THE BALATON BULLETIN

Newsletter of
The Balaton Group

Autumn 1994

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(contact Dennis Meadows)

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(contact Joan Davis if you plan to come)

BALTIC BALATON MEETING: DECEMBER 12-15, 1994, RIGA, LATVIA
(contact Valdis Bisters or Raimonds Ernsteins)

BALATON 95: AUGUST 31 -SEPTEMBER 5, 1995, CSOPAK, HUNGARY

BALATON '94

The theme: sustainable human settlements, in particular the sustainability of cities.

The participants: 48 people from 22 countries, 31 of us "old-timers," 17 new to the Balaton Group.

The place: first the lavishly luxurious student dormitory of the Budapest University of Economics (in summer a youth hostel), then by bus to the Hotel Petrol, the vacation hotel of workers of the Hungarian Oil and Gas Company, on the shore of Lake Balaton.

The weather: sunny enough to have workshops out on the lawn, windy enough to be cool at night, warm enough to swim, one good thunderstorm, the first appearance of autumn on the Hungarian plain. It did not rain on the goulash.

The mood: as ever -- perhaps more than ever -- delight at seeing each other, working with each other, learning from each other, supporting each other, singing with each other, and giving each other silly presents.

Our traditional songmaster **Niels Meyer** was missing -- busy running for the Danish Parliament. So for the first time in Balaton history, we didn't hear the Danish coffee song and philosophy of life (life is not the worst you have, and the coffee is almost ready). But **Alan AtKisson** was present with his guitar, so we heard the Dead Planet Blues, and Water of Life, and how Freddy the Fungus and Alice the Algae took a Lichen to each other. We made Alan sing his systems song about parachuting cats roughly a dozen times. In the middle of one night a beautiful new song came to him -- titled "Balaton."

Drew Jones taught us to "blow up the TV, throw away your papers, move to the country, build yourself a home, plant a little garden, eat a lot of peaches, find sustainability on your own." **Valdis Bisters** sang us a Latvian song full of "rei, rei rei's" and "fa la la la la's" and a satisfying "hey"

at the end. **Milan Caha** sang something unpronounceable in Czech. **Gwen Hallsmith** got us all shouting about "Garbage." With the help of a strong Latin American contingent consisting of **Gerardo Budowski, Carlos Quesada, Rosendo Pujol, and Enrique Ortiz**, we did a fine job on "Cielito Lindo" and "Guantanamero."

We played the new SUSCLIM game, invented by **Bert de Vries** and **Dennis Meadows,** in which a rich and a poor country try to meet their domestic needs, trade with each other, and avoid unbalancing the global climate. A boisterous group played **Gwen Hallsmith's** World Bank game. (No real World Bankers ever had so much fun). And in one of Dennis's team-building exercises we tried to build cages of straws around raw eggs, so the eggs wouldn't smash when dropped from shoulder height. (Does this have anything to do with sustainability?) All but one of the eggs broke.

Small and large meetings went on all day and much of the night. Notices appeared on our self-organizing bulletin board, chairs were grouped and regrouped on the terrace, heads bent over laptops, rapporteurs took notes. One night **Alan AtKisson** gave us a hilarious multi-media presentation on how he explains the Balaton Group. Another night **Michael Ablema**n took us on an agricultural trip around the world. Up in the TV lounge, we could watch ourselves in **Herbie Girardet's** video from last year's meeting. **Chirapol Sintunawa** spent some time in his room, drafting Thailand's first environmental policy. **Aromar Revi** and **Ashok Gadgil** planned how to field-test Ashok's new UV-C radiation device, which kills microbes in water using 1/40,000th as much energy as boiling.

We took an afternoon boat trip to Tihany, where the meetings and conversations continued as we walked around the old town.

The Balaton Member of the Year Award went by universal acclaim to **Wouter Biesiot** of the Netherlands, for his steady encouragement of the development of the sustainability toolbox, for his oversight of the successful Ph.D. thesis of **Anupam Saraph**, and for the glowing light of his spirit during this year in which he is being treated for cancer. We were touched that he was able to join us at Balaton, and we sent him home stocked up with hugs and good wishes. Wouter is tired but looks fine, he is working out in a gym, so his muscles are stronger than ever, and according to all the evidence, the treatment is working.

We also talked and learned about human settlements. The plenary sessions this year were planned by **Carlos Quesada** and **Aromar Revi,** with help from **Bob Wilkinson** and **Dana Meadows**. Here's what happened.

Plenary On Sustainable Human Settlements

The test of the quality of life in an advanced economic society is now largely in the quality of urban life. Romance may still belong to the countryside, but the present reality of life abides in the city.
-- John Kenneth Galbraith

Day Zero: The Zoo, the Basilica, the Sewage Treatment Plant

Since we were studying cities, this year we decided to experience more of Budapest than the ride from the airport to the university dorm. So, at the kind invitation of **Miklos Persanyi**, the new director of the Budapest Zoo, we boarded the screeching Budapest subway on the night before our official meeting and went to the zoo.

Set at the edge of a city park, the Budapest Zoo is classic in the old style, with traditional Hungarian architecture. There are the requisite elephants, big cats, apes, and bears. Bold Balaton members got to throw dead fish to the pelicans, pet a baby otter, and feel an enormous python twine about their shoulders. Miklos has inherited a city outpost of biodiversity, in need of modernization and funding -- and he has a great vision for it. He wants it to be an educational center for sustainability. He sees it transformed from "a zoological garden to a garden for life."

(Incidentally, here is a zoo recycling story. Someone threw a rubber ball into the mouth of the hippopotamus at the Budapest Zoo. The poor creature died a slow and painful death; an autopsy revealed an intestinal stoppage caused by the ball. Miklos intends to display the ball in front of the hippo quarters, with a stern warning to visitors. Meanwhile, the hippo meat is in the freezer, to be used as food for the carnivores.)

The next morning the Balaton Group boarded the bus early, for a city tour planned and guided by **Tamas Fleischer** and **Zoltan Lontay**, with help from members of the Clean Air Action Group and the staff of the North Pest Sewage Treatment Plant.

Right off we experienced the impossibility of traffic in central Pest on a weekday morning. Fifteen years ago 84% of the trips in the city were made by public transport and only 16% by car. Today the ratio is 70:30 and still shifting rapidly toward cars. In 1970 there were 40 cars per 1000 inhabitants, now there are 240. Residential development has concentrated on the Buda side of the Danube, while most industry and offices are on the Pest side, which means most commuter traffic (and an astonishing percentage of cross-national traffic) has to funnel over just five bridges. The consequence is air pollution and gridlock, which we made worse.

Our bus was unable to turn a strategic corner, because the street was blocked by illegal parkers. We stalled, blocking the street for at least 15 minutes, while six husky BG members shifted a parked Lada, so the bus could squeeze through. By the time it did, we couldn't see to the end of the traffic jam we caused.

The lead content of Budapest air can hit 27 times the standard permitted by law. Carbon monoxide, nitrogen oxides, formaldehyde, and dust also exceed safe levels. Many Budapest children have more lead in their blood than is permitted for adult industrial workers. Half of the traffic police have been hospitalized for respiratory disease. Cases of asthma have increased 24 times, and lung cancer has doubled since 1970. Almost half the Hungarian population lives in areas with serious air pollution.

We climbed the 320 steps to the dome of the Basilica to see the city laid out before us, wrapped in haze. Andras Lukacs of the Clean Air Action Group (a coalition of 36 NGOs) was there to inform us of the state of the air and the work of his group. Since the coming of capitalism, industrial air pollution in the city has dropped as industries closed down. The polluting two-stroke engines of the East German cars have decreased. But every other source of air pollution is increasing. Most of the cars now populating the city are imported used from the West, with no catalytic converters, and with unimpressive fuel efficiency.

> Seventy percent of the surface area of Los Angeles is in some way dedicated to the use of automobiles. A recent traffic jam in Bangkok stretched 50 kilometers. Transport in Budapest consumes 600 million liters of fuel per year, which could be reduced by 20-25% if traffic jams were eliminated.

"First a park, then a parking lot, then an 11-story building," commented Zoltan, as we drove past a construction crane bringing modernization to central Pest. Capitalism has given land in the city too much value to remain as open space, so the central city is becoming even more dense, attracting even more traffic.

Half the sewage of Budapest flows through pipes directly into the Danube. The site where that happens would not be interesting for our group to see, said the city authorities. So we went to the North Pest Sewage Treatment Plant, one of two plants that give secondary treatment to 20% of the city's sewage. (The remaining 30% leaks out of septic tanks into groundwater.)

Budapest's water comes from "bank-filtered" sources, which is to say alluvial gravel beds along the Danube. The capacity of the beds upstream from the city has recently been exhausted, so now some drinking water comes from downstream beds too, giving the city an immediate feedback pressure to improve its sewage treatment. At the moment, the problem with taking water downstream isn't pathogens; it is the high organic content and acidity of the water, which mobilizes iron and magnesium from the riverbed stones. These minerals are not harmful, but they cause a black deposit that bothers people. So water from the downstream source is de-ionized, at great expense.

Another ominous feedback: construction has dredged so much gravel from the Danube that the water level has dropped permanently by 1/2 meter, which has increased the rate of groundwater flow into the river -- which is bringing contamination from septic tanks closer to the water supply.

There is a close link between the city's air pollution and its water pollution, since many toxics that wash into the river or come through the sewage treatment system are deposited from the air. The city management company washes the surface deposition into the sewers, saying "If we don't wash it, you will breathe it."

Sludge from the North Pest treatment plant is hauled 23 km to the village of Csomad and dumped into a landfill. The sludge can't be used for agriculture because it is too high in industrial toxins, especially chromium from tanneries. The plant generates 350 m^3 of sludge a day. The

capacity of the sludge landfill is 380,000 m^3 (giving it a lifetime, if our calculations are correct, of just 3 years).

Clearly Budapest's water system needs help, which means money. The engineers at the North Pest plant calculate that $700 million is needed for new treatment plants, another $700 million to connect the whole city to sewage pipes, $60 million for a new sludge disposal site, and $380 million for repair of old pipes.

On the bus on the way to Csopak the water experts among us were busy calculating how to provide a better system with less money by separating industrial from domestic flow, by using low-flow toilets, by repairing leaks, by building **John-Todd** organic treatment systems. Maybe we should start a consulting company.

Day One: The History, Metabolism, and Dynamics of Cities

> *I will return to Jerusalem, my holy city, and live there. It will be known as the faithful city.... Once again old men and women, so old that they use a stick when they walk, will be sitting in the city squares. And the streets will again be full of boys and girls playing.*
> -- Zechariah (520 B.C.)

The common reasons given for urban problems -- exploding populations, a failing countryside, the false attraction of urban glitter bringing in hordes of naive migrants -- are simply wrong, said **David Satterthwaithe** (of the International Institute of Environment and Development in London), who opened our plenary session with a dose of myth-shattering. There are 50,000 urban centers in the world, most of which are growing slowly, some of which are stagnating or declining. The few rapidly growing ones get all the attention. It's actually astonishing how stable urban systems are. One-third of present cities were also important 1000 years ago. Only in sub-Saharan Africa has there been a spurt of new cities.

It is also false that migrants come ignorantly to cities. People make reasonable choices about moving, choices that are nearly always in their best interest. And a final myth -- overcrowded cities are not hot-beds of social tension or sources of revolution. Given urban living conditions, it is surprising that there is not more unrest. The reason is probably that the poor are much too busy trying to survive to have the luxury of fomenting social change.

Some facts, insofar as we know the facts (David also inserted a healthy degree of skepticism about urban statistics):

1. Between 1950 and 1990 the urban population of Africa, Latin America, and Third-World Asia grew from 285 million to more than 1.4 billion. In the rest of the world urban populations grew from 448 to 875 million.

2. The UN projects another 600 million will be added to cities in the South between 1990 and 2000 -- compared to less than 90 million in the rest of the world.

3. In 1900 there were 12 cities with more than 1 million people (3 in the South); by 1950 there were 82 (32 in the South); by 1990 around 289 (171 in the South). In 1900 there was only one city with more than 5 million inhabitants; in 1990 there were 35 (23 in the South). This is rapid change, but not as rapid as other economic and political changes over the same period.

4. Historically urban culture originated in the South, and many urban traditions and responses have been shaped there. What is new is not the fact but the size of urban agglomerations.

5. The world's cities are phenomenally diverse. Some are growing, some are losing population, some, like Los Angeles, are doing both, depending on where you draw the boundary around them. Some are economically based on industry, some on government, some on transport, some on finance, some on universities and high technology. It is not possible to generalize about the world's cities.

What drives urban change? Many surprising factors:

- Changes in the economy and employment base (the rate of growth of per capita GDP is almost perfectly correlated with the rate of growth of cities),

- Disasters that disrupt populations, such as civil wars, drought, famine,

- Trade patterns (frosts in Brazil make coffee-processing towns in Kenya grow, changes in shoe preferences in the U.S. determine income in one Brazilian town, the rise of the Japanese car industry killed the city of Detroit),

- Changing crop patterns, crop prices, and land ownership structures in rