of research needed by Eco-Agriculture tends to be very complex and time consuming.

By the mid-1970's Rachel Carson had published Silent Spring; the "environmental crisis" had made pollution a household word; the "energy crisis" was making it obvious that dependence on petroleum products was neither economically nor politically wise; the United States Senate was preparing to hold hearings on the relationships between diet, disease, and health; and some students of agriculture were beginning to demand information on ecologically sound methods of farming. Eco-Agriculture emerged in the 1970's as a coherent and self-aware movement, ready to offer farmers an alternative to expensive biocides and energy intensiveness; an alternative which minimized the impact of agriculture on the environment and worked with nature rather than in spite of it. In the United States ACRES, U.S.A. was providing news and information to anyone interested, as well as sponsoring conferences on the nature of Eco-Agriculture and how to convert a farm to ecologically sound methods. Any number of regional producers and consumers groups were being formed, both in the U.S. and abroad. Worldwide, the International Federation of Organic Agriculture Movements was founded to facilitate communication and information exchange among Eco-Agriculturists, and to encourage the spread of ecologically sound farming practices. International conferences were being held and at least two institutes for Eco-Agricultural research were established. In the last five years there have even been rumblings of interest from several governments. Eco-Agriculture is still only a small fraction of the total agricultural scene, but given the economic plight of farmers and the increasing degradation of agricultural soils, most Eco-Agriculturalists feel that their system will spread -- they just aren't sure how fast.

Historically, the more cohesive and logically consistent movements have had an underlying

philosophy -- a 'weltanschauung' -- which gave them purpose and direction. Eco-Agriculture does have such an undergirding philosophy. Its fundamental orientation is holistic. To be holistic necessitates a rejection of the Cartesian dualism which does not admit the existence of any connection between things of the body and things of the mind. Holism reunifies matter and spirit which allows Eco-Agriculture to recognize that intuitive knowledge and perception and "even the philosophy or religious sense or temperament of the farmer may well pay off in dollars and cents in a fashion which can never be entered on the ledger."(Bromfield 1947, p.401)

Eco-Agriculture believes that agriculture is an art as well as a science. In the words of Dr. Albrecht "it is not yet a case in which the science is in complete control. Agriculture is still an art, which we study by deduction, that is we look at it as natural behavior." (Albrecht 1975, p. 50) This is a point of view almost alien to our modern society.

Eco-Agriculture believes that by respecting and cooperating with nature a richness and wholeness of production can be obtained that is, in the long run, impossible to attain by attempting to dominate and bend nature to man's will; man's role should be that of "a superior intelligence working in nature as a conscious and therefore as a responsible part in a plan of evolution, which is a continuing creation." (Bailey 1915)

Due largely to its conviction that man and nature are partners and partly to its rejection of mechanism, Eco-Agriculturalists maintain that the independant, fully franchised farmers who own their own farms are not only the backbone of any society, but more importantly are the only ones who will have the sense of responsibility and dedication requisite to the proper care of the soil. The true husbandman is at least subconsciously "aware that he is a symbiont in an elaborate and delicately balanced union of species." (Hyams 1976, p.128) As a co-creator with nature he will farm in such a way that he builds and improves his soil rather than exploiting and mining it.

In contrast with the husbandman is the "agricultural industrialist" who

> regards soil as an inexhaustable source of wealth, requiring only sufficiently powerful machines and quick-acting chemicals, which he feeds to the roots, and by means of photosynthesis and some later processes, into loaves of bread worth money. (Hyams 1976, p.128)

The "agricultural industrialist" is the antithesis of the Eco-Agriculturalist. He is concerned primarily with the here and now; with profit and loss; with quantities and maximums. Chemistry and technology exist to solve his problems. Eco-Agriculture by contrast is as concerned about the future as it is about the present. There is a strong sense of obligation to protect and even improve that which must be passed on to future generations. This is especially true of the soil. The emphasis is always on the optimum, not the stress-inducing maximum, because "agriculture is biology first and foremost. It is technology and management second." (Albrecht 1975, p. 51) As Hyams points out,

> (s)cience in agriculture is good when the approach of the scientific specialists to the subject is controlled by an ecologist, or by an ecological point of view; when it is biological rather than mechanical; when the scientist's respect for husbandry is profound; his education humane and philosophical; his methods controlled by empirical trials. (Hyams 1976, p. 127)

The Living Soil, its aliveness and dynamic nature, is such a fundamental precept of Eco-Agriculture that the quality of a living soil is equated with the quality of its fertility which, in turn, is equated with the level of health of the plants, animals, and men dependant upon that soil. The living soil is an intricate and complex entity. Man's relationship to it does not have to be one of exploitation and destruction, though generally this has been the case. It is not only possible for man as nature's partner to build a living soil, it is imperative that he do so. Hyams' description of the living soil is typical of Eco-Agricultural thinking:

> A soil is completed, given life and the power to endure alive almost indefinitely, by the plants which grow in it. They, as much as the mineral particles, the organic particles, the gasses, the fungi, the earthworm, are components of the process, the life-system called soil. That this is the case is clear from what happens when these plants, be they trees or grasses, are removed and nothing done to compensate the other parts of the soil for their removal. The soil ceases to be fertile, dies, soil erosion by wind and water follows, and where there was soil there is nothing. . . .rock. On the other hand, any example of a true soil community . . . is stable, enduring, perhaps immortal. (Hyams 1976, p. 23)

The Biotic Pyramid (see figure) is a schematic representation of the progression of life from the soil through plants and animals to man. In a sense it represents the "mutual synthesis between organism and environment" (Balfour 1976, p. 11) which functions with self regulating harmony, unless or until man intervenes. In his shortsighted attempt to eliminate various species deemed

injurious, man has dangerously weakened the lower levels of the pyramid. Eco-Agriculture systematically seeks to restore balance and harmony to the ecosystem, so that each level of the biotic pyramid will function at its optimum. The biotic pyramid is also used to demonstrate how nutrients and contaminants accumulate and concentrate as they move up the food chains.

The Law of Return is generally regarded by Eco-Agriculture as one of the most important of the natural laws -- and yet the one most disregarded by modern society. Lady Balfour describes it well:

> Out of the earth are we, and the plants and animals that feed us, created and made, and to the earth we must return the things whereof we are made, if it is to yield again foods of a quality suited to our needs. (Balfour 1976 p. 26)

Observance of the Law of Return means the preservation of and even increase in soil fertility, while ignoring it can only result in declining fertility, erosion, and ultimately the death of the soil.

In conclusion, Eco-Agriculture is an holistic approach to farming which arose partly in response to observed natural phenomena and partly in reaction to the dominance of mechanism and specialization. Its philosophy is grounded in the premise that all facets of creation are intimately interrelated; that there is an intrinsic harmony to the natural order; and that this natural order is governed by certain laws or principles. Man's role is that of the caring steward and -- in the person of the farmer -- nature's partner in the creation and recreation of life. Agriculture must be a creative process, not a mechanistic one, because it is fundamentally biological and living, rather than technological and industrial. The effects or results of agricultural activities start in the soil and work through the biotic pyramid to man. It is, according to Eco-Agriculture, in man's own best interests to conduct his affairs in harmony with the natural order. However, as Harrison Brown so aptly put it: "Mankind has . . . a kind of arrogant assumption that man's technological management of the planet exempts him from the limitations nature imposes on every other species." (anon 1977, p. 12) Eco-Agriculture, by its very existence, is a rejection of this arrogance.

