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Table of Contents

ECOSOPHIC PRACTICES IN FORESTRY AND FARMING	Alan R. Drengson	57
FORESTRY AND AGRICULTURE		
REFLECTIONS ON CONSERVATION IN BRITISH COLUMBIA AND SCOTLAND	James McCarthy	59
TO FRIENDS OF CANADIAN FORESTS	Alexander Jablanczy	64
INDIVIDUAL TREE SELECTION: MORE THAN FORESTRY WITHOUT CHEMICALS	Marie Reeder	66
STRATEGIES FOR CONSERVATION OF OLD-GROWTH	Reed Noss	71
THE FUTURE IS TODAY: FOR ECOLOGICALLY SUSTAINABLE FORESTRY	Chris Maser	74
ECOFORESTRY: REDEFINING FORESTS, FORESTERS, AND FORESTRY	Orville Camp	78
CITIZEN INVOLVEMENT IN FOREST STEWARDSHIP: USING THE LAND STEWARDSHIP TRUST MODEL	Jeffery Tyhson Banighen	80
WE ARE ON THE EDGE OF STARVATION: THE IMPORTANCE OF FORESTS TO CIVILIZATION AND AGRICULTURE	Larry Ephron	85
SMALL, ORGANIC FARMS CAN SOLVE THE FARM CRISIS	Mark Satin	88
SOIL, FOOD, HEALTH AND VALUES	Stuart B. Hill	90
DEEP ECOLOGY AND ECOPHILOSOPHY		
SHALLOW THINKING ON DEEP ECOLOGY	Hwa Yol Jung	95
ON THE INTERPRETATION OF NAESS'S CENTRAL TERM "SELF-REALIZATION"	Warwick Fox	98
IN PRAISE OF ECOSOPHY	Alan R. Drengson	101
THE EARTH - YES!	Fraser Lang	104

ECOSOPHIC PRACTICES IN FORESTRY AND FARMING

Alan R. Drengson, Editor

In this issue we bring together several themes which have appeared in earlier issues. We first did a three issue series on ecoagriculture in 1985, and since then have published two issues with focuses on forestry. Articles already published have described the connections between ecologically bad agricultural and forestry practices and problems of disease and environmental degradation. Connections also have been made between forestry and farming practices. Industrial agriculture and application of this philosophy and methods to forestry is destroying the Earth's forest ecosystems. Agriculture and forestry are connected in more ways than this, as this issue makes clear. The health of farmland depends upon the maintenance of climate and diverse biological communities, and these require sustainable forest ecosystems, not tree plantations. In short, everything from weather to biodiversity depends on the continuing health of the complex ecological communities of natural forests.

It is now clear to students of environmental processes and whole communities that large-scale, industrial agriculture and forestry are ecologically foolish. The philosophy of industrial agriculture assumes that we can ignore natural processes and engineer the Earth to suit the whims of industrial culture. As in industrial agriculture the ground is cleared of organic matter, "weeds," and insects, so the same methods have been applied to forests, clearcutting large areas of natural forests, burning the debris, leaving the soil exposed, and then monoculture tree planting is followed by chemical interventions to control "pests and weeds". These practices lead to disaster for croplands and forests.

As Chris Maser and Orville Camp point out, the ancient and natural forests are the only examples we have of sustainable forest processes. No human has succeeded in creating a sustainable forest. Selective logging which makes use of high-grad-

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ing, shelterbelt cutting, and even the selective logging practiced in many Northern European countries, are not sustainable, ecosophic practices. In the end they all lead to destruction of the biodiversity and community structures of natural forest ecosystems. We give an example in this issue of one of the best managed selective logging approaches, as described by Marie Reeder in her article.

The management practices of ITS are superior to those of the clearcut and other regimes dominant in the wood products industry. However, as described, they do not encompass the ecological wisdom of Nature referred to by Maser and Camp. Nonetheless, they do illustrate that it is possible to remove forest materials over a long period of time from forestlands, and make a profit in doing so, while the standing volume of timber is increasing through the years. The records of the Farr acreage, if nothing else, illustrate that it is economically feasible to practice forestry without clearcutting and burning. If similar practices had been used on public and other private lands, we would certainly be in better shape today than we are given the results of large-scale clearcutting and plantation tree farming.

A selective logging practice only becomes ecoforestry when the decision making process involves applying natural selection methods of harvesting, for then the whole forest's needs are addressed. This means that we do not think just in terms of timber. A forest is more than trees. As Camp points out, the aim of ecoforestry is ultimately to return land that has been cut over to old-growth forest status, with its rich diversity of plants, animals and ages, below and above ground. In managing existing old-growth, of course, the aim is to maintain the ecological balance and the diversity of species and ages that characterize these natural communities.

The relationship between forest death and ecologically bad forest practices in Europe is now clear to many observers. A similar process is at work in North America and elsewhere. In addition to the large-scale destruction of forests through clearcutting and burning, there is the slower destruction of forests which results from certain non-ecosophic selective harvesting practices. There are also the adverse effects on forests of other human activities, such as burning fossil fuels and forest debris, chemical pollution of the atmosphere, the generation of acid rain, and so on. All of these effects of industrial activities accelerate a process already in sway, according to Larry Ephron. As we mismanage our agricultural, grass, and forest lands, lowering water tables, spreading deserts, causing the build up of greenhouse gases through these and other activities, the climactic patterns of the planet are changing.

Ephron and his associates see another factor at work in the death of the forests. In their view, this is accelerated by human activities, but it is also part of the cycle of ice ages, which during the past, involved 90,000 years of ice age followed by glacial recession and renewal of forests, or warm interglacial periods of about 10,000 years. According to Ephron and others, we are near the end of an interglacial period. They believe that forests play a crucial role in moderating climate during interglacial periods. As the warm cycle continues, the forests grow rapidly and remove carbon dioxide from the atmosphere. As the forests continue to remove CO₂ and build up organic matter, increased precipitation leaches minerals nutrients from forest soils.

The rich minerals in forest soils had their origins in glacial rock-flour, which stimulated forest growth. [And probably, at least in some areas, in volcanic ash.] As the minerals are leached

away, the growth of forests slows, trees begin to show the effects of mineral deficiencies, and various stresses then lead to disease; trees start to die. As forests die and dry out, there are increasing numbers of forest fires, and so on. This feeds greenhouse gases back into the atmosphere. The build up of greenhouse gases increases temperatures in the tropics, which accelerates the circulation of air between the poles and the tropics. This air movement transports increasing amounts of water to the polar regions, where increased cloud cover means lower temperatures, and so the perennial snowlines move toward lower latitudes. As snow builds up, year after year, ice forms and another period of cold climate and glaciation is underway.

This theory is controversial. However, we do know enough to appreciate that the death of Earth's forests will be the greatest catastrophe of human history. It is therefore of the utmost urgency that we stop clearcut logging and burning of forests, and move with all speed to ecologically sound forestry and agriculture. The time for action is here. As Maser says, the future is now. We must restore damaged forests by following Nature's methods. We must actively embrace an ecosophic, holistic approach which will utilize all of the knowledge now available to us. When we see the forest and land whole, when we unify ourselves and our vision, it will be plain that what happens to the Earth happens to us.



Our current practices are not only destructive of forests and croplands, and of the planet, they are also self-destructive. As Stuart Hill points out, such destructive behavior is in part a reflection of unsatisfied needs for which we seek compensatory gratifications. To repair and correct ourselves, we must heal and improve our relationships, within, without, with each other, to other beings, and to the Earth as a whole. What unites us in the common ground of our lives is far more important than the ideologies and dogmas which divide us. Through ecosophic lives and practices we can create ecosophic cultures. One critical place to begin to focus our efforts is on our practices related directly to wildlands, forests, grasslands and croplands. Wildlands and ancient forests are examples of Nature's wisdom which we must not lose. It is time for environmentalism to move from reform to the transformation of life styles and culture necessary to usher in **The Age of Ecosophy**. Thus, this issue concludes with discussions of some central issues in deep ecological philosophy.

REFLECTIONS ON CONSERVATION IN BRITISH COLUMBIA AND SCOTLAND

James McCarthy

I am the Deputy Director (Scotland) for the Nature Conservancy Council, (NCC) the official government nature conservation agency in Great Britain. During the course of a travelling fellowship between June 1988 and March 1989, I spent 5 months in British Columbia investigating aspects of a study topic "Building Support for Conservation in Rural Communities". In this article, some of the contrasts between land use and conservation in British Columbia and Scotland are highlighted.

Seeing the Wood and the Trees

During my stay at the University of British Columbia, I was invited to give occasional lectures to the Faculty of Forestry, where I was invariably introduced as an unusual phenomenon, ie a professionally trained forester who now worked exclusively in the field of nature conservation. (This despite the eminence of an ex - BC forester Harold Eidsvik as Chairman of the Commission on Natural Parks and Protected Areas of the International Union for the Conservation of Nature). I did not appreciate the significance of this description until I had been in the province for sufficient time to become aware, not only of the dominance of the forest industry, but also of the powerful antipathies between commercial foresters and so called "environmentalists" - to such an extent that one could be forgiven for thinking that no other conservation issue was of any consequence! My experience as a student of forestry in Scotland in the 1950s, with a basic training in the natural sciences and the prospect of serving in different parts of the globe, was that ecology and silviculture were fundamental elements in our broadly based education. As such, the principles could be applied to a wide variety of situations and activities, including nature conservation. In my case it led to research on the ecology of swamp forests in Uganda, to forest and land use survey in Tanzania and subsequently to administration of scientific nature conservation in England and Scotland. Indeed, in the early years of the Nature Conservancy, many officers were recruited from the then Colonial Forest Service, since their original motivation was often a strong interest in natural history, combined with experience of integrating forest management with other community interests, including indigenous agriculture. The practice of forestry was not seen as primarily an industrial activity, but one which had to take account of local and domestic needs, including the protection of other natural resources. This was no different from the precept of the Canadian Dr Filbert Roth, who in supporting the principle of multiple use as far back as 1907 stated that " forest functions and benefits in their totality are

many times as viable and important as is the immediate log yield".

My impression of forestry in British Columbia is somewhat different, where partly because of the historic dependency of much of the economy on timber, a powerful lumbering culture has developed which is not synonymous with "forestry" in its wider sense. And of course in Britain, with so little natural forest remaining, there has never been an important private timber industry to compare with BC. Because of this, the government forest service in Britain with its own substantial forest state and timber enterprise, has been able to maintain a degree of independence from industry. Certainly, to a visitor, the extent of access to crown land by private timber companies in BC and their relative freedom of operation there, is surprising, as is the relaxed control over their extractive operation. On the smaller scale of European forestry there is both a requirement and a facility for a more sophisticated silviculture in contrast to the relatively crude clear-cut techniques almost universally adopted in BC, and which has led to the most heated controversies concerning forestry and conservation eg at Carmanah, Meares Island, and South Moresby. However, the situation at Galiano Island, one of the Gulf Islands, particularly exemplifies the infelicity of this approach, where the community interest and forestry is intimately related. Here the scale is more comparable to Scotland, for example, because of the distribution of the settlements within forest and non-forest land. At the invitation of the local community, I had the opportunity to investigate the problem here (which has received far less publicity than the well covered examples above) and came to the conclusion that large scale clear cutting was simply not appropriate in this context, where both residential amenity and considerable tourist use were important factors, and required particularly sensitive consideration if the integrity of the islands ecosystems were to be maintained. However, the fact that the timber company in question itself owned over 50% of the island did not augur well for the working out of an acceptable compromise.

Lest the impression be given that it is only in BC that forestry and land use planning justified criticism, it must be said that in Scotland, large scale tree planting (ironically most often utilizing Sitka Spruce originally from BC!) has provoked some of the most fiercely fought battles between conservationists and forestry interests, notably in the wetlands of the northwest. Paradoxically it is the proposed establishment of new forest cover on open landscapes rather than the clearing of natural forest which has aroused the ire of ecologists and other interests. While much of the problem has stemmed from the various substantial financial incentives provided to encourage private plant-

ing (even where this is marginally economic at best) it is also caused by the lack of a strategic locational plan for forestry, which has allowed for ad hoc and cumulative extension of monocultural plantations often to the exclusion or impairment of other land uses and wildlife. However, a significant step has been taken by the encouragement now given to local government authorities to prepare forestry strategies for their areas, indicating preferred zones for new forests and correspondingly, other zones where, because of constraining interests, there would be a presumption against forestry. Importantly, because these strategies will be part of the local government strategy plan for their area, they will be exposed for the first time to public consideration. In a country where there are relatively tight controls on any land development through the local authority planning system, it is an anomaly that forestry (in company with agriculture) has been exempt from this statutory restraint.

Protected Areas and the Wider Environment

If BC has surprisingly few National Parks given its superlative landscapes and wildlife, this is still more than Scotland, where the inhabitants, with characteristic caution, are still debating the wisdom of establishing any such system. Further, while BC has a very large number of provincial parks, Scotland has no direct equivalent to these, the nearest being national scenic areas which do not make specific provision for public recreation. The nub of the issue is also central to any comparison between BC and Scotland regarding land use and development, reflecting the history of the territories respectively, i.e. the relative proportions of privately owned and publicly owned land. Whereas in BC, although 90% of the land area is crown land, that proportion in Scotland is in private ownership, in some individual cases extending back for centuries. Thus the establishment of any legally protected area, including National Parks, immediately involves the rights and interests of non-public sectors, usually of considerable historicity and complexity. While the current political mood is firmly against expropriation and "land nationalization", the prospects for a national park system dominated by Government control are remote.

Set against this however there are other more subtle forms of landscape and wildlife protection which are not paralleled in BC. First, there is the countrywide development control system vested in local government, which requires any change in land use to be subject to local planning permission and which is given a high degree of protection to much of the general countryside. Second, there is the system of National Nature Reserves and Sites of Special Scientific Interest (SSSI) administered by the Nature Conservancy Council (mainly by agreement with owners of private land). Over and above the local planning regulations, these protect important areas from activities (including agriculture and forestry), which might damage their nature conservation value. The nearest equivalent to the latter in BC would be the Ecological Reserves which are designated on public lands, usually within provincial parks. Although BC became the first province in Canada to give permanent status to such reserves, and made a good start to the establishment of the first 120 sites (by 1988), the programme is severely constrained by shortage of funds and staff. While comparisons are invidious because of differences in designation, it is worth noting that this programme in 1989 had a full time staff of 3 professionals, its equivalent in Scotland, administering legal protection over 100 times the num-

ber of ecological reserves, had a staff of 100 dedicated to this function, notwithstanding the complexities of private ownership.

The critical difference between these different forms of nature conservation is that the BC system of ecological reserves, almost exclusively on public land, allows for virtually no other uses whereas the Scottish system of scientific sites must take into account existing land management, and where necessary requires individual agreements by negotiation, usually with compensation. However, the initial establishment of such sites is not dependent on such agreement: statutory notification of the site's importance is sufficient to oblige an owner's compliance with the consultative requirements. Thus a private landowner in Scotland, while apparently retaining what might be considered "feudal" privileges (e.g. the exclusive right to hunt all game animals and fish within his ownership) is substantially constrained regarding changes in land use and management, and by the law of the land, must accept a general right of public access over unfenced ground. The Scots might well ask under the circumstances "who needs national or other perks?"

However, whereas in BC such areas are in relatively natural condition, often tree covered or high mountain, in Scotland their de-afforested equivalents continue to be modified, as they have been for centuries, by sheep grazing and burning (both for domestic stock and grouse management) while the control exercised by local government authorities over rural activities is frequently slight. Further, on such private lands, positive provision for public access facilities and recreation is usually limited. A fascinating sideline on the debate in Scotland at the present time is that, for entirely different reasons, the "wilderness men" and many traditional landowners are on the same side in resisting parks: the former to pre-empt the risk of "urbanization" of wild places by public recreation facilities, and the latter to maintain control over their presumed rights. In this equation, there are also the well known polarizations between local residents who derive their basic livelihood from the resources of the land, and the distant urbanites who often view the countryside as amenity and recreation space. Not least, there is the conundrum of matching long term conservation desiderata to more immediate economic needs of the communities involved.

Whereas in North America, conservation has always been strongly associated with the protection of basic soil and water resources, primarily to maintain agriculture and forestry on a continental scale, the term in Scotland is more often linked with the preservation of relic wildlife habitats or historic landscapes and habitations. The concomitant of this is that the conserved areas are seen as satisfying primarily aesthetic or cultural needs. There is no evidence that in the public mind these are connected with the wider issues of environmental deterioration, such as global warming or ozone depletion. For that matter connections are not readily made between such elemental processes as photosynthesis and virtually all essential food production - processes which are dependent on world climate conditions. What it means is that the degree of anxiety about urgent environmental issues is not accompanied by the necessary understanding of processes and relationships (both ecological and economic) to enable informed judgements to be made or decisions taken either on individual lifestyles or political actions.

Is there any link between the establishment of protected areas for heritage conservation purposes and this broader social purpose of informing and raising awareness on the human environment? What part, if any, can be played by such areas in

scholastic, community, or general publication education, and what priorities should be given to this function? What lessons can be learned from the BC experience? Protected areas - nature reserves, national parks etc - represent but one segment in a whole gamut of resource conservation action and have traditionally been selected on criteria which reflect natural and rare qualities. Apart from this their location may often be inconvenient for mass public access. A number of other factors will condition their suitability for interpretative and educational purposes on a significant scale, and their contribution to this purpose will necessarily be limited. This is particularly true of nature reserves and similar wildlife areas where use may be required to be very selective within the context of all the other sources of environmental information available to the public. They may, however, offer a unique opportunity to influence both local and general public opinion in favor of conservation and may also importantly enlarge understanding of wider environmental issues.

It has to be said that at present, educational use of protected areas in Scotland tends to be focused on the specific attributes of the locality, emphasizing their most attractive features and promoting particular objectives in management. While this approach is perfectly valid, it confirms its "relic heritage" image, disconnected from its context of surrounding land use and history, not to mention the missed opportunity of establishing links with wider environmental concerns. In one of the most important areas for wildlife conservation in Europe, the Scottish Highlands, there is a remarkable paucity of easily accessible quality information for visitors, notwithstanding the modest attempts by organizations such as NCC or the National Trust for Scotland at a number of interpretative centres. It would be, for example, very difficult to suggest to a visitor where he might go for a reasonably comprehensive orientation on the geography, land-use, economics and history of the Highlands expressed in relatively simple terms. We often fail to understand the fairly basic nature of many questions in visitors' minds which relate to general ecological factors such as climate and land-use history - "why there are no trees" or "who owns the land"? Nor is there sufficient awareness of the contribution this (i.e. quality interpretation) can make to the visitor experience and indeed to local appreciation of the interest and value of the natural resources of the area. The dichotomy in Scotland between nature conservation *sensu strictu* and landscape protection, particularly for recreation is much less evident in BC, especially in its park systems which combine, in various measures, wildlife protection with recreational use usually by principles of zoning which allow for different emphasis to be given to appropriate areas to these functions. Two factors make this relatively easy in this part of the world, i.e. the sheer scale of protected areas such as national parks, and their public ownership and administration. Nevertheless, even on a smaller scale and in the absence of public ownership, the merits of this conjunction of interests are attractive especially in relation to exploitation of educational opportunities. In Scotland relatively little use is made of recreation (particularly active recreation) and tourism as a vehicle for promoting conservation, compared to North America. This is despite the fact that visitors and others are often more receptive to information in pursuit of enjoyable activities in attractive outdoor surroundings.

Recreational facilities apart, the public expectation of provision of this range of information, presented in an enjoyable

way should not only attract visitors to these locations, but should contribute to their appreciation of and support for conservation of the protected area. The conclusion that can be drawn may seem obvious - where it is appropriate, far more use should be made of the potential in and around protected areas for public information and education, not only to recruit support for local conservation, but also to promote environmental awareness on a much broader front. The growing sector of adventure tourism and active recreation provides a special opportunity to link these activities with promotion of a conservation ethic. Whatever the merits or demerits of a system of national parks, experience in North America has shown that these areas command strong loyalties among the visiting public, for which they may be identifiable symbols of national pride in their land and its environment. The two most obvious benefits of an association between nature conservation and landscape conservation for aesthetic and recreational purposes, is that the latter is often the commonest channel to appreciation of nature. The outdoor recreation experience often precedes, and is indistinguishable from, awareness of wildlife as an aesthetic object and because of this, it is frequently easier to obtain support and resources for what appears to be a more overtly social purpose than nature conservation *per se*. That is not to say that the provision of parks to secure scenic protection and public access always caters adequately to nature conservation. In the Canadian system, I have heard frequent complaints that under financial stringencies, resource conservation was relegated to lower status in favor of provision of public recreation facilities. There was a neglect of necessary management for nature conservation, sometimes born out of ignorance of wildlife habitat requirements, more often arising from the pressure to demonstrate quantifiable public use. Nevertheless, on balance, there is much to commend a supportive association between the needs of nature conservation and landscape/recreation respectively and a recognition of the links between these.

Community Interests

The question of local needs and concerns has become a major issue in the politics of conservation in Scotland. The Wildlife and Countryside Act of 1981 is a formidable piece of legislation which empowered the Nature Conservancy Council throughout Britain to establish the SSSI referred to above, and these now cover approximately 10% of the land surface of Scotland. However this legislation, following very considerable losses of wildlife habitat (mainly to intensive agriculture since World War II in lowland England) is most strongly supported by the conservation-minded constituency in the south of England, although by no means exclusively so. But it also applied to Scotland, which especially in the rural areas, has a very different social, economic, and political culture. Given the relative abundance of wild and unspoiled land in Scotland, there was initially little enthusiasm in traditional rural communities for this legislation, and subsequently even less where it was applied to extensive sites most often in economically deprived areas where there had been a history of land exploitation by absentee landlords. A number of highly publicized confrontations between conservationists and local interests helped to fuel the perception of the former (including the Nature Conservancy Council) as insensitive and authoritarian, disregarding the needs of those who

gained their livelihoods from the land. As far as NCC was concerned, it was not helped by its image of being somewhat academic and remote, with a central headquarters in the southern midlands of England.

I have encountered, in different forms, quite comparable situations in BC with the additional dimension in this province, of aboriginal land and hunting claims, notably on South Moresby and Meares Island. In many ways these claims, in their historicity are not dissimilar to the arguments used by Gaelic speaking crofting (small field cultivation) communities in the Northwest Highlands and Islands, where people can trace their association with their land over many generations. By contrast, the non-indigenous lumbering and fishing communities of BC are relatively ephemeral. In the Proceedings of the Canadian Assembly on National Parks (1987) there is the statement: "... the aboriginal peoples are rooted to the land, they trust in it and it will always provide for their needs native peoples perceive themselves as an integral part of the land, but they do not own it it is a place full of cultural history and inherent values". Elsewhere in these proceedings, however, the conflict between aboriginal approaches to conservation (in this case the establishment of National Parks) and that of Government is regarded as one of control in the statement:

Each sees conservation as a tool for controlling the potential excesses of the other. Each party sees the environment as in need of protection from the other.

These words might well have been written about the attitudes of the warring factions in several recent land use controversies in Scotland. A very real difficulty is how each side views itself and its actions: the farming community often makes claims to good husbandry and careful stewardship of the countryside, long after which relatively benign practices have been replaced by intensive agribusiness. On the other hand there are conservation organizations who pay lip service to the needs of local communities, but refuse to acknowledge the reality of their changed economic circumstances and changing wildlife populations. There is also confusion between the real requirements of wildlife and people's feelings - thus traditional hunting of deer is acceptable, but culling of seals which damage fisheries, is not. With increasingly effective protection, the populations of some species, such as grey geese, have risen dramatically on their wintering grounds causing considerable losses to farmers with grazing stock. Partly because of their international status, the culling of such geese is strongly resisted by conservation interests, despite the angry reaction of local farmers. On the other hand, almost certainly any culling is likely to offer only temporary alleviation, even if it to some extent assuages the feelings of graziers. In these circumstances, it is extremely difficult for protagonists to consider objectively the facts of the situation and realistic options, when they have taken up defensive positions and stereotyped one another.

A New Organization for New Challenges

It is claimed that it is these well publicized controversies and the stance taken by the Government's own wildlife organization, i.e. the Nature Conservancy Council, which has led to the recent legislative proposals by the present Government to split the Great Britain agency into its component "territorial" parts -

England, Scotland and Wales. There is little doubt that it is the situation in Scotland which largely prompted this, on the basis that the organization here needs to be seen to be more responsive to the local situation and be directly accountable to the Secretary of State for Scotland. The clamor of protest from many conservationists (mainly in England) reflects a deep mistrust of Government's real intentions, but at the same time tends to confirm the view of many in Scotland that southern "imperialism" is by no means dead. Stripped of the polemic, it can be said that the furor is not about the effectiveness of conservation and the benefits to wildlife, but about political power and control, since we are dealing not just with land and natural resources, but with ideologies. A crucial element in this is whether the divided organization will continue to have at its centre the strong scientific service which has characterized its culture from its inception in the 1950s. This question is especially applicable to Scotland where the proposals are to merge the Nature Conservancy Council with the Countryside Commission for Scotland - the parallel official body responsible for landscape protection and countryside recreation. The rough parallel in BC might be to marry the Provincial Parks department with the Fish and Wildlife Service.

It is fascinating to speculate whether these overtly administrative changes between Government agencies, were they to be proposed for BC, would spawn national TV and radio coverage, stimulate fierce parliamentary debate, force Ministers to make special press announcements, and call into question, according to some, the Government's commitment to international conservation obligations. All of this, which has actually happened in recent months in Britain, is in part a reflection of the distinctively symbiotic relationship which has developed between the voluntary conservation movement and the official wildlife agency. That movement in Britain has been a strong one, predating the NCC, and now commands considerable political power, notably in England. Significantly, its membership in Scotland is much weaker, for both demographic and socio-economic reasons. The more strident of the non-government bodies would claim that the current proposals are an attempt to neutralize NCC on the old colonial principle of "divide and rule" and that, in effect, the Scottish organization (government departments, NCC, and Scottish voluntary organizations) are incapable of standing up for conservation against powerful land and development interests. The angry reaction from north of the border can be imagined.

Why in an article such as this, should these apparently parochial concerns be detailed, and what relevance do they have for a Western Canadian province? In my fellowship report to the Cabinet Office, I included the following statement "... in the context of economic and environmental interdependence, it is important for Scots and other Europeans to appreciate the problems of staple resource exploitation and conservation in huge territories such as Western Canada. We need to appreciate that our widespread muir-burning and grazing in hill land of Scotland over long periods of time has just as serious an impact on its own scale, as massive clear cut logging in British Columbia. These are but different facets of the global issues of exploitive land use and impoverishment. The general principles underlying their resolution are the same". That said, there is increasing awareness even in government, that nature conservation is not a specialized concern of interest only to a minority, but that it is very much part of the international issue of sus-

tainable development - i.e. of politics, economics, and the public voice. It is not exclusively about the protection of special places, but about use of resources, lifestyles and the capacity of government among others, to adapt its thinking and institutions to radically different challenges from those perceived heretofore. It will no longer do to reshuffle the pack, change the name of agencies or make "green" Ministerial statements. In the debate over reorganization of official nature conservation bodies in Britain, three issues have been considered paramount, viz:

1. The need for the bodies to have a sound scientific base to maintain their credibility;
2. The need to have an independent voice, capable of making its views known clearly to both government and the public;
3. The need to have adequate resources commensurate with the size of the task.

It might be asked how well development agencies in BC meet these essential criteria. Certainly, as far as the national wildlife service in Canada is concerned, the indications from the comments of staff are that in recent years it has been sadly emasculated. The scientific capacity is seen as vital in Scotland, since there is a plethora of bodies prepared to make *ex cathedra* statements about the state of nature, but very few which can substantiate their claims with solid information, whether as a result of in-house research or commissioned studies. Equally important is the way data is interpreted and used, to ensure that especially in conflict situations, it is not metered out selectively to buttress a particular sectional viewpoint. The question of independence is particularly fraught where the agency's paymaster is government, and its officers quasi-civil servants. But it is also crucially dependent on the composition of boards and committees to make certain that there is a majority of individuals who are not aligned either to government or development interests, but are nevertheless sympathetic and sensitive to the rural populations' needs and aspirations. The balance between these and over-arching national and indeed, international, conservation obligations in the longer term calls for peculiarly wise counsels.

On resources, of equal importance to the "slice of the cake" afforded to nature conservation is the degree of freedom given the agency to direct resources to priorities which are determined by conservation needs, and not, as too often happens, to fashionable but ephemeral political priorities. The problems which are being dealt with require continuity of investment, more especially stability in employment of experienced professional staff. A significant proportion of these resources should be dedicated to a function which to date has been relatively weak in Scotland, i.e. environmental education targeted on decision makers in government, industry, land management, et al. However, that process must start at an earlier stage - in schools and centres of learning. I have been particularly impressed by the development and implementation of the educational "Project Wild" under the aegis of the BC Department of the Environment, since there is no counterpart to this national programme, prepared jointly by senior educators and resource managers, in Scotland. It is, however, encouraging that the Secretary of State for Scotland has recently made special emphasis on education as a priority function for the new nature conservation agency now proposed by government and has invited comments on how a national strategy for this purpose can be prepared. In political terms, this is indicative of a commitment by government which might not

have come forward outside the context of its proposals to reorganize nature conservation services, and is therefore a cause for modest optimism for the future.

Conclusion

Coinciding with the period of this fellowship there has been a very significant shift in public perception of global environmental issues and the resultant politicization of "green" concerns, both in Scotland and North America. Sustainable development has become a rallying cry for conservationists and at least some politicians. The degree of understanding of the complexities involved in the relationship of ecology and economics in many quarters is questionable. Conservation is a word which for many people appears to be concerned with protecting heritage, whether natural or man-made. Relatively rarely, at least in Scotland, are the connections made between conservation and essential life processes in order to survive. Partly this is due to our having a moderate climate and adequate soil and water resources, so that mismanagement of these is not manifest in widespread catastrophe, as happens in arid zones.

During the course of this study, I have developed a more fundamental perspective on the function of nature conservation within the broader context of environmental maintenance and resource conservation which may be an important element in building public support. I have become increasingly aware of the over-arching issues of large scale - often global - environmental impacts such as atmospheric changes which provide the context for more particular conservation measures such as wildlife protection and nature conservation. With even a limited exposure to the statistics of global environment change, such as earth's warming, the breakdown of the ozone layer, and large-scale acidification, it is difficult not to be impressed with a sense of crisis and of urgency regarding the radical change in attitudes and actions necessary on both the environment and conventional growth economics. Within this context it can seem as if traditional nature conservation, more especially the protection of a limited number of relatively small sites (which themselves cannot be isolated from such large scale environmental changes) is a somewhat unimportant, if not futile exercise. The metaphor of "fiddling while Rome burns" might be thought appropriate.

On reflection I am persuaded that if anything, there is an even greater need under these circumstances to ensure that the maximum possible extent of protected areas is secured against the direct human impacts (even if they cannot be protected from more insidious indirect effects such as pollution from distant sources) as refuges for species and genetic reservoirs, but also as benchmarks against which changes due to these direct human effects can be measured. At the same time I have become convinced that this by itself could be vitiated if the indirect effects of large-scale environmental changes are of such a catastrophic nature that such reserves will be irrelevant. I believe therefore that these reserves should, wherever this is possible, play a more significant role in raising public awareness of the need for conservation in the wider environment than heretofore. Nature conservation as conventionally defined and practiced, i.e. the specific protection of assemblages of plants and animals in particular areas, is one of the more attractive aspects of this broader environmental conservation, and as a consequence can become a distraction activity: in some cases an expedient substitute for facing up to some of the urgent, complex, and absolutely criti-

cal issues of the development/conservation balance. It is necessary to remind ourselves and others that such activities, necessary though they are, form but one segment of the whole spectrum of resource conservation, which in turn is such an integral component within the concept and practice of sustainable development. In that respect, at least regarding the important conceptual level, British Columbia can claim to be in advance of Scotland in having published the report of its Task Force on Environment and Economy ("Sustaining the Living Land" - June 1989) including a schedule for preparing the sustainable development strategy.

However, the quote in that document from the World Commission on Environmental Development to the effect that ".... ecology and economy therefore are becoming even more interwoven locally, regionally, nationally and globally into a seamless net of causes and effects" applies equally to the old world, not least Scotland.

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About the author: **James McCarthy** is Deputy Director (Scotland) of the Nature Conservancy Council. Following military service in Kenya, he graduated with a BSc in Forestry from Aberdeen University, Scotland (1959). He carried out post-graduate research on swamp forests in Uganda (1959-1961) and subsequently was Assistant Conservationist of forests in Tanzania. (1961-63) He was Deputy Regional Officer, Nature Conservancy for North England (1963-69) and Regional Officer, South Scotland (1970- 1975). He received a Churchill Fellowship (1976) to study coastal conservation in USA, and was awarded a Nuffield- Leverhulme Fellowship (1988-89) to investigate "Building Support for Conservation in Rural Communities" in North America. He has travelled extensively in Europe, East Africa and North America.

TO FRIENDS OF CANADIAN FORESTS

Alexander Jablanczy

We Canadians are victims of misconceptions and myths spread by those who benefit from the present mismanagement of forests, or by others whose ignorance of ecologically sound forestry prevents them from making proper decisions. Conflicts between ecologically sound forest management and commercially oriented fiber-farming by the wood processing industry has reached crisis proportions in our time.

Not very long ago the Science Council issued a statement entitled "Canada's Threatened Forests" (1983) in which it was said that "one-eighth of Canada's productive forest area has deteriorated" and that a "23 billion dollar industry is facing economic stagnation." The responsibility for management on public lands is put by Canada's Constitution on the Provinces. The Science Council extends the responsibility for the state of Canadian forests to the wood-processing industry corporations. This is a proposition hardly acceptable to professionals who know the history of forestry in advanced countries. The analysis of the problem in the statement does not get to the heart of the matter, which would require putting in place modern, ecologically based, permanent, socio-economic forestry policies. Antiquated techniques and forestry practices based on European mismanagement are resurrected without adopting their lasting warning principles, like progressive legislation for the maintenance of productive capacity and strict adherence to long-term management planning for realistically limited areas.

The following myths are commonly used to defend the present situation in Canada:

1. Leasing utilization of forests to industrial corporations (processing wood) is a healthy way of managing forests. Their short-term cutting plans are sufficient measures to provide for sustainable forests;
2. Monoculture plantations of commercially "desirable species" on extensively clearcut lands is preferable to limited-size-area

cutting techniques which promote natural regeneration of ecologically "important species";

3. Forestry is a branch of agriculture, so agricultural techniques, such as clearing the land, soil preparation, fertilization, use of chemicals for crop protection, etc. are basically useful tools in forest management as well. The role of ecological concern can be restricted to soil evaluation and species choice for plantation of "industrial trees";

4. The Scandinavian silviculture system, developed for their own naturally simpler ecosystems of few species, should be considered a model for Canadian forests, with dozens of species in vastly variable ecosystems. (This system is now criticized even by Swedish experts.)

All of these statements are myths serving short-sighted profit interests, but not the long term welfare of the forests. These approaches were used for centuries in Central Europe until experience and ecological knowledge revealed their flaws in stunted second stands, in pests, diseases, and in deteriorated sites with degraded and eroded soil. This has all been documented in scientific studies, see, e.g., the writings of Josef Koestler, Hans Leibundgut, L.S. Minckler, Anton Nemeč, E.P. Odum, S.A. Wilde, and many others.

Since the beginning of this century, in some Central European countries, the agricultural type of forestry (cornfield forest) changed to Ecological forestry, where natural capability of the working ecosystem is fully utilized to maintain safe, healthy forests for the nation. Such work needs professional know-how, devotion and responsibility of the land-owner which is not transferable to foreign, commercial concerns. The quality of handling the forest rapidly improved in European countries where the burden of harvesting was taken away from wood industry, commercial firms. Reforestation in Central Europe had never been the responsibility of any one other than the owner. Greenwood and Edwards (**Human Environments and Natural Systems**, 1973,

Duxbury Press) believe that to relieve the wood industry of their function in forest management would benefit both the industry and the forest. Unfortunately, none of these progressive lessons were utilized in the Canada Science Council's statement.

The idea of multiple use is generally accepted in Canadian forestry by scientific and economic circles. However, the ways which lead to it are seldom defined, much less sincerely pursued. The term "multiple-use" is in fact compatible with the concept of ecological management. The former refers directly to diverse socio-economic goals, the latter defines it from the standpoint of necessary biologically directed techniques which will maintain essential conditions to serve these goals.

Methods of ecological forestry not only allow but absolutely require considerable utilization of most forest types which by present standards are considered only for one-sided use. Modern holistic forestry approaches forest practices with environmental care, preserves and perpetually utilizes wood-producing capacity of the resource and retains all of its potentials for beneficial climactic conditions, rich natural flora and fauna, giving society all benefits wanted. Such provisions are not esoteric but realistic given our knowledge based on centuries old Central European experience with failures and remedies. The golden rule in forest management is "Nature to be commanded, must be obeyed." (Francis Bacon, 1561-1626) Avoid drastic changes in forest cover on extensive areas and follow natural, progressive processes.

I have followed the changes and studied the practices in North American forestry for the last 27 years. I have collected a large number of studies, opinions, and facts about results. These convince me that the worst menace to Canadian forests is not the mismanagement now practiced but the acceptance of undeniably retrogressive ideas supported by pseudo-scientific arguments. This attitude prevents any honest attempt to find progressive ways toward sensible methods in harvesting, renewal and tending the forests.

The following excerpts demonstrate the chaotic situation of ideas, the irresolute directions and the lack of courage for taking responsibility for ecologically sound forestry. In effect, **no progressive evolution can be expected in forestry without changes in basic philosophy.**

In British Columbia in the mid-fifties at the university the huge unrestricted clearcuttings and the use of heavy machinery were severely criticized. Professors of ecology and forestry informed us, the new-comers, about the attempts to end the destructive techniques. The Sloan Report of 1956 was encouraging for optimism. Twenty-seven years later the small improvements, without principle break-through in policy, are disappointing: Ever increasing backlog in reforestation, erosion, floods, damage to human settlements and communication facilities, unsafe and ecologically untenable monocultures, unsatisfactory care of young forests, and so on, these are only some of the problems. The management is, almost totally, entrusted to self-serving, industrial wood products corporations. Adverse public opinion is expressed by the media, ecological organizations, and in books, like those of J. Swift, P. Marchak, and F. Oberle. All condemn the policy of forest-mining, creating large devastated regions with many ghost-towns, instead of opening up permanent life and work conditions for newly populated regions. In a province where forests are one of the most important sources of livelihood and where forests demand continuous work of many kinds, the "Restraint and Recovery Program" dismissed

foresters along with other "superfluous" officials. In the 26 page folder "The Next Step for Recovery" no attention is devoted to the serious problems in forestry.

In the Maritimes the management-promoted moth (sprucebudworm) dominates for decades and the quixotic war against it distracts attention from the main tasks of care for the forests. Prestigious authority recently made a public statement confessing the impotence of the forestry establishment by saying "we do not manage those forests, the budworm does it." A similar cynical conclusion had been common at the Research Laboratory, that wood-industrial companies do the best possible forest management on the crown-land. The fact is that doing it any worse would be unthinkable. When a research program was suggested for neglected farm woodlots, the Maritime's largest ownership category, it was rejected as "a social problem" outside the interests of national research. Backlogs in reforestation are on the increase, as in everywhere else in Canada, endangered monoculture plantations in naturally mixed broad-leaved coniferous ecotypes start developing diseases by unexpected fungi, or previously insignificant insects take hold as logical consequences of the changed, unbalanced environments which are a result of mismanagement.

In Nova Scotia, unlike in New Brunswick, willingness to move toward ecological approaches started to make inroads in the 60's. Government statements, research orientation, and reluctance to undertake a large-scale pesticide program, vividly manifested sound intentions. (E.g., Lands & Forests Review, Spring 1977: Forest-management planning will fight budworm problem.) By the early eighties, due to an unexplainable retrograde change, concerned farmers and worried Indians lost the lawsuit against an international papermill supported by the provincial government. The verdict: plaintiffs could not prove that the planned herbicide program endangered human health. Arguments of the farmer's witnesses about adverse effects on the environment in general and on future forests, as well as opinions about needless application of spray in many places, were dismissed. And then the Swedish company was free to use a phenoxy herbicide banned in Sweden and withdrawn from circulation in the U.S. The company issued a Forest Management Policy and Guidelines in which major provisions contradict every approved principle of modern silviculture and paralyzes socio-economic management policy approved in 1981.

I surveyed about 150 industrial clearcuttings in Nova Scotia in the 70's to evaluate natural regeneration years after cutting. Only 30% of areas had satisfactory (75%+) coverage of any tree species. The survey represented about 20,000 acres of cuttings in Northern Nova Scotia. In the course of investigations I found that the companies' records were unsatisfactory, often inadequate for follow-up work or supervision. I had to admit, an industrial establishment cannot deal keenly with hundreds, after decades thousands, of cuttings spread over different counties. Each area should be worked with and studied repeatedly for a period of 10 to 20 years after harvest. Responsible people must be available in each region for such important work.

At the conference of the Eastern Spruce Budworm Research Work Execution Council in Bangor, Main, in January 1980, I presented a paper on Ecological Management as Prevention Against Pests. Despite wide interest and comments, the **Forestry Chronicle** did not accept the article for publication. A leading American silviculturist commented, "Our forests badly need this kind of advice." Woodlot owners requested the manuscript in

Southern New Brunswick for distribution among the members of their association. (Available from author, Bangor Paper 1980.)

Coppice method of management in broadleaved forests degraded and deteriorated millions of hectares of the richest forests in Europe. Short rotations, reduction of mixture to a single species, and the destruction of the forest-floor, changed the soil and the ecological balance. France and Hungary, in particular, must face crucial problems so as to recover such forest soils. Recently some erroneously informed experts started advocating that malignant form of management (coppice method) in Ontario and the Maritimes.

In the late 1970's newspapers and the *National Geographic* (May 1980) announced that Daniel K. Ludwig, the altruistic American shipping magnate, in his own words, "wanted to plant trees like rows of corn" in the Brazilian multi-species forest region of Jari. Led by the irresponsible advice of his technocrats, he invested hundreds of millions of dollars in plantations of fast-growing, "desirable trees" for an oversized papermill. Much sooner than predicted by forestry experts, in less than 15 years, the whole project went bankrupt, not financially, nor technically, but biologically. Disease, fungus, fast subsurface erosion, discouraged Mr. Ludwig to continue the war against Nature and in 1981 "the nearly 1 billion invested is up for sale." (T.P.S. Rio De Janeiro announcement) This extreme tropical example, similar to thousands of others closer to us in the temperate hemisphere, must serve as warnings against our technical myopia in handling our unique Green Treasure.

Who is responsible for the Green Treasure? None, but we ourselves, the professional foresters, particularly those in government service and at academic institutions who should represent the public interest. The difference between a wood-harvester technician and a forester is that the former has to think by a scale of decades (at most), a professional forester must have a vision of centuries ahead. (Mincklen) The model for the industrial harvester is the chemically controlled cornfield-tree-plantation, for the forester it should be the ecologically safe, quasi-natural, healthy forest ecosystem, with most of its genuine living components

in it, which will supply society with livelihood and other benefits.

At the end of the century North American forestry has arrived at a crucial turning point. The dilemma is the choice between two irreconcilable philosophies of forest management. We have to decide which road to take. We have to choose between:

1. **The short-term profit oriented mercantile forestry**, where plantations replace natural regeneration, human labor is displaced by heavy machinery, regardless of the inevitable destruction, and the necessity of using polluting chemicals which are avoidable under an ecological approach. 2. **Ecological forest management**, with continuous care for the environment and the forest. Using well-tested techniques in stand-improvement, conversion, and partial harvesting cuttings promoting natural regeneration. Here plantation remains an important supplement to natural regeneration, preventing the present unsolvable situation of running up back-logs in reforestation. Ecological forestry provides for continuous labor, instead of money spent on heavy machines, aircraft and chemicals. Canada's forests could give decent employment to millions of people in the forests, if properly managed by qualified foresters devoted to their profession and ecologically sound forestry practices.

With regard to responsibility for the future, the decision we have to make is a moral issue. The public is fortunately ready to support progressive steps. The media is already standing up for the public interest. They need now cooperation of many conscientious experts to convince political and economic leaders to make the right decisions for necessary changes. Universities and other scientific institutions must take the initiative for the evolution of forestry toward more provident national goals. Young professionals are eagerly looking forward to such leadership. Denis Diderot (1713-1784) observed, "There is no moral precept that does not have something inconvenient about it."

About the author: Alexander Jablanczy is a retired professional forester with extensive experience in both Europe and North America. This article was written in 1984 and updated in 1986. It was originally sent to more than 60 experts and politicians. It is still pertinent today.

INDIVIDUAL TREE SELECTION: MORE THAN FORESTRY WITHOUT CHEMICALS

Marie Reeder

It was a rare cool morning in a southern Oregon's blazing, drought-ridden summer. I was stacking firewood in the dreamy state that pleasant repetitive outdoor tasks induce.

I was stacking two kinds of wood for this winter: madrone bucked and split into hefty chunks for long burning, and mill ends for kindling and a smaller stove. Both woodpiles raised my concerns for our future, disturbing the tranquility of stacking.

It's hard to shake nagging doubts when a task pins you to a spot for hours on end, but doesn't occupy much of your attention. If you're lucky (and the weather that morning was a fine omen), your enforced encounter with the problem results in a

solution. So gradually that morning I shifted my thoughts from worrying about the dangerous wounded animal of industrial forestry mangling my favorite old growth forest in its agony over continued timber supply, to remembering a day I had recently spent in the woods with Scott Ferguson and seeing what the future of forestry could be for a lot of us.

The Small Woodland Alternative

"People think that there are only two choices for their woodland acreage: devastation or preservation. A lot of what I do is

just show them that alternatives exist." Scott is easing me into the cold, technical water of silvicultural management. He's the head of Individual Tree Selection Management, Inc. (ITS), a forestry consulting firm based in Portland, Oregon.

"Typically, I start with owners who don't like what they've seen happen: big clearcuts, for example."

"If you talk to a guy who owns twenty to forty acres of forest, and tell him he should manage it commercially, he's likely to think you're pointing him into a dead-end. He doesn't want to clearcut his land. So I may need to tell the owner right off that with our system, he'll never need a clearcut. We work with owners to fit their needs aesthetically, emotionally, and financially. And we recognize that small woodland owners feel strongly about their land and what it looks like."

The Individual Tree Selection system is based on a couple of principles and a team of committed people. The twin cornerstones, equal in principle, are to thin out trees in order to both promote optimum stand growth and meet the owner's needs for a steady income, sustainable over the long haul. The team consists of the landowner, who's willing to look at more than just an initial timber harvest; a forester, who will ultimately mark every tree that is ever cut, thus taking responsibility for the look and health of the forest at all stages; and the loggers, who agree to limit themselves strictly to marked trees and who can harvest skillfully enough to fall and yard without damaging the rest of the forest.

Forest considerations are the first issues we discussed. I am trying to uncover Scott's guidelines for marking trees for harvest.

"I cut for the forest, not for the product. Than I maximize the value of the product through marketing."

"Trees grow in groups, not in a grid pattern. I try to maximize what the group can do," he says.

As we bump along in his pickup, I piece together a lay version of what Scott Ferguson, forester, looks for in the forests he manages. In northwestern Oregon, sunlight limits the amount of growth a stand of trees can make in a year. So the most basic concept in management is to thin out trees to let in light, thus promoting growth.

So much for the easy part. The rest of the forester's decisions seem to be almost as much art as science, although a few generalizations, not rules, emerge. Scott balances sunlight with shade, for example, because shade is the tool he uses to inhibit the growth of weeds. He uses what's called "high thinning," taking out the biggest, most commercially valuable trees in order to achieve his financial goals and leave 90% of the trees untouched and growing. But "high thinning" can be a euphemism for "high grading," a logger's epithet meaning that the cream has been skimmed, leaving the worst genetic stock to replenish the forest. Again, it's a question of skill and balance.

Scott debates the scientific basis for attacking "high thinning." While he admits that his technique can be abused, he's firm about the lack of evidence about genetics. Dick Smith, founder of ITS, spent thirty years gathering evidence that the smaller trees in a wild stand aren't genetically inferior, merely suppressed in growth by the dominant trees.

"Dick came out of forestry school in the 1950's. They taught him the traditional rule of thumb: If 30% or less of the height of the tree is not in crown (needle-covered branches), it won't be released by thinning. That's bunk. He found that such trees may not respond as quickly as younger trees, but they will respond.

Even 120 foot trees can be released to gain as much as an inch in girth annually."

"Bunk" is a strong word coming from Scott Ferguson. He's tall, slim, and quiet, like a reserved college professor in field trip clothes. With a bachelor's degree from Yale and a masters in forestry from Oregon State University (OSU), he's calmly self-assured about his technical expertise. Like most foresters and wildlife experts I've met, Scott seems to detach himself from both the politics and marketing hype of the timber business, so that his ironclad support for the radical forestry techniques developed by a Lone Ranger in the field stands in sharp contrast to his demeanor. I probe into the root of the controversy.

Since the fifteenth century, he tells me, German thought has dominated Western approaches to forestry. With an almost fanatical zeal for order, German foresters promoted the ideas of clearing out the junk and debris of wild forests. They argued that spindly-looking suppressed trees should be thinned out, even at a financial loss, to achieve an evenly-spaced stand of reproductively superior trees. After thinning, the commercial crop of trees would make progress in the form of a fairly uniform gain in height and girth until they crossed the zenith of the growth curve and settled into decadent old age. Like corn, the timber would then be felled in an intense, clearcut harvest cycle timed to match the top of the growth curve. It remains the model for timber as a form of industrial agriculture.

The German system so effectively shapes contemporary American thought that even our universities only study those techniques of thinning that fit the German model. Ferguson points to the Hoshkins study,¹ probably the most thorough in the literature, as a case in point.

In this study, various plots on a large stand of Douglas fir were subjected to any of eight different thinning regimes, ultimately leaving, by the fourth treatment, an average of 70-220 trees per acre depending on the treatment. The unthinned, control plots averaged 767 trees per acre.

"Conducted in Oregon by a team from Oregon State University over a twenty year period, the Hoshkins study doesn't investigate high thinning at all," Scott states.

By removing up to 50% of the smallest trees, the Hoshkins study's conventional thinning systems alter the forest environment far more dramatically than high thinning. While Scott may leave up to 400 trees per acre, thinning from below usually leaves 150 evenly-spaced trees. Since those trees are supposed to be the biggest and best, the forest is converted into a stand of even-aged trees. With the young trees and seedlings removed, Hoshkins stands are groomed for a clearcut as the final harvest operation.

This kind of study gathers no information about the release of older spindly trees into faster growth cycles. It is silent on some of the other major advantages of the high thinning system, especially eliminating the financial and environmental costs of preparing a clearcut site for tree planting.

The silence is maddening. If studies can prove that suppressed older trees will catch up with their dominant kin, we can score an enormous win for the environment by displacing the necessity of clearcutting.

Under the ITS system, young trees grow continuously side by side with the commercial stock. Not only does this offer the potential advantage of matching the genetics of seedlings to the microsite to which their parents were adapted, but it avoids en-

environmentally disruptive practices such as broadcast burning and herbicide applications.

The environmental problems of clearcutting do not stop with visual blight. Silviculturists ordinarily prescribe drastic procedures to restock a clearcut with new trees. They may call for an application of alumagel, derived from the Vietnam war technology of burning enemy territory; the procedure is now used to suppress weed growth by burning clearcuts prior to planting. After the seedlings are planted, silviculturists may find a need to further restrain competitive weeds by applying herbicides.

Never mind that the weeds are a natural part of the native ecosystem, and may contribute substantially to the health of the soil and watershed. And hang the expense! The Forest Service often spends \$400 or more per acre to prepare and stock clearcuts with seedlings. That \$400/acre of avoidable expenses is money left in the pocket of a landowner who hires Scott Ferguson. A tangible reason to explore alternative forestry.

Economics And The Forest Environment: Where The Rubber Meets the Road

The most important constraint facing most small woodland owners is a lack of money. As a result, they view their forest land somewhat schizophrenically. In good times, they see that it is valuable for wildlife and the family's own quality of life. But in an economic crunch, whether caused by unemployment, ill health, or sending the kids to college, the forest becomes a stand of timber, the source for a quick influx of cash.

Steady long term management plans can seem pie in the sky, for a number of reasons. Woodland management can be labor intensive, and beyond the time, strength, or skill available to many landowners. Equally important, a landowner may lack an effective means of marketing.

That's where outside help is usually called in. But a hired independent logger, a gyppo, may be more motivated to cut than to think about the long term health of the stand. A contract with a large company may subject your home to the common industrial practices of clearcutting and herbicides.

That's where a forestry consultant like Scott Ferguson can make the critical difference. He (or she) will work with owners to develop a plan for a steady cash flow and a sustainable forest. He'll use his expertise and the skills of the best loggers he can find to take out the highest dollar-value trees with the least possible environmental damage. The whole team (owner, consultant, and loggers) is invested in the long term process and the continued health of both forest and bank accounts.

"I've got to be frugal and put dollars to use for the owners. I want to spend money only where it counts, so that the owner winds up with a profit year after year. A good logger makes all the difference. The logger has the skill to remove the trees, knows the market at the mill, and how to get the biggest dollar for the log," states Scott.

Road costs are one place where small landowners may have a distinct advantage. While the Forest Service routinely spends up to \$10,000 per mile of log haul road (and as high as \$250,000 per mile in the case of the Bald Mountain road in the north Kalmiopsis, a roadless area in southern Oregon), small acreages, especially those 50 acres and under, may already have all the road access they need.

The first site Scott and I visit brings that point home. It is a forty acre piece off Hugg Mill Road in Clackamas County,

Oregon. Other than the county road, the haul roads he's used a year or two ago are now merely bands of wildflowers and grass.

Skid trails on that piece are marked only by some branches, and are half covered by berry vines and foxgloves. The benign northwest climate covers this ground with such a mat of herbs that the crash of an occasional tree seems to have negligible impact. Since I'd been concerned about compaction of the soil when harvest machinery enters a site every three to seven years, the undisturbed humus and flourishing herb layer are reassuring testimony, indeed.

Probably the most compelling evidence of the economic success of the Individual Tree Selection method comes from their case studies. The Farr tract is the one most often cited (see Table 1). After 30 years of managing 425 acres of class three (good, but not excellent, potential for timber production) logged over land, ITS boasts an average \$4,000 net income per year from land on which the standing volume of timber has more than tripled. The owner purchased the land for \$17,250; it's clear that the ITS standards for success are high.

Table 1
Harvest and Cash Flow Record

Year	Board Feet	Owners' Net Timber Revenues
1955	33,660	\$1,161.57
1956	444,425	10,737.21
1957	2,550	321.14
1958	33,630	957.85
1959	199,960	3,012.31
1960	40,959	747.65
1962	6,365	42.93
1963	82,140	1,641.47
1965	338,878	7,365.75
1966	197,819	3,981.62
1967	239,120	3,642.65
1968	174,530	4,677.80
1969	175,660	6,760.59
1970	192,425	6,306.28
1971	134,325	4,409.46
1972	124,030	4,860.22
1973	194,935	11,471.55
1974	87,195	5,397.23
1975	3,420	313.85
1976	73,360	5,931.00
1977	28,910	2,600.51
1978	37,030	3,810.00
1980	54,285	20,852.00
1981	18,750	5,478.10
1984	421,100	40,632.27
1985	253,080	24,430.29
1986	121,470	14,459.10
1987	397,130	33,684.06
1955-87	4,118,140	\$229,596.79

Forest Inventory
1955 1,000,000 B.F.
1987 3,700,000 B.F.

The economic and environmental results of 32 years of Individual Tree Selection Management can be seen on the Farr Tract, a 425 acre woodland near Sandy, Oregon.

While the Farr tract statistics can not be repeated everywhere, Ferguson says that as a rule he will mark 2,400 to 4,000 board feet per acre for harvest every three to seven years. That's about 10% of the trees in an acre, but since they are among the largest, they equal 15% to 20% of the standing volume.

Frequency of entry is the key to small woodland owners' cash flow. Conventional thinning programs, based on the German model, call for entry only one every decade until final clearcutting. Ten year intervals make it much harder for the landowner to maintain an even cash flow.

Another site points out the potential value to a typical small landowner. One of the ITS clients is a dentist who owns ten acres of woodland with a recreational cabin. The initial harvest netted the dentist a nest egg of \$4,000 towards his son's college education. The harvest included some showplace logging techniques, including removing trees adjacent to the cabin. Not only did the loggers manage to avoid damage to the powerline, cabin, and adjacent trees, they left no ugly scars. The site remains a rustic, densely forested getaway, with the added value of producing a college trust fund. From the loggers' perspective, the challenge of such difficult tree removal was offset by the excellent county road access, which made it possible for them to log in the winter when most industrial loggers are idle.

Scott waxes enthusiastic about these smaller acreages. "It's these forty acre pieces that have potential. The non-industrial owners of 1000 acres or more have probably been contacted by one timber company or another. But for our kind of operation, efficiency is not dependent upon size. While more neighbors mean more conflicts for industrial practices, for us that's usually outweighed by the county road access. We may only haul out a total of ten truck loads, so it's not a steady stream of traffic for locals to contend with. I've never used herbicides on any site, so no complaints there. And almost every small acreage has one landing site already, so we really minimize our traces."

The Old-Growth Connection

To the wood products man an old-growth forest, with its many dead and dying trees, is an over-mature forest, a decadent forest, a forest in decline doing no human being any good. As a Reagan administration official remarked in 1984, "Old-growth forests remind me of an old folks home, just waiting to die."

He said that because when he looks at trees he sees board footage. He sees rotation cycles and allowable annual cuts, he sees lumber and houses and an ill-defined picture of progress...But he doesn't see the slow exuberant dance the forest does through time. He doesn't see the intricate web-work of fungi that strands through the ground, drawing its food from the roots of trees and helping the roots draw food from the soil. He doesn't see the red-backed vole that eats the fungi's fruiting bodies and disperses their spores, sheltering itself in downed rotting wood. He doesn't see the spotted owl that eats the red-backed vole, hunting in the dark through thousands of acres of trees, nesting high in a standing snag and feeding her owlets, this brood and all her broods, as the Douglas firs keep growing and growing, each in its turn going down, melting into ground, sheltering the vole and feeding

the fungi and holding the cold meltwater in its fragrant sponge. -John Daniel, "The Long Dance of the Trees"²

Contrary to the blindness John Daniel ascribed to the Reagan administration official, many small woodland owners do see the non-commodity values of their forest lands. Moreover, they may have a far easier time than a federal agency's wildlife expert in balancing the need for some profit with retaining elk thermal cover, deer winter range, or a lush streambank.

Scott Ferguson shows me a large beaver pond on a forty acre piece of woodland that he's managing profitably. Stumps show that he's taken out trees right down to the water's edge. But carefully, and one at a time, over the years. A full canopy shades the creek still, maintaining an unbroken pledge to the cold water fishery. Runoff is still filtered naturally by stable soils, held in place by thick vegetation.

A short way up the path from the pond we cross over the mounds and tunnels of the mountain beaver, *Aplodontia*. These ancient rodents, now limited in range to small portions of the Pacific Northwest, damage enough trees to have earned the enmity of most foresters. Scott seems calm about them, though. Dick Smith had made his peace with these living relics of the Eocene when he learned to control their numbers by leaving a lot of shade. "Shade keeps down the vine maples, their preferred food. And then in turn, the mountain beaver don't become too numerous," Scott says.

"But what about old-growth?" I ask.

"Not a lot of non-industrial private woodland falls into that category," Scott says. "Woodlots have usually been entered and logged over to one extent or another before they were sold into smaller parcels."

Non-industrial management does offer some positives for those concerned about old-growth protection, however. Wildlife habitat values can be protected, in many cases, under Individual Tree Selection methods. Small woodland owners can help provide the corridors that let species move among the islands of old-growth that are protected on federal lands.

Another connection to old-growth preservation is more utopian. The scenario goes like this:

The pressure to cut old-growth on federal lands is driven by a belief that timber supplies are inadequate to maintain the jobs in Oregon's number one industry. Small woodlands in Oregon comprise the largest untouched new source of logs, since over 90% of small woodland owners do not manage their lands at all. Theoretically, if more timber were to flow from small ownerships into millyards, the pressure to cut federal lands would be reduced.

Exporting logs, mill automation, and subsidies paid from federal timber receipts to local governments, attenuate the linkage between old growth left on federal lands and the intensified management of woodlots. But there's no doubt that increasing the amount of management of non-industrial private woodlands would have a positive effect on another environmental issue, land use planning.

Implications for Land Use

Public interest groups like 1000 Friends of Oregon, (a group that watch-dogs Oregon's land use planning process) claim that local governments are permitting the suburbanization of forest lands by failing to adequately enforce Oregon's land use plan-

ning laws. They fear that sprawl will take woodlands out of timber production, increase air pollution from wood stoves and auto emissions, and will lead to the loss of the open spaces of Oregon's countryside.

For example, 1000 Friends successfully appealed Lane County's plan, which would have permitted housing on 150,000 acres of forest lands. But lawsuits and minimum lot size requirements are usually seen as all stick and no carrot. Whatever the laws may say, there's little political momentum to conserve land by saying "no" to development.

Recognizing that, Henry Richmond, Executive Director of 1000 Friends, has proposed that the state government explore a new system to encourage the active management of woodlands.³ Some government, private, or cooperative agency would arrange annual payments to landowners in exchange for receiving the timber revenue when the landowners harvest their trees. This kind of arrangement could add millions of acres to Oregon's timber base and slow the pattern of chopping forest lands into smaller, suburban parcels. Assuming that many small woodland owners would choose to manage along the lines of Individual Tree Selection's system, it could also help to break down the hidebound notion that forestry in the Pacific Northwest must follow the German model. It's a daring, new idea that will depend as much upon the goodwill of many of the 19,000 owners of non-industrial private woodlands as much as it depends upon a change in law or a source of funding.

Community

After we talk about the big picture, especially the future as seen through the 1000 Friends' proposal, Scott and I focus more on forestry as a human activity. I ask him why he has chosen this line of work.

"It's a challenge, to work in it all the time and still enjoy it. But I knew that I wouldn't like the life of an industrial forester. In the winter, they stand and watch the planting, then they burn in the summer, repeating the same thing every year on a huge territory. I think I have a much more satisfying relationship with the land.

"The pressure to cut old-growth on federal lands is driven by a belief that timber supplies are inadequate to maintain the jobs in Oregon's number one industry."

"Dick knew some of our tracts for 35 years. He told me that it would take me five years before I'd even know if I'd like the work well enough to keep at it.

"When he died last February, about half of our clients phoned me just to see if I was okay. It's not only a money arrangement for them either."

"They really opened my eyes. Now I know that my number one job is to communicate enthusiasm for what we can do with their land. We have to show owners that it can be profitable, enjoyable, and that they can do what they want for their land."

"Most owners don't know what they have. It's our job to educate them. I try to talk with everyone at least twice a year, not just to plan harvests."

I ask him about how closely he works with his clients, and how he finds new ones.

"It's almost 100% referral by word of mouth. The owners usually can't work alongside us, but we're still a team. Dick found that it took so many hours to try to teach owners how to mark trees that it wasn't profitable for them to pay him by the

hour. And as for logging, it takes a lot of skill and the right equipment to take out an individual tree without damaging others.

"My loggers, especially George and Larry Baker, are my best salespeople. I've found the owners down there just watching them work, seeing their skill firsthand. And the loggers are great to talk with. George, Larry's father, has been working with Individual Tree Selection for thirty years now. He knows his stuff."

A laden log truck passes us. Scott cranes his neck to get a last look as it goes over the hill, into town. He estimates that the truck holds about 15 logs, worth about \$1300.

The load is a part of the 200,000 board feet George and Larry are currently taking off a 60 acre site near Molalla.

"George and Larry are shopping for a new skidder. It will cost them about \$54,000 if they have to buy a new one. With equipment costs like that, I take seriously the task of keeping them in timber to cut, and I try to keep them working year round."

By now we've caught up with the loggers, who are finishing up a day's work in the heat of midafternoon. The log truck has made its last haul of the day, and the men seem willing to visit with us a while.

They kid Scott for bringing me to this site which is still recovering from an industrial thinning job arranged by a prior owner, rather than to the Farr tract or one of their other showcases. It was obvious that they look at the individuality of their harvest areas with as much regard as Scott does.

They want to know a little of my background, so we talk about southern Oregon forests and the continuing struggle over herbicides. Larry is warm in his scepticism about the safety of forest chemicals.

They seem genuinely interested in what I have seen and how it compares to my home turf. Logging techniques will always have to change with the site, and southern Oregon can seem like a different world to a woodlot owner or manager from the lush north. I tell them about the importance of hardwoods as a year to year firewood income for many southern woodland owners. I talk about the generally lower timber productivity, since natural regenerative potential is hampered by summer drought.

George and Larry talk about travelling to Canada in search of a skidder, and how different those forests are.

Shop talk, I've always liked it. You get some feel for the personalities of the workers through their discussion of tools and techniques. I am a little sorry to leave.

But you've always got to wrap up a job. George and Larry skid the last logs down to a landing, buck them to length for the mill, sharpen their tools, and pack up. I shoot my remaining film and Scott figures out when he can schedule them for another site. And we all joke about whether Larry's dog is working or still on his break.

It was that image, the day's end in the woods, that cheered me up as I stacked my firewood. You've got to take some stuff on faith, that we'll bungle through well enough to sustain millwork and some native hardwoods over the long haul. But it bolsters my confidence to shift focus back from the big lands and the impersonal federal forest policies manoeuvred in Congress to the more human scale of a few people working on their dreams in somebody's backyard. A forester I know down here told me all the good stuff was really about people to people.

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STRATEGIES FOR CONSERVATION OF OLD-GROWTH

Reed Noss

In forestry, we generally look at the stand as the unit of investigation, and define these units in relatively homogenous terms. Not only have we focused on single stands, but also on single dimensions (such as age or time). We see old-growth as a late successional stage. But is old-growth really equal to old age? Is old-growth really just a successional stage?

Something very interesting happens at the old-growth stage, as described by Oliver and many other forest ecologists. In old-growth, the first generation trees become senescent and die, the canopy degenerates, and trees fall over, forming gaps. These small-scale disturbances fractionate the old-growth forest system into a mosaic of smaller patches. So in a sense old-growth incorporates many of the elements found in previous forest developmental stages. It is the stage of maximum heterogeneity. However, as time passes, we have large disturbances that impose change on the landscape and create a coarser-grained pattern.

In an entire landscape we have an intermingling of these coarse-grained and fine-grained patterns, and this is what determines landscape diversity. So the old-growth is really far from undisturbed, at least in the sense that ecologists now define disturbance. We now see disturbance as breaking the dominance of established individuals, and allowing a flush of new resources to come in, such as light, moisture, sometimes nitrogen and phosphorus. This allows for regeneration and growth of plants in the ground cover and understory.

Tree-Fall Gaps

Tree-fall gaps have been a big research topic in recent years, both in the temperate zone and in the tropics. We find a similar gap structure in many different kinds of old-growth forests.

We know that many shade-intolerant trees require gaps of a minimum size in order to regenerate and grow. Even many of our so-called shade-tolerant trees require multiple gap episodes in their vicinity throughout their lifetime in order to reach the canopy. So these shade-tolerant species live lives of suppressions, punctuated by brief moments of growth.

Animals respond to the enhanced resource levels in gaps. Flowering and fruiting of understory plants is enhanced in gaps. Insects often congregate in gaps. So birds and other vertebrates cue in on these resources. Animals also play a part in enhancing landscape heterogeneity. Beaver is a true keystone species as it creates new habitat for a variety of organisms. Insects help open the canopy. Even animals like black bears, by munching

on the cambium of plantation trees, are a source of heterogeneity. So depending on your perspective, we can see these species either as pests or as contributing an important part of biodiversity at the landscape level.

Larger-Scale Disturbance

Larger-scale disturbances impose a coarser-grained pattern, but they serve a similar function to smaller-scale disturbances.

Stand-replacement types of fires occur at intervals of about 70 years in the boreal spruce forest in northern Ontario. Catastrophic fires in the Douglas fir region occur at a return interval an order of magnitude higher -- 350+ years. In other forest types we often have more frequent but less intense fires, mainly burning the ground cover, such as in the southeastern coastal plain. We have an analogous situation in the Ponderosa pine forest of the eastern Cascades.

Disturbance also interacts with different kinds of environmental gradients. For instance, in the southeast we have a longleaf pine system on the uplands, with fires that regularly burn every two to five years. Within the system, fires burn downslope and prune back wetland shrubs which would otherwise encroach upslope. In the process they maintain an open, herb-bog community. On this entire gradient is one of the richest herbaceous floras in the world, some 200 species along a given gradient.

When we look at a single stand, or a single community, we miss a lot of what is really going on in Nature. Real landscapes are composed of gradients and mosaics, not isolated communities, so perhaps this is a better level to focus on in many of our management decisions.

A section of virgin forest in Yugoslavia was studied by Mayer, et al.. The patches in this spatial mosaic are actually stages in a temporal cycle of degeneration and regeneration. So what we have here is a stand level breakdown and recovery process every stage of which is vital to biological diversity. In fact, many wildlife species require several habitat types and would use the entire mosaic and not just a certain stand. This has a lot of implications for conservation. How large does this mosaic need to be to maintain itself with some constancy of habitat types and diversity over time?

How Large An Area Is Needed?

A landmark paper which addresses this question was prepared by Pickett and Thompson in 1978. They defined a minimum dynamic area "as the smallest area with a natural disturbance regime which maintains internal recolonization sources and hence minimizes extinction." They suggest in practical cases we should define this minimum dynamic area by the most extinction prone taxon. They went on to establish guidelines for Nature reserves. If you look at these guidelines the authors were essentially arguing for large reserves, but using very different arguments than those of Island Biogeography - which are customarily used to support establishment of large reserves, but do not always, hold a lot of water.

An important question is "How large does an area need to be to maintain some quasi-equilibrium of patch types over time?" Shugart and West addressed this question by relating the size of the largest disturbance to the size of the landscape area, and divided landscapes into non-equilibrium and quasi-equilibrium, depending on whether they maintained some constancy of habitat proportions.

A small watershed, for example, would be able to incorporate tree fall gaps and maintain a quasi-equilibrium of habitats over time. The same watershed would not be able to incorporate a wildfire, and would shift to non-equilibrium. A hurricane would be larger in scale than an entire Caribbean island, so these forest types would be in perpetual non-equilibrium.

Some later work by Shugart and Seagle looked at the effects of landscape area, measured by number of patches, on habitat diversity over time. As a landscape area increases, habitat diversity is more constant over time. This still does not answer the question of how large these areas should be; but other simulation work comparing real data from Australian eucalyptus forests, and southeastern National Park and Forests, persuaded Shugart to suggest an area needs to be 50 to 100 times larger than the largest disturbance patch to maintain some constancy of habitat diversity.

For example, if 20,000 hectares burn in a single fire, we need to have a fairly intact forest landscape of one to two million hectares. That doesn't mean we need to have it all in wilderness, but it would have to be fairly unfragmented to allow for movement of species and recolonization of disturbed areas.

Management Implications

An important question for management is "How does this natural mosaic patterned by natural disturbance differ from the artificial patchwork of habitats imposed by our management regimes?" Or, looking at it from a process point of view, "How does this artificial man-made disturbance regime differ from a natural disturbance regime?" There are of course no definitive answers, but we can look at some specific management practices to see how well they mimic the natural disturbance regime.

Looking at some different forestry practices, clearcutting seems to be an inappropriate disturbance for a system characterized by small-scale disturbances. Clearcutting might be more appropriate for systems that are characterized by catastrophic disturbances, but with an important caveat. We remove the wood in clearcutting. Natural disturbances such as blowdown and wildfire leave all that coarse woody debris on the forest floor, which plays important ecological roles.

Shelterwood would tend to ameliorate this type of difference or change and might be more appropriate in some ecosystems. Group selection, which removes small groups of trees, might mimic a natural regime where multiple tree gaps are common. Individual tree selection might be appropriate for those regimes characterized by single-tree-fall gaps as found in many Appalachian forests. But selective cutting requires lots of access (i.e., roads). Prescribed burning might be appropriate for those ecosystems characterized by frequent low-intensity fires, if we do it at the right frequency and in the right seasons.

Various techniques have been used in wildlife management to intersperse habitat, to create openings and so forth, mostly to create edge. Prescribed burning has been used to manage habitat conditions for a long time, going back to Herb Stoddart's work in the 1920's and 1930's to create habitat for quail.

A common plan in wildlife management, but fortunately becoming less so as we learn more about fragmentation, is to intersperse habitats. This takes an area and creates a checkerboard pattern, which creates maximum edge and is very good for game animals such as deer that require tightly interspersed forage and cover areas. Unfortunately, it also results in what many conservation biologists believe to be **the greatest single threat to biological diversity on Earth - habitat fragmentation.**

Forest Fragmentation

Fragmentation has essentially two components, which can vary independently. First, there is the reduction in total habitat area. Secondly, there is the apportionment of the area that remains in pieces of small size that are isolated from one another. The consequences of forest fragmentation are becoming all too clear.

We lose many sensitive species of the forest interior that require certain minimum areas. We tend to lose the wide ranging animals that need some continuity of habitats. Our habitats and landscapes become dominated by those "weedy" species that don't require public lands or any kinds of reserves for their survival and get along quite well in human dominated landscapes. Finally, when we have these isolated populations, we get a number of genetic problems that have been well discussed in the literature, in addition to demographic problems.

This kind of fragmentation process benefits certain species that are of value to us, like whitetail deer, which are certainly more common today than in presettlement times. There are other species like many warblers that requires forest interior habitats - they do not do so well under a fragmentation regime. Harrison suggested that heavy browsing by deer was the major factor reducing habitat suitability for the Kentucky warbler.

Edge Effects

Although Harrison did not closely study the brown-headed cowbird, other scientists have shown this native species to have some serious effects on forest interior bird populations. Cowbirds increase dramatically with fragmentation of the landscape. It is a true edge species. It parasitizes nests of other birds within 100-200 metres of the forest edge. It does not occur in the undisturbed forest interior.

Gates and Gysel, in their landmark paper of 1978, described edge as an "ecological trap." What their study found was that a number of bird species were attracted to the forest edge, presumably because the edge contains structural cues similar to

the mixed heterogeneous forest in which these species evolved, but at the edge these species suffered reduced reproductive success, measured as fledgling success. This was related to the higher predation losses, and higher rates of cowbird parasitism near the edge.

Dave Wilcove completed some studies for his Ph.D. work several years ago using artificial nests. He found that nest predation rates increased towards the edge. Some species actually avoid the edge and place their territories some distance from the edge, such as the Acadian flycatcher and the hooded warbler in the east. This is interesting since the Acadian flycatcher is a true closed-canopy species and avoids openings of all sizes. On the other hand, the hooded warblers are classic gap species; it likes gaps, but it doesn't like edge, so opening size is important.

I also did some work in an old-growth hardwood forest in Florida, relating these interacting effects of natural gaps to other patches called "bay-heads," where dense shrub-level vegetation occurs in seepage areas. I studied how birds used plots of different heterogeneity. In this study I had twelve 5-hectare plots with 120 one-half hectare subplots at various distances from the edge. In the more homogeneous subplots, without gaps or bayheads, I found a classic and significant edge effect. But the more heterogeneous plots, those with gaps and bayheads, had a nonsignificant edge effect. This suggests that old-growth forests, with much natural heterogeneity, may experience fewer harmful edge effects.

Franklin and Forman studied the effects of forest cutting practices on the landscape. They found the checkerboard patchwork cutting maximized the effect of border on the landscape. They also found that cutting in smaller units with a given amount of land cut tended to increase the amount of border. We should interpret this rather carefully.

Cutting Small Openings

What happens when we start cutting in units below one hectare? Should we still expect edge effects to increase? Or is there a minimum opening size below which edge effects do not occur? There are very few data on what type of opening, and what size of opening, where edge effects occur. Some recent work by Overcash and Roseberry in the Shawnee National Forest in Illinois addressed this question. They found that constructed wildlife openings of less than 0.3 hectares did not attract edge species of birds. But above 0.3 hectares, edge species did show up, including the brown-headed cowbird, which has a deleterious impact on other bird species. Cowbirds become particularly abundant in openings of 0.7 hectares and larger. So opening size is significant as well as the kind of habitats we juxtapose within our forest. The edge effect is greatest, when we have the greatest contrast between adjacent habitats.

Buffer Zones

Larry Harris wrote about this in his book *The Fragmented Forest*. We need to start thinking of ways in which we can buffer these edge effects and other types of intrusions on our existing old-growth reserves and special habitats we are interested in preserving. One way to do this is to incorporate a gradation of buffer zones around our core reserves. The outer buffer zone could be used for a more intense multiple-use regime, but all buffer zones should serve to insulate the core reserves.

Patch Size and Shape

In simple geometry, as the size of the patch decreases, the edge/interior ratio increases. For minimum edge effect you need very large blocks, not only to incorporate the natural disturbance regime but also to include the viable population requirements for the most demanding species. Not only is the size of forest patch important, but so also is the shape.

From the data of Temple in Wisconsin, in a forest patch of 47 hectares, with a core area of 20 hectares, 6 of 16 bird species known to be sensitive to fragmentation did not breed. Another forest fragment of about the same size had no core area and was essentially all edge. None of the 16 bird species escaped the effects of fragmentation and bred here. So we have to think about the shape of the remaining forest as well as the size.

Roads

We also have to think about the types of intrusions we put into the landscape. More and more conservation biologists and wildlife biologists are beginning to recognize that roads are one of the most significant impacts on sensitive wildlife. Road impacts vary quite a bit from the natural disturbances these species have evolved with. The direct impacts of roads are mortality and injury, on both hard surface and forest roads. Some species such as elk avoid roads. For many species, roads alter migration and habitat use patterns. Roads fragment habitat for some species. In Germany, studies by Mader have shown that many small mammals will not cross roads, so a road essentially cuts a population in half.

There are other major effects of roads such as sedimentation and pollution in streams. Roads do have some beneficial effects for certain species, but these tend to be the "weedy" species that get along fine in human-dominated landscapes. There are other effects of roads that are less obvious but probably more important in the long run. Providing access to various disruptive human uses can result in changes at the population, community and ecosystem scales.

Studies of road impacts on wolves, mountain lions, and black and grizzly bears, show there is a maximum road density these animals will tolerate. Populations of these species tend to decrease directly with increasing road density. Above a certain density these species disappear. The reason seems to be the access allowing people to shoot and harass these animals. While solutions are going to be sticky politically, I think we need to start closing roads in sensitive areas, and enforce these closures.

Wilderness

Let's look at the function of wilderness in providing habitat diversity. Designated wilderness areas tend to avoid the more productive sites. We have the "ice and rock phenomena with a little tundra thrown in." Some wilderness boundaries start at the tree line. But properly representative wilderness has great potential for implementing the landscape level of a biodiversity strategy.

We tend to look at wilderness only in terms of recreation. In most of the forest plans that I have read, the need for wilderness is described in terms of recreation visitor days. The scientific and ecological values of wilderness are scarcely mentioned. On

a historical note, Aldo Leopold, who is known as the father of wildlife management in North America, and premier forester in the Gifford Pinchot tradition, was also the founder of the U.S. wilderness movement. When he first started talking about wilderness in the early 1920's, he indeed stressed the recreational values. By the mid-1930's Leopold was already stressing the scientific and ecological values of wilderness. This was after observing and comparing systems that had been heavily logged or grazed, or otherwise heavily impacted by humans, to truly pristine areas. So far our public agencies have not caught up with Leopold's observations in the 1930's.

In many areas, of course, wilderness is missing from large-scale landscapes. So we need to think of wilderness recovery in terms of closing roads, and re-introducing natural disturbance regimes and extirpated species.

Philosophy

And finally, more than any specific management strategy, we need to look very closely at our philosophies of management, as Aldo Leopold did. We need to start thinking, not only in terms of our utilitarian use of these forest landscapes and what products and resources they provide, but also in terms of land as having value for its own sake.

Aldo Leopold's land ethic offers the best guidance: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

About the Author: **Reed Noss** is currently a Biodiversity Project Leader for the U.S. Environmental Protection Agency. This paper is based on remarks which were transcribed from a talk given in Corvallis, Oregon in August, 1986. The transcription was published in **Forest Planning Canada**. Those transcribed remarks were then revised for **The Trumpeter**.

THE FUTURE IS TODAY: FOR ECOLOGICALLY SUSTAINABLE FORESTRY

Chris Maser

Introduction

As we human beings lost our spiritual connection with the Earth, as we lost the inner ground of our being, of our place in the world, we lost sight of the reciprocal interrelatedness of all life. We now walk the Earth with impoverished souls. Human poverty, global deforestation, global degradation and poisoning of the land, and the nuclear arms race are but a few metaphors of this emptiness of soul. Unless our minds and hearts are set on maintaining a biologically sustainable forest, each succeeding generation will have less than the preceding one, and their choices for survival will be equally diminished.

Poverty As Metaphor

Zane, my wife, and I recently became the sponsors of two children in Ecuador, a small country in South America sandwiched between Colombia and Peru. Ecuador is about the size of the state of Nevada, but whereas Nevada is about 87 percent public lands and has relatively few permanent residents, Ecuador has a population of approximately 9.6 million people that is projected to double to 19.2 million people by 1993. Thus, poverty becomes the ever-present metaphor of the human condition.

Our new children, Patricia and Eduardo, were born into abject poverty. Six-year-old Patricia is undernourished and in poor health. She has six brothers and sisters, and although both her father, age 50, and her mother, age 36, work as day laborers, the family income is about 68 US dollars per month. Their house is made of split cane, with a tin roof and a floor of rough boards. There are two rooms and two beds for the entire family. They

have water, electricity, a portable gas stove for cooking, but no latrine.

Eduardo is four and is in good health. He has a brother and a sister. His mother, age 25, works as a washer woman; his father has abandoned the family. In addition to Eduardo, his brother and sister, and his mother, a grandmother, age 51, who takes care of the home and the youngsters, a grandfather, age 53, and an aunt, age 27, all live under the same roof. Although the grandfather is a street vendor and the aunt is a factory worker, the pooled family income is about 32 US dollars per month. Their house too is of split cane with a tin roof and a floor of rough boards. There are two rooms and three beds. They have water, electricity, and a latrine, and they cook with firewood.

I remember working in North Africa and in Asia and seeing this kind of poverty, but that was over 20 years ago and time has dimmed my memory. In addition, I was younger and did not see quite so clearly as I do today. When the information about our new children arrived and I read it, all I could do was sit in stunned inner silence as the years in Africa and Asia came flooding back to engulf me. For the first time, I had an insight into real poverty. Oh, I had lived amongst it and had looked at it, but somehow I had not really seen it. Now, with our new children, it came home to me with searing clarity how much difference a mere 12 dollars per month can make. It was giving our children a choice they otherwise would not have...a choice that equals hope. In turn, choice and hope equal dignity...the birthright of every human being. How little for us to give from our incredible material wealth as a middle-class American family, and yet how much for them to receive, for to these children ours is not a gift of money but rather a gift of hope.

It occurs to me, thinking about our new children, that as human beings, all we have to bequeath future generations is options, choices, and each option, each choice, represents the future's limitations. Future generations must respond to our momentary decisions ---- including the present struggle over the ancient forests ---- which will become their inherited circumstances, and because the future **must** respond to our decisions as their circumstances, the future is today.

Why Save The Ancient Forest?

There are many valid reasons to save ancient forests from extinction, as many, perhaps, as there are for saving tropical forests. One is that our forests of the Pacific Northwest are beautiful and are unique in the world (Waring & Franklin, 1979). Another is that the old trees of the Pacific Northwest inspire spiritual renewal in many people and are among the rapidly dwindling living monarchs of the world's forests. They are unique, irreplaceable, and finite in number, and they shall exist precisely once in forever. We can perhaps grow large trees over two or three centuries, but no one has ever done that on purpose. And if they did, such trees will not be Nature's trees; they will be humanity's trees. And although they may be just as beautiful as those created by Nature, they will be different in the human mind. A third reason is that a number of organisms, such as the spotted owl (*Strix occidentalis*) and the flying squirrel (*Glaucomys sabrinus*), either find their optimum habitat in these ancient forests or require the structures provided by the old trees, such as large snags and large fallen trees, to survive (Forsman et al., 1984; Franklin et al., 1981; Harris, 1984; Meslow et al., 1981). And a fourth reason is that ancient forests are the only living laboratories through which we and the future may be able to learn how to create sustainable forests -- something no one in the world has so far accomplished.

As a living laboratory, ancient forests serve four vital functions. First, they are our link to the past, to the historical forest. The historical view tells us what the present is built on, and together the past and the present tells us what the future is projected on. Because the whole forest cannot be seen without taking long views both into the future and into the past, to lose the ancient forests is to cast ourselves adrift in a sea of almost total uncertainty with respect to the creation and sustainability of future forests and tree farms. We must remember that knowledge is only in past tense; learning is only in present tense; and prediction is only in future tense. To have sustainable forests and tree farms, we need to be able to know, to learn, and to predict. Without ancient forests, we eliminate learning, limit our knowledge, and greatly diminish our ability to predict.

Second, we did not design the forest, so we do not have a blueprint, parts catalog, or maintenance manual with which to understand and repair it. Nor do we have a service department in which the necessary repairs can be made. Therefore, how can we afford to liquidate the ancient forest that acts as a blueprint, parts catalog, maintenance manual, and service station -- our only hope of understanding the sustainability of our simplified, plantation-mode tree farms?

Third, we are playing "genetic roulette" with tree farms of the future. What if our genetic engineering, our genetic cloning, our genetic streamlining, our genetic simplifications run amuck, as they so often have around the world? Native forests, be they ancient or young, are thus imperative because they -- and only they

-- contain the entire genetic code for living, healthy, adaptable forests.

Fourth, intact segments of the ancient forest from which we can learn will allow us to make the necessary adjustments in both our thinking and our subsequent course of management to help assure the sustainability of forests and tree farms. If we choose not to deal with the heart of the ancient forest issue -- sustainable forestry, we will find that reality is more subtle than our understanding of it and that our "good intentions" will likely give bad results.

Although there are many valid reasons to save ancient forests, there is only one reason that I know of for liquidating them -- short-term economics. Economics, however, is the common language of Western civilization; is it not therefore wise to carefully consider whether saving substantial amounts of well-distributed ancient forests is a necessary part of the equation for maintaining a solvent forest industry?

Can we really afford to liquidate our remaining ancient forests? I have often heard that "We can't afford to save 'old-growth', it's too valuable and too many jobs are at stake." I submit, however, that we must be exceedingly cautious lest economic judgement isolates us from the evidence that without biologically sustainable forests, we will not have an economically sustainable forest industry, and without an economically sustainable forest industry, there will be human communities in which we cannot have a sustainable economy. Therefore, if we liquidate the ancient forests of the Pacific Northwest -- our living laboratories of which the spotted owl is the designated symbol -- and our tree farms fail, as tree farms are failing over much of the world, we will be further impoverishing our souls and those of future generations through the myopic worship of the golden idol of materialism -- short-term profits.

If We Really Want The Spotted Owl To Survive

The northern spotted owl has become the chosen symbol for the ancient forest, a symbol in the struggle of conflicting values -- short-term economics versus all other human and other values of ancient forests. The spotted owl is the symbol for the survival of the ancient forest, but what does it really symbolize? The spotted owl is called an "indicator species" because its presence supposedly indicates a healthy ancient forest, but what does it really indicate? The spotted owl may be seen as a symbol for the survival of ancient forests, but in reality it is an indicator species for the planned extinction of ancient forests. Although the spotted owl was selected as the symbol of the ancient forest with good intentions, the results are bad if the objective is to save the owl because the real issue is not the owl. The real issue is the economics of extinction (Chasan, 1977) -- the planned liquidation of ancient forests for short-term economic gains.

If we really want spotted owls to survive, then we must want ancient forests to survive also because on the **scientific side there is evidence beyond a reasonable doubt that northern spotted owls require the unique structural components of ancient forests** (Forsman et al., 1984; Franklin et al., 1981; Irwin, 1986). Where is the scientific data to the contrary? There is none that I know of. And yet, set-asides of ancient forest, as now planned, will create self-destruct islands of time-limited old-growth trees in a sea of young-growth tree farms. Unless a portion of the existing mature forest also is set aside to replace the ancient forest as it falls apart with age or by unplanned

catastrophe, the spotted owl is doomed. And then the only difference is time if a portion of the young-growth forest is not also committed to replace the mature forest, as needed to maintain quality spotted owl habitat. We are planning spotted owl habitat in terms of absolute minimums and the liquidation of the ancient forest in terms of flexible maximums.

The great historian, Arnold Toynbee (1958), asked the critical question of why 26 great civilizations fell. He concluded that **they could not or would not change their direction, their way of thinking, to meet the changing conditions of life.** On page 298, Toynbee says of history, "We cannot say [what will happen] since we cannot foretell the future. We can only see that something which has actually happened once, in another episode of history, must at least be **one of the possibilities** [emphasis mine] that lie ahead of us." In addition, a knowledge of unwise historical choices and their disastrous consequences not only gives us the option of doing something different, but also gives us the possibility of altering an outcome in the future. Herein lies the hope of humanity. But to grasp that hope for the children of today and of tomorrow and beyond, we must ask ourselves, "Can society afford the environmental costs of the economics of extinction?" Have we become so myopic in our economic view that we are willing to risk losing the ability to have sustainable forests by pursuing the short-sighted, short-term, economic windfall to be had by cutting the remaining ancient forests?

In this context, it is imperative to understand that humanity has not "reforested" a single acre, because no one has planted and grown a forest on purpose. What we and the rest of the world have done, and are doing under the guise of "forestry," is trading our forests in on simplistic, economic tree farms. And **forests and tree farms are not synonymous**, no matter how many high-priced public relations firms try to create the impression that they are.

A Forest Versus A Tree Farm

Before we can discuss a forest versus a tree farm, we must "define" forest and forestry and a tree farm and tree-farm management. A **forest** is the most complex, terrestrial biotic portion of the ecosystem, and is characterized by a predominance of trees. **Forestry** is the profession that embraces the science, art, and business of managing the forested portion of the ecosystem in a manner that assures the maintenance and sustainability of biological diversity and productivity for perpetual production of amenities, services, and goods for human use. A **tree farm** is an area under cultivation, a group of cultivated trees. And because a plantation is an economic crop, it is grossly simplified and specialized. **Tree-farm management** is the profession that embraces the science, art, and business of managing a tree farm -- an agricultural crop -- to reap the greatest economic returns on the least economic investment, in the shortest possible time.

Today's "forest practices" are counter to sustainable forestry because, instead of training foresters to manage forests, we train tree-farm managers to manage the short-rotation, "economic" tree farms with which we are replacing our native forests. Forests have evolved through the cumulative addition of structural diversity that initiates and maintains process diversity, complexity, and stability through time. We are reversing the rich building process of that diversity, complexity, and stability by replacing native forests with tree farms designed only with narrow, short-term economic considerations.

Thus, every acre on which a forest is replaced with a tree farm, is an acre that is purposefully stripped of its biological diversity, of its biological sustainability, and is purposefully reduced to the lowest common denominator possible -- simplistic economics. Simplistic, economic theory in agriculture has not proven to be biologically sustainable anywhere in the world. So the concept of a "tree farm" is a strictly simplistic, economic concept that has nothing to do with the biological sustainability of a forest. Under this concept, native forests are being replaced more and more with tree farms of genetically manipulated trees accompanied by the corporate-political-academic promise that such tree farms are better, healthier, and more viable than are the native forests that evolved with the land over millennia.

Native Forests

In our burgeoning, product-oriented society, one of the most insidious dangers to native forest -- that which has experienced no disruptive, human intrusion -- be they ancient or young, is the perceived lack of value in maintaining an area for its **potential**. By that I mean its research value as an ecological blueprint of what a biologically sustainable forest is and how it functions, educational value, spiritual value, or any other value that does not turn an immediate, visible, economic profit. This short-sightedness is understandable considering that: (1) the Native North Americans viewed the land and all it contained as a "Thou," which is holy and is to be revered; Europeans, on the other hand, viewed the same land and all it contained -- including the indigenous peoples -- as an "it," which is simply an object to be exploited (Buber, 1970; Campbell with Moyers, 1988); (2) we in Western civilization focus predominantly on utilizable products from the ecosystem, rather than on the processes that produce the products; (3) renewable "natural" products are largely manifested above ground, whereas many of the processes that produce the products as below ground; (4) we therefore think about and manage what is visible above ground, and tend to ignore the processes below the surface of the soil; and (5) short-term economics is the driving force behind management of renewable natural resources and our society.

When these points are taken together, they form the foundation of Western economic culture. Reared with this historical background, it is difficult for most people to really understand the risks involved to humanity's future by violating all remaining natural areas either in principle or in fact. Although this may seem a bold statement, consider that, in addition to representing a collection of native species of both plants and animals with X amount of genetic diversity, each protected area of native forest, whether ancient or young, also represents a repository with a portion of the world's ecological processes and functions in living laboratories.

For example, the native temperate coniferous forests of the Pacific Northwest are still "healthy," whereas both the temperate coniferous forests and tree farms of central Europe are dying, and far more is known scientifically about forests of the Pacific Northwest and how they function than is known about European forests (Franklin et al., 1981; Harmon et al., 1986; Harris, 1984; Maser et al., 1988; and others). So a system of natural areas of native forest in the healthy Douglas-Fir (*Pseudotsuga menziesii*) region of the Pacific Northwest is a repository for ecological processes that, although different in specifics, are similar in principles to those of the dying forests and the dying Norway spruce

Conclusion

(*Picea abies*) tree farms of central Europe (Blaschke & Baumler, 1986; Durrieu et al., 1984). By analogy, rather than an historical transplant of a particular species to reintroduce it into an area from which it has been extirpated, we have the potential to perform "global process-information transplants" through ecological knowledge that is and can be gleaned from and maintained through benchmark areas that represent Nature's blueprint -- natural areas -- whether or not today economists and industrialists can see anything but "economic waste" in saving them.

Areas of native ancient forest are even more important now than ever before, because today we face a generalized global warming called the "greenhouse effect." Such a historically unprecedented warming means that forests must be adaptable -- both plants and animals, which constitute the interrelated, often symbiotic, biological processes of life. The problem for humanity is that no one knows which species will be able to adapt to such changes. What is known, however, is that native species are much more likely to be able to adapt than exotics, even of the same species, brought in from other areas. In this sense, adaptability equates to resilience in the face of sudden, dramatic, perhaps irreversible change.

Part of the process of maintaining ecological resilience is setting aside an ecologically adequate system of natural areas of native, ancient forest -- an unconditional gift of potential knowledge for the future. In so doing, present and future generations have a repository not only of species, which more often than not are region-specific, but also of processes, which more often than not are world-wide in principle and application.

From such repositories, in addition to monitoring human-caused changes and maintaining habitat for particular species, it will be possible to learn how to maintain, restore, and sustain biological processes in various portions of the ecosystem. In this sense, reserves of native, ancient forests are the parts catalogues and maintenance manuals not only for that which is but also for that which can be.

Whatever we do to move toward biologically sustainable forestry -- and we must act -- will take the utmost in courage. With the right attitude, any mistakes we make may become the future's strength. But we must act while the Earth still has the strength and the resources to survive in the face of ongoing errors, and while there still is the ecological margin to allow a few more mistakes from which to learn. To assure the future's potential to correct our errors and its people's ability to learn from them, we must remember always that all we have to give the future is options and that an option spent -- liquidating the ancient forest for whatever rationalized reason -- is no longer an option. Therefore, we must ask, each time we make a decision that deals with natural resources, "How will our decision either maintain or enhance the options for the future?" That is our moral responsibility as human beings, because all we have to bequeath future generations is options, and each option foreclosed represents the limitation -- the impoverishment -- of the future. The generations to come have no choice but to respond to our decisions, which will have become their inherited circumstances, and because the decisions we are making today are inexorably creating the circumstances of the future, in sober reality the future is today.

As human beings, we participate in creation of the world we live in, because our very existence and that of every other living thing is involved in this on-going act of creation. As conscious, co-creators, we are the moral, ecological guides for the future. In this sense, our impressions of our ancestors are reflections of the care they took of the land that we inherited, and as the ancestors of future generations, we know that their impressions of us will be mirrored in the care we take of the land that they must inherit. Thus, if we would change our image, we must begin now, consciously, to create a new paradigm for our trusteeship of the land, one based on a sense of place and permanence, a sense of creation and landscape artistry, a sense of ecological health and sustainability, and a sense of humility and humanity. Although such a harmonious union between people and the Earth is not new in the world, it is new to our modern Western psyche. It is the art of gardening the land with the artistry and the beauty that for so long has lain dormant in our souls.

The images we see on the landscape are but reflections in our social mirror of the way we treat ourselves and one another. As we compete and fight and live in fear, so we destroy the land; as we cooperate and coordinate and live in love, so we heal the land. We see the inner landscape of our being reflected on the outer landscape of the Earth; we see ourselves reflected in the care we take of the land. So, the question is, "How do we participate in creating our world and to what extent?" Do we create a world in a way that is environmentally compatible with human existence, or do we create an unfriendly environment that is hostile to human existence? Do we alienate ourselves from our own planet, or do we accept our responsibility as trustees of Nature's bounty and act accordingly? One thing is clear, nothing will change the effect on the collective, outer landscape until we first change the cause in our individual, inner landscapes, until we move toward conscious simplicity in both our inner and our outer lifestyles.

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ECOFORESTRY: REDEFINING FORESTS, FORESTERS, AND FORESTRY

Orville Camp

Introduction

The terms forest, forester and forestry have come to mean many different things to many different people. Conventionally, a "tree farm" is viewed as a "forest," those who manage them are called "foresters" and the management concept is known as "forestry."

A forest is, however, far more than just a tree farm. It is an ecosystem which has trees. An ecosystem consists of all the living and nonliving things and their relationships and processes. All living things are interconnected and dependent on one another in some way as we are upon them. A natural selection system of checks and balances keeps it healthy and productive. For sustainability, forests must be managed as ecosystems.

We need to redefine forestry for both forest and community health reasons. Many people are managing and harvesting forest products in such a way as to address the full ecosystem in order to meet these concerns. We need terminology which reflects this new kind of full ecosystem forestry in order to distinguish it from traditional forestry. I will refer to this new kind of forestry as "ecoforestry" and those who practice it as "ecoforesters."

Those forest managers who are knowledgeable enough to practice sustainable ecoforestry need to have credentials and a good track record of success. I will refer to them as "ecoforesters."

The groundwork has now been laid for completely new fields. Ecoforesters will be practising ecoforestry to manage forest ecosystems.

"**Natural Selection Forestry**" is a specific kind of ecoforestry. Natural Selection Forestry uses the only time tested and proven forest ecosystem management program -- Nature. Natural Selection Forestry uses Nature to do the managing and Nature to do the selecting for harvesting.

WHAT IS NATURAL SELECTION FORESTRY?

Natural Selection Forestry is a full forest ecosystem management program for all normally associated species and ages. Nature does all the managing and "natural selection" is used for determining which individuals have been selected for

removal to serve our needs. There are no weeds in the forest and all species are considered to have value. Forest ecosystem health is determined by population stability of its species.

For ecoforesters in charge of the forest, Natural Selection Forestry is a matter of learning how to read nature's indicators. For harvesting purposes, it is reading the natural selection indicators to determine which individuals have been selected for removal. Before harvesting to serve people needs, however, there are forest ecosystem conditions which must be addressed and maintained.

The Three Essentials, climate, soil and water, determine what can live in a given area. These three essentials must be kept compatible to ecosystem needs. Climate is critical for determining what can live in a forest ecosystem structure. The forest structure modifies climate all the way down to the forest floor. Climate determines what kind of plant life can live in each part of the forest structure and also the animal life that depends on these plants for their survival. A change in climate will also have a major affect on the soil and water conditions of the forest floor. Before removing a single tree, ecoforesters must make sure the three essentials are not seriously affected.

There are also "Four Basic Needs" that must continue to be met for a species to survive. Every "habit" must have "food", "shelter" and "reproduction" needs met for all normally associated species. This means leaving a natural like forest with some dead, dying, and defective trees in order to keep forest wildlife workers healthy, happy and productive so that they can continue to work for us.

How can natural selection forestry solve environmental and economic problems?

I. Nature Manages:

1. Nature has the only time tested and proven forest management system.
2. Nature, through the natural selection process, has historically been the most successful at providing a suitable habitat for its wildlife. A habitat must be able to supply food, shelter and

reproduction needs for all its associated life if they are to survive. No human-made forest management system has ever been able to achieve this.

3. The natural selection process, either directly or indirectly, has also provided for the needs of people as well. Again, no human has ever been able to even come close to equalling Nature in providing for these needs.

4. Natural Selection Forestry uses Nature's time tested forest management system.

II. Selecting For Harvest:

1. Natural Selection Forestry uses Nature to do the selecting of trees and other plants for removal to serve human needs.

2. Because Nature does the selecting, the risk of damage or loss to forest ecosystem health is near zero.

3. Natural Selection Harvesting allows only removal of those individuals that Nature has selected. This means people can harvest only what the forest is truly capable of producing at any given time, not what some theory predicts. This prevents over cutting and assures a continued maximum yield.

III. Slash Disposal:

1. Natural Selection Harvesting has no heavy build up of slash because of smaller volumes harvested at any given time.

2. Slash is used to sustain decomposers and other wildlife needs, which supports new green plant growth. Slash is used to support the forest wildlife workers.

3. No slash burning is needed.

4. No slash burning pollution is produced.

5. No slash burning costs are incurred.

IV. Competing vegetation:

1. Nature controls through the natural selection process.

2. No herbicides or pesticides are needed because there are no weeds.

3. No environmental costs due to use of chemicals.

V. Forest Products and Uses:

1. Nature manages for all natural products and uses.

2. Potential for many kinds of recreational uses is maintained.

3. Maximum sustainable yield of all natural forest products including timber. There is no down time such as there is in clear cuts, shelterwood cuts, and regeneration cuts.

VI. Easier to Teach and Learn:

1. Nature does the managing.

2. Nature does the selecting.

3. Management and harvesting is a relatively simple matter of reading the indicator signs of Nature.

VII. Climate and Microclimate:

1. Maintains suitable climates for all native species, which helps maintain maximum forest production.

2. Moderates local and global climates.

3. Substantially reduces the cost of using non-renewable resources such as fossil fuels in equipment or the public use of air conditioning, for example, because forests were removed.

VIII. Water:

1. Far less erosion.

2. Fully stocked with vegetation at all times for holding water through drought.

3. Continuous filtering keeps water quality high at all times.

IX. Soil:

1. Continual soil build up.

2. No fertilization costs.

X. Reforestation:

1. Nature does all reforestation except in cases of past bad management practices, where restoration might be necessary.

2. No reforestation costs.

XI. Wildlife Needs:

1. Nature provides.

2. No wildlife management cost due to harvesting practices.

XII. Equipment:

1. Smaller equipment can be used because access is designed for efficiency.

2. Less impact on environment because of smaller equipment type that can be used.

3. Less capital investment in equipment because it can be smaller.

XIII. Fire:

1. Under conventional forestry, fire fighting costs run higher each year to protect the forest. The highest risks are in clearcuts, next are high removal partial cuts, and last are Nature's forests. Natural Selection Forestry reduces fire damage risk by keeping a natural like forest.

2. Special contour roads also help, plus they allow better access for fire equipment and act as fire breaks should a fire occur.

XIV. Access Roads:

1. Permanent.

2. Less maintenance.

3. Allows use of smaller equipment.

4. Far less equipment impact.

5. Far less environmental impact than typical tree farm roads.

6. Allows harvesting of any size or shape product.

7. Enhances aesthetics and recreational uses.

8. Costs far less per mile to construct.

9. Enables continuous annual harvesting.

10. Allows managers to quickly inventory.

11. Allows instant harvests, when products are ready for removal and/or are needed.

XV. Employment:

1. Annual on all managed stands rather than once or twice in a lifetime.

2. Truly sustainable.

3. Limitless potential.

4. More potential jobs because we manage for the whole forest, instead of only for special crops at the expense of whole forests.

XVI. Net Worth:

1. Net worth of the forest ecosystem keeps increasing with Natural Selection Forestry.

2. The most value to humans has historically been in the ancient old growth forests. Young tree plantations have never equalled

the large trees in value per acre. While Natural Selection Forestry manages ultimately for old growth and its associated wildlife, trees that Nature has selected for removal are continuously harvested from seedlings on. Natural Selection Forestry manages for all kinds and ages of forests.

Harvesting Rules

Ecoforest farmers typically manage a forest ecosystem for all normally associated species and ages. This means viewing the forest as a whole body of living and nonliving things and their relationships and processes. It also means recognizing that all living things depend on each other in some way, as we do upon them. All these living things make up the natural system of "checks and balances" which are needed to keep the forest healthy and productive.

Many forest farmers are using "Natural Selection Forestry" concepts for attaining ecologically sound forest management objectives. Natural Selection Forestry, however, requires a whole set of rules different from conventional tree farm practices. These rules are as follows:

- (1) **Address forest needs first.** In so doing you will address yours.
- (2) **Always leave the stronger dominants.** Leaving the stronger dominant trees will provide the best genetic traits for new stocking which will best survive environmental extremes. Leaving the stronger dominant trees will help maintain the forest health and avoid paying a high ecological price over the long term.
- (3) **Harvest only those trees that Nature has selected for removal.** There are many indicators for determining which individuals Nature has selected for removal. One of the best indicators, for example, is when two or more trees of the same age are competing for the same space and the growth rate of one starts tapering off. The one that starts tapering off with respect to the other is usually the one Nature has selected out and can be removed. A major benefit in harvesting only naturally selected individuals is in being able to continue addressing the ecological needs of the forest ecosystem. A big plus economically is

that the costs of using chemicals, slash burning and reforestation can be reduced to zero.

(4) **Maintain suitable climate, soil and water conditions for all normally associated species.** These three essentials determine what can live in a given area. Canopy dominants control all three of these conditions below and should not be removed if they will substantially alter the climate below.

(5) **Maintain habitat suitable for providing food, shelter and reproduction needs for all normally associated species.** All these needs must continue to be met for a species to survive.

(6) **Maintain the natural selection system of "checks and balances" for keeping the forest ecosystem healthy and productive.** There must be adequate populations of all normally associated species for maintaining the best system of checks and balances.

(7) **Remove no more than what the forest is truly capable of producing at any given time.** Over harvesting can substantially reduce production and seriously affect forest health, or even result in its death.

(8) **"Do I feel certain of my decision?" The rule is: "When in doubt, don't!"** Get expert advice or evaluate the situation until you are satisfied with what you propose to do. Remember, you may never be able to replace what you are removing or undo the damages caused by what you have removed. If you still cannot decide, it's usually best not to do anything.

About the Author: **Orville Camp** is the author of *The Forest Farmer's Handbook: A Guide to Natural Selection Forest Management*. Sky River Press. He is a consultant in Natural Selection Forest Management which is a form of Ecoforestry. He works with private forest land owners to set their forest lands on the path of ecologically sound forest management. He and other forest farmers have established an organization called the Forest Farmers Association which promotes ecologically sound forestry practices. The Association publishes a journal and sponsors workshops for those interested in ecoforestry. For more information on this organization and their workshops write to them at P.O. Box 715, Grant's Pass, Ore. 97526. **The Conference and workshop on Ecoforestry will be held this year, from June 16 through 19, in Grants Pass, Oregon.**

CITIZEN INVOLVEMENT IN FOREST STEWARDSHIP: USING THE LAND STEWARDSHIP TRUST MODEL

Jeffery Tyhson Banighen

1. Why Forest Stewardship?

There is a basic paradox inherent in the private ownership of forest resources: If you own the forest, you can exploit it for short term profits: If you don't own the forest, why should you care enough about the forest's future to wisely manage it in the long term?

The concept of forest stewardship is an attempt to bypass this paradox. Forest stewardship is making land use decisions that nurture the health of the natural ecology, while fulfilling the goals of those stewarding the land's resources. The Land Stewardship Trust (LST) model is a legal agreement(s) that en-

ures that the steward of the forest does not have the ability to exploit the forest resource in a way that will damage the forest ecosystem, yet at the same time the model provides incentives for the steward to act in his own behalf, while simultaneously acting in the best interests of the future forest (Concept adapted from Raphael: 1981, p. 235).

2. The Need for a Land Ethic

Aldo Leopold (1987-1948), who was also a professional forester as well as the founder of the Wilderness Society, wrote in 1949:

There is as yet no ethic dealing with man's relationship to land and the animals and plants which grow upon it...The land-relation is still strictly economic, entailing privileges, but no obligations...Obligations have no meaning without conscience, and the problem we face is the extension of the social consciousness from people to land. All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts...The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land. (Leopold: 1966, p. 239)

It has been forty years since Leopold wrote those words. Now the need for a "land ethic with obligations" is even greater, as we realize there are limits to progress based on our utilitarian ethic of unlimited growth.

3. Turtle Island Earth Stewards (TIES)

Turtle Island Earth Stewards (TIES) is a non-profit charitable society incorporated in Canada in 1972 and in the U.S.A. in 1982. One of TIES objectives as a society is, "to research, develop and teach stewardship of the land and its resources within an ecological context."

4. The Implementation of a Land Ethic

In order to implement the concept of stewardship as a "land ethic with obligations," TIES developed the Land Stewardship Trust (LST) model.

Using the LST model TIES assists citizens and non-profit organizations to place their lands in public trust, or to use conservancy and stewardship principles to protect and manage land. Lands presently in LSTs in B.C., Washington, Oregon and California are stewarded by non-profit charitable societies doing a variety of social service and land stewardship activities.

The LST model is now being broadened by TIES to include the stewardship of forests on Cortes and Lasqueti Island, agricultural lands in Armstrong, Black Creek, Cortes Island and the Kettle Valley, an urban community garden in White Rock, and the incorporation of land conservancy and stewardship principles as components of a comprehensive land use plan for Burns Bog. The conservancy principles will protect Burns Bog ecosystem, while the stewardship principles will allow for sustainable development to take place within clearly defined ecological perimeters.

5. What is a Land Stewardship Trust?

The LST model is a whole systems design approach to land use planning using land conservancy and land stewardship principles. The LST model integrates elements from other land trust models into one comprehensive LST agreement. The various land trust models that LST model integrates are as follows.

5.1 Conservation Land Trusts

The conservation land trust creates Nature preserves that protect unique and special ecologies. The Nature Conservancy, Nature Trust and the Ecological Reserve Branch of B.C. specialize in this kind of trust activity to protect endangered species of plant and animal communities. The LST model sets aside ecologically protected areas or buffer zones as part of a comprehensive land use plan.

5.2 Community Land Trusts

The Community Land Trust (CLT) is a private non-profit corporation created to acquire and hold land for the benefit of a community and provide secure affordable access to land and housing for community residents. In particular, CLTs attempt to meet the needs of residents least served by the prevailing market. CLTs prohibit speculation and absentee ownership of land and housing, promote ecologically sound land-use practices, and preserve the long-term affordability of housing (ISCE:1988). LSTs have similar goals in providing access to land for those who could not otherwise afford to buy the land, and the implementation of ecologically sound land-use practices is a necessary condition for residency on trusted lands.

5.3 Agricultural Land Trusts

An agricultural land trust uses land conservancy techniques, such as conservation easements and estate planning devices to maintain the farm land virtually in its present natural condition and to prevent the decline of agriculture and the family farm. Similarly agricultural lands in a LST are stewarded according to set of clearly defined ecologically sound principles.

5.4 Forest Land Trusts

A Forest Land Trust consists of a group of farmers (or land owners) donating the "development rights" of their forested land to a Land Trust and receiving a tax credit for doing so. The farmers (or land owners) would then form a partnership and pool the value of their trees in a long range forestry program managed by the partnership and/or the Land Trust. Such a plan can increase the value of the trees several fold and bring an additional income to farmers and land owners (ISCE:1980). The LST has similar goals in stewarding forested lands, but in addition the use-rights to forested lands are conditional on the stewards fulfilling a clearly defined set of ecological principles that protect the forest ecosystem.

6. How the LST Model Differs from other Land Trust Models

In addition to incorporating aspects of the other Land Trust models, as mentioned, the LST model has the following additional purposes:

To ensure that a whole systems design approach to comprehensive land use planning incorporates the values of ecosystem preservation as well as land stewardship.

To ensure that use-rights to land and its resources are dependent on the application of a stewardship ethic with obligations.

To ensure that the legal framework supports mutually nurturing long term relationships between people and land so that the stewards can realize their own personal dreams, while at the same time foster a thriving natural ecology.

To provide community control of land and its resources as the bases for community-based and ecologically sound sustainable development.

7. The LST Model as Applied to Linnaea Farm

Linnaea Farm, a 311 acre farm on Cortes Island B.C. is a good example of how the LST model uniquely blends concepts from the other Land Trust models.

The Conservation Land Trust aspect of Linnaea includes two ecological reserves: one a high bluff and the other forest lands bordering Gunflint Lake, which is a designated volunteer bird sanctuary.

The Community Land Trust aspect allows the members of the community of Linnaea as stewards access to land they could not afford to buy.

The LST aspect insures occupancy of the land by the stewards is dependent on the wise stewardship of the agricultural and forest lands, according to a set of ecological conditions that protects the heart of the farm and its surrounding ecosystem.

At present, TIES as the Land Trust is negotiating a Land Stewardship Trust Agreement (LST Agreement) with the present stewards of Linnaea Farm which will include both an Agricultural and Forest Management Plan based on sound stewardship principles.

To date TIES has completed a number of LST Agreements with various groups of stewards living on lands placed in trust.

8. Why Place Lands in Trust?

Because lands in trust cease to be commodities that can be bought and sold for speculative gain, nor encumbered or used in anyway except as outlined in the trust agreement, the value of the land drops and then stabilizes. For example, the value of agricultural or forest land stabilizes because it can no longer be sold for development purposes. Essentially a landowner trades short term speculative gains for long term private and social benefits. These benefits are derived from land conservancy and/or the wise stewardship of resources in perpetuity.

If the owner does not want to give up ownership rights then conservation easements can be placed on the land or the development rights sold, donated, or bequeathed to a Land Trust in order to protect the ecological integrity of the land, or to implement wise stewardship practices. Essentially the main issue is not who owns land and resources, but how the land and its resources are managed ecologically and in a sustainable manner for present and future generations.

9. Advantages of Using the LST Model

While LSTs provide for local community control over the "ownership rights" to lands and resources by placing them in public trust, the real advantage for the community is to be able to ensure that the "use-rights" to lands and resources are conditional on their wise use. The important issue then is how to implement and monitor a stewardship ethic with obligations at the community level, whether the lands are owned privately, cooperatively, or by the Crown.

For example, both Crown land and lands in trust are held as "commons" for the common good of society. A commons is an economic resource like forest lands that are subject to individual use but not to individual possession.

The essential difference is that Crown Lands can suffer resource depletion or degradation like the forests of B.C. -- an eventuality characterized by Hardin (1968) as the "tragedy of the commons," in that ownership by all managed by a distant government can be as indifferent in consequence as no ownership at all. In contrast, lands in a LST are managed locally and are used according to an underlying ethic of responsibility.

10. The LST Model and Sustainable Development

The goal of a land stewardship ethic is to protect a sustainable ecologic system as the necessary underpinning for both sustainable social systems and sustainable economic development whether at the community, bioregional, provincial, national, international or global level.

Sustainable development requires decisions to be made in three areas: biologic, economic, social. For **biologic systems** the goal of sustainable development is: maintenance of genetic diversity, resilience, and biological productivity through the recognition of ecological thresholds and the need to merge human activities with natural replenishment cycles. For **economic systems** the goals are: satisfying basic needs, achievement of equity, and increasing useful goods and services. For **social systems** the goals are: maintenance of cultural diversity, provision for participation and self-determination, social justice, and institutional adaptability (Barbier: 1987, pp. 101-102)

The World Commission on Environment and Development's 1987 report titled, **Our Common Future**, defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED:1987, p. 43).

All development, whether sustainable or not, is dependent on a sustainable ecological system as the necessary underpinning for a sustainable socio-economic system, and if there is not, there will be an inevitable socio-environmental systems crash. While the LST model is designed to protect ecological sustainability and to manage lands and resources held in public trust, the same stewardship principles could be applied, if there were sufficient political will, to manage Crown Lands, or for that matter the Global Commons.

Once the sustainability of the ecological system is protected, then the LST model can be used to operationalize sustainable socio-economic development at the community level by using the principles of Community Economic Development (CED).

11. The LST Model and Community Economic Development

Local ownership and control is the basis for both LSTs and Community Economic Development (CED). The Social Planning and Research Council (SPARC) states,

Community Economic Development is concerned with fostering the social, economic and environmental well-being of communities and regions through initiatives, taken by citizens in collaboration with their governments, community agencies and other public and private organizations, that strengthen local decision-making and self-reliance, cooperative endeavours and broad participation in community affairs (Claque:1986, p. 6).

According to this definition, CED is sustainable development by and for a local community, and an LST is a technique for implementing CED.

For example, when private forest lands are placed into an LST, communities can practice self-governance through forest stewardship that provides for both sustainable CED, and environmentally sound, integrated forest management. Forests managed in trust incorporate the following CED principles, to name a few: local ownership and control of enterprise, local permanent employment creation, worker/employee participation,

equality, cooperation, interdependence of economic, social, and environmental factors, and opportunities for all citizens to participate fully as contributors and consumers.

12. How to Place Forest Lands in Trust

There are number of ways in which lands and forests can be placed in trust and/or managed by stewardship principles: by outright purchase, by donation, or by bequests of land, or alternatively by acquiring conservation easements or development rights to forest lands either by purchase, donation or bequest. To understand conservation easements, or purchasing development rights, think of owning land as holding a bundle of rights. A landowner can sell or give away the whole bundle, or just one or two of these rights -- the right, for example, to manage the timber on the land. To give up certain rights, while retaining most of them, the land owner deeds an easement which may apply to the entire parcel or a portion of it. Exactly what the landowner gives up, and what he or she gets in return, is spelled out in terms of each easement's legal document. By granting conservation easements or development rights forest landowners can be ensured that their forests will be protected and/or wisely stewarded in perpetuity without giving up their ownership rights. Conservation easements can also be tailored to the specific ecological concerns of each land owner.

A community can also use the same principles to obtain the development rights to land and its resources, in order to protect the ecological and scenic integrity of the community and its surrounding environs.

13. Why Use the LST Model to Manage Land and Resources?

An LST ensures that the use rights to lands and resources are held in public trust and are conditional on the application of a land stewardship ethic, which both protects the ecological integrity of the land and its resources, while allowing stewards to derive income from them.

14. Stewardship of the Forest

The LST model applied to lands with forests can provide for the preservation and conservation of old growth forests, as well as the "wise use" of forest resources not just for economic gain but for recreation, education, or spiritual nourishment.

15. How Does a LST Manage the Forest

A committee of forester(s) familiar with the principles of holistic forestry would assist the Land Stewardship Trust to draft a set of ecological management principles -- sort of an operationalized "land ethic" -- that would outline the conditions necessary for forest stewardship and forest harvesting based on the principles of holistic forestry.

The ecological use conditions of the forest would be "site-specific" as to geography, soil type, tree species, rate of growth, etc., and would be designed to ensure the long term viability of the forest ecosystem. Forest companies would submit Five Year Forest-Management Plans to the Forest Land Trust. Each company would outline how they intend to steward the forest in compliance with the ecological conditions placed on the forest lands in trust.

If a forest company's plan is accepted by the LST then a fifteen-year lease is negotiated. The LST's function as Leasor is to ensure the Forest Management Plan will guarantee a healthy forest in perpetuity, while the forest company's function, as

Leasee or steward, is to manage the forest according to the ecological conditions and the Five Year Forest Management Plan.

As long as the forest company stewards the forests appropriately, then the lease is renewable in its last year for another 15 year period. In this way the forest company has use rights in perpetuity for as long as they meet the ecological conditions of stewardship.

16. How to Create an LST to Manage Forest Lands

TIES works carefully with each community group to design an LST model that fits their particular needs. There are many creative ways in which lands and resources can be placed in trust to be protected, or wisely stewarded -- the only limiting factor being what is possible within the present context of Canadian and Provincial law, or U.S. and State law.

Two models have been used so far by TIES to place lands in trust. The first model is that lands, or money to purchase land, are donated to TIES. In this case all donations to TIES are tax deductible. Tax advantages include the possibility that if the present owner is willing to sell the land at less than the market price, then the difference between the appraised value and the selling price is tax deductible.

The second LST model is that TIES, or another non-profit society, holds a Reversionary Interest (RI) on the land title of the lands placed in trust, while the group of stewards retains actual ownership. The Reversionary Interest consists of a \$1.00 option to purchase that can only be exercised by the Reversionary Interest Holder (RIH) if the steward violates the LST agreement, refuses to rectify the situation, and after due process is found to be negligible. The stewards are then given thirty days to rectify the situation and if non compliance still occurs then the Committee would notify the forest company to rectify the situation or the lease would be terminated, and new stewards found.

17. Why Use the LST Model to Manage Forest Lands?

Using the LST model to manage forested lands has a number of economic, social and political advantages. Economic advantages include: decreased land taxes, economy of scale, Government funding, long term planning, as well as being a technique to apply CED or sustainable development at the local level. Other reasons are political in nature such as community control of resources and being able to set an example to government. Finally, some are social, such as collective ownership of resources or providing right livelihood in the community.

17.1 Decreased Taxes

Timber on residentially zoned lands can be costly to the landowners, as Lasqueti Island residents discovered, when they received their 1989-90 tax assessments. The B.C. Assessment Authority added timber values to their previous property values. As a result the land values jumped significantly if the majority of trees on their land were greater than 13 inches in diameter, the minimum size mills accept as merchantable timber (Rusland:1989 The Parksville-Qualicum Beach News). However, if these timber stands were placed in trust or under conservation easements the lands could be reclassified as Forest Lands. According to a Port Alberni assessment authority, "Forest Land isn't assessed until the timber is cut" (Rusland:1989 The Parksville-Qualicum Beach News).

17.2 Economy of Scale

All the timber on private lands can be stewarded by an LST under one management and harvesting plan. To increase the economy of scale the LST could also apply to manage other timber on Crown Land under a Woodlot Licence. If sufficient timber is managed by the LST, about 2000 acres, then the economy of scale permits hiring a part- or full-time resident forester to manage the forested lands.

17.3 Funding Availability

Individual land owners usually do not have sufficient lands in forests to qualify for funding from the Canadian Forestry Service under the Private Forest Lands Program, whereas the LST as "trustees" of the collective forest lands would qualify.

Forest lands under the direct jurisdiction of Municipal or Regional governments can obtain funding from the Ministry of Forestry as part of their Community Forestry Program. There may be ways in which an LST could collaborate with local governments or in the future qualify for these funds.

17.4 Long Term Planning

A LST provides the secure long term land tenure necessary for holistic forestry based on all-age management, selective logging and a sustained-yield cut, which in turn ensures a permanent forest cover for wildlife and recreational use.

Long term generational planning creates a balance between short term and long term profits, and allows for a steady forest income--profits that stay within the local community-- replacing the boom and bust cycles common to clear-cut logging practices.

17.5 Right Livelihood

Forests in trust provide secure longterm work, a "right livelihood" that promotes a form of living which also enlarges the spirit. Trees planted today become a community forest for tomorrow.

17.6 Community Control

When private forest lands are placed in public trust or protected by conservation easements the community begins to gain control over a local resource. Presently there are no controls over how forests are managed or harvested on private land. Usually, developers and logging companies simply clear-cut and subdivide.

17.7 Community Planning

A considerable amount of community planning is necessary to place forest lands in trust and in the process local citizens will develop a deeper personal relationship with the forest as a complete ecosystem which not only grows timber, but nourishes wildlife, stabilizes hillsides, provides water, and serves the recreational needs of human.

18. Setting an Example for Government and Industry

By placing forests in trust a strong message is sent to government and the forest industry that the public sector can manage forests in perpetuity, not only ecologically, but economically for the benefit of the whole community. While at the same time as long as the lease agreement is upheld then the integrity of the forest ecosystem as well as the forest company's use rights are protected in perpetuity.

If citizens want to change the way forestry is done in B.C., then a good way to start is to create a local LST as a demonstration forest project that can show citizens, forest companies, and government that there are viable alternatives to clearcutting. In the process the community will become familiar with the long term economics of holistic forestry, and be able to present a strong case to the forest industry and the Government of B.C. that stewardship obligations monitored by local citizens are a prudent way to manage all of B.C.'s forests.

19. Conclusion

In summary, land trusting techniques and conservation easements are a set of legal tools that can be used by a community in many creative ways to implement sustainable development plans at the community level. The implications of managing forests in trust are economic, social and ecological and could include the following:

- * New jobs;
- * Increased productive use of the forest by pooling small tracts of forest land to be managed collectively;
- * Tax incentives for land owners;
- * Strengthen local economy by increased revenue to land owners and the community;
- * New possibilities for value added forest products;
- * Resource profits that are dependent on the wise stewardship of the ecosystem;
- * Establish Community economic development in the forestry sector by and for local residents -- not just for this generation but for future generations;
- * Create conservation zones or ecological reserves to include old growth forests, wildlife preserves, wildlife corridors, watershed buffer zones, etc.;
- * Protect the integrity of ecosystems or watersheds;
- * Maintain a community's ecological integrity through the conservation of wildlife habitats and/or wilderness;
- * Protect agricultural lands for agricultural purposes;
- * Provide access to land for low income people, which they cannot otherwise afford to buy, in order to establish cooperative or community ventures;
- * Provide for appropriate development by keeping the ecological impact of the development to a minimum.

Ecologically sustainable development at the community level cannot happen overnight because as Aldo Leopold said:

We shall never achieve harmony with land, any more than we shall achieve justice or liberty for people. In these higher aspirations the important thing is not to achieve, but to strive...

Managing a forest according to the concepts of a LST model is one way a community can strive towards a "land ethic" or as Aldo Leopold says, "yet another search for a durable scale of values" -- an environmental ethic that can endure from generation to generation, not only to deepen our relationship to the land and forests, but to each other, the planet, and to all of life.

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WE ARE ON THE EDGE OF STARVATION: THE IMPORTANCE OF FORESTS TO CIVILIZATION AND AGRICULTURE

Larry Ephron

Introduction

Three droughts in the 1980s, each worse than the last, have increasingly damaged our ability to grow food. The terrible heat and drought of summer 1988 destroyed almost a third of all the grain growing in the U.S., the basic staple food of our lives. For probably the first time in our history, we were not able to grow enough grain to feed ourselves.

Lester Brown, director of the Worldwatch Institute, says that if there is another severe drought in 1989, America and other affluent countries will already be faced with the choice of going somewhat hungry ourselves or condemning millions of people to starvation. Even if we were to hoard all our grain (and perhaps risk global, even nuclear war), two or three more severe droughts in the next few years could quickly wipe out all our reserves and bring us to the edge of starvation ourselves.

There is widespread agreement that the spreading drought is caused by the greenhouse effect, which results when the rapidly rising level of carbon dioxide and other gases in the atmosphere trap additional heat from the sun. What is only gradually becoming recognized is that the greenhouse effect also causes other extreme climatic changes, which are also rapidly destroying our ability to grow food.

This Greenhouse is Sometimes Freezing

Most observers assume the greenhouse effect will warm the Earth's climate dramatically in the coming years, since the four hottest years of the century were all in the 1980s and the summer of 1988 was unbearable.

But surprisingly, winters have also been getting longer and colder for the past 50 to 100 years. Over and over again in the last fifteen years, Northern hemisphere winters have been the coldest in recorded history, and record snow has fallen shockingly late in the season in many areas, sometimes even into June and July. What is going on?

The greenhouse effect is indeed occurring -- but primarily in the tropics and lower latitudes, where there is a lot more of the

sun's heat for the greenhouse gases to capture. Since the polar regions get few of the sun's rays, the greenhouse effect is minimal there. So the greenhouse effect is primarily heating up the tropics and lower latitudes.

Any meteorologist can tell you what happens next. As the greenhouse-heated tropical air rises faster, cold, heavy polar air rushes in to fill the vacuum. So the Earth's air masses circulate faster, creating higher winds. In fact, there have been increasing numbers of hurricanes and tornadoes for half a century now, and 1988's Hurricane Gilbert was the strongest ever recorded in the Western hemisphere.

These greenhouse winds often carry a lot of moisture with them, evaporated from the surface of overheated tropical oceans. When this moisture is carried in clouds to the higher latitudes, it precipitates out -- as increasing rain during the spring and fall, and as more snow and ice during the winter. Thus winters get longer and colder. In the last forty years, longer winters have reduced the growing season by almost a month in the American midwest. All these phenomena are well-documented in the scientific literature.

In the summer, the winds circulate more rapidly toward the opposite pole, which is now in winter cold. So most of the moisture-laden tropical clouds are blown to the opposite hemisphere, leaving behind intense summer heat and drought, to make our lives miserable and kill our food crops.

All of these terrible consequences of the greenhouse effect -- record heat, drought, high winds, longer winters, and increased spring flooding from the excess snowfall -- destroy our ability to grow food. The drought is only the most extreme threat at this time. It began with the unprecedented 15-year drought in northern Africa that killed millions of people, and which seems to be recurring with only a brief pause. A severe drought in the southeast states of the U.S. in 1986 destroyed some 90% of the crops in that region. And now the ominous drought of 1988 shows us where we are headed.

Some climatologists argue that because of the great natural variability in the climate, we cannot be sure that the record cold winters and hot summers of recent decades are anything other

than normal fluctuations. But Stefi Weisburg and Janet Raloff calculated the likelihood that the long north African drought was a random series of dry years at about 1 in 130,000.

There is a grave misunderstanding in all public discussions of the greenhouse effect. By looking only at average global warming as the greenhouse "signal," scientists can still argue whether the climate has yet been affected, or when the problem will become serious. Even those who insist that the apparent 1/2 degree C warming over the last hundred years is the long-awaited signal, continue to focus on what we can expect in the middle of the next century (perhaps in part because their computer models are arbitrarily set for a doubling of atmospheric carbon dioxide, expected by about 2030).

The increased cloud cover and precipitation attributable to the greenhouse effect -- especially in winter at the higher latitudes -- has been both theoretically predicted and empirically verified by climatologists at major universities. It has recently been determined that middle and high latitude winter clouds result primarily in substantial cooling, rather than warming. And Ray Bradley at the University of Massachusetts and others have found "marked increases" in mid-latitude precipitation over the last 30-40 years, mostly in winter. They also found increasing drought in the lower latitudes over the same time period, especially in summer and fall.

In other words, the greenhouse effect has already been doing both major scorching (the tropics, and higher latitude summers) and major freezing (mid- and high-latitude winters) -- and has been doing both for decades. **By continuing to look only at global averages, in which the warming and cooling effects of greenhouse gases cancel each other out, "greenhouse-warming" climatologists are doing us a terrible disservice.** We are being lulled into an utterly false sense of security that the worst consequences of the greenhouse effect are several decades away, a time so far in the future that most of us don't expect to be alive.

But it's not a question of what the world will be like for our grandchildren. If we don't act fast, it's a question of whether we ourselves will survive the next five or ten years. Why are most climatologists ignoring the kinds of research described above, all of it reported in mainstream journals?

The Ice Ages

We now know that the major ice ages recur on a vast 100,000-year cycle -- about 90,000 years cold, only 10,000 years warm (with up to a couple of thousand years variation). Evidence of the past 25 of these cycles has recently been discovered in glacial and sea-floor core samples.

We are about 10,800 years into a warm time, one of the so-called interglacial periods. Everything we think of as human civilization -- pottery, agriculture, the wheel, writing, cities -- has been created in that brief span of time since the last major ice age ended and the Earth warmed up again.

What could cause such an awesome recurring cycle of ice ages? Until recently, many scientists have believed that the major ice ages are caused by very small changes in the Earth's orbit and rotation, changes which have minute effects on the amount of sunlight falling on various parts of the globe. Some of these orbital movements do seem to cause relatively minor fluctuations in ice cover on the Earth. But the small variation in the Earth's orbit around the sun, which very slightly narrows and widens on a hundred-thousand-year time-frame, produces changes in sun-

light which are so minute -- on the order of half of 1% -- that many scientists, like Stephen Schneider, director of interdisciplinary studies at the National Center for Atmospheric Research, now feel that this is too small to be the cause of the major ice ages.

This orbital theory assumes that something has to cool the Earth to bring on an ice age. But Sir George Simpson, former head of Britain's Royal Meteorological Society, suggested fifty years ago that, paradoxically, some source of increased energy would have to be found -- energy to move the huge amounts of water that builds up the glaciers during an ice age. But nobody could figure out where that energy might come from, or what would make it flow in the distinctive pattern of the ice age cycles.

John Hamaker's Theory

Finally a scientist has come up with a plausible source of that energy. John Hamaker is a mechanical engineer trained at Purdue, who has been studying climate from a multidisciplinary perspective for the past fifteen years. Hamaker believes that the energy to build up the ice age glaciers comes from a greenhouse effect, which transfers tropical moisture to the higher latitudes during the winter.

But wait a minute, isn't the greenhouse effect caused by human activities? How could a greenhouse effect have been responsible for the major ice ages, almost all of which occurred long before we ever existed?

Science has long known that a great deal of erosion, by wind and water, takes place during the 10,000 years of each warm interglacial period. One of the major consequences is that the minerals in the soil get substantially eroded away, or leached deep into the subsoil, where they are no longer available to the trees and other plants.

We now know that close to a hundred minerals -- iron, calcium, magnesium and many others -- are essential nutrients for all plant, animal and human life. As the vital minerals in the soil get eroded away, the Earth's forests get progressively weaker, and eventually begin to die back. They succumb more readily to insects, disease and forest fires, all of which increase.

As the forests die back, they not only consume less carbon dioxide from the atmosphere, the huge amounts of carbon stored in them is released back to the atmosphere -- where it recombines with oxygen to form large quantities of carbon dioxide. Since carbon dioxide traps more heat from the sun, this increase creates a naturally-occurring greenhouse effect, with all the extreme climatic consequences we described earlier.

This greenhouse effect continues for tens of thousands of years, transferring more and more moisture to the growing polar glaciers and creating an ice age. The tropics, paradoxically, are known to be hotter during an ice age, something which could never be explained before.

Why does an ice age ever come to an end? That's the last piece of this awesome puzzle. As the glaciers slowly advance over tens of thousands of years, they grind up the rocks in their path into a dust as fine as talcum powder. This dust is then carried by streams and blown by wind over many parts of the Earth.

Rocks are made up of minerals. So this rock dust remineralizes much of the Earth's soil! It nourishes the forests again, and they become rejuvenated. As they thrive and spread, they consume the excess carbon dioxide in the atmosphere. The green-

house engine eventually subsides, and another mild interglacial period, like the one we have been living in, is ushered in.

Every element of this complex theory is validated by current scientific knowledge. The fact that this knowledge is spread out in several scientific fields, and that most scientists focus on narrow specialties, may be part of the reason this grand pattern was not recognized earlier.

The Coming Ice Age

Pollen specialist Genevieve Woillard, studying deep undisturbed pollen beds left by ancient trees, concluded that last time, the final shift from a warm interglacial climate to the beginning of the last ice age -- when it became too cold for fruit and nut trees to grow -- was "less than 20 years." Observing that European forests now seem to be dying in a similarly precipitous way, she wrote, in 1979, that we may already be well into a comparable period of rapid climatic change, and only a few years from the beginning of the next ice age.

This time around, we are accelerating the natural processes of climatic change by adding our own contribution to the greenhouse effect: destroying the world's remaining forests at an ever-increasing rate, and burning the long-buried remains of ancient forests which have turned to coal, oil and natural gas.

Hamaker agrees with Woillard's assessment of where we are in the current cycle. He feels with Worldwatch that we may be less than a year or two from widespread hunger and starvation. And he believes that if we do not act in time, the majority of people on Earth, in every region, will starve to death, probably in less than a decade.

What Can We Do?

If Hamaker's theory is correct, however, and if we act quickly, we may have it within our power not only to slow down the deterioration of our climate, but to stop the cycle of ice ages completely.

How? By doing four simple but monumental things very fast: (1) Stop the clearcutting/burning of the world's forests, especially the fast-growing tropical rainforests which contain so much carbon. (2) Plant vast quantities of fast-growing types of trees to quickly begin consuming the excess carbon dioxide. (3) Take over the glaciers' job and remineralize much of the Earth ourselves, simply by grinding up mixed gravel into a fine dust and spreading it over the forests, to rejuvenate them.

And (4), take a two- or three-year vacation from our energy-guzzling way of life -- until enough of the new trees come in and existing forests can be revived. These things will reduce the greenhouse gases enough to move us back from the brink of oblivion, and give us the time to create a less suicidal way of life. Within just a few years a sustainable way of life can be based partly on liquid and gaseous fuels (methanol and methane) from newly planted trees, and partly on solar, wind and other safe, nonpolluting energy sources.

We can also quickly remineralize our farmlands, to increase yields dramatically (on the order of 300-400%, based on exist-

ing research!) -- before drought and other climatic threats wipe out all our meager food reserves and much of our ability to grow food. Remineralizing our agricultural soils will also allow us to stop using chemical nitrogen fertilizers, which are adding to the greenhouse effect, and toxic pesticides, which are poisoning the Earth and contaminating our food. Plants grown on remineralized soil are so hardy they do not need any pesticides.

But we may have to act very quickly to have any chance of succeeding. The climate system may very soon reach a point-of-no-return, when various feedback loops (for example, drought kills forests, which increases both drought and the greenhouse effect) take the deterioration completely beyond any human capacity to reverse it. At such a point the Earth would be committed to the 90,000 years of the next ice age. It is quite possible that we are less than a year or two from such a point.

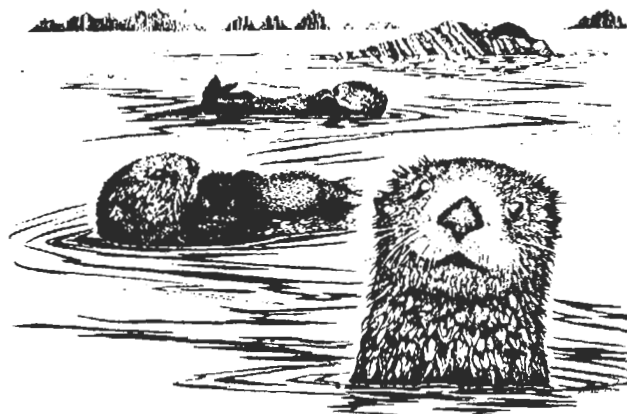
Unfortunately, it probably won't be easy to get such massive things accomplished, even with the threat to our survival. There are enormous vested interests making huge profits from the current way of doing things.

But it may not be hopeless. "Debt-for-Nature" swaps have recently been made in which rainforest countries agree to protect large preserves of forest in exchange for reduction of their national debt: the banks agree to discount the loans greatly (85% or more), and foundations have put up the money. On this model we might be able to save most of the remaining rainforests for less than \$100 million. The Live-Aid concert for drought victims in north Africa raised \$82 million in one weekend.

But the world's governments are going to have to finance and organize most of what needs to be done, and they're probably not going to acknowledge the need and do it in time, unless there's a mass movement to demand that they do. It may take a movement as big and determined as that which stopped the Vietnam War, and we have little time in which to organize it.

It looks like we need to put aside everything in our lives that isn't absolutely essential now, and get on with what is -- our survival.

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SMALL, ORGANIC FARMS CAN SOLVE THE FARM CRISIS

Mark Satin

There are not one, but two farm crises. The "official" farm crisis is bad enough -- and no genuine solutions have been forthcoming from the traditional left or right. The "unofficial" crisis is typically ignored by policymakers from both sides.

The official farm crisis -- soaring farm debt, dramatically increasing numbers of farm foreclosures -- is in part a result of the farm policies that have been enacted over the last two decades. These policies are hopelessly contradictory. For example, tax policies are designed to help big farmers get bigger, and to encourage surplus production on marginal lands (e.g., about 3% of our wheat is grown with federally subsidized water!). At the same time, farmers are paid to not plant crops. In 1983, subsidies to farmers from that year's farm program totalled \$32 billion. That's \$12 billion more than the **net earnings** of farmers!

In response to this situation, many conservatives are calling for a "free market" in agriculture. The response is understandable, but the effect would be to wipe out all but the 100-200,000 biggest farmers. As for the traditional liberals, here, as in so many other areas, they have become the party of the status quo. They don't want anyone to have to leave farming, and they are prepared to continue to provide massive subsidies to ensure the continuation of "farming as usual."

Hidden Crisis

Unfortunately for the prospects of "farming as usual," a hidden farm crisis is brewing -- "hidden" because it is rarely addressed by traditional liberals or conservatives. It consists of the following:

*Our agricultural lands lose 4.8 billion tons of topsoil annually to erosion -- enough to cover all the cropland of New England with one foot of earth.

*To maintain high crop yields, we apply an average of 111 pounds of synthetic fertilizer per acre of cropland each year -- about 210 pounds for every person in the U.S.!

*In the past 15 years, while pesticide use has gone up 140%, crop loss to insects has **increased** more than 40%!

*More than 75% of the food we eat is processed in some way.

*The average molecule of processed food in this country travels 1,300 miles before being eaten.

Fortunately for us all, some people are addressing both farm crises -- and are doing so in constructive and innovative ways. But they're not well known in Washington, to say the least. They include such people as Chuck Hassebrook, at the Center for Rural Affairs in Nebraska; Christopher Hitt, at the American Farm Foundation in Missouri; Wes and Dana Jackson, at the Land Institute in Kansas; and Ellen Pahl, at the Regeneration Project in Pennsylvania. We like to call them the "Re-framing Agriculturalists," because their work, taken together, is creating a whole new framework for understanding agricultural issues.

If you put together what the Re-framing Agriculturalists have been saying, it is this: to solve the farm crisis, we need to achieve at least six interrelated goals. We need to increase farmers' profits. We need to establish more small farms. We need to put more people on the land. We need to adopt sustainable agricultural practices. We need to achieve regional self-reliance in food. And we need to increase the nutritional quality of food.

It's a visionary agenda, but given the "hidden" farm crisis, it may also be our only realistic one.

Increase Farmers' Profits

The obvious way to increase farmers' profits is to increase the prices people pay for farm goods. Some Congressional populists would have the federal government impose rigid farm-by-farm quotas on production. The idea is to lower production enough to drive up prices. However, most of the Re-framing Agriculturalists are searching for methods that would keep the government out of the business of policing farm production, and would keep prices from going up in the supermarkets (to the detriment of the urban poor).

Spokespeople like Ellen Pahl and Chris Hitt are making the point that organic farming and local marketing could -- all by themselves -- increase farmers' profits substantially. "If all farmers were to cut their input costs by farming regeneratively," Pahl told NEW OPTIONS, "savings in fertilizer alone would be enough to provide over one million farms with the present average farm income. And with less input costs, interest payments would decrease as well....If there were more local markets for a more diversified crops-and-animal production system, farmers would earn more for their products because there would be fewer middlemen than in the transcontinental distribution system we currently use."

Break Up The Big Farms

Food production is becoming concentrated in fewer and fewer hands. Currently 1% of farmland owners control 30% of all farmland.

There would be some justification for this Banana Republic-like development, if it could be shown that there are "economies of scale" in agriculture. But there are none. According to Chuck Hassebrook and others at the Center for Rural Affairs, most types of farms come close to "theoretical technical perfection" while they are small. For example, a typical Midwestern corn and soybeans farm achieves 90% of its potential efficiency with 300 acres under cultivation. Production efficiency may actually decline as farms grow larger than this. It is only the tax structure of American agriculture that makes it possible for larger

farms to reap greater profits. It is entirely shameless in this. For example, the individual farmer with a taxable income of \$50,000 pays 40%, while the rate for corporate farms is 17%.

The Re-framing Agriculturalists have proposed a number of measures that would, in effect, break up the large farms and permit their division into many small ones. They would, to begin with, tax family-sized farms at the same rate as corporate farms, or even at a lower rate. Jefferson is frequently quoted on this score: "[Let us] exempt all [property] from taxation below a certain point, and tax the higher portions of property in geometric progression as they rise."

Marty Strange, a colleague of Hassebrook's, would eliminate the use of tax deductions that heavily favor large farms (e.g., those that encourage purchases of heavy farm equipment, and those that encourage the sale of capital assets like land and breeding stock). Medard Gabel, a colleague of Pahl's, would put a \$25,000 limit on the amount of subsidy any one farmer could receive.

Bring In More Farmers

Most advocates of family-sized farms are seeking to "maintain" or "preserve" the number of farmers now on the land. Often they'll admit they're motivated partially by sentiment. The Re-framing Agriculturalists would bring more people onto the land -- millions more. And they'd do so for reasons that are eminently practical.

The main one is that you can't have organic agriculture without more people -- a point well made by Dana Jackson in conversation with NEW OPTIONS: "You can't farm well without caring. We need a better eyes-per-acre ratio to take care of land well."

"Increased labor requirements on 'organic' farms [might] range from 2% for apple production in the Northeast to 111% for corn production in Iowa," says one Regeneration Project document. "Changing the average size of the U.S. farm to 300 acres [from 430 today] would create over one million additional farms employing [nearly] 1.4 million people -- two million if the additional farms were [organic]" ("Jobs for Americans," 1984).

The Great Fear in Rural America is that more farmers would mean less income per farmer. Not so, say the Re-framing Agriculturalists. According to Pahl, billions of dollars of energy savings would result from market decentralization and decreased farm size. Moreover, "If the billions of dollars of subsidies that the taxpayer/consumer is currently paying to the large farmers were removed, and these tax revenues were given back to the consumer, the actual price paid for food might indeed be less."

There are about as many proposals for attracting more people to farming as there are Re-framing Agriculturalists. Hassebrook told NEW OPTIONS that the Farmers Home Administration (FmHA) should return to its original purpose of providing reduced-interest loans to low-income and beginning farmers (over the years it's drifted into the role of providing "emergency" credit to cushion expanding farms for financial risk!). Other Re-framers are pursuing a more exclusively market-oriented approach. Let's figure out how to make small plots profitable again, they seem to be saying, and new farmers will come running.

In Alabama, Booker T. Whatley, recently retired professor at Tuskegee, is figuring out how to turn a tiny, 25-acre farm into a

moneymaker. (Among his suggestions so far: it must have a year-round cash flow from crops that mature sequentially, and it must sell its crops to signed-up "members" to assure a steady flow of customers.) In Missouri, Chris Hitt is establishing a network of "training farms" to introduce beginning farmers to organic agriculture and to business. "Farmers were all entrepreneurs once -- they had to be," he told NEW OPTIONS. "We're trying to get entrepreneurship back into farming again."

Promote Organic Farming

It should be obvious by now that the centerpiece of the Re-framers' proposals is the promotion of a largely organic (a.k.a. "sustainable" or "regenerative") farming system in the U.S.

Pahl and Gabel would hope to achieve this simply by creating a level playing-field for organic agriculture. They are convinced that, "Without subsidies, the small number of large farms would not be able to produce the crops that they do with the costs they presently have, [and] there would be more farms and more people in farming."

Michael Luick, head of the Terra Nova group in Iowa, would have state governments play a more explicit pro-organic role. Here is one of his model proposals: "The Iowa Department of Agriculture should declare an eventual phase-out of the general use of pesticides, herbicides, and artificial fertilizers over a 10-year period."

Encourage Self-reliance

A final goal for the Re-framing Agriculturalists is to achieve regional self-reliance in food production. It sounds impractical, even romantic, but the Re-framers' rationale is hard-headed as can be. "A more regenerative, regional food system would not have the long-distance transportation bills to pay that our present food system does," Pahl told NEW OPTIONS. "Nearly \$21 billion is spent just moving food in the U.S. -- amounting to \$344 per family." Other Re-framers emphasize that regional markets could provide fresher and more nutritious food.

How to create regional self-reliance? Simply moving to an organic system would help, since most organic systems would require farmers to plant a variety of crops, not just one or two. Farmers' markets are catching on and can certainly help. In addition, farmers need to market their crops much more systematically to local and regional outlets. "You have got to start with the marketplace," Hitt told NEW OPTIONS. "If the farmers were connected in a tangible, real way with the [local and regional wholesalers and retailers], that would do more than any single thing to get [American farming] back on track."

Courage Of Our Convictions

The genius of the Re-framing Agriculturalists' program is that it is internally consistent. Small farms can be worked organically. Organic farms require fewer costly inputs, meaning farm profits can rise, meaning more people will want to go into farming. Organic farms require more farmers than large, mechanized farms. Organic produce is nutritionally sound. Fresh, nutritionally sound produce can find markets close to home.

To move toward the Re-framers' program, it will be necessary for the traditional left and right to take the "hidden" farm crisis into account. And it will be necessary for decentralist/globally

responsible, Greenish advocates to have the courage of their convictions and insist on the interconnected, inseparable nature of their proposals, even if that puts them at odds with most of the farmers' own organizations.

Sources: Hassebrook: Center for Rural Affairs, P.O. Box 405, Walthill, NE 68067. Hitt: American Farm Foundation, 1712 Ribback Road, Columbia, MO 65201. Jackson: Land Institute, Route 3, Salina, KS 67401. Luick: Terra Nova, 2919 Oakland, #2, Ames, IA 50010. Pahl: Regeneration Project, 33 E. Minor St., Emmaus, PA 18039; "Jobs for Americans," \$6.

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SOIL, FOOD, HEALTH AND VALUES

Stuart B. Hill

Suddenly I realized that nobody knew anything and from that moment I began to think for myself.

- Maurice Nicoll

The task is not so much to see what no one has yet seen, but to think what no one has yet thought about what everybody sees.

- Arthur Schopenhauer

I start with these two quotes firstly to encourage you to be willing to do your thinking and be wary of being over-reliant on so-called experts, and secondly, to caution you that recognizing the significance of what I am about to present will require a willingness to do new thinking about subjects that you may not have previously regarded as worthy of close attention.

Thinking, however, is not enough, for it is only when we feel passionately about something that we are likely to exhibit the necessary commitment to translate our clear thinking into effective action. Hence, "The task is not so much to think what no one has yet thought, but to feel what you have not yet felt about what you and others have thought." The importance of acknowledging our feelings was particularly evident to me at a conference a few years ago at which Joe Collins, co-author of "Food First" and "Aid as Obstacle," went through a depressing list of ways in which people in less industrialized parts of the world are oppressed by those in the more industrialized parts. Three of us were to respond and as the final speaker I had heard my colleagues present two more installments of "bad news." I had watched the energy level of the audience go down and down, and I knew that I just had some more bad news to tell. At that moment I acknowledged my feelings - I was feeling really angry - so instead of launching into my prepared text, I shouted into the microphone as loud as I could, "DOESN'T THAT MAKE YOU DAMN MAD!" At that point we started to discuss the issues. I'll never forget an elderly McGill professor coming up to the microphone and saying, "It makes me damn mad and there are a few things I want to say," and he probably was saying those things for the first time. I should add that "The task is not just to feel what you have not yet felt, but to transform your knowledge, skills and feelings into personal actions that, for example in the food area, will lead to nourishment and fulfilment

for all, and sustainability of the systems involved." To avoid burnout and personal frustration it also helps to keep in mind that "The task is not so much to act in isolation, but to act in cooperation with other humans, other organisms and with the plant itself." I think it is extremely important for humanists to work in collaboration with other groups based on our common interests.

We are presently losing, based on a conservative estimate, a species a day on this planet (some have estimated over 100 species a day: over 400 times the natural rate of loss of species). This is a measure of the functioning of humanity. We could lose 20% of all species within the next generation, and a quarter of all plant families by the end of the next century, i.e., 50 families. We desperately need to translate our thinking about such insults to life into effective cooperative action.

Over a third of the earth's land area is threatened by desertification. The surface of the earth has been likened to the human body, which cannot survive losing more than a third of its skin. If the earth loses much more than a third of its surface through desertification. There will be irreversible changes with respect to atmospheric and biological functioning, and this will certainly have negative effects on our own species.

The Science Council of Canada recently published their study of soil degradation. Whereas the present cumulative cost was estimated to be about one billion dollars, by the year 2005 it is expected to reach \$44 billion, unless we make radical changes in the way in which we farm and manage the land. Over the last 30 years we have lost 60% of the organic matter content of some of our most productive prairie soils. We have lost it by inappropriate farming systems that keep the soil exposed for most of the year, and that emphasize row crops with bare soil between the growing plants. There is loss of soil in wind and water, breakdown of organic matter by exposure to heat and degradation, and lack of return of organic waste to the soil. Such losses are clear evidence that our present practices are unsustainable. Soil should be covered with green or brown material at all times, i.e., growing plants or dead organic matter. But the systems of agriculture on which we currently rely depend on keeping the soil bare. As I will point out later, I think the reasons for this are not primarily scientific, but psychological.

We try to enrich this eroded and degraded soil by putting on nitrogen, potassium and phosphorus fertilizers. But out of poor

soil we can produce only poor quality food. We take basically the same "enrichment" approach to food that has been degraded by food processing. Perhaps two or three dozen different nutrients are partially removed and only three or four added, and the processors have the audacity to call the food "enriched." In medicine we see the same approach to the human body through the taking of vitamins, minerals and toximolecular substances; and, if these approaches do not work, the surgeon is summoned -- a sad state of affairs.

There is another approach to sickness. It is to look at the previous stage in the chain of forces affecting us. One of these forces is the state of the food, whose quality is partly determined by the quality of the soil. Examining the causes of problems is one way in which we can take a more scientific approach to finding rational solutions. From 1953 to 1973 the Canadian population grew by 49%, but the cancer death rate grew by 73%, and 60% to 70% of those cancers are claimed by the Ontario Cancer Society to be related to food.

Why have we been a long time coming to grips with this? Starting in the 1920's, Drs. Williamson and Pearse examined the health of the population of Peckham, London, and they found that only 10% of the people were free of detectable physical or mental disorders. Ninety percent of the population were "sick." Although 20-30% were aware of their condition, 60-70% had exactly the same diseases and conditions but were unaware of this. Based on this finding and other observations, they classified the population into three states: healthy, diseased and compensatory. Thus, most of the population had developed compensatory lifestyles to mask their true conditions. Studies repeated since then have found roughly the same distribution among other Western populations, probably including those reading this article; i.e., most of us are living to some extent in a compensatory state.

There are certain characteristics of this compensatory state that are important to understand. We tend to deny the disorder. We do this not only about our own physical condition, but often also about the state of society and of the environment. To mask its effects there is first a widespread interest in stimulatory activities that are very distracting, and second a tendency to get involved in postponing activities such as forming committees, knowing that they won't lead to anything. Indeed, as a society we have invested considerable efforts into setting up institutional structures to support our compensatory habits. Even meetings such as this Humanist Conference are, to some extent, compensatory, because they rarely lead to the sort of action that is required. Unless you commit yourself to take some relevant action I will have fallen short of my objective to facilitate our moving out of this compensatory state.

If we examine our culture -- our social structures, our education, our relationships, birthing, child-rearing and consumption patterns, recreation and work, and also our industries, agriculture, forestry, social services, and political and legal systems -- we can usually recognize two agendas: one that is rational, and another that is designed and maintained (usually unknowingly) to meet our compensatory needs, thereby keeping us partly in the dark and willing to continue postponing taking relevant action.

My position is that there are many inter-related local and global problems, and many of these have reached crisis levels. They are all caused by my species, including me. They can only be solved and prevented by my species, including me, and this re-

quires that I change the way I feel, think and act. This approach is based on the important assumption that I can change. So the whole crux of my argument is based on each of us taking responsibility for changing ourselves and, in particular, abandoning our compensatory habits.

The general approach to problems in our society today is to recommend economic growth. But what does economic growth imply? In its conventional form it implies increases in resource consumption, waste production, environmental impact, degeneration of the support systems, impacts on humans, an increased sense of vulnerability, and an expansion in the tendency to resort to emergency measures to solve these problems. In agriculture this is particularly obvious. For example, we now automatically put antibiotics in animal feed. Instead, antibiotics should be reserved for real emergencies. Now when we are faced with a problem that really requires an antibiotic, the micro-organism may no longer be affected by it.

The use of pesticides has also become standard practice in agriculture, rather than as an emergency measure. This characterizes a humanity in retreat. We have become victims of a process of increasing dependence on emergency measures for maintaining our existence.

It is time to consider human growth and development as an alternative approach to progress. We will need to develop a supportive relationship with our resources and wean ourselves from our present dependent state. This will require a radical rethinking of our relationship with the Earth.

We can already recognize some indications of the crisis. Currently (1987) a quarter of Canadian farms are facing financial difficulty and possible closure. Farm debt is over \$21 billion. A third of prairie farmers may be out of business by the end of this year. Potato prices in P.E.I. are two cents per pound at the farm gate; cost of production is six cents per pound. We have taken our cheap food policy to ridiculous ends, and made the farmer increasingly dependent on government subsidies. Economically, it is now almost impossible for anyone new to enter farming. A tragedy for me is seeing students, trained in agriculture, having to accept jobs as feed, fertilizer, and pesticide salespeople, when what they really want to do is to farm.

Most of us tend to have rather romantic ideas of the farm and the food system, but things have changed radically over the past 50 years. Today farms produce the raw materials which the agribusiness system collects, processes, stores and delivers to us packaged as "neofood" -- reaping profits at every stage of the process. The number of middlemen has increased, and the highly processed products are correspondingly more expensive and less nutritious.

Through the industrialization of agriculture we have certainly increased productivity per area and per farmer effort; but we have done this by increasing energy inputs, particularly in the forms of fuels for machinery and the production of fertilizers, and to some extent pesticides. At the same time there has been an incredible increase in pollution, soil erosion and other related impacts. The energy efficiency of this system has gone down dramatically. Whereas a farmer in China might put in one unit of energy and get 100 back in the form of rice, in North America, which relies heavily on feedlot beef, a farmer can be putting in 100 units of energy and getting one back in the form of beef. Agriculture has become an energy sink.

The amount of natural capital within the system has gone down in several ways. Soil fertility has decreased, so that we have be-

come more dependent on synthetic fertilizers to maintain the system. The natural pest control capacity of the systems has declined, so we have become increasingly dependent on synthetic pesticides. The amount of genetic material in the gene pool is gradually eroding away as we specialize in a narrower and narrower range of crops, and some are under the illusion that this can be solved by biotechnology.

The farmer is in the worst position to effectively respond to this situation. The farmer buys retail and sells wholesale. S/he is completely in the grip of the input oligopoly, the output oligopoly, the bank and the tax man. Donald Mitchell, author of *The Politics of Food*, showed that in the 1970's one out of every four dollars that Canadians spent went to one interlocking oligopoly, which included Massey-Ferguson, Canada Packers, Dominion Stores, and a number of other agribusiness enterprises. When the farmer goes to the bank to borrow money, the bank manager will often only approve a loan, if it is to be spent on products produced by other members of the oligopoly. If the farmer wants to borrow money to set up a farm that is not dependent on such imported synthetic inputs, that is designed to be self-regulating and self-sustaining, then the bank is predictably not too interested. A cartoon I saw recently put it very well: The bank manager was saying to his son, who is looking at a farm, "Some day, son, this will all be yours!" The change in farm organization from family farms to large corporate, industrialized farms is increasing; so is our dependence on production for distant and uncertain export markets, and on government subsidies. The diffusion of urban social and industrial values to rural areas is having an enormous effect on the way farmers live, what they demand, and how they approach farming -- increasingly as a factory process, not as a farming process. As corporate concentration expands, the number of strong economic players in the food system declines.

Presently the food system emphasizes three objectives: productivity, profit and power -- the use of the food system as a bargaining tool in international relationships -- and the folly of this focus is that it fails to recognize ecological limits. Natural systems function with numerous built-in limits which, in transcended, result in resource exhaustion, environmental impact, and degradation of person and planet, outcomes which are obviously not sustainable. In contrast, goals such as nourishment, fulfilment, flexibility, evolution, justice and sustainability are more likely to respect natural limits, conserve resources, be based on renewable resources and their maintenance, and be supportive of the development of person and planet. Such sustainable objectives are broader than the present narrow agribusiness ones.

The food system is really a cyclical system of production, consumption and not recycling. In our effort to increase production we have taken resources, primarily non-renewable ones, injected them into the production part of the cycle, thereby making it appear that the recycle part is not important. Instead of the wastes being recycled, they are allowed to accumulate or contaminate fragile ecosystems, thereby wasting valuable resources and causing damage to the environment. Thus, the outcome has been increased resource dependence, environmental impact and related health problems, partly resulting from changes in the quality and composition of the human diet. There has been an increase in the probability that toxins will be present in the diet and nutrients lost. In this way we expose ourselves to increasing amounts of

stress and, at the same time, reduce our ability to recover from it. The result: a predictable increase in degenerative diseases.

Soil is a living system containing hundreds of different types of beneficial organisms that maintain the integrity of that system. Unless we take care of these organisms, they will not be able to benefit us. We tend to ignore such unseen allies, and may even see them as enemies. For example, our society tends to be entomophobic, afraid of insects, and constantly at war with insects, yet 99.9% of insects are beneficial or neutral with respect to humans; only 0.1% are pests. If we use pesticides to kill these we risk the lives of the harmless 99.9%, thereby destroying many of our allies.

What is imperative for soil is that sustainable systems of management be implemented; and what is imperative for food-health relationships is that people become aware of their individual needs and tolerances. For example, one individual's requirement for a particular nutrient, such as Vitamin C, might differ from that of another individual by as large a factor of 100, because of differences in their metabolic functioning and lifestyle. Thus, RDAs (recommended daily allowances), which imply that all people have uniform requirements for different nutrients, merely reflect the primitive state of the science of nutrition. Eventually techniques will be available whereby individuals will be able to determine their unique and changing needs and tolerances.

Many of the things that we do within the food system decrease the nutritional value of food. It can be lowered by reducing the presence of desirable components and by adding undesirable materials, such as pesticides. The production process involves selecting a crop and a site, planting the crop, maintaining the site and harvesting the crop. We then usually transport, store, process, package, and eventually consume the product. There is a high probability that during each of these processes nutrients will be lost and toxins added. Crops are more often selected for their productivity than for their nutritional value; and one of the easiest ways to increase the productivity of a vegetable is to increase its ability to retain water. Some of our increased productivity of vegetables actually reflects an increased capacity to sell water to people. When you shop for vegetables, I recommend that you choose the smallest product, because usually these are the one that have the least water, whereas the great big lush looking items represent a fairly expensive way of buying water!

We not only select for productivity, but also for machine pickability, for resistance to pests, shelf life, and cosmetic appearance. Selection for such non-nutritional qualities is likely to reduce nutrient content. Planting sites are selected to maximize productivity and profit. Often produce is grown in areas that are not ideal for them, and this can result in a loss of nutrients. The same plant is often grown in the same soil year after year. If that plant tends to require a lot of zinc, for example, its annual demand will eventually deplete the soil of zinc; the pantry will be bare, and when you eat the plant you won't get enough zinc.

Pesticides of course are poisons, and so their use can make food more toxic. Harvesting is often done before the plant is ripe, because it can be more easily machine-picked, and this can lower its nutritional value. Transportation, storage, processing, packaging and preparation may all result in a loss of nutrients and an addition of toxins.

To examine how soil and climate can affect food quality, the same variety of spinach was grown in about 20 different states

in the U.S.A. The manganese content of the final product varied from one part per million (ppm) to 117 ppm; iron from 1,584 ppm in the west to as low as 19 ppm in the east. These differences are significant nutritionally.

One cause of such difference is our tendency to add to soil massive amounts of single nutrients, such as nitrogen, potassium and phosphorus. All of these interact with the other elements in soil. For example, phosphorus interacts with iron, sodium, calcium, boron and aluminum, and can change the availability of these elements to plants. In the human body elements such as manganese and iron function in the formation of essential enzymes. Manganese is a co-enzyme in arginase, which is involved in the formation of urea. If nitrogenous waste products are not converted into urea, they can result in poisoning.

Relatively little (less than 50%) of the nitrogen fertilizer applied to the soil is actually taken up by the crop. Most of it is lost through erosion, leaching, and conversion to gases. Some goes into the atmosphere as ammonia and some of this is converted to nitrous oxide; this becomes nitric oxide in the presence of ultraviolet radiation and through its reaction with ozone depletes the protective ozone layer, thereby increasing the risk of skin cancers.

Pesticides are another issue. The food items on our plate do not come with labels describing the pesticide residues that might be in them. Most of these chemicals have not been adequately tested. A U.S. study by the National Academy of Sciences in 1984 found that only 10% of pesticides had sufficient data for a complete health hazard appraisal, 24% had partial data, 2% minimal data, 26% had some data but below minimal, and 38% lacked any toxicological data; and this only refers to the testing of individual chemicals. Our understanding of the possible synergistic effects between such toxic chemicals has hardly been examined. We are essentially guinea pigs in a rather cruel human experiment.

Clearly, new approaches to pest control are called for. In a conventional agricultural system the crops are in nice neat rows of single crops, a situation that is ideal for any organisms that feed on the particular crops, i.e., with such a design there will always be pests. The conventional response is to spray pesticides. As David Suzuki said recently, spraying pesticides to get rid of pests is like bombing New York City to get rid of criminals. To kill the 0.1% that are harmful we risk the lives of the 99.9% that are beneficial or neutral with respect to humans. Two improvements are currently being promoted. One is to monitor pests and only spray when the pest is there, using more sophisticated spraying equipment. I call this the **efficiency approach**. The other is the **substitution approach** whereby we import or promote biological control agents -- parasites, predators and pathogens -- or use other more benign interventions to kill the pests. The problem with these "shallow" ecology approaches is that the more effective they are, the more we protect and perpetuate the agroecosystem designs and management systems that are the causes of our pest problems. I believe that we should keep curative approaches for emergencies and instead emphasize preventive approaches -- strategies that recognize and respond to the causes and roots of our problems. This "deep" ecology approach requires the **re-design** of both self and system.

The task is to prevent pest outbreaks without compromising our other goals, especially nourishment. I grow much of my own food. Sometimes visitors to my garden, on seeing a few holes in some leaves, will say, "Aren't you going to do anything about

that? You are supposed to be a model gardener. What if people see these holes?" My reply is, "All I am growing that garden for is to nourish my family, not to produce olympic standard vegetables. I don't care if insects eat a few things. My garden always produces more food than I can ever use." We have become so conditioned to expect cosmetically perfect fruits and vegetables that we confuse this with nutritional quality, and we regard as an enemy any organism that interferes with this unrealistic appearance standard. One study showed that sugar beets could suffer about 60% defoliation of the plant before affecting the sugar beet in the ground. But farmers have been conditioned by pesticide salesmen and the media to spray when they see a few holes in the leaves.

I go through three stages of perception when I am searching for solutions to such problems as agricultural pests. The first I call **deceptive simplicity**, the second **confusing, paralyzing complexity**, and the third **profound simplicity**. Pesticides represent the deceptively simple solution. A medical friend clearly pointed out such deceptions to me when he commented that "We don't suffer from headaches because of a deficiency of aspirin in our blood." Similarly, we don't suffer from crime because of a deficiency of prisons, or cancer because of a deficiency of cancer beds in hospitals, or pests because of a deficiency of pesticides in the air around the farm, garden or home.

Confusing complexity is experienced when we start to examine in detail the causes of such problems. In this stage we tend to initiate studies, establish committees, or conduct hearings. The result is often that we become distracted and side-tracked, and effective action tends to be postponed.

Profound simplicity is experienced when we have recognized the causes and meanings of problems, and have identified key actions that can be taken to prevent them. Thus, pest problems might be solved by adjusting the timing of planting to avoid the pest, using suitable crop rotations and planting designs, avoiding stressing the plant, supporting the development of natural controls, and abandoning our demand for cosmetically perfect commodities, or for crops that are not suited to our environmental conditions.

In our society we consistently take curative, symptom-focused, single, simple, direct, short-term, technology-intensive, physico-chemical, high-powered, often imported types of approaches to solve problems. Furthermore, we tend to be very enemy-oriented; and we promote and give prizes to people who find deceptively simple solutions to "eliminate" enemies. In contrast, **the fully developed and functioning human being is probably someone who sees no enemies and is content to solve problems anonymously**. This usually involves being willing to take indirect, long-term, low-powered, multi-faceted, bioecological, and local approaches. Problems solved in this way cannot so easily be associated with effective individual actions or actors. It requires collaboration both with others (excluding no one) and with the natural environment. The fact that this approach is virtually untried in our society gives me hope that most of our problems can be solved.

In terms of science I believe we are still functioning at an incredibly primitive level. Most scientists and the agencies that fund them are caught up in the deceptively simple and confusingly complex paradigms. How can we change this? The main limiting factors are lack of relevant information (and presence of misinformation), skills, and institutional supports; but also lack of a realistic sustainable vision, lack of awareness and

widespread disempowerment. These latter deficiencies are essentially inherited, not in a genetic but in a psychological sense. The psychological hurts from which our parents in particular, and society in general, have not fully recovered are unknowingly passed on to the subsequent generations. This can happen in apparently innocent ways. For example, a small boy may fall down and hurt himself. His natural response is to cry; indeed the act of crying in the presence of another's loving attention is the natural means of recovering from such hurts. What usually happens, however, is that this process is interrupted by the parent distracting the child, mistakenly thinking that by stopping the crying, the hurt is healed. The result is that the distress becomes internalized and subsequent hurts become more painful or, conversely, the child learns to become numb to such pain. In both cases there is a loss of awareness and a disempowerment. The parent may have been unknowingly stopping the child from crying to avoid their semi-conscious recollection of their own unhealed hurts. In this way unhealed hurts are "inherited" and humans are prevented from reaching their true potential.

Similarly, if you watch any small child being given baby food for the first time, you can observe the same process. The parent sits the baby on their lap, scoops up the "goop" and shoves it into the child's mouth. I've never seen a baby who didn't spit it out on first exposure. The parent then scrapes it up and shoves it back in. The baby of course knows exactly what it needs nutritionally -- mother's milk -- but it also needs the love and acceptance of the parent; and so the baby is taught that to get the good stuff you have to swallow the bad stuff. This lesson is repeated over and over again in many forms throughout our upbringing. If you just think back to your own childhood, how were meal times? Were they wonderful, happy times? Did you eat what you wanted to, how you wanted to, when you wanted to? Or was it "I've called you six times; come and eat now!" "Don't eat with your elbows on the table...." Countless times one was told essentially, "You are stupid, you are going to be controlled by me," and then when the child tries to let out some feelings about it, "Shut up" and, particularly to a boy, "Don't cry." It is little wonder that children grow up with poor self-images, feel inadequate and overwhelmed by situations, and seek compensation in addictive activities, including the attraction to "violent" solutions to problems.

A very interesting experiment to carry out, whenever you get a chance, with a child who is crying, is to sit her (or him) on your lap and not try to stop the crying. Just pay loving attention and allow her to cry. She will cry and cry and cry. Usually she will stop every now and then to check if you are still paying attention, and if so she will start to cry again, because she is going to take the chance to also recover from some earlier hurts. Eventually, which may even be twenty minutes later -- you have to have a lot of patience for this experiment -- the child will stop crying and spontaneously start to laugh; or, if she is exhausted, she will go to sleep and on awaking will spontaneously laugh or produce contented noises. This is a wonderful thing to experience.

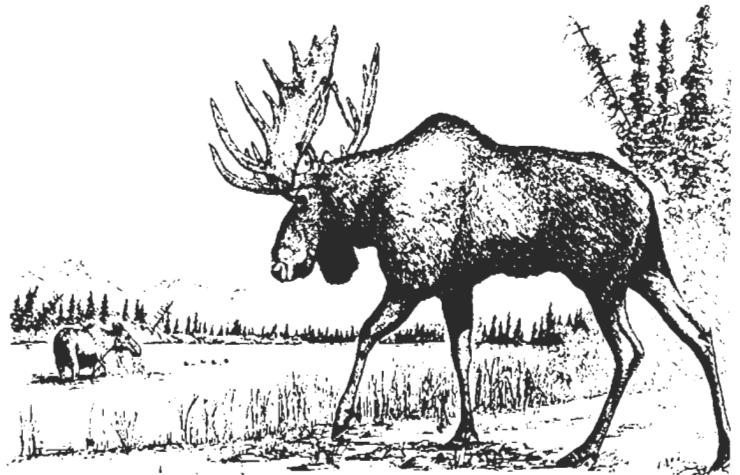
It really will only require one generation of adults allowing children to recover from their hurts to stop them from being passed on unhealed to future generations. The effects of this on society could only be positive. The effects of controlling children in oppressive ways are evident in the ways in which we design our lives and our industries. The projection of control is evident everywhere. In agriculture, for example, the emphasis

on clean cultivation of monocultures may reflect a subconscious effort to keep things simple enough to facilitate control (with high-powered machinery and strong chemicals).

If we are really serious about solving the main problems that face society today, I believe that in addition to taking the necessary political and technological actions we must accept responsibility for healing our hurts at the individual level and in so doing we will be dealing with seminal causes of all of our problems. It is usually not easy to accept this for as R.D. Laing commented, "In our development it is as if each of us were hypnotized twice, firstly into accepting pseudo-reality as reality, and secondly into believing that we were not hypnotized."

Note: To find the addresses of groups in your area involved in the healing of individual hurts and the reclaiming of one's full potential, write: Re-evaluation Counseling Communities, 719 Second Avenue North, Seattle, WA 98109, U.S.A., or to Co-Counseling International, 144 Smith St., Middletown, CT 06457, U.S.A.

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SHALLOW THINKING ON DEEP ECOLOGY

Hwa Yol Jung

The earth is the very quintessence of the human condition, and early nature, for all we know, may be unique in the universe in providing human beings with a habitat in which they can move and breathe without effort and without artifice. Hannah Arendt, in *The Human Condition*

To see the earth in the letter of law...
Anonymous

As ecology has become the foremost issue that occupies the mind of the American public today, it is most heartening to see that **The Public Interest**, for its name sake, featured ecology in its Fall, 1989 issue. I read with great interest and care particularly Mr. Joel Schwartz's lead article "The Rights of Nature and the Death of God" (pp. 3-14). It is deeply distressing to find, however, that his criticism generally of deep ecology and particularly of the eco-jurisprudence of Christopher D. Stone¹ and Laurence H. Tribe² is misguided and wrong-headed. Mr. Schwartz's argument against them falters. The purpose of my response is to show how it falters, to point out several important flaws in it, and, most importantly, to clarify the meaning of deep ecology.

We would have to define from the outset the perimeter of deep ecology since Mr. Schwartz's article is a critique of deep ecology the view of which is reflected in the ethical and legal "theory" and "practice" of Tribe and Stone. According to deep ecology, the ecological crisis is the result of thinking about Nature in terms of the extrinsic rationality of utility and domination, which turned out to be the most glaring and lethal failing of modern thought since Rene Descartes and Francis Bacon. To overcome this failing, we need to think about Nature in a radically new way, that is, in terms of seeing that Nature has intrinsic meaning and value of its own.

It was in 1973 that the Norwegian philosopher Arne Naess wrote "The Shallow and the Deep, Long-Range Ecology Movement: A Summary" in the Norwegian interdisciplinary journal called *Inquiry* (vol. 16, pp. 95-100), which became the architectural framework for building deep ecology philosophy. The regulative principles of deep ecology are "reverence" for and "harmony" with Nature rather than the "utility" and "domination" of Nature solely for humankind. Mr. Schwartz is correct in quoting Roderick Frazier Nash's work *The Rights of Nature* (1989) that the antipode of deep ecology is anthropocentrism (homocentrism) which sees man as the measure of all things or as the center of (God's) creation. Let me quote a key passage from Naess' seminal exposition:

[I]n so far as ecology movements deserve our attention, they are **ecophilosophical** rather than ecological. Ecology is a

limited science which makes use of scientific methods. Philosophy is the most general forum of debate on fundamentals, descriptive as well as prescriptive, and political philosophy [or, for that matter, legal philosophy or jurisprudence] is one of its subsections. By an **ecosophy** I mean a philosophy of ecological harmony and equilibrium. A philosophy as a kind of **sofia** wisdom, is openly normative, it contains both norms, rules, postulates, value priority announcements and hypotheses concerning the state of affairs in our universe. Wisdom is policy wisdom, prescription, not only scientific description and prediction (p. 99).

Mr. Schwartz follows Nash in equating deep ecology with "ecological egalitarianism" (or, as I prefer to call it, "biocentrism") which "accords Nature ethical status at least equal to that of humans" (Schwartz, p. 3 and Nash, pp. 9-10). In the impressive list of notable deep ecologists in the American history of environmental ethics, let me just single out Aldo Leopold and his work *A Sand County Almanac* (1949) in which he spells out the meaning of his "land ethic." As he declares, "There is as yet no ethic dealing with man's relation to land and to the animals and plants which grow upon it. Land, like Odysseus' slave-girls, is still property. The land-relation is still strictly economic, entailing privileges but not obligations" (see Special Commemorative Ed., 1987, p. 203). By land ethic, Leopold wishes to enlarge "the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land" (p. 204). Here the human sense of community with the land is the "I-Thou" rather than the "I-It" relation -- to use the classic expression of Martin Buber. It should be noted in passing that Mr. Schwartz accuses Tribe of engaging in misology by "shamelessly" practicing name-dropping (Nietzsche, Heidegger, and many others) or merely "alluding" to names (pp. 11 and 13). In defence of Tribe, however, it should be said that so-called name-dropping, just as footnoting, is a way of acknowledging one's indebtedness to and one's solidarity with other writers with the same concern, and that what is name-dropping for one person may be illumination or knowledge for another.

Be that as it may, we must be careful about equating deep ecology with ecological egalitarianism since equality means equality for life, that is, equality for nonhuman living organisms (e.g., animals, trees, and plants) to **cohabit** with humans on this Earth. Both humans and Nature are "equal" in their right to inhabit the Earth, yet they are "distinct" in their faculties: this dialectic of equality and distinction is, according to Arendt, the **sine quo non** of plurality. Only by endowing Nature with rights for life, according to Tribe, can we dispense with "Nature surrogates" (e.g., plastic trees) and prevent us from creating "a synthetic hell" (p. 1316). Ecological egalitarianism, properly understood, does not obfuscate or obliterate the "ontological difference," if I may use

the expression, between humans and nonhumans, or between living and nonliving (or artificial). The idea of ecological harmony of which Naess speaks assumes at least two basic conditions: (1) the interconnectedness of everything with everything else on Earth and (2) the coexistence of the differentiated many or human coexistence with myriads of natural things both living and nonliving, which is called an ecological diversity. To make the music of ecological harmony, there needs to be the orchestration of many different beings and things -- each of which plays a distinct role.

Mr. Schwartz distinguishes between "ethical" and "self-interested" environmentalism. His allusion to "self-interested" or "Hobbesian" environmentalism is overdrawn. For there is no environmentalist, as far as I know, who is Hobbesian and at the same time believes in "an egalitarian relationship between humanity and Nature" (p. 4). However, there are two types of homocentrism: (1) strong and (2) weak. The "strong" form of it asserts with arrogance that humans are born or destined to dominate Nature, whereas the "weak" form of it maintains that it is in the self-interest of humankind to preserve Nature. Mr. Schwartz's "self-interested" or "Hobbesian" environmentalism fits into the "weak" form of homocentrism. By "self-interestedness," he is alluding to *Leviathan*, I think, in which Hobbes imagined the state of Nature to be the condition in which everyone is at war with every other. In such a wretched condition, in the total absence of civilized behavior, everyone is for him/herself and lives in constant "fear of violent death." This fear of violent death compels people to form a polity by way of social contract for the interest of "self-preservation." In so doing, people empower their sovereign with absolute authority and relinquish all of their "natural rights" except "self-preservation."

When he considers Tribe's endowing natural objects with legal rights as "the liberal extension of rights" (to Nature) (p. 5. *Italic added.*) Mr. Schwartz agrees with Nash that Tribe is extending radically John Rawls's theory of justice (equality) as fairness (Nash, p. 132) whose paradigmatic move is to distance itself from customary Anglo-Saxon utilitarianism and to return to the Kantian foundation of ethics. "Ethical environmentalism," Mr. Schwartz thus observes, "derives from Kantian morality" (p. 5 and see Tribe, pp. 1327-29). This observation is, however, not entirely correct because, as Tribe himself perceptively notes, Kant is a homocentrist when he writes: "Animals are not self-conscious and are there merely as a means to an end. That end is man" (Tribe, p. 1330n. 73). As Tribe further notes, "The structure of the Rawlsian argument...corresponds closely to that of instrumental rationality; ends are exogenous, and the exclusive office of thought in the world is to ensure their maximum realization, with Nature as raw material to be shaped to individual human purposes" (p. 1335).

Tribe's "spiral of moral evolution" may be described as a phylogenetic extension of the (Jean) Piagetian and (Lawrence) Kohlbergian ontogenetic stages of moral development. As in Tribe's "spiral of moral evolution" without closure (see p. 1339), Stone demonstrates in the opening pages of his argument for the legal rights of trees the gradual progression of legal protection: from children to senior citizens and to prisoners, aliens, the insane, Blacks, Chinese, Jews, Indians, women, and fetuses. If corporations and banks -- artificial or inanimate bodies -- are protected by law as legal entities ("persons"), why not protect living organism like trees? Stone considers this evolution of legal protection as thinking "the unthinkable," that is, there are

really no "unthinkables" -- including the legal rights of natural objects. It was in 1875 that the first woman applicant in Wisconsin was denied her right to practice law in the following language:

The law of Nature destines and qualifies the female sex for the bearing and nurture of the children of our race and for the custody of the home of the world...[A]ll life-long callings of women, inconsistent with these radical and sacred duties of their sex, as is the profession of the law, are departures from the order of Nature; and when voluntary, treason against it.... The peculiar qualities of womanhood, its gentle graces, its quick sensibility, its tender susceptibility, its purity, its delicacy, its emotional impulses, its subordination of hard reason to sympathetic feeling are surely not qualifications for forensic strife. Nature has remembered woman as little for the juridical conflicts of the court room, as for the physical conflicts of the battle field.... (Stone, pp. 7-8).

A little over one hundred years later, it is indeed unimaginable today for any court or judge in this land to use such "naturalistic" language to deny to a woman a right to practice law. Only in this light, must it be pointed out that although Tribe rejects "plastic" trees in favor of "natural" ones which deserve legal rights, he does not -- as Mr. Schwartz mistakenly alleges -- contradict himself in concluding his argument concerning the abortion issue in *Constitutional Choices* (1985):

Yet does it not seem an arbitrary punishment of women for the mere fact of their physiological difference -- for the role "Nature" has assigned them in the reproductive cycle -- to treat restrictions on abortion more tolerantly than we would treat forced ingestion of the hypothesized drug? The perspective proposed by this essay -- and by this book as a whole -- would regard any such incorporation of the "natural" into the "legal" as a deliberate choice, one by no means inevitable or inexorable, and one in need of constitutional justification in light of the way in which such naturalism retards full equality for half the human race (p. 245 and see Schwartz, pp. 12-13).

Here we must keep in mind that there is the "nature" of Nature and there is also the "nature" of man/woman. The two "natures" are not the same. If they were, we would be committing the fallacy of naturalism. Nor does respect for inanimate and animate Nature by the same token diminish, as Mr. Schwartz also alleges (p. 14), respect for human nature. Nonetheless, we would be hard pressed not to agree with an enlightened Mississippi judge in 1887 -- thirty-one years after the *Dred Scott* case (1856) in which Blacks were judged to be white men's **property**, when he declared that it is

a criminal offence for any person to cruelly beat, abuse, starve, torture or purposely injure certain animals, whether they belong to himself or another. This statute is for the benefit of animals, as creatures capable of feeling and suffering.... Human beings have at least some means of protecting themselves against the inhumanity of man -- that inhumanity which "makes countless thousands mourn," but dumb brutes have none.... [H]uman beings should be kind and just to dumb brutes, if for no other reason than to learn how to be kind and just to each other (Tribe, p. 1342).

Tribe is absolutely right when he considers the current ecological crisis as deeply rooted in the tradition of Western thought both philosophical and theological. The issue of religion or

transcendence confronts Lynn White's celebrated 1967 essay "The Historical Roots of Our Ecologic Crisis" in *Science* (vol. 155, pp. 1203-7) which sums up Christianity as "the most anthropocentric religion" in the history of all world's religions and ends up recommending St. Francis of Assisi as "a patron saint for ecologists" in the West. Although White leaves no room for "a divinely inspired stewardship" for Nature within Judaeo-Christian mainstream thought, according to Tribe, his thesis becomes "chillingly plausible in the period when the rise of science heralds the death of God" (Tribe, p. 1334). The scientific secularization of transcendence, according to Tribe, puts no checks on human will and moral restraints (on Nature). With the death of God there is no center.

Tribe brings in the idea of immanence to rescue the world with no center. In place of the "homocentric calculus" of instrumental rationality, he offers a tentative and cautious answer to restore moral reason that awakens our "environmental awareness in law and culture" (p. 1336). It is the process of becoming aware of the sanctity of Nature which is not religious but wholly secular and which cultivates "a sense of reverence" that negates the human domination of Nature or the "total subservience of any form of being to any other" (p. 1339). In short, it cultivates the "intrinsic significance" of life "according to which we orchestrate our relationships with one another and with the physical world of which we are a part" (p. 1339). Tribe concludes with eloquence:

What differentiates a silent wilderness or a breathtaking monument from a littered campground or a tornado-struck town cannot be summarized in any facile contrast between the works of "man" and those of "Nature." To recognize that humanity is a part of Nature and the natural order a constituent part of humanity is to acknowledge that something deeper and more complex than the customary polarities must be articulated and experienced if the immanent and transcendent are somehow to be united. At that crossroads, conceptions like harmony, rootedness in history, connectedness with the future, all seem more pertinent than the ultimately conventional concept of "the natural" (p. 1340).

What is really the upshot of Mr. Schwartz's lengthy discussion against Tribe's deep reflection on the unity of transcendence and immanence or the death of God? He believes that Tribe "literally portrays ethical environmentalism as a response to the death of God" (p. 10). He negotiates an unexpected turn in his argument when he contends that while the "superman" is Nietzsche's answer to the death of God, Tribe's solution is the **deification of the judiciary** since Tribe rules out the deification of Nature! Mr. Schwartz contends in his concluding paragraph that "The fact of transcendence, of human domination, cannot be avoided; for all of Tribe's talk of a synthesis with immanence, the project begun by Stone and endorsed by Tribe amounts to substituting the transcendence of unelected judges and environmentalists for the transcendence of the elected representatives to whose rule the people consent" (p. 14. *Italics added*). In turn, Mr. Schwartz himself may easily be subject to the same kind of accusation that he is deifying "the people" and their "elected representatives" and that, furthermore, he substitutes the transcendence of human domination for the death of God!

It is quite clear that by taking what appears to be a populist stance, that is, in the name of "the people," Mr. Schwartz wishes to put breaks on the rapidly increasing influence of "orphanic jurisprudence"³ (or deep ecology) on environmental politics.

First of all, environmentalists are people or part of "the people," too. Nor are they the privileged or anointed guardians of Nature. Anybody who is willing to protect Nature or any part of it can be called its guardian. Mr. Schwartz totally ignores Stone's detailed legal argument concerning the issue of why trees should have standing. One important issue Mr. Schwartz overlooks is the fact that the United States Forest Service has long been designated as the legal "guardian" of the public land. Second, the term "people" with a definite article (*demos* in Greek) is too vague. It may mean everybody, the poor, many, a majority absolute or limited, etc. By "the people" Mr. Schwartz seems to mean everybody except environmentalists. Third and most curiously, Mr. Schwartz should really criticize the Justices of the Supreme Court, especially the judicial politics of such Justices as Douglas, Brennan and Blackmun who wrote dissenting opinions for **Sierra Club v. Morton**. Justice Douglas in particular even suggested that the case be called **Mineral King v. Morton**.

Mr. Schwartz's argument against the alleged "deification of the judiciary" is a slightly exaggerated version or extension of the Solicitor-General's plea in **Sierra Club v. Morton** for judicial restraint by saying that "Ours is not a government by the Judiciary" (Stone, p. 85). In response to the Solicitor-General's argument, Justice Douglas intimated that the judiciary should be the (legal or governmental) "guardian" of environmentalism for no other reason than that the federal agencies have been "industry-minded" and that the Forest Service in particular "has been notorious for its alignment with lumber companies" by ignoring even a Congressional mandate (Stone, p. 79). Justice Douglas declared:

The voice of the inanimate object, therefore, should not be stilled. That does not mean that the judiciary takes over the managerial functions from the federal agency. It merely means that before these priceless bits of Americana (such as a valley, an alpine meadow, a river, or a lake) are forever lost or are so transformed as to be reduced to the eventual rubble of our urban environment, the voice of the existing beneficiaries of these environmental wonders should be heard.... Perhaps the bulldozers of "progress" will plow under all the aesthetic wonders of this beautiful land. That is not the present question. The sole question is, who has standing to be heard? (Stone, pp. 80-82).⁴

The most significant aspect of the Court reasoning was the very acceptance of the fundamental idea that -- to use the language of Justice Stewart who wrote the majority opinion -- "Aesthetic and environmental well-being, like economic well-being, are important ingredients of the quality of life in our society, and the fact that particular environmental interests are shared by the many rather than the few does not make them less deserving of legal protection through the judicial process" (Stone, p. 65). Indeed, Justice Stewart's verdict contains a rebuttal in whole or in part to Mr. Schwartz's use of "the people" -- the few as well as the many are protected by the constitution which posts the most unique aspect of American constitutionalism.

To sum up: deep ecology of which the "orphanic jurisprudence" of Stone and Tribe is a part is a new way of thinking about our relationships with Nature. It replaces the old conceptual grids of utility and domination with the new wisdom of reverence and harmony. Our respect for Nature (**geopiety**), as Tribe explicitly assures us, will not be at the expense of our respect for humans (**homopiety**). It only decenters humans as the center of creation by respecting all forms of life on Earth and ceases to treat non-

human Nature as mute plenum. Deep ecology would, therefore, insist on idea of Nature for its own sake rather than Nature solely in the interest and service of humans. For the "homocentric logic of self-interest" leads ultimately to the "loss of humanity" itself (Tribe, p. 1348). As Tribe puts it forcefully, it is a matter of **value choice** between anthropocentrism and biocentrism. It is the question of "to be" or "not to be" for all living beings. For the death of Nature is also the death of humanity. To quote a passage from Henry G. Bugbee's *The Inward Morning* who speaks of the "sacrament of coexistence" (**ecopiety**): "We all stand only together, not only all men [and women], but all things. To abandon things, and to abandon each other, is to be lost" (p. 62). To sing the "song of the Earth," we must both think and act globally. I hope that the day may come, the sooner the better, when the iconoclastic word **ecopiety** becomes a "household" word, that is, when it becomes the new ethical canon of the whole globe.

NOTES:

1. Stone's agenda-setting proposal of 1972 appeared originally as "Should Trees Have Standing?: Toward Legal Rights for Natural Objects" in *Southern California Law Review* and in book form in 1974 with some additional material. Stone intended to bring his argument to the attention of the Supreme Court -- the late Justice Douglas in particular who was a "friend" of the Earth -- whose decision on the lawsuit (*Sierra Club v. Morton*) was pending. The lawsuit was brought by the Sierra Club against Walt Disney Enterprises, which was granted in 1969 by the United States Forest Service the right to develop Mineral King Valley in California's Sierra Nevada Mountains. Stone himself gives a detailed account of the circumstances under which this article was written in *Earth Ethics and Other Essays: The Case for Moral Pluralism* (New York: Harper and Row, 1987), pp. 3-14. All my citations from Stone in the text come from the book *Should Trees Have Standing?* (Los Altos, CA: William Kaufmann, 1974).
2. Tribe's intellectually sophisticated and elevating argument appeared originally as "Ways Not to Think About Plastic Trees: New Foundations for Environmental Law" in *The Yale Law Journal*, vol. 83, 1974, pp. 1315-48. A revised version of this article with a few added paragraphs and abbreviated footnotes appeared as Chap. 3 of *When Values Conflict: Essays in Environmental Analysis, Discourse, and Decision*, ed.

Laurence H. Tribe, Corinne S. Schelling, and John Voss (Cambridge, MA: Ballinger, 1974), pp. 61- 91. All my citations from Tribe in the text come from the original article in *The Yale Law Journal*.

3. I used the phrase "orphanic jurisprudence" in reference to Stone's legal argument in "The Orphanic Voice and Ecology," *Environmental Ethics*, vol. 3, 1981, pp. 329-40. I was alluding to the legend of Orpheus -- the Thracian musician who was able to make the whole of Nature -- animals, birds, and trees -- **dance in delight**. Monteverdi, Gluck, Offenbach, Liszt, Stravinsky, and Rilke all celebrate in their composition of music or poetry the legend of Orpheus.

4. Pursuant to Justice Douglas's opinion, John Naff wrote a poem ridiculing him in the *Journal of the American Bar Association*:

If Justice Douglas has his way --
 O come not that dreadful day --
 We'll be sued by lakes and hills
 Seeking a redress of ills.
 Great mountain peaks of name prestigious
 Will suddenly become litigious.
 Our brooks will babble in the courts,
 Seeking damages for torts.
 How can I rest beneath a tree
 If it may soon be suing me?
 Or enjoy the playful porpoise
 While it's seeking habeas corpus?
 Every beast within his paws
 Will clutch an order to show cause.
 The courts, besieged on every hand,
 Will crowd with suits by chunks of land.
 Ah! But vengeance will be sweet
 Since this must be a two-way street.
 I'll promptly sue my neighbor's tree
 for shedding all its leaves on me (Stone, *Earth Ethics*, p. 5
 and Hash, pp. 133-34).

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ON THE INTERPRETATION OF NAESS'S CENTRAL TERM "SELF-REALIZATION"

Warwick Fox

In the course of our ongoing correspondence, George Sessions has recently raised what I consider to be a particularly significant question regarding the interpretation that I place upon "Self-realization!" -- the central term in Arne Naess's approach to ecophilosophy -- in *Toward a Transpersonal Ecology*.¹ Sessions expressed his point as follows:

There is one main problem about your interpretation of Naess's 'Self-realization' which I picked up in your earlier writings. Maybe this is a mistake on my part and you can clear it up. As I interpret Naess he means by Self-realization the realization of Gaia and even the cosmos -- everything -- **the system** -- is realizing itself. Thus, if humans were not here anymore, there would still be Self-realization. To turn this into a form of human psychology, i.e., 'transpersonal

psychology' seems to restrict this to humans. Remember Routley's 'last man argument' -- the universe and ecosphere would still be valuable even if humans weren't around to appreciate it. This is a major part of deep ecology to me -- the whole system (and the individuals which comprise it) has value apart from humans. To me then, transpersonal psychology -- the ecological self -- is **part** of deep ecology -- concerning **human** potential, but it doesn't speak to the potential of the nonhuman. If I have misunderstood you, please let me know.²

Now I agree with Sessions that, in Naess's view, all entities are engaged in the process of unfolding their various inherent possibilities, of evolving, or, as Naess would say, of realizing themselves. Thus, as Sessions says, "everything -- **the system** -

- is realizing itself ... if humans were not here anymore, there would still be Self-realization." But the crucial issue here, is this: what, if anything, follows from this observation? Why should we care or why might we want to care about the fact that all entities are realizing themselves? I think that you can go in either of two directions on this issue -- an axiological direction (i.e., a value theory direction) or a psychological-cosmological direction.³ If you take the axiological route then you attempt to provide a convincing argument to the effect that all entities that realize themselves are valuable in and of themselves -- or, more abstractly, that the process of self-realization is valuable in and of itself. If you take the psychological-cosmological route then (like Spinoza and like modern science, including the sciences of evolutionary biology and ecology) you attempt to provide a convincing argument to the effect that all entities are part of a single, unfolding process. You do this in the belief that when people attain a deep seated realization of this understanding they will scarcely be able to refrain from identifying with "other" entities.

I agree that Naess's term "Self-realization!" is ambiguous and that, taken at face value, it is possible to interpret this term in either an "intrinsic value direction" (i.e., an axiological direction) or an "identification direction" (i.e., a psychological-cosmological direction). But, as Sessions would be the first to agree, this ambiguity should not come as any surprise. The fact that "Self-realization!" is the highest norm in Naess's logical systematization of his philosophy -- "highest" in the sense that it is the norm from which all other norms are ultimately derived -- means that, like any other high level norm, it is cast in very general terms and so is necessarily open to a wide range of possible interpretations. Notwithstanding the ambiguity inherent in Naess's use of the term "Self-realization!," however, I would offer the following observations in favour of my "identification" interpretation of this norm.

First, I think that Naess himself primarily interprets this term in an identification direction. In Chapter 7 of *Toward a Transpersonal Ecology* I show at some length that Naess repeatedly declines to adopt a philosophical intrinsic value approach ("I do not need ... concepts of intrinsic value which are developed by professional metaphysicians," says Naess⁴); that when he employs the term "intrinsic value" he does so purely in a expressive, everyday, nontechnical sense (Sessions has made a similar point in regard to Naess's writings⁵); and that Naess consistently explicates the meaning of his term "Self-realization!" in terms of the psychological-cosmological framework of wide and deep identification. (I say that this framework is cosmological as well as psychological because, for Naess, the [psychological] process of wide and deep identification is brought about through the [cosmological] realization that all entities are aspects of a single, unfolding process -- the realization that, as Naess says, "Life is fundamentally one."⁶)

With respect to Naess's explication of "Self-realization!" in terms of the psychological-cosmological framework of wide and deep identification, Naess writes, for example:

In my outline of a philosophy [which Naess refers to as Ecosophy T] 'Self-realization!' is the logically (derivationally) supreme norm, but it is not an eternal or permanent Self that is postulated. When the formulation is made more precise it is seen that the Self in question is a symbol of identification with an absolute maximum range of beings.⁷ (MY Emphases.)

If we take a look at Naess's most recent logical systematization of Ecosophy T, we see that it begins as follows:

N1 (read: "Norm 1"): Self-realization!

H1 (read: "Hypothesis 1"): The higher the Self-realization attained by anyone, the broader and deeper the identification with others (my emphasis).

H2: The higher the level of Self-realization attained by anyone, the more its further increase depends upon the Self-realization of others.

H3: Complete Self-realization of anyone depends on that of all.

N2: Self-realization for all living beings!

If Naess were interpreting his "Self-realization!" norm in an intrinsic value direction then I submit that in order to get from Norm 1 to Norm 2 he would introduce hypotheses such as:

H1: All living beings attempt to realize their inherent possibilities (i.e., realize themselves).

H2: Regardless of whether or not a being is aware of any striving tendency within itself, any being that strives to realize its inherent possibilities can at least be said to embody certain kinds of interests.

H3: Any kind of being that has interests is morally considerable (i.e., its interests ought to be taken into account in actions regarding it).

These three hypotheses lead one to the view that one ought to protect all living beings (i.e., N2: Self-realization for all living beings!) on account of the fact that they are morally considerable (i.e., intrinsically valuable). In contrast, in Naess's formulation of Ecosophy T, one arrives at the view that one wants to protect all living beings on account of the fact that one feels deeply identified with them. In Ecosophy T, Hypotheses 1-3 mean that N2 is more an expression of inner desire (phenomenological description, if you like) whereas, in the latter example, Hypotheses 1-3 mean that N2 is more an expression of moral obligation (i.e., moral prescription). Naess draws out this difference in emphasis (endorsing the identification/inner desire approach over the intrinsic value/moral obligation approach) in paper after paper. Thus, to repeat one of my favorite examples, in a paper devoted to the topic of "Self-realization: An Ecological Approach to Being in the World," Naess writes:

Care flows naturally if the 'self' is widened and deepened so that protection of free nature is felt and conceived as protection of ourselves ... just as we do not need morals to make us breathe ... [so] if your 'self' in the wide sense embraces another being, you need no moral exhortation to show care ... you care for yourself without feeling any moral pressure to do it -- provided you have not succumbed to a neurosis of some kind, developing self-destructive tendencies, or hating yourself.⁹

To take just one more example, Naess has said elsewhere:

I'm not much interested in ethics or morals. I'm interested in how we experience the world ... Ethics follows from how you experience the world. If you experience the world so and so then you don't kill. If you articulate your experience then it can be a philosophy or religion.¹⁰

The second point I want to make is that when I go beyond Naess's own interpretation of "Self-realization!" and look at those who have been inspired by Naess's ideas, I find no argument for intrinsic value in the deep ecology literature (and this, of course, includes Sessions' writings). On the contrary, as I show in Chapter 7 of *Toward a Transpersonal Ecology*, I again find an explicit and widespread rejection of approaches that issue in moral "oughts" (and this also includes Sessions' writings). I see some deep ecologists assert that nonhuman entities are intrinsically valuable (e.g., Naess and Sessions do this in their 8 point "platform" of the deep ecology movement), but, at a philosophical or argumentative level, these assertions are always explicated in terms of a deep identification with these entities rather than in terms of some theory that seeks to establish an objective distribution of intrinsic value in the world.¹¹ Thus, to paraphrase Naess's claim that "Ethics follows from how you experience the world," for deep ecologists in general, assertions of intrinsic value follow from how they experience the world. What is basic for deep ecologists is the psychological capacity for, and the experience of, wide and deep identification.¹²

None of this is to say that deep ecologists consider it impossible to mount a strong argument to the effect that the nonhuman world is intrinsically valuable in an objective sense (i.e., valuable in and of itself, independently of the existence of any evaluators) or that they do not respect the power of some of these arguments. For example, although I prefer to adopt the identification/deep ecology (or, as I would now prefer to say, transpersonal ecology) approach to ecophilosophy, I nevertheless argue in Chapter 6 of *Toward a Transpersonal Ecology* that there is much to be said for the view that any entity that is engaged in the ongoing process of regenerating its own organizational structure and activity is intrinsically valuable. (Entities of this kind -- which includes biological organisms, ecosystems, and the ecosphere, but excludes all mechanical systems -- are referred to as *autopoietic* because they are self-producing [from the Greek *autos*, "self," and *poien*, "to produce"]. The primary product of their operations is themselves.) Other deep ecologists may point approvingly, as Sessions does, to arguments such as the "last man argument" put forward by Richard Routley (now Richard Sylvan): if there were only one man left in the world and it happened to be his pleasure to set about systematically destroying the world around him, would he be morally wrong to do so? If we think that he would be then, as Sessions interprets this argument, we must presumably accept that "the universe and ecosphere would still be valuable even if humans weren't around to appreciate it." We must accept, in other words, that the nonhuman world is intrinsically valuable in an objective sense.

But it is worth noting in passing here that, unlike, say, the standard sentence (i.e., "animal liberation") based argument for intrinsic value, or my autopoiesis based argument for intrinsic value, both of which advance positive reasons for accepting sentience or autopoiesis as a criterion of intrinsic value, Sylvan's last man argument does not represent a *direct* argument for the intrinsic value of the nonhuman world. Rather, Sylvan's argument relies upon an appeal to our intuitions in order to suggest that the nonhuman world must be valuable in and of itself. But this appeal to our intuitions may also be taken to suggest other conclusions as well -- conclusions that may be better suited to vocabularies of discourse other than the axiological one. For example, many people would consider Sylvan's last man to be engaged in actions that can just as well be described as *senseless*

as morally *wrong*. Indeed, I would go further and tentatively suggest that, for many people, the reaction that the last man's actions are senseless is even more immediate or basic than the reaction that his actions are morally wrong. Yet these are rather different kinds of reactions, and they point to different kinds of vocabularies for their explication.

The reaction that the last man's actions are morally wrong does indeed point in the direction of the axiological vocabulary of intrinsic value. This is because the wrongness of the last man's actions lends itself to explication in terms of the view that the nonhuman world is valuable in and of itself and, hence, ought not to be violated for trivial purposes. However, the reaction that the last man's actions are senseless points more in the direction of the psychological-cosmological vocabulary of wide and deep identification. This is because the senselessness of the last man's actions lends itself to explication in terms of the view that the last man is part of a single, unfolding process -- a leaf on the tree of life, if you like -- and, hence, that his actions are akin to systematically destroying his own body. It is easy enough to see why self-destructive actions tend to be seen as senseless before they are seen as morally wrong (if they are seen that way at all): the fact that self-destructive behavior is behavior that works against the integrity of the entity that gives rise to it means that, first and foremost, it is behavior that is self-negating, self-contradictory, or, as we say colloquially of anyone who asserts A and not A at the same time, crazy.

The point of this detour, then, is to say that even Sessions' reference to Sylvan's last man argument turns out to be equivocal, since the point of Sylvan's argument can lend itself just as easily to explication in terms of the psychological-cosmological vocabulary of wide and deep identification as it does to explication in terms of the axiological vocabulary of intrinsic value. But even if we restrict our interpretation of Sylvan's argument to the view that it represents an indirect, intuitive argument for the (objective) intrinsic value of the nonhuman world, the fact remains that, as I have said, I am not attempting to argue that deep ecologists deny either the possibility or the potential power of some of the arguments that have been made for the intrinsic value of the nonhuman world. All I am saying is that it just happens to be the case that, at a philosophical or argumentative level, the main writers on deep ecology and their close associates have adopted an identification based approach in preference to an intrinsic value based approach (or, in other words, a psychological-cosmological approach in preference to an axiological approach).¹³

The third main point I want to make is this: even if it were the case that it is just as reasonable to interpret "Self-realization!" in an intrinsic value direction as in an identification direction (which, of course, goes against all that I have argued here), the fact remains that in *Toward a Transpersonal Ecology* I am concerned with homing in on, and developing, what is defensible and *distinctive* about the central ideas associated with deep ecology. Now if you interpret "Self-realization!" in an axiological direction there is nothing particularly distinctive about deep ecology. Deep ecology becomes just another approach to intrinsic value theory, an approach that issues in moral "oughts" and that, as I argue in Chapter 7 of *Toward a Transpersonal Ecology*, thereby serves to reinforce a narrow, atomistic, particle-like sense of self. What is distinctive about deep ecology vis-a-vis other approaches to ecophilosophy is the fact that, by stressing (a primarily cosmologically based approach to) identification, it

shifts the focus of debate from an axiological focus to a psychological-cosmological focus. In doing this, deep ecology (or as I would prefer to say in this context, transpersonal ecology) invites and inspires us to experience a wide, expansive, field-like sense of self.

In summary, then, I have made three main points in favour of my identification based interpretation of "Self-realization!": first, that this is the direction in which Naess himself interprets this term; second, that this interpretation is more consistent than any other with the thrust of the work of those writers who have been most inspired by Naess's ideas; and, third, that it is their emphasis upon the psychological-cosmological vocabulary of wide and deep identification (or what I have referred to as a transpersonal approach to ecology) that most distinguishes those writers who have been most inspired by Naess from the wider ecophilosophical community.

There is one final point that should be mentioned in this context. The emphasis that Naess and his colleagues have placed upon the human capacity for, and experience of, wide and deep identification may lead some critics to charge -- and some sympathizers to worry -- that this focus means that deep/transpersonal ecology is anthropocentric (notwithstanding the emphasis that deep/transpersonal ecologists have also placed upon a cosmological basis for identification). However, this represents a misunderstanding of the intended, evaluative sense of the term "anthropocentric." This can be explained as follows. Just as the terms "sexist," "racist," and "imperialist," for example, are intended to refer to approaches that promote unwarranted differential treatment of people on the basis of their sex, race, or culture, so the term "anthropocentric" is intended to refer to approaches that promote unwarranted differential treatment of other entities on the basis of the extent to which they are considered to be human-like. It follows from these understandings that to say that deep/transpersonal ecology is "anthropocentric" simply because it focuses on the human capacity for identification is as perverse a use of this term as it is to say that a group such as Men Overcoming Violent Emotions (MOVE) is "sexist" simply because it focuses on men. Rather, just as MOVE is wholly directed toward overcoming domestic violence in particular and sexist behavior in general, so deep/transpersonal ecology is wholly directed toward overcoming the various forms of human chauvinism and domination. What is at issue, then, in deciding whether a particular approach is sexist, racist, imperialist, or anthropocentric is not the question of what class of entities the approach focuses on *per se*, but rather the intention that lies behind this focus of interest as well as its practical upshot. Seen in this light, it should be clear that deep/transpersonal ecology's focus on the human capacity for, and experience

of, wide and deep identification is not remotely anthropocentric in the intended, evaluative sense of that term.¹⁴

Notes

1. Warwick Fox, *Toward a Transpersonal Ecology: The Context, Influence, Meanings, and Distinctiveness of the Deep Ecology Approach to Ecophilosophy* (Boston: Shambhala Publications, 1990, forthcoming).
2. Personal correspondence with the author, 8 March 1989.
3. There seems to be no point in attempting to go in **both** directions on this issue since, as should be borne out by the discussion that follows, adopting either one of these approaches seems to obviate the need for adopting the other. Moreover, I will argue that, whatever the case may be in this regard, at a philosophical or argumentative level, deep ecologists have only attempted to go in one of these directions.
4. Arne Naess, "Environmental Ethics and International Justice," 1987, ms., p. 10.
5. George Sessions, *Ecophilosophy III*, 1981, pp. 55a.
6. Arne Naess, *Ecology, Community and Lifestyle: Outline of an Ecosophy*, trans. and rev. David Rothenberg (Cambridge: Cambridge University Press, 1989), p. 166.
7. Arne Naess, "Gestalt Thinking and Buddhism," 1983, ms., p. 13.
8. From Naess, *Ecology, Community and Lifestyle*, p. 197.
9. Arne Naess, "Self-realization: An Ecological Approach to Being in the World," *The Trumpeter* 4(3) (1987): 39-40.
10. Quoted in Bill Devall, "Greenies: Observations on the Deep, Long-Range Ecology Movement in Australia," 1984, ms., p. 17.
11. For an earlier discussion of this point, see my paper "A Postscript on Deep Ecology and Intrinsic Value," *The Trumpeter* 2(4) (1985): 20-23.
12. Michael Soule, a prominent, deep ecologically oriented conservation biologist, has aptly described identification with Nature as "the emotional root of the cognitive experience of intrinsic value" ("Mind in the Biosphere; Mind of the Biosphere," *Earth First!*, 21 March 1989, p. 23).
13. In Chapter 7 of *Toward a Transpersonal Ecology*, I argue that the main reason for this preference lies in the different kinds of self that are emphasized -- whether implicitly or explicitly -- by intrinsic value based approaches on the one hand and identification based approaches on the other hand (specifically, a narrow, atomistic, particle-like sense of self and a wide, expansive, field-like sense of self respectively).
14. For a closely related discussion on the importance of distinguishing between the weak, trivial, or merely descriptive sense of anthropocentrism and the strong, significant, or evaluative sense, see my "Further Notes in Response to Skolimowski," *The Trumpeter* 4(4) (1987): 32-34; or Chapter 1 (Section 1.2) of *Toward a Transpersonal Ecology*.

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IN PRAISE OF ECOSOPHY

Alan R. Drengson

Although the word "ecosophy" has only recently come into current use, the reality to which it points is ancient. The reality of ecosophy is at least as old as humankind, and possibly as old as life itself.

"Ecosophy" for humans means ecological wisdom, which is not just discursive knowing, but a state of harmonious relationship with Nature. The Earth has wisdom, and each species has a wisdom peculiar to it, which is exemplified in continued

flourishing, beyond bare survival. "Flourish" means an optimal state of self- fulfillment and self-realization. In humans this requires a form of self-knowledge peculiar to language using, self-reflexively aware beings. What constitutes self and how far self-identification extends is part of the human inquiry relevant to realizing ecosophy. So the *sophia* or wisdom of ecosophy is not only Earth-wisdom realized by individual beings, it is also the practice of ways of life based on wisdom and deliberate harmonizing with *ecos*. Ecosophy is the wisdom dwelling in a place and it is also the wisdom to dwell in a place harmoniously.

Different cultures and groups developed ways of practice, healing, and attuning arts to bring the self, community and nation into resonant harmony with Nature. This state of harmony can be reached by activities such as ritual dancing and ceremonial drumming, tantra yogic practices, praying and fasting, wilderness travel, some martial arts disciplines, and certain kinds of meditation. To be sure, such practices do not always lead to harmony; they can go awry and yield the opposite.

"Ecos" in ancient Greek meant household and "sophia" meant wisdom. For many ancient Greek philosophers *sophia* is realized only when a certain passion or love is present in the pursuit. For contemporary ecophilosophers the household or *ecos* is the entire web of living beings and their total Earth habitat, not just the human-centered household in built environments and cities.

Some cities in the ancient world might have been conducive to ecosophy, and their design and construction intuitively based on its realization. The word "technology" was originally used in the building trades and in its roots meant the art and science of proper construction. Arts of construction were seen as having an element of the Divine in them, for the Divine Nature reveals itself in the ongoing process of creation and construction. Building was thus a sacred art. A proper site had to be found and its spirits consulted by geomancy or divination. Builder and site alike were cleansed, consecrated by rituals, and these, we can surmise, helped to realize a certain measure of ecosophy.

Today cities can be designed to have more or less of Nature in them. They can be built to provide opportunities for realizing ecosophy. A city could be designed which celebrates wilderness. This might seem paradoxical, since the city is often taken as the opposite of wilderness. And yet, even in the most urbanized areas there are forms of nondomesticated life, such as birds, rodents, insects, trees and weeds, and also the natural self within each of us. Cities can be designed so as to enhance some kinds of wildlife habitat, thus to increase human encounters with beings of Nature not regimented by us. Cities could contain Nature sanctuaries and Ecosteries. Of course, we can leave the city and take part of our culturally acquired ways, along with minimal amounts of manufactured equipment, into the wilderness, and this can open other possibilities for realizing ecosophy and transformation to the transpersonal level of awareness.

Ecosophy, whether in gardening, farming, using tools, interacting with other humans, or other beings, is characterized by a respectful power that resolves seeming conflicts between wild and tame, natural and artificial, self and other. Ecosophy involves seeing and feeling that such supposed dichotomies are partly a product of certain ways of thinking and talking, they are not necessarily in the things themselves. It is in our whole life, in our activities, our conversations, interrelationships, and practices that ecosophy is realized, not in abstract thought alone. When

we are totally one with Nature in meditation or in gardening, we are realizing ecosophy as a state of being.

Thus, "ecosophy" not only represents the idea of ecological wisdom and harmony, but it also refers to a realized state in ongoing activity, that is vital, fully alert and alive, which manifests the harmonies, fruits and bounties that flow from all of Nature and the Cosmos. It is authentic dwelling through which the full potential values of life on Earth are made actual. It is what Plato called *eudaemonia* and the Pythagoreans identified as being in harmony with the music of the Cosmos. It is living with a sense of belonging and being at home in our local place on the Earth within the Universe. Thus, ecosophy realized is practical cosmology.

In ecosophy our sense of self-identification enlarges beyond the narrow boundaries of ego to include other persons and other beings. Through this transformational process ecosophy unifies the smaller self with the larger ecological Self and also with the Whole of Nature and Cosmos, the Grand Ultimate or Absolute --as it is sometimes called when not personified, God when It is. In this reference to the Absolute we do not mean to suggest that ecosophy involves a return to nonaware unity, or a withdrawal from daily life, but a more intensely aware, alive and loving life, wherever one happens to be. Ecosophy, then, is not a static state but a dynamic and living practice. Its realization involves moving beyond the personal to the transpersonal, and this inquiry into and exploration of the relationships of the transpersonal is transpersonal ecology, to use Warwick Fox's terms.

Ecosophy has affinities with the mystical unity of Christian mysticism and the enlightenment of Buddhism. Since it involves transcending narrow self-identification to extend love to all beings so to see them in one's Self, it also has affinities with the liberation of Hinduism. It has kinship with the ethic of love at the heart of Jesus's Sermon on the Mount. It is at the center of some of the aims of rituals and ceremonies in ancient Nature religions. As a realization of harmonious unity with the power of the way of the Universe, it has affinities with Lao Tzu's Tao. It also shares common elements with such philosophical ideals of the supreme good as Spinoza's concept of full unity. As Spinoza observed, we are as large as our love extends. What we love, we identify with; its good is seen as our own. Our love for place and Earth, our home, extends our identification to help us to realize ecosophy. Ecosophy involves extending compassion to all humans and to all beings.

Seen ecosophically the world is many and yet it is One. There is diversity in unity, which is a mystery. The logic of ecosophy is a dynamic dialectical process, where the union of opposites interpenetrate to create new unities, as in the sacrament of marriage in which two can become one, or in spiritual worship where many can be in communion with the Absolute as One.

Ecosophy is a unifying concept as well as a unifying practice, and it facilitates the ongoing resolution of the tension between self and other, wild and tame. Ecosophy is a reconciliation of tension between self, community, and Nature. To be in ecosophy is to be in an unconditioned, harmonious relationship to all that was formerly seen as other. It is to accept the world as It is, while striving to improve our relationships. It is a state in which the other is respected for its intrinsic worth, for we and the other are within the circle of love that binds all together in the ongoing process of creation. Thus, we can say that ecosophy is a sacred state.

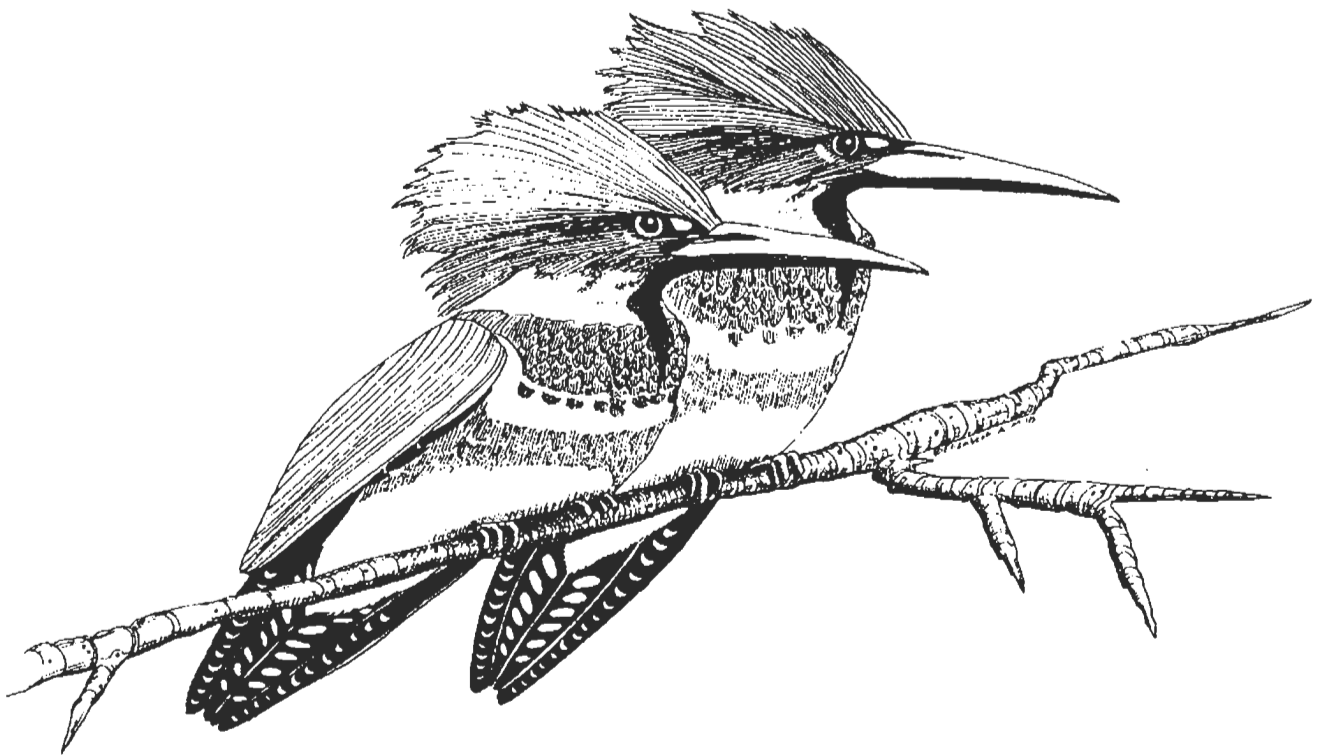
If the goal of ecophilosophy is to understand and act appropriately in relation to our ecological--in the broad sense-- circumstances, then its aim is realized in ecosophy. An ecophilosophical practice that brings us to ecosophy is one which completes its mission in this very activity. Its means, ends, reason and practice are one, which, as Socrates said, is true of all virtue. It reconciles life and death for us. We see through the arbitrary boundaries that "separate" us from each other and Nature. Ecophilosophy as an activity is ongoing preparation for nothing other than its practice as a form of ecosophic life. The dichotomies that ecophilosophers encounter or set up as heuristic are resolved by this practice as a whole, when it is in living time.

Ecosophy is the good at which all things should aim. To be in ecosophy is to flourish in the most complete sense. As Lao Tzu observed, as each realizes its own way and the power of the Tao, their myriad ways are reconciled and support one another. In the biological dimension ecosophy is manifest as symbiosis and complementarity. In bodily form it shows itself in harmonious

movement and beautiful form. In social life it is manifest in authentic friendship and true community. In spiritual form it is manifest in compassion and communion.

The ecosophic mind imposes no power hierarchies. It realizes that all life forms in mutual thriving together help create the changing harmonies of the biospheric symphony. To engage in a practice that is ecosophic is to become a harmonious player in a music of joy and wisdom which celebrates all life.

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POETRY

THE EARTH -- YES!

Fraser Lang

The Earth; slate gray stones, amber and sienna,
Bones of brown, metamorphous and igneous hue.
Blue marble, agate green, bright corals in the sea,
Red clay, white sand, black loam,
Mineral foam and mist.
Continental drifts and intrusions of granite,
The slow layering of limestone, the compression of jade.
Alluvial siltation and glacial perambulations,
The grinding dance of plates tectonic.
Fold and fault, the histories geologic
and evolutionary, strands of time in space,
The growth of the cell, the bloody trials of the race,
Have brought us now to this;
I call God from His sky to witness as I say;
There are many worlds, but all exist inside this one.
Be content with the miracles that daily appear.
For nothing is higher than that which lives beneath our
feet.
In this age we will find our peace and heaven here,
And beneath our bootsoles our maker meet.

For the Earth creates us, yes;
Winds us on the wheel and weaves us in the weft,
Threads of life and cells in strands
A verdant cloth that ripples the land
Like a swaddling blanket.
Oh filter and fibre of life!
Earth energy that suckles and swells,
Rising with the sun in the blood and the sap,
Chains of food and symbiotic life,
Forever sun to leaf to blood to soil,
Cycles in cycles, born in cycles, absorbed in cycles,
Our blood spiraling through all, rising through all,
Running like a river to a lover to the land.

The Earth will take all that is past, yes;
All that is over and done in the swinging arc of time;
The grasses as they fall in the field,
And forests as easily, and eons upon eons
Of forests and all they contain.
Your body too, consumed like a moth in a flame.
For the Earth will purify us, yes,
Take our tired flesh and channel it back to the whole
That is our heart's desire,
Make it new as rain, and fresh as loam,
And hopeful as a child.
Death is not to be feared,
It is unification -- our lover calls, and we come.
It is dissolution, not destruction,
For we return -- but who knows where?

Out of the Earth we will be reborn, yes;
For out of the Earth all is reborn, and we no different --
No better, no worse, no higher, no lower.
Out of the soil womb, fecund and dark,
All issues forth, steadily and with passion.
Out of the water womb, mysterious and vast,
All issues forth, steadily and with will.
Life arising and arising, urge upon urge!
A thrusting, enveloping, streaming pulse,
Accumulating energy, adapting mass and form,
Joined in a continuum of birth and death, growth and
decay,
The never-ending cycles from which the Earth will claim
us,
And consume us,
And affirm us, yes.

The Earth contains all and reveals
A vision of wholeness and infinity,
An invitation to a greater dance, a deeper song.
For the Earth is the interpenetration
Of vast, rushing atmospheres,
Of the oceans, transient and ephemeral,
The rock of the living soil, and more;
The Earth contains life, and genesis,
Plants, animals, insects -- multitudinous variations
Of the life principle, all perfect and fulfilled.
And humans too, the life principle, perfect and fulfilled.
For the Earth contains our cultures, tools and works,
Our minds, gods, philosophies and religions,
Spirit, love and dreams,
All flowing in an unbroken stream,
Irrepressible life spirit, creation energy,
Upwelling in every tiny corner
Of this good, sweet Earth, yes.

For all is a continuum; we arise, then pass,
And but for one simple shining moment
Are indistinguishable from the whole.
The organic fuses to the inorganic,
Our atoms mix elegantly,
And all is indistinguishable from the next;
The good and evil, the high and low,
The many and the one,
All wed in the unity of Earth.
And we say; the Earth, yes, it is sufficient.
The Earth, yes, it is our home.
The Earth, yes, it is our body.
The Earth, yes, it is our self.
The Earth, yes, it is sacred.
The Earth, yes, in unity,
The Earth, yes.

About the poet: **Fraser Lang** is a musician (with Zumak), a writer and a stump farmer from the Fraser River watershed, who is currently working on a novel.

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