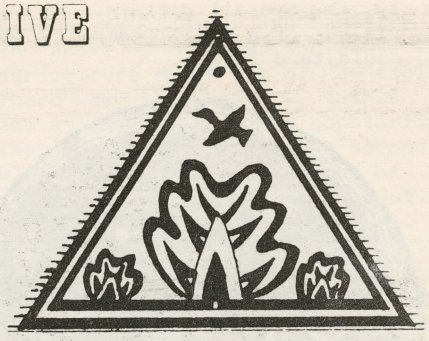
ESSENTIALS OF A NATIVE AGRICULTURE



BY DR. JOHN TODD

[Editor's Note: The following was first presented by Dr. Todd at the Fourth Annual Alternative Agriculture Conference sponsored by the Natural Organic Farmers Association and the Bio-Dynamic Farming and Gardening Association, Inc. on August 4, 1978 at New England College in Henicker, New Hampshire. The transcript of his recorded talk has been edited for publication in ROOTDRINKER.]

In the early days of the New Alchemy Institute we were living in Southern California. At that time we had a group of friends that moved to a small community high up in the mountains near the Mexican border. There our friends felt was work that needed to be done--work that included putting aside the dominant material culture that they felt was anti-life. They had found the most exquisite piece of land--a land of skewed rock, boulders, canyons, and vistas as far as the eye could see. There they wanted to establish a somewhat self-sufficient, autonomous community.

They asked Bill McLarney, Nancy Jack Todd, and myself to come out and design for them the basis of an autonomous agriculturally-based village. We came with a whole variety of schemes we had drawn up, based on what we knew. As hard as we tried, though, we found there was no way we could wean them from being totally dependent on the outside for their water, for their food, and for their energy. Despite our boatloads of degrees, none of us knew how to make that little piece of the world work. Instead of running away--and it was a terrifying experience to discover the gap between our abstract educations and this new reality--we admitted, "we do not know how to make this piece of the world work," and we stayed to find out more.

Along with Nancy, Bill and myself, we had nine students. We studied the soil animals, the soil, the rocks, the sun, the wind, the small plants, and the scrubs. To the best of our abilities, we made a catalog of everything that was there--every thing that hinged upon every other thing--and then taught each other what we had found.

It was after several months of intensive work that the first tiny clues stood revealed. The land itself began to tell us what to do. High up in a crevice between two huge boulders a plant was found that a desert ecologist told us was only found where there was an aquifer within sixty to a hundred feet of the earth's surface--no one thought there was water in that area.

In another place we found a plant association and it had a soil with all the qualities to produce life and food. We found that the topography of the land itself could be used to drive wind and solar engines.

Bit by bit, slowly, we began to perceive: a wind engine, water to the surface, a small pond providing moisture and nutriments to the land below, and then, ultimate-

ly, the overall pattern. We saw a village or a small community that could tend itself.

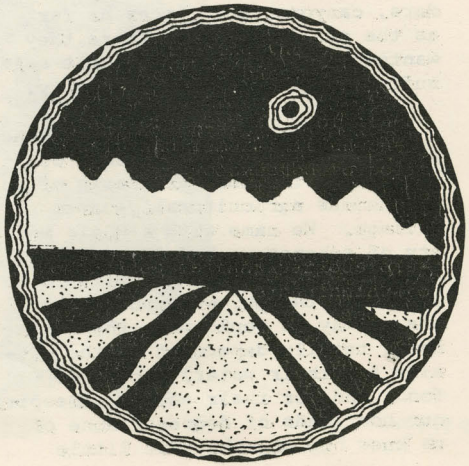
I would like to say that the story has a beautiful ending, but it doesn't. Bulldozers came in and devastated the surrounding land so that hundred thousand dollar weekend retreats could be built for millionaires who were living in San Diego. The people there, living in the community, were shattered by that experience. They had the kind of Indian knowledge of a piece of land which was destroyed by the bulldozers and development, if you can call that development.

At the same time that this was going on, there were changes in the larger world around us. Perhaps what we are seeing in our time is the beginning of a revolution in perception? Through the work of many different people in many different ways we were all beginning to see a new vision of how human communities could be sustained. The old ideas of linear cause and effect, and the fragmented disciplines that occurred and dominated and drove much of science to a kind of pedantic and amoral form, were being attacked from all sides. Modern science and our modes of perception increasingly became the subjects of criticism. A transformation not yet over--in fact, only just becoming visible--has been affecting the commonwealth of which we're a part.

All of this, some of it consciously and some of it unconsciously, was connected to political and social movements that began to gain in strength in the 1960's. What has happened over the last two decades is that various disperse movements are beginning to come closer together and add to each other. First came the very dramatic civil rights movement. Then came Viet Nam. From Viet Nam came the whole idea that people we didn't even know could be slaughtered and their lands destroyed wholesale, and the shattering revelation that the destructive chemicals used in Viet Nam were, in many cases, being used on our own agricultural land. That really caused people to look at what agriculture was all about.

Also out of the Viet Nam movement came the sense that we could criticize the scientists and the technicians who were pretending to be neutral while the end products of their inventions and production were very destructive.

This then began to be connected within the human potential movement. Here people began to see that so much of what we are as humans has not been tapped, has laid fallow, partly because of the kind of materialistic and reductionistic world view promoted by the Industrial Age.



Parallel with the human potential movement is the feminist movement and the idea that for millennia there have been injustices--injustices hardly felt in many cases, strongly felt in others--that need correcting. This, in turn, was coupled (and when you stop and think you can see the many affinities) with the ecological movement which simply said, "we are responsible for what is going on in the world."

Finally, there is the decentralist movement--the idea that the world is too centralized, that power is invested in the interests of too few, that we are becoming spectators in our own future rather than participants.

I will suggest to you that, in 1978, each one of these is fertilizing the other. They are building what I think is the basis of a coherent social and political world view. Old notions of gross conquest, dominance, and greed are being replaced by concepts of nurture and of stewardship. All of them together could come to that kind of conclusion.

At the root is agriculture, and it goes back quite a ways to people like Jay Russell Smith. Having traveled around the world as a geographer, he concluded that the only agriculture which could enhance society over a long period of time would be a permanent agriculture based primarily on trees, a permaculture. There were also people like Steiner and Pfeiffer who spoke of a sacred wholeness in agriculture and a set of new tools There were the Rodale's, father and son, who taught and popularized that agriculture is not a second class activity, but the core of what society is really all about.

Sir Albert Howard, besides legitimizing composting, asked deeper questions--should there not be feedback of the most intimate type between the scientist/naturalist and the agriculturalist? Perhaps they should even change roles from time to time.

By the late 1960's and 70's organizations like the Natural Organic Farmers Association in Vermont and New Hampshire and the Maine Organic Farmers Association were beginning to emerge in agriculture. What these organizations are doing, and I consider this a key in what is happening, is struggling to reconnect agriculture to the larger society.

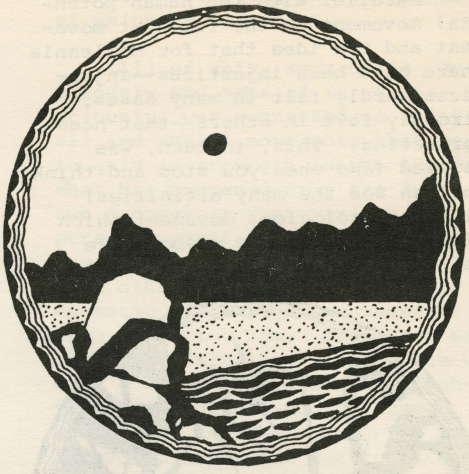
While Earl Butz was out proving that food equals power, starving people in Bangladesh were making deals with the Russians. At this time there was a growing sense that the apparently successful contemporary agriculture was beginning to prove maladaptive. By maladaptive I just mean it is not fated to exist for much longer as it is. It is unfit for a post-petroleum era within which fuels are scarce and costly. In the largest sense, the sense Wendell Berry talks about, it failed. Socially, it has driven most of the population off the land. It has wreaked havoc with rural communities and rural society throughout North America. It has put people in untenable positions in the cities.

Contemporary agriculture has failed ecologically. There are between 72,000 and 84,000 toxic materials in the environment as a result of our activities today, according to the head of the Environmental Protection Agency. At least 1400 of them have them scared out of their wits. Many of these come from agriculture and

have gotten into the ecosystems through farming practices that have been proven unnecessary. Being totally dependent on petroleum and fertilizers means contemporary agriculture is dependent on international political relationships and is also inflexible to change during shortages. Some people think 10-15 calories of petroleum to produce one calorie of food is not a wise way to proceed as a society.

In addition, agriculture, which on the surface is so successful, is really debt-ridden. For example, if one were to plot the curves of increase in productivity against that of increase in fertilizer use against the debt curve, you'd find productivity increasing much slower in comparison to fertilizer use, and an incredibly sharp rise in debt compared to a small crop increase. Because modern agriculture is so debt-ridden, most of us are fated to either work around in the fringes or stay out of it altogether.

If modern agriculture is maladaptive, then where does one go to look for adaptive farms? When you begin to research traditional society, you discover that, in most cases, you couldn't say that other cultures produced foods in the most adaptive ways. There were deforestations and loss of soil fertility and a whole variety of other things. You can't look



to any particular people or any particular place and say, aha, there <u>is</u> a universal answer and <u>they've</u> got it. In fact, the only adaptive thing we're aware of is the nature of nature itself. It has, for billions of years, persisted, enhanced, and enriched itself. What news is in it that enables it to do that?

We don't have all the answers to that, but we are able to say a little of what we've found by looking at nature. First of all, we've found that if you look at nature, from the very smallest component--the organelle in the cell--through to the cell, up to the organisms, to the ecosystems within which the organism lives, and finally to Gaia or the biosphere, you will find that it is composed of units that at every point are mirror images of the one smaller and the one larger than it. As a unit they care for their own reproduction, their own nutrition, waste treatment and so on. Many of the organelles are complete--they care for everything. The same is true for the cell. But the genius of nature is that, while it is comprised of mirror images of itself all the way from the smallest cell up to the planet, it has a wonderful ability to be both autonomous and interdependent at the same time.

Another characteristic of all living systems is that they are cont→ p-25

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participatory. They orchestrate their energy, their food, and their shelter. They orchestrate the very forces which sustain them.

A native agriculture should strengthen the possibility that everyone begin to participate in some way in the growing of food. I think that all kinds of possibilities will arrive out of that. It is important that people be reintroduced to agriculture, even if it is a very part-time, window box type of agriculture.

The scale of a native agriculture should be reduced. One of the things ecology teaches us, perhaps as much as anything else, is that nature has an extraordinary way of miniaturizing itself. Through increasing diversity and complexity, and by re-arranging agriculture away from a kind of industrial wasteland to a more human scale, you find that you can produce more in a given area of land.

A native agriculture involves large numbers of people in agriculture, and you don't proceed just as agriculturalists. You try to understand and orchestrate--to link together energy, food production, manufacturing, transport, and so on.

There is a great deal to learn from nature. Systems in nature, for example, rarely export or import massive amounts of energy. What this suggests is that, perhaps inherent in adaptiveness is the whole notion that nature is powered by the energy it gets and by little or nothing else. If we use the sun, the wind, and the biofields as the basis of our agriculture, and very frugally use imported materials--mainly as materials--maybe intrinsic in that act, itself, is the beginning of a stable and self-enriching system?

Along with this idea, we should should seek living equivalents to capital costly engines. This may sound arcane and old-fashioned, but I don't think it is. For example, the most obvious living equivalent is using the horse and ox to partially replace the tractor. More subtle is the idea of using, as we have done at the New Alchemy Institute, alible cells in a solar receiving pond to heat buildings. We are using an algae-based ecosystem which receives solar light to provide the bulk of the heating for our architectural entities. Here is a case where an alible cell is replacing, through an architectural intermediary, what was a fuel-consuming furnace.

Another must for a native agriculture is that it be bioregional. Our thinking is often plagued by ideas derived from places that are not our own. For example, for years solar designers and architects were plagued because they kept thinking as if they were living in Arizona. This was because the early solar pioneers were from Arizona. Then along came some people from New England who said, "Our sun is diffuse--as if someone goes ten feet below the surface of the sea and looks up at the sky. Our scattered light has its own type of energy form and can be used equally well."

Applying the bioregional concept to plant types, and the very biota upon which the agriculture is based, leads one into a consideration of our agricultural heritage. Howard Russell has written a book called A Long Deep Furrow, Three Centuries of Farming in New England. Our past tells us what works in what context, and that is very important. Russell's book is an excellent source of information, for we will have to cull and use what others have been learning for 300 years, in order to create a native agriculture.

It's interesting to take just the history of Indian corn, or the Northern Flint. One finds that, from the time of the Boston Bay Colony and the Pilgrim Colony, New England has pulsed through periods of dependency upon it to periods when it turned its back on it. Wheat came in and replaced, to a large degree, the native corns. Then the rust came. In a period of just a few years you couldn't grow wheat

other than in previously uncultivated ground. So, people went back to native corn again.

After awhile, they decided to try wheat again and this time, maybe 75-100 years later, the Hessian Fly swooped in and destroyed it. So, it's back to the native corn again--forty bushels an acre on some of the poorer Massachusetts soil, seventy to eighty bushels an acre on the alluvial plains, and up to one hundred bushels an acre where the farmers really took a great amount of care. That's still impressive for a high-protein, easily-stored entity.

What we cannot and must not do is fall into trying to compare ourselves with Iowa or Ohio every time we find ourselves evaluating productivity. The kinds of forms of agriculture using native related grains will differ from region to region. This climate is highly suited to a rich diversity of grasses. A grass and corn-based agriculture, particularly livestock agriculture, will grow much stronger here in the next few years.

One area of agriculture that I'm fascinated by is the fruits. In our region's history, the fruits are perhaps the most unique thing. The man who founded modern biology and the way biologists talk to each other was the Swedish biologist, Linnaeus. He developed a binomial system in order to describe all the plants and animals in a language that people, whatever their nation or language, could understand. He was working at his peak in the early 1700's, and he sent his prize student to North America to find out what the news was.

Everywhere he went, he described in his diary a super abundance and super diversity of fruits. The few fruit varieties that were brought over from Europe and transplanted into North America started to thrive and went beserk. It was unlike anything he had ever seen before, and he wrote in his diary that anybody could pick from anybody's orchard anywhere. He said, "If I did the same thing in my native Sweden, I'd be shot."

Something really interesting was going on. In fact, one farm in the early 1800's, just up by Boston, had 1200 varieties of pears alone on it. There were cider orchards in the colonies that, up into the 1850's and 60's, supplied the bulk of the alcoholic beverages to the region in the form of cider wines. In other words, try and transpose into your mind right now the Napa Valley in California to this part of the world and change it from grapes to apples. Apparently, all the way down to the James River from as far north and as far northwest as New York and Ohio, there were cider orchards. A description of these orchards, written in the 1790's, described not only the types and varieties used to produce exquisite fruit and juices, but also management techniques, which will be the kinds that will be essential to a native agriculture.

For example, there are descriptions of fruiting techniques that allow tall trees where the actual production is huge. The lowest branch was above the head of a farmer seated on his horse, so that the best farms could very carefully have rich lush fodder crops and pastures beneath their apple trees. Livestock grazed within pastures planted with cider producing fruit trees. They had actually inadvertently developed a multi-storied permanent agriculture.

If you look at the history of

ply by eating every little dropped apple before it has a chance to complete the coddling moth life cycle.

Another form that a native agriculture should take is aquaculture. Bill McLarney is very fond of saying that there is a hell of a lot of water in New England and that we, as farmers, rarely take advantage of it for producing viable crops. What he is attempting to do is to use part of the natural productivity of lakes by putting various kinds of native species of fish in those lakes in floating cages. The idea is that there is a scarcity of complete protein, and that throughout all of New England are lakes and streams convertable to a kind of aquaculture. Small fish could be seined in the spring, caged, provided with food to make them grow rapidly (such as aquatic insects which can be grown to be in turn fed), and removed as a crop in the fall. There is a market for good fish, and a totally undeveloped aquaculture in New England.

You can use the bioshelter or the solar greenhouse as part of a regional agriculture. Bioshelters could and should take two forms. One is an urban form within which they are microclimates in their own right. An urban bioshelter could have the capacity to grow 20,000 fish a year in addition to vegetables and flowers in such abundance that they could pay for their mortgage and also provide a suitable livelihood for urban farmers. With no fossil fuels in the system, powered exclusively by the sun, they are tapped right in close to the market.

The rural ark or bioshelter would be, in many ways, like a barn. In order to harbor other kinds of agriculture during parts of the year, it might produce fish that could be moved to lakes like cattle are moved to pasture. It might also be used to produce seedlings for large-scale market garden planting in the spring and also for spring seedlings for other gardeners--the kind of thing that's really needed in this climate.

We're also beginning to see arks as being the epicenters for large-scale propagation of trees. Thousands of valuable fruit, nut, and fodder trees can be propagated in a year. Arks are not isolated islands retreating from agriculture. They are, in fact, the antithesis and meant to be integrated into agriculture on a regional basis.

One thing that I'm certain of is that the strength of a native agriculture is going to lie in its diversity--its real love of many different forms. There is a strong tendency to look down on forms of agriculture other than that which we particularly practice. I think that's a danger that we have to look out for. I would like to argue that we must see it as a regional whole and nothing less because we're really all brothers and sisters of the land. I would say, let a hundred forms reign if they are not destructive. Let a hundred forms reign.

New England agriculture it has always been short of labor, so they devised techniques that used less people to do things. When they harvested their trees, people didn't climb them--a team of oxen or horses would come in to shake them. When the apples hit the ground, the process that led to superb wine would be activated.

Then, tragedy struck. In about the 1840's, there were large-scale immigrations of people of Germanic stock who brought mass bulk beer making--as distinct from small-scale beer making which was already present. As a result, within twenty to twenty-five years the great cider orchards were being chopped down. They couldn't produce cider as cheaply as the Germans could mass produce beer.

But things weren't all bad. According to one researcher, there were still 3,000 varieties of apples in commerce in this country in the year 1900. Yet, as a result of what has gone on since 1900, there are now less than a couple dozen varieties found in commerce. Perhaps the most extraordinary genetic diversity of a food crop ever to exist appeared over a couple of centuries, then disappeared over the last century. We know of people actively trying to reverse this process. There's a lot to be learned just perusing the six or seven volume Fruits of New York.

Permaculture or agricultural forestry is a most interesting form of agriculture. One of the things that has struck me the most at the New Alchemy Institute is the amount of energy we expend mowing the lawn. In Northeastern North America, look out over almost any domesticated land and you'll begin to see, clipped lawns, then meadow, then scrubbery, and then finally the forest. If you stop pumping energy into that system the clipped lawn quickly starts the successional process that is intrinsic to climates with a fair amount of moisture. The lawn starts on its way to becoming a forest. Yet we don't have an agriculture that truly responds to that dynamic process. An agriculture based on trees not unlike the cider orchard, is three-dimensional. There are several stories of different types of fruit, nut and fodder crops, under which are livestock, under which are beautiful mixtures of grasses, legumes and so on.

I think that it is possible, in several stages, to economically get from a meadow to that point. In the first evolutionary stages you have seedlings whose branches are protected by cages or fencing. They could be fruit or nut tree seedlings or possibly trees that produce lumber, as many of the boat builders would like. As the trees get larger, the livestock would change. First geese or goats, then sheep could graze. As the trees get larger still, you ultimately see a complex environment with heavily producing trees and such things as beef, sheep and possibly even pigs.

It may sound funny to include pigs, because they root around and might cause some damage to the trees, but interestingly, a few people have done this and the pigs have been quite successful in short-circuiting the coddling moth sim-