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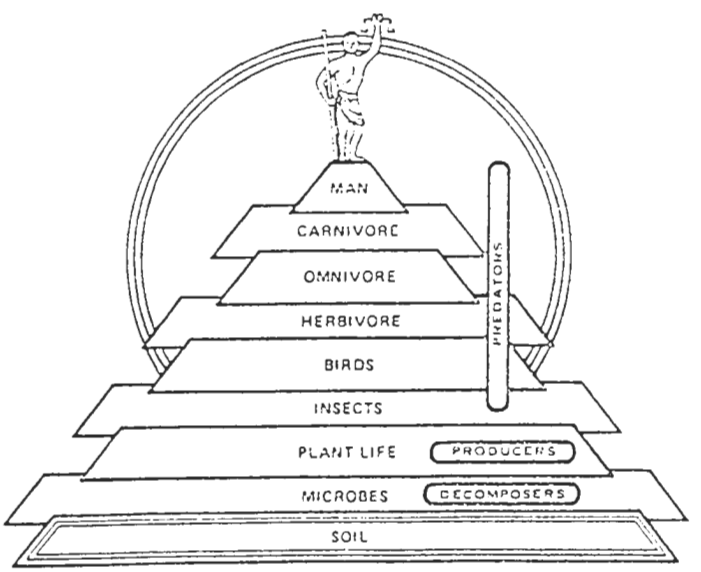

The Biotic Pyramid

People, Land, and Community

by Wendell Berry*

I would like to speak more precisely than I have before of the connections that join people, land, and community--to describe, for example, the best human use of a problematical hillside farm. In a healthy culture, these connections are complex. The industrial economy breaks them down by oversimplifying them and in the process raises obstacles that make it hard for us to see what the connections are or ought to be. These are mental obstacles, of course, and there appear to be two major ones: the assumption that knowledge (information) can be "sufficient," and the assumption that time and work are short.

These assumptions will be found implicit in a whole set of contemporary beliefs: that the future can be studied and planned for; that limited supplies can be wasted without harm; that good intentions can safeguard the use of nuclear power. A recent newspaper article says, for example, "A congressionally mandated study of the Ogallala Aquifer is finding no great cause for alarm from [sic] its rapidly dropping levels. The director of the . . . study. . . says that even at current rates of pumping, the aquifer can supply the Plains with water for another forty to fifty years. . . All six states participating in the study. . .are forecasting increased farm yields based on improved technology." Another article speaks of a different technology with the same optimism: "The nation has invested hundreds of billions of dollars in atomic weapons and at the same time has developed the most sophisticated strategies to fine-tune their use to avoid a holocaust. Yet the system that is meant to activate them is the weakest link in the chain. . . . Thus, some have suggested that what may be needed are warning systems for the warning systems."

Always the assumption is that we can first set demons at large, and then, somehow, become smart enough to control them. This is not childishness. It is not even "human weakness." It is a kind of idiocy, but perhaps we will not cope with it and save ourselves until we regain the sense to call it evil.

The trouble, as in our conscious moments we all know, is that we are terifyingly ignorant. The most learned of us are ignorant. The acquisition of knowledge always involves the revelation of ignorance-- almost **is** the revelation of ignorance. Our knowledge of the world instructs us first of all that the world is greater than our knowledge of it. To those who rejoice in the abundance and intricacy of Creation, this is a source of joy, as it is to those who rejoice in freedom. ("The future comes only by surprise," we say, "--thank God!") To those would-be solvers of "the human problem," who hope for knowledge equal to (capable of controlling) the world, it is a source of unremitting defeat and bewilderment. The evidence is overwhelming that knowledge does not solve "the human problem." Indeed, the evidence overwhelmingly suggests--with Genesis--that knowledge **is** the problem. Or perhaps we should say instead that all our problems tend to gather under two questions about knowledge: Having the ability and desire to know, how and what should we learn? And, having learned, how and for what should we use what we know?

One thing we do know, that we dare not forget, is that better solutions than ours have at times been made by people with much less information than we have. We know too, from the study of agriculture, that the same information, tools, and techniques that in one farmer's hands will ruin land, in another's will save and improve it.

This is not a recommendation of ignorance. To know nothing, after all, is no more possible than to know enough. I am only proposing that knowledge, like everything else, has its place, and that we need urgently now to **put** it in its place. If we want to know and cannot help knowing, then let us learn as fully and accurately as we decently can. But let us at the same time abandon our superstitious beliefs about knowledge: that it is ever sufficient; that it can of itself solve problems; that it is intrinsically good; that it can be used objectively or disinterestedly. Let us acknowledge that the objective or disinterested researcher is always on the side that pays best. And let us give up our forlorn pursuit of the "informed decision."

The "informed decision," I suggest, is as fantastical a creature as the "disinterested third party" and the "objective observer," or it is if by "informed" we mean "supported by sufficient information." A great deal of our public life, and certainly the most expensive part of it, rests on the assumed possibility of decisions so informed. Examination of private life, however, affords no comfort whatsoever to that assumption. It is simply true that we do not and cannot **know** enough to make any important decision.

Of this dilemma we can take marriage as an instance, for as a condition marriage reveals the insufficiency of knowledge, and as an institution it suggests the possibility that decisions can be informed in another way that is sufficient, or approximately so. I take it as an axiom that one cannot know enough to get married, any more than one can predict a surprise. The only people who possess information sufficient to their vows are widows and widowers--who do not know enough to remarry.

What is not so well understood now as perhaps it used to be is that marriage is made in an inescapable condition of loneliness and ignorance, to which it, or something like it, is the only possible answer. Perhaps this is so hard to understand now because now the most noted solutions are mechanical solutions, which are often exactly

suited to mechanical problems. But we are humans -- which means that we not only **have** problems but **are** problems. Marriage is not as nicely trimmed to its purpose as a bottle-stopper; it is a not entirely possible solution to a not entirely soluble problem. And this is true of the other human connections. We can commit ouselves fully to anything -- a place, a discipline, a life's work, a child, a family, a community, a faith, a friend -- only in the same poverty of knowledge, the same ignorance of result, the same self-subordination, the same final forsaking of other possibilities. If we must make these so final commitments without sufficient information, then what **can** inform our decisions?

In spite of the obvious dangers of the word, we must say first that love can inform them. This, of course, though probably necessary, is not safe. What parent, faced with a child who is in love and going to get married, has not been filled with mistrust and fear -- and justly so. We who were lovers before we were parents know what a fraudulent justifier love can be. We know that people stay married for different reasons than those for which they get married and that the later reasons will have to be discovered. Which, of course, is not to say that the later reasons may not confirm the earlier ones; it is to say only that the earlier ones must wait for confirmation.

But our decisions can also be informed -- our loves both limited and strengthened -- by those patterns of value and restraint, principle and expectation, memory, familiarity, and understanding that, inwardly, add up to **character** and, outwardly, to **culture**. Because of these patterns, and only because of them, we are not alone in the bewilderments of the human condition and human love, but have the company and the comfort of the best of our kind, living and dead. These patterns constitute a knowledge far different from the kind I have been talking about. It is a kind of knowledge that includes information, but is never the same as information. Indeed, if we study the paramount documents of our culture, we will see that this second kind of knowledge invariably implies, and often explicitly imposes, limit upon the first kind: some possibilities must not be explored; some things must not be learned. If we want to get safely home, there are certain seductive songs we must not turn aside for, some sacred things we must not meddle with:

> Great captain,
> a fair wind and the honey lights of home
> are all you seek. But anguish lies ahead;
> the god who thunders on the land prepares it . .
> . . . . . .
>
> One narrow strait may take you through his blows:
> denial of yourself, restraint of shipmates.

This theme, of course, is dominant in Biblical tradition, but the theme itself and its modern inversion can be handily understood by a comparison of this speech of Tiresias to Odysseus in Robert Fitzgerald's Homer with Tennyson's romantic Ulysses who proposes, like a genetic engineer or an atomic scientist,

> To follow knowledge like a sinking star,
> Beyond the utmost bound of human thought.

Obviously unlike Homer's Odysseus, Tennyson's Ulysses is said to come from Dante, and he does resemble Dante's Ulysses pretty exactly -- the critical difference being that Dante thought this Ulysses a madman and a fool, and brings down upon his Tennysonian speech to his sailors one of the swiftest anticlimaxes in literature. The real -- the human -- knowledge is understood as implying and imposing limits, much as marriage does, and these limits are understood to belong necessarily to the definition of a human being.

In all this talk about marriage I have not forgot that I am supposed to be talking about agriculture. I am going to talk directly about agriculture in a minute, but I want to insist that I have been talking about it indirectly all along, for the analogy between marriage making and farm making, marriage keeping and farm keeping, is nearly exact. I have talked about marriage as a way of talking about farming because marriage, as a human artifact, has been more carefully understood than farming. The analogy between them is so close, for one thing, because they join us to time in nearly the same way. In talking about time, I will begin to talk directly about farming, but as I do so, the reader will be aware, I hope, that I am talking indirectly about marriage.

When people speak with confidence of the longevity of diminishing agricultural sources -- as when they speak of their good intentions about nuclear power -- they are probably not just being gullible or thoughtless; they are likely to be speaking from belief in several tenets of industrial optimism: that life is long, but time and work are short; that every problem will be solved by a "technological breakthrough" before it enlarges to catastrophe; that **any** problem can be solved in a hurry by large applications of urgent emotion, information, and money. It is regrettable that these assumptions should risk correction by disaster, when they could be cheaply and safely overturned by the study of any agriculture that has proved durable.

To the farmer, Emerson said, "The landscape is an armory of powers. . . ." As he meant it, the statement may be true, but the metaphor is ill-chosen, for the powers of a landscape are available to human use in nothing like so simple a way as are the powers of an armory. Or let us say, anyhow,

that the preparations needed for the taking up of agricultural powers are more extensive and complex than those usually thought necessary for the taking up of arms. And let us add that the motives are, or ought to be, significantly different.

Arms are taken up in fear and hate, but it has not been uncharacteristic for a farmer's connection to a farm to begin in love. This has not always been so ignorant a love as it sometimes is now; but always, no matter what one's agricultural experience may have been, one's connection to a newly bought farm will begin in love that is more or less ignorant. One loves the place because present appearances recommend it, and because they suggest possibilities irresistibly imaginable. One's head, like a lover's, grows full of visions. One walks over the premises, saying, "If this were mine, I'd make a permanent pasture here; here is where I'd plant an orchard; here is where I'd dig a pond." These visions are the usual stuff of unfulfilled love and induce wakefulness at night.

When one buys the farm and moves there to live, something different begins. Thoughts begin to be translated into acts. Truth begins to intrude with its matter-of-fact. One's work may be defined in part by one's visions, but it is defined in part too by problems, which the work leads to and reveals. And daily life, work, and problems gradually alter the visions. It invariably turns out, I think, that one's first vision of one's place was to some extent an imposition on it. But if one's sight is clear and if one stays on and works well, one's love gradually responds to the place as it really is, and one's visions gradually image possibilities that are really in it. Vision, possibility, work, and life -- all have changed by mutual correction. Correct discipline, given enough time, gradually removes one's self from one's line of sight. One works to better purpose then and makes fewer mistakes, because at last one sees where one is. Two human possibilities of the highest order thus come within reach: what one wants can become the same as what one has, and one's knowledge can cause respect for what one knows.

"Correct discipline" and "enough time" are inseparable notions. Correct discipline cannot be hurried, for it is both the knowledge of what ought to be done, and the willingness to do it -- all of it, properly. The good worker will not suppose that good work can be made properly answerable to haste, urgency, or even emergency. But the good worker knows too that after it is done work requires yet more time to prove its worth. One must stay to experience and study and understand the consequences -- must understand them by living with them, and then correct them, if necessary, by longer living and more work. It won't do to correct mistakes made in one place by moving to another place, as has been the common fashion in America, or by adding on another place, as is the fashion in any sort of "growth economy." Seen this way, questions about farming become inseparable from questions about propriety of scale. A farm can be too big for a farmer to husband properly or pay proper attention to. Distraction is inimical to correct discipline, and enough time is beyond the reach of anyone who has too much to do. But we must go farther and see that propriety of scale is invariably associated with propriety of another kind: an understanding and acceptance of the human place in the order of Creation -- a proper humility. There are some things the arrogant mind does not see; it is blinded by its vision of what it desires. It does not see what is already there; it never sees the forest that precedes the farm or the farm that precedes the shopping center; it will never understand that America was "discovered" by the Indians. It is the properly humbled mind in its proper place that sees truly, because -- to give only one reason -- it sees details.

And the good farmer understands that further limits are imposed upon haste by nature which, except for an occasional storm or earthquake, is in no hurry either. In the processes of most concern to agriculture -- the building and preserving of fertility -- nature is never in a hurry. During the last seventeen years, for example, I have been working at the restoration of a once exhausted hillside. Its scars are now healed over, though still visible, and this year it has provided abundant pasture, more than in any year since we have owned it. But to make it as good as it is now has taken seventeen years. If I had been a millionaire or if my family had been starving, it would still have taken seventeen years. It can be better than it now is, but that will take longer. For it to live fully in its own possiblity, as it did before bad use ran it down, may take hundreds of years.

But to think of the human use of a piece of land as continuing through hundreds of years, we must greatly complicate our understanding of agriculture. Let us start a job of farming on a given place -- say an initially fertile hillside in the Kentucky River Valley -- and construe it through time:

1. To begin using this hillside for agricultural production -- pasture or crop -- is a matter of a year's work. This is work in the present tense, adequately comprehended by conscious intention and by the first sort of knowledge I talked about -- information available to the farmer's memory and built into his methods, tools, and crop and livestock species. Understood in its present tense, the work does not reveal its value except insofar as the superficial marks of craftsmanship may be seen and judged. But excellent workmanship, as with a breaking plow, may prove as damaging as bad workmanship. The work has not revealed its

connections to the place or to the worker. These connections are revealed in time.

2. To live on the hillside and use it for a lifetime gives the annual job of work a past and a future. To live on the hillside and use it without diminishing its fertility or wasting it by erosion still requires conscious intention and information, but now we must say **good** intention and **good** (that is, correct) information resulting in **good** work. And to these we must now add **character:** the sort of knowledge that might properly be called familiarity, and the affections, habits, values, and virtues (conscious and unconscious) that would preserve good care and good work through hard times.

3. For human life to continue on the hillside through successive generations requires good use, good work, all along. For in any agricultural place that will waste or erode -- and all will -- bad work does not permit "muddling through"; sooner or later it ends human life. Human continuity is virtually synonymous with good farming, and good farming obviously must outlast the life of any good farmer. For it to do this, in addition to the preceding requirements, we must have **community.** Without community, the good work of a single farmer or a single family will not mean much or last long. For good farming to last, it must occur in a good farming community -- that is, a neighborhood of people who know each other, who understand their mutual dependences, and who place a proper value on good farming. In its cultural aspect, the community is an order of memories preserved consciously in instructions, songs, and stories, and both consciously and unconsciously in **ways.** A healthy culture holds preserving knowledge **in place** for a **long** time. That is, the essential wisdom accumulates in community much as fertility builds in the soil. In both, death becomes potentiality.

People are joined to the land by work. Land, work, people, and community are all comprehended in the idea of culture. These connections cannot be understood or described by information -- so many resources to be transformed by so many workers into so many products for so many consumers -- because they are not quantitative. We can understand them only after we acknowledge that they should be harmonious -- that a culture must be either shapely and saving or shapeless and destructive. To presume to describe land, work, people, and community by information, by quantities, seems invariably to throw them into competition with one another. Work is then understood to exploit the land, the people to exploit their work, the community to exploit its people. And then instead of land, work, people, and community, we have the industrial categories of resources, labor, management, consumers, and government. We have exchanged harmony for an interminable fuss, and the work of culture for the timed and harried labor of an industrial economy.

But let me bring these notions to the trial of a more particular example.

Wes Jackson and Marty Bender of the Land Institute have recently worked out a comparison between the energy economy of a farm using draft horses for most of its field work and that of an identical farm using tractors. This is a project a generation overdue, of the greatest interest and importance -- in short, necessary. And the results will be shocking to those who assume a direct proportion between fossil fuel combustion and human happiness.

These results, however, have not fully explained one fact that Jackson and Bender had before them at the start of their analysis and that was still running ahead of them at the end: that in the last twenty-five or thirty years, the Old Order Amish, who use horses for farmwork, doubled their population and stayed in farming, whereas in the same period millions of mechanized farmers were driven out. The reason that this is not adequately explained by analysis of the two energy economies, I believe, is that the problem is by its nature beyond the reach of analysis of any kind. The real or whole reason must be impossibly complicated, having to do with nature, culture, religion, family and community life, as well as with agricultural methodology and economics. What I think we are up against is an unresolvable difference between thought and action, thought and life.

What works **poorly** in agriculture -- monoculture, for instance, or annual accounting -- can be pretty fully explained, because what works poorly is invariably some oversimplifying **thought** that subjugates nature, people, and culture. What works well ultimately defies explanation because it involves an order which in both magnitude and complexity is ultimately incomprehensible.

Here, then, is a prime example of the futility of a dependence on information. We cannot contain what contains us or comprehend what comprehends us. Yeats said that "Man can embody truth but he cannot know it." The part, that is, cannot comprehend the whole, though it can stand for it (and by it). Synecdoche is possible, and its possibility implies the possibility of harmony between part and whole. If we cannot work on the basis of sufficient information, then we have to work on the basis of

an understanding of harmony. That, I take it, is what Sir Albert Howard and Wes Jackson mean when they tell us that we must study and emulate on our farms the natural integrities that precede and support agriculture.

The study of Amish agriculture, like the study of **any** durable agriculture, suggests that we live in sequences of patterns that are formally analogous. These sequences are probably hierarchical, at least in the sense that some patterns are more comprehensive than others; they tend to arrange themselves like interesting bowls -- though any attempt to represent their order visually will oversimplify it.

And so we must suspect that Amish horse-powered farms work well, not because -- or not **just** because -- horses are energy-efficient, but because they are living creatures, and therefore fit harmoniously into a pattern of relationships that are necessarily biological, and that rhyme analogically from ecosystem to crop, from field to farmer. In other words, ecosystem, farm, field, crop, horse, farmer, family, and community are in certain critical ways like each other. They are, for instance, all related to health and fertility or reproductivity in about the same way. The health and fertility of each involves and is involved in the health and fertility of all.

It goes without saying that tools can be introduced into this agricultural and ecological order without jeopardizing it -- but only up to a certain kind, scale, and power. To introduce a tractor into it, as the historical record now seems virtually to prove, is to begin its destruction. The tractor has been so destructive, I think, because it is **unlike** anything else in the agricultural order, and so it breaks the essential harmony. And with the tractor comes dependence on an energy supply that lies not only off the farm but outside agriculture and outside biological cycles and integrities. With the tractor, both farm and farmer become "resources" of the industrial economy, which always exploits its resources.

We would be wrong, of course, to say that anyone who farms with a tractor is a bad farmer. That is not true. What we must say, however, is that once a tractor is introduced into the pattern of a farm, certain necessary restraints and practices, once implicit in technology, must now reside in the character and consciousness of the farmer -- at the same time that the economic pressure to cast off restraint and good practice has been greatly increased.

In a society addicted to facts and figures, anyone trying to speak for agricultural **harmony** is inviting trouble. The first trouble is in trying to say what harmony is. It cannot be reduced to facts and figures -- though the lack of it can. It is not very visibly a function. Perhaps we can only say what it may be like. It may, for instance, be like sympathetic vibration: "The A string of a violin. . . is designed to vibrate most readily at about 440 vibrations per second: the note A. If that same note is played loudly not on the violin but near it, the violin A string may hum in sympathy." This may have a practical exemplification in the craft of the mud daubers which, as they trowel mud into their nest walls, hum to it, or at it, communicating a vibration that makes it easier to work, thus mastering their material by a kind of song. Perhaps the hum of the mud dauber only activates that anciently perceived likeness between all creatures and the earth of which they are made. For as common wisdom holds, like **speaks to** like. And harmony always involves such specificities of form as in the mud dauber's song and its nest, whereas information accumulates indiscriminately, like noise.

Of course, in the order of creatures, humanity is a special case. Humans, unlike mud daubers, are not naturally involved in harmony. For humans, harmony is always a human product, an artifact, and if they do not know how to make it and choose to make it, then they do not have it. And so I suggest that, for humans, the harmony I am talking about may bear an inescapable likeness to what we know as moral law -- or that, for humans, moral law is a significant part of the notation of ecological and agricultural harmony. A great many people seem to have voted for information as a safe substitute for virtue, but this ignores -- among much else -- the need to prepare humans to live short lives in the face of long work and long time.

Perhaps it is only when we focus our minds on our machines that time seems short. Time is always running out for machines. They shorten our work, in a sense popularly approved, by simplifying it and speeding it up, but our work perishes quickly in them too as they wear out and are discarded. For the living Creation, on the other hand, time is always coming. It is running out for the farm built on the industrial pattern; the industrial farm burns fertility as it burns fuel. For the farm built into the pattern of living things, as an analogue of forest or prairie, time is a bringer of gifts. These gifts may be welcomed and cared for. To some extent they may be expected. Only within strict limits are they the result of human intention and knowledge. They cannot in the usual sense be made. Only in the short term of industrial accounting can they be thought simply earnable. Over the real length of human time, to be earned they must be deserved.

From this rather wandering excursion I arrive at two conclusions.

The first is that the modern stereotype of an intelligent person is probably wrong. The prototypical modern intelligence seems to be that of the Quiz Kid -- a human shape barely discernable

in fluff of facts. It is understood that everything must be justified by facts, and facts are offered in justification of **everything.** If it is a fact that soil erosion is now a critical problem in American agriculture, then more facts will indicate that it is not as bad as it **could** be and that Iowa will continue to have topsoil for as long as seventy more years. If facts show that some people are undernourished in America, further facts reveal that we should all be glad we do not live in India. This, of course, is machine thought.

To think better, to think like the best humans, we are probably going to have to learn again to judge a person's intelligence, not by the ability to recite facts, but by the good order or harmoniousness of his or her surroundings. We must suspect that any statistical justification of ugliness and violence is a revelation of stupidity. As an earlier student of agriculture put it: "The intelligent man, however unlearned, may be known by his surroundings, and by the care of his horse, if he is fortunate enough to own one."

My second conclusion is that any public program to preserve land or produce food is hopeless if it does not tend to right the balance between numbers of people and acres of land, and to encourage long-term, stable connections between families and small farms. It could be argued that our nation has never made an effort in this direction that was knowledgeable enough or serious enough. It is certain that no such effort, here, has ever succeeded. The typical American farm is probably sold and remade -- often as part of a larger farm -- at least every generation. Farms that have been passed to the second generation of the same family are unusual. Farms that have passed to the third generation are rare.

But our crying need is for an agriculture in which the typical farm would be farmed by the third generation of the same family. It would be wrong to try to say exactly what kind of agriculture that would be, but it may be allowable to suggest that certain good possibilities would be enhanced.

The most important of those possibilities would be the lengthening of memory. Previous mistakes, failures, and successes would be remembered. The land would not have to pay the cost of a trial-and-error education for every new owner. A half century or more of the farm's history would be living memory, and its present state of health could be measured against its own past -- something exceedingly difficult **outside** of living memory.

The second possibility is that the land would not be overworked to pay for itself at full value with every new owner.

A third possibility would be that, having some confidence in family continuity in place, present owners would have future owners not only in supposition but **in sight** and so would take good care of the land, not for the sake of something so abstract as "the future" or "posterity," but out of particular love for living children and grandchildren.

A fourth possibility is that having the past so immediately in memory, and the future so tangibly in prospect, the human establishment on the land would grow more permanent by the practice of better carpentry and masonry. People who remembered long and well would see the folly of rebuilding their barns every generation or two, and of building new fences every twenty years.

A fifth possibility would be the development of the concept of **enough.** Only long memory can answer, for a given farm or locality, How much land is enough? How much work is enough? How much livestock and crop production is enough? How much power is enough?

A sixth possibility is that of local culture. Who could say what that would be? As members of a society based on the exploitation of its own temporariness, we probably should not venture a guess. But we can perhaps speak with a little competence of how it would begin. It would not be imported from critically approved cultures elsewhere. It would not come from watching certified classics on television. It would begin in work and love. People at work in communities three generations old would know that their bodies renewed, time and again, the movements of other bodies, living and dead, known and loved, remembered and loved, in the same shops, houses, and fields. That, of course, is a description of a kind of community dance. And such a dance is perhaps the best way we have to describe harmony.

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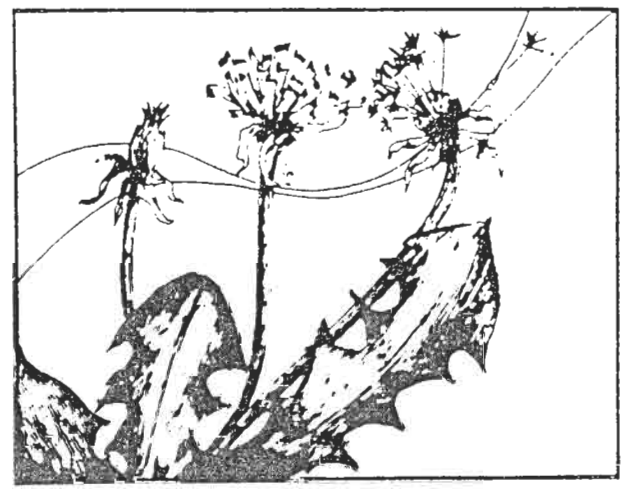


Two Philosophies of Agriculture: From Industrial Paradigms to Natural Patterns

by Alan R. Drengson

Previous issues of **The Trumpeter** have surveyed some of the many issues arising out of environmental degradation produced by industrial society. We have seen how the industrial paradigms of work, production, and efficiency have been applied to all aspects of society. Since the early industrialization of textiles there have been several waves of industrial activity that have applied industrial paradigms to different sectors of society. In the process, industrial philosophy has come to dominate our activities and economic considerations have come to dominate our politics. It has now come to pass that even the academy has been in many ways industrialized in mind.

The industrial mind is underpinned by the metaphor of the machine. It is enamoured with it. It is captive of an approach to relationships that emphasizes control and mastery. It proceeds in its conquests by dividing a productive activity into separate steps, and by constructing hierarchies of organization that are rigid, ordered according to abstract paradigms or models, and that are handled and evaluated primarily in terms of their quantitative values. In the academic setting the philosophy of industrial mind can be traced back to the separation made between mind and nature in modern philosophy. A proponent of this was Descartes.

Descartes believed that the human mind is not of nature, that the body is only a machine, and that the essence of the mind is thinking (narrowly defined in terms of a set method). The aim of thinking is to discover principles and general laws that can be applied so as to master nature. We need have no compunction about applying our mastery of physical laws to nature, by means of technology, because nature is void of intrinsic value. Since consciousness resides only in the souls of God, humans and angels, there is no reason to retain the primitive animism of the ancients, who saw spirit and intelligence everywhere in nature.

Once the aim is to develop general principles that are seen as mathematically abstract laws, it becomes clear that analysis, calculation, division of labor, specialization, quantification, and systematic methodologies will produce a certain kind of mind. It will be a mind that ignores the fact that each of us knows far more than we know that we know. Good farming, e.g., is the result not just of scientific knowledge. So-called scientific farming is in trouble these days, in part because it has proceeded on the assumption that it knew everything that was relevant. This certainty was a result in part of its ability to treat variables abstractly, that is, to ignore the concrete particular. The variables of a given piece of land, of yearly weather patterns, the water cycles, the plant and animal variations, and the patterns of culture all come into play in farming. Good farming is never the result of mechanically following a general principle or an abstact theory. It is the result of sound tradition, flexibility in practice and a mind in the farmer that is one with a specific piece of land. The good farm practice is a reflection of a mind very much reflective of its place. To know place in its particular concreteness over time is to appreciate its unique character. It is also to appreciate the fact that knowledge in the Cartesian sense can never be equal to our skill in terms of the art and craft that are part of the patterns of good farming on a particular piece of land.

The movement of the industrial approach through our society and through the rural culture of farming is an historical process that has almost run its course. In the context of agriculture it is easy to see that the philosophy of industrial farming has failed to create a sustainable agriculture. Moreover, it has undermined the culture of agriculture and the rural communities that make farming possible as a way of life. It is the communal culture that preserves and enhances patterns of tacit and other knowledge that make up good farming. That this has become more widely recognized is part of the reason for the shift in mind that is now beginning to happen in agriculture, as well as in several other areas of our culture. It is a shift from an industrial mind to an ecological mind. In the philosophy of agriculture we can say that this is a shift from industrial agriculture (agribusiness) to post industrial, eco-agriculture. The intersection of conventional industrial practices with environmental limits has helped to initiate this shift.

Industrial agriculture attempts to impose on organic, biological, living processes, the values of the market and the mechanisms of central control and mass production. The paradigm of industrial philosophy is that all productive processes have to be "rationalized", that is, mechanized. The less human labor and skill that goes into each step, the better. The fewer hands and brains involved in the "manufacture" of cattle, wheat or chickens, the better. If living stock do not fit the industrial pattern, then it is proposed to selectively breed and genetically engineer them so that they do. Hogs and cattle are bred that are docile and can be kept under tight, closed conditions. They must also be fed a diet filled with supplements and antibiotics to maintain them free of disease. If they do not grow fast enough for the industrial pattern, then they will be fed hormones and other chemicals to stimulate their growth.

Since the industrial process is concerned with the economies of scale, it is thought rational to have as large units as possible. Thus a hog "factory" that turns out 350,000 hogs a year is

built. Its inefficiencies and costs are hidden in balance sheets that reflect tax shelters gained by urban investors, most of whom know little about pigs or farming. The industrial factory approach to agriculture creates problems which it then attempts to solve by the same level of thinking, only to create more problems. Thus we see the failure of the chemical approach to pest control. The use of all such chemicals has increased dramatically, and at the same time the loss of crops to insects has increased as well. (This is partly related to plant vulnerability, which is related to scale, use of hybrids, use of chemicals and poor soil conditions.) In addition, other side effects appear on the body earth and in the human body.

Newsweek recently claimed that cancer will strike one out of every three persons now alive in North America. It did not make clear that it is now thought that over 80 percent of all cancer is caused by environmental factors which are the result of industrial activity. The forests of Europe and North America alike are suffering from increasing damage as a result of the activities of industrial society, as are world fisheries and rangelands. The industrial solution to the increase in cancer is to find further technological means to alter the body in order to "cure" the condition. But the condition of health in the body is a reflection of a condition of character and culture. They in turn reflect the health of the soil. The health of the soil is reflected in the health of the plants and animals it supports. Human health is the result (in part) of a healthy agriculture, but a healthy agriculture depends upon a healthy culture.

These are all interrelated processes. As our minds are, so shall our practices be, and as our practices are, so shall our lives be. Nature is our ultimate barometer, and when our activities consume and destroy the living soil, we know that our culture cannot long endure. Its practices are not sustainable, for they consume that upon which they depend. The pyramid of life that Margaret Merrill refers to (see figure) does not represent a domination hierarchy, but a reflection of dependencies, with the largest base, the supporting base of the pyramid, represented by the soil communities. (In the oceans the larger, more complex forms of life, such as whales, depend upon the microorganisms that live in the seas.) The good farmer understands the pattern of return, that decay produces life, and that all that lives must return through the endless cycles of the good earth. Industrial agribusiness seems to understand none of these things. For the industrial hog factory, manure is a problem. For the ecoagricultural practice it is an asset.

We have previously described in **The Trumpeter** how we might tentatively conceptualize philosophies on the basis of their awareness of ecological patterns of thought and perception. Deep ecology we defined as a form of inquiry and practice that sought to question ever deeper into the multiplicity of our relationships, and to explore ecological interrelationships between various levels of activity, from thinking, to working and playing, especially as these relate to nature. It involves the recognition that all things are part of the patterns of ecological interrelatedness that ultimately resolve themselves into a oneness of mind with nature in ecosophic or wise action. The aim of deep ecology is not theory, but practice and ecosophy.

Descartes and his successors were after a foundational theory from which all else could be deduced. They were after impersonal knowledge, a form of second hand information that could be mathematized or given a tight "logical" structure. But the ecologcial consciousness realizes that this is a fantasy that can be maintained only by a great deal of self forgetting, and only by a great deal of self deception. Deep ecological knowledge and understanding is the result, finally, of particular, personal, experiential, first hand knowing that is not capable of being captured by any one formula or paradigm. It cuts across disciplinary boundries. It is holistic. It is open and creative. It is conscious of ecology as well as the ecology of consciousness.

Clearly, as we have spoken of it, deep ecology is not the science of ecology. It is one of many ways of helping us to realize that our deeper sensibilities reveal more of the world to us, not when the mind mirriors nature in a theory, but when it harmonizes with nature in the patterns of our practices. Without first hand knowledge there is no genuine understanding, only theory, only abstraction, then reification, and the mystification of the expert. (It is important to note that this type of abstract "knowledge" lends itself to impersonal killing and destruction, such as bombing people from high altitude B-52s, or putting out 1080 to poison coyotes and thereby indiscriminately poisoning all sorts of other animals and birds, or by indiscriminately dumping large amounts of toxic wastes in the air and rivers. The evidence is overwhelming that if we become abstracted in this way we lose our ability for responsible action. The so-called objectivity of abstraction that ignores a great deal of our so-called subjective experience can actually lead to a psychology that is imprisoned in subjectivism and fantasy, which characterizes much of the main entertainments in our mass media. Such abstracted subjectivism is one of our most serious problems, and it accounts for the fact that we cannot treat nature with indifferent violence without also treating humans in this same way. Societies that exploit and abuse humans also exploit and abuse nature.)

What we are calling the philosophy of ecoagriculture can also be a deep ecology practice.

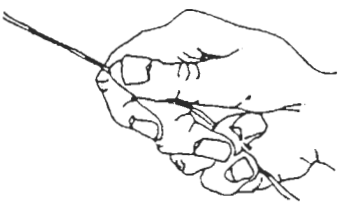
Industrial agriculture represents the philosophy of technocracy, as we spelled this out in earlier issues. The philosophy of ecoagriculture is a pernetarian philosophy, one that recognizes the networks of interrelationships that are organic, natural and cultural, and involve selves of all kinds. The industrial agricultural philosophy thinks in terms of consumers, producers, output and input, profit and loss, labor and management, increasing productivity, mechanization, and the like. The ecoagriculturalist thinks in terms of persons and health, husbandry and soil fertility, of good work, sustainable practice, and community. Ecoagriculture substitutes first hand knowledge, skill, attention and care for power and chemicals. Ecoagriculture is not a job but a way of life. Industrial farming is just a job.

Ecoagriculture is just one of the many terms that have been used to refer to ecologically sound, sustainable agriculture. Organic farming, natural farming, sustainable agriculture, regenerative agriculture, agroecology, all of these terms reflect the underlying philosophy that nature knows best, that all things are interconnected, that every benefit has some cost, that everything has to go some place, that we have to understand things holistically in terms of processes. Also, that there is a proper time and place for things.

The activities of a farm fit into larger patterns and cycles. The natural farmer imitates nature's process for building soil, feeding the soil communities, husbanding water, and so on. The organic farmer avoids the use of petroleum based chemicals and fertilizers, seeks to prevent pest problems by means, e.g., of planting strategies and biological controls. The sustainable agricuturist practices forms of cultivation that can be carried on indefinitely through the maintainence of soil health. The regenerative approach to agriculture aims to rebuild soil health and fertility by means of natural, organic methods, so to realize a sustainable agriculture. Agroecology stresses the role of ecological science in good farming. As Margaret Merrill indicates, "eco-agriculture" is a term which unites all of these different ways of attempting to describe a philosophy of agriculture that moves beyond the industrial paradigms, with their mechanical metaphors and analogies, to a post industrial, biologically understood practice that unites contemporary knowledge and new patterns with the skills of the older craft of traditional agricultures.

From early times agriculturists practiced craft knowledge that has in many parts of the world established and maintained sustainable patterns of agriculture. Civilizations which did not do this, and which ignored the needs of the land, soon disappeared.

The older pattern of traditional horse agriculture was not replaced by industrial agriculture because it was less energy efficient, or because it was not capable of producing enough food. The Old Order Amish have kept the best of horse agriculture alive, and their numbers on farms has doubled in the last 30 years, while mechanized farmers have been going to the cities in large numbers. The Amish developed forms of regenerative agriculture that enabled them to purchase run down lands and rebuild them through a practice of crop rotation, mixed farming, small scale cultivation, livestock husbandry, and the maintainence of a farm size that can be attended by one mind. The scale of industrial farming in large part makes good husbandry impossible, for such care is beyond the scope of one's attention. The machine expands our power and shortens our time, it does not expand our wisdom or our ability to care for, or pay attention to things. The Amish have preserved their farming traditions because these practices are part of a larger way of life that is both a community and a culture. They have recognized that the introduction of labor saving devices on the farm eliminates human members of the community by denying them meaningful work, and displaced labor must go somewhere else. On an Amish farm a worker is not just labor. The farm hand is not just a worker, but is also a father, a church member, a horse trainer, and so on. An ecoagricultural practice must be part of patterns of culture that reinforce and preserve appropriate patterns of cultivation which preserve or rebuild the land. In Amish culture one can be excommunicated for abusing the land.



Each time we have introduced the industrial process to a given area of human practice we have lost as well as gained something. What we might have gained in increased productivity by one farm worker, has been offset by the loss in skills and by the loss of of the vigorous farm community. The result has been an undermining of rural culture and of the small agricultural community. If the recent trends of industrial agriculture were to continue, agricultural lands would eventally be mostly automated "agribusiness" controlled by a few large companies. The large expanses of land in our granary would be depopulated and mechanized, diversity and resiliance would suffer, seeds and animal varieties all would be patented and controlled by corporations. This would involve a verticle integration with control of land, animals and plants, energy sources, distribution and

marketing. However, things do not seem likely to progress to this extreme. Bigness and organized structures have size limits beyond which they become pathological and undermine the very values that we often espouse for them. To turn our democratic traditions into the direction of corporate feudalism, and our industry to the creation of a warfare state, would be to undermine the legitimacy that gives our polis its moral authority.

We can find evidence of two minds in our culture: We can call one the Jeffersonian mind of the person who is of the land, the self reliant, responsible husbandman who represents the best wisdom of the rural tradition, (which degenerates in films and popular literature to rural hicks and cowboy heroes); the other is the mind of the industrial urbanite who thinks in terms of market efficiency, industry, technology and free enterprise. The former values are given lip service, while politicians have often served the values that encourage centralization of power, concentration of ownership and the undermining of diversity. What our agriculture needs is an ecoagricultural practice, which by its very philosophy is decentralist and is not based on power or violence. As Ghandi put it, "We do not need more mass production. We need more production by the masses." The values of such an agriculture transcend short term concerns for immediate gratification and profit. We have begun to perceive the corruption of our traditions and the spiritual bankruptcy of trying to order our lives on the industrial model. Economics loses its value, when it becomes the only value. We cannot run our society on the basis of the "bottom line", or on the basis of monetarism and accounting. We cannot reduce all values to the abstractions of money. We have our priorities reversed when economics means more than the people it is meant to serve and the nature upon which it depends.

The movement from industrial paradigms to ecoagricultural patterns is comparable to the movement in medical practice from the industrial model to the holistic approach. In both, larger patterns are kept in sight. One does not attempt to impose one generalized solution on all cases just because they can be put in a general category. The ultimate form of the industrialized approach in medicine is to attempt to replace the wise practi tioner with the "expert" machine system that can be computerized. Holistic medicine, on the other hand, takes larger patterns of life into account. It does not follow rigid methods, but is senstive to the art of practice that sees health as part of a larger pattern of living, at the same time as it appreciates the individual. Holistic medicine does not overlook the health of the soil. Industrial medicine does. Just as there can be malpractice in medicine, so there can be agricultural malpractice.

Industrial agriculture tries to simplify natural systems and control biological processes, as if they were industrial ones. It attempts to turn the farm into a factory. In the history of factory mass production the economy of large scale was pursued. This involved top down hierarchies of management and control. The aim was to control all aspects of the whole process of production, and the autonomy and creativity of workers was controlled by fragmenting the production process into individual "steps" that could be measured and timed. This "scientific management" (Taylorism) had certain advantages for the "rationalization" of production. It led to the development of large scale corporations whose major power rested in their productive capital, management abilities and organizational skills. It depended heavily upon specialists. As centralization and market control led to fewer and fewer firms manufacturing various commodities (think of autos, e.g.), capitalization of jobs, worker productivity and costs all became central factors of increasing concern. The increasing power of centralization was matched by larger and larger labor organizations. In agriculture this approach also focused on productivity measured primarily as an output of units of labor. The analysis reduces all values to common measures that can be changed into dollars.

Money is an abstraction which hides the true value and worth of things. The fertile, living soil that sustains healthy animals, plants and humans over generations cannot be equated with a fossil fuel that will be consumed once for all time. Yet the economics of industrial agriculture lead to the conclusion that family farms and rural culture can be exchanged for crude oil. A large trade deficit gives to foreign holders of dollars the power to exchange oil for farm land. Dollars are assumed to give to agribusiness the right to mine soil for short term gain. The larger farms become, and the more mechanized they are, the more industrial processes are substituted for biological ones, and the more costly they become in terms of all of the values that are lost.

When considered only as a resource the land in the industrial process is no longer understood and farmed with care. If you are driving several thousands of dollars worth of machinery in an insulated, air conditioned, stereo equiped cab, you are not paying much attention to the biological pulse of the land.

Ecoagriculture advocates farming as a way of life that is interconnected with a rural culture and tradition, set in larger patterns of practices that unite craft skills and knowledge with modern ecological science, on a scale compatible with proper human care, attention and understanding. It farms according to natural patterns and the patterns of the land. It uses biological processes and controls instead of industrial ones. It understands energy, information and scale as

interrelated factors which operate at every level of farm practice and ecosystem function. The soil is a living community to be cared for. Regeneration of abused soils is a sacred duty. In studying natural succession within biological communities, a regeneration of sustainable agriculture becomes possible through imitating and working with rather than against nature. The good farm is family scaled and the technology practice is appropriate. The ecoagricultural patterns fit into the aim to reinhabit the country and to be committed to place. It reconnects the rural community with nature and leads to a development of a sense of bioregional integrity and the need for bioregional activities and festivals. Ecoagriculture recognizes that we have to live within biological limits, but we can choose our economy.

The ecoagriculturalist uses natural strains of plants and saves seeds to develop plants more carefully suited to the place being farmed. Ecoagriculture tries to be clear about the ends agriculture is to serve, and its ultimate values and raison detre. It does not treat agriculture as an industrial, commodity producing process. It yields food and fiber, to be sure, but these are only part of a larger, more abundant life.

As a philosophy for a sustainable way of life ecoagriculture places desires under the limits of a self conscious discipline. Patience, and harmony with nature represent strength of character. The desire to master and control nature and persons is an expression of immature character. Ecoagriculture leads to a deepening sense of the mystery of things, to a sense of the limits to our knowledge. Out of its practices grow a deepening sense of the meaning and value of life.

Some have said that agriculture represents our most fundamental break with nature, the first alienation. The story of Adam and Eve can be read as a way of telling about our historical and current separation from nature. Humans lived in a natural garden of plenty, without the need for clothing or cultivation. (What urbanites now call wilderness.) They had only to gather their food. They could communicate with the animals and the animals were not afraid humans. Then they ate of the fruit of the tree of knowledge of good and evil, i.e. they became self conscious and capable of separating themselves from their surroundings by means of concepts and judgements. Judging by means of concepts of good and evil separated things into categories that they either accepted or rejected. Desire entered and they sought more than the garden could provide. In eating the apple they fell from the grace of God, i.e. (in this reading) from the blessings of living in harmony with nature as the animals do, without judging, simply enjoying life. They were then forced, as a result of their own actions, to cultivate the soil and to herd animals. Even birth (a natural process) became painful. The wild animals were feared and the wild garden was seen as threatening. So agriculture or cultivation marked the end of the gathering paradise and complete harmony with nature. But ecoagriculture does not approach farming as a struggle with a hostile nature. It learns from nature's own regenerational patterns and its cycles of succession. The industrial mind, however, is in a basic conflict with nature.

Agriculture is the activity that has the largest impact upon nature, in that it is the largest single sector of the economy, and provides the largest share of our material needs. Some think that agriculture of almost any form must be incompatible with deep ecology and with ecosophy because it involves managing and killing other beings (cattle, carrots, and so on) who are held (by deep ecology) to have intrinsic value. To be sure, hunting and gathering cultures have felt this implied conflict. They recognized the intelligence, aliveness and awareness of other animals. They hunted, yet did so with humility and with great apologies to the animal. Except for those they consumed, they left the animals to their free and wild ways. The ways of natural beings were to be respected. They certainly were not seen as "game" to be managed.

With the birth of agriculture, there is also the development of societies with hierarchies of domination and control that raise armies to defend and expand boundries. Also, in agricultural societies there is a greater sense of vulnerability to natural forces, and with this go accompanying changes in religion. Further, agriculture often gives rise to a rate of population growth that is not sustainable, as it goes beyond the long term carrying capacity of natural systems. Many civilizations were born and developed on new soils, and when those were depleted the civilization declined. They consumed the accumulated fertility of natural soils. Hunting and gathering societies almost never do this, for they gather only what they can consume and do not store food or accumulate surpluses. In the city empires of the ancient agricultural societies farm surpluses produced by fertile soils allowed armies to be formed. Large scale slavery also became possible. But when the farming was land consuming, even armies could not hold the civilization together, unless they could be used to acquire new lands.

The philosophy of ecoagriculture is within the tradition of the Jeffersonian ideals of the self reliant, intelligent and educated farmer, who is the basis for the strong rural communities that help democracy to thrive. This implies that having a large number of family farmers who own their land, and who are not dependent on external inputs of energy and fertilizer, would make our food supply more certain, less vulnerable, more sustainable, more wholesome, and at the same time it could contribute to the cultivation of citizen participation in democratic processes.

Organizational and technological realities today mean that the rural community is no longer isolated. Educational resources, information, and new sources of knowledge are all accessable, as well as are mid-scaled, appropriate technologies, and new flexible systems of manufaturing, new financial institutions, networks and various forms of cooperatives and land trusts. Conventional industrial technology leads to a diminishment of the middle (e.g., the middle class, mid-sized farms, mid-sized technologies). Regenerative agriculture would help to revitalize a broad middle by rebuilding local economies and self sufficiency. The agriculture practiced by many of our grandparents was characterized by a community spirit of mutual cooperation and help. A rebirth of this spirit is now a great need. It is also a genuine possibility.

HIDDEN FARM ROAD*
by Walt Franklin

Curving uphill from
the barn, it lay behind me
hidden in orchard trees,
in crowded lilacs, brambles
and poplars sprung-up from
neglect. Never waiting
to be found, it lay
all these years beneath
the westward rising ridge.
Cleared, it mapped the route
to vistas on house and valley,
bygone days of use and
misuse and abandonment of
hill life. Only now is it
revealed-- a picture for
recovery with a saw and
scythe and careful thought,
small tools for future days.

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*from **Topographies** by W. Franklin, M. A. P. Press, Box 392, Portlandville, N.Y. 13834 U.S.A. Originally published by Blueline Magazine. Reprinted by permission from the author.

FILMS

The film **Witness** is not only a very good thriller in the police-crime genre, it is also, at another level a powerful juxtaposition of the rural culture of an earlier America, with the urban culture of today, with its crime, violence and lack of both real community and contact with nature. The film shows us the 19th century farm culture by taking us from the city (Philadelphia) to the farm community of the contemporary Amish. Harrison Ford plays John Book, a dectective investigating the murder of an undercover policeman. The murder occurs in a washroom at the railroad depot and is witnessed by a young Amish boy. Book discovers that police corruption is involved in the murder, and when the conspirators find out that he is on their trail, they attempt to kill him. Book then takes his witness and the boy's mother to an Amish farm. Book suffered a wound in the attempt on his life, and when they get to the boy's Grandfather's farm he collapses. The Amish family nurse him back to health. (On the other level the film could be seen as a metaphor for the healing powers of nature, over the urban cement.) The bulk of the film is set on the farm, and the photography of the country side, the horse carriages, the barn raising, and other aspects of the community give one a profound sense of what we have lost in leaving the life on the land. The corrupt cops eventually track Book down, and when their car pulls over the rise above the farm one feels that the urban industrial presence is threatening the tranquility of farm life beyond this particular incident. Again, this is symbolic of the underlying sense of the film as a whole. The film is fairly accurate in its visual portrayal of Amish culture and life, although the Amish might not like the way they are presented. Their commitment to non-violence, community solidarity, mutual aid, and to good farming do come through in the film fairly well. It is worth seeing for these reasons. I did not enjoy the violence at the beginning and end of the film. Here are two books for those who might want to read about Amish culture in more detail: E. and D. Schwieder, **A Peculiar People**, and J. A. Hostetler, **Amish Society.**

Two other films that pertain to country life and farming are **Places in the Heart** and **River.** I have not seen either of them, but intend to review them in the next issue. (From Silver Bear)

BOOK NOTES

Meeting the Expectations of the Land: Essays in Sustainable Agriculture and Stewardship is edited by Wendell Berry, Wes Jackson and Bruce Coleman, published by North Point Press, San Francisco, 1985. This book contains essays by 18 different authors, but there are 17 essays since some are co-

authored. This book aims to contribute to a new synthesis and new definition of agriculture in terms that involve a practice which depletes neither people nor soil. The essays cover a wide range of topics, from traditional farming practices, cross cultural studies, reflections on perennial polyculture, stewardship, energy on the farm, horse vs. tractor agriculture, and so on. It is a treasure trove for anyone who is aware of the problems of agriculture and is looking for a new vision of what a good agriculture could be. The book also reflects on gardening from the standpoint of the sustainable garden. One of the most memorable passages in the book is a description by John Todd of an ecologically intelligent farm he observed in Java. This farm is designed to integrate a number of different elements so that they compliment one another, and so that no one of them dominates the others. Trees, grasses, livestock, grains, fish, and vegetables are all interrelated through the use of water and land. This sustainable farm grows richer with each passing year. This book is highly recommended for anyone who wants to get a good grasp of the philosophy and practice of the new directions in sustainable agriculture.

Wes Jackson's book **New Roots for Agriculture** has now been revised. Just released this spring by the University of Nebraska Press, the book goes into much greater depth about what is wrong with conventional agriculture and how new ecological strategies and perennial polyculture can lead us out of the problems we are in to a fully sustainable agriculture. This too is an important book.

Farmers of Forty Centuries by F. H. King, (Rodale, Emmaus) is a book which describes the traditional agriculture of China, Korea and Japan. King was especially concerned to bring out how the U.S. could benefit from using some of the eastern techniques that improve soil fertility. A good book for cross cultural perspective.

Agroecology: The Scientific Basis of Alternative Agriculture, by Miguel A. Altieri, published by Division of Biological Control, UC Berkeley, can be ordered from Altieri by writing to him at the Division of Biological Control, UC Berkeley, 1050 San Pablo Ave., Albany, Ca. 94706, price $11.50 US includes postage. This book is a good introduction to the theory and design of alternative agricultural practices. It covers a number of different topics such as minimum tillage (the kind that does not use herbicides), cover crops, agroforestry, organic farming, polyculture, and so on. (Suggested by Oreamnous)

PERIODICALS AND ORGANIZATIONS

Margaret Merrill mentions **ACRES USA** in her paper. ACRES USA can be contacted by writing to Charles Walters, PO Box 9547, Rayton, Missouri, 64133. They publish a newsletter on egoagriculture and books on the same subject. They also put on conferences and provide information to farmers who want to convert to alternative practices.

The **International Alliance for Sustainable Agriculture** at the University of Minnesota, 1701 University Ave. SE, Room 202, Minneapolis, Minn. 55414, publishes a newsletter **Mana** as well as a larger journal, **New Directions in Agriculture**, that is expensive, but contains a wealth of information on sustainable agriculture. Mana is **not** expensive ($15 US), and is a very informative newsletter, especially useful for its international information. IASA does research, conducts worshops, builds networks, etc.

The **Steering Committee for Sustainable Agriculture**, PO Box 1394, Davis, Ca. 95617, has as their main activity putting on an ecological farming conference each year which draws about 500-600 people. They are strongly committed to showing how organic methods work and why they are important.

The **International Federation of Organic Agriculture Movements** (IFOAM) has their head office at 161 Dom. des Bois Mures, 06130 Grasse, France. IFOAM is an organization of groups and individuals around the world with more than 80 member groups who are working together to promote an agriculture that is biologically, economically and socially sustainable. Two of their affiliated groups in Canada are: **Movement pour l'agriculture biologique au Quebec (MAB)**, 1415 Jarry est, Montreal, Que. H2E 2Z7; **Canadian Organic Growers**, c/o Ken McMullen, 46 Laurentide Ave., Toronto, Ont. M5M 3C2.

Tilth is an organization committed to biologically sound agriculture and gardening. They put on workshops, and have a great deal of information available on organic methods. They have several chapters on the west coast. Their Seattle office can supply other addresses: 4649 Sunnyside N., Seattle, Wn. 98103. Tilth is working hard to get bills passed in Washington, Oregon and California on certification and standards for organically grown food, for which there is more demand than supply.

The Rodale people have a newly defined project they call **The Regeneration Project** which grew out of the Cornucopia Project described in the last issue of **The Trumpeter**. Their work on regenerating agriculture led them to see that one cannot

regenerate agriculture in North America without also undertaking the regeneration of small towns, local communities, and regions. Therefore, they began an investigation of regeneration technologies (which is their word for appropriate technologies) and regeneration economics. They have developed the concept of a regeneration zone, and are collecting a great deal of very useful and inspiring information on areas, cities, which have projects underway that lead to greater employment, more self reliance and sounder relationships with the land. I have read the first issue of their newsletter and it is well worth the small price of $8.00. They have other publications which provide details on how to get a regeneration project underway in your own community.

Finally, let us not forget to mention two seed companies (and there are many others) whose philosophy is explicitly committed to preserving open pollinated, native and diverse seed. They are: Abundant Life Seed Foundation, PO Box 772, Port Townsend, Washington, 98368; and, Sanctuary Seeds, 2388 West 4th, Vancouver, B. C. V6K 1P1. Write for their catalogues.

N.B. There are several other organizations such as land trusts and stewardship trusts that should be mentioned, as well as some other valuable books and materials related to alternative agriculture. The length of this newsletter dictates that they be left for the last issue to be devoted to agriculture.

FUTURE ISSUES

Please send your contributions to the up-coming issues on wilderness. The details of the ecostory will be set forth in the Summer issue.

NETWORK SUBSCRIPTION INFORMATION

The Trumpeter is published quarterly. Membership for 1985 is $5.00. A complete set of past newsletters (vol. 1, nos. 1-5) is $5.50 postpaid. Please make cheques payable to LightStar, 1138 Richardson St., Victoria, B. C., Canada V8V 3C8.

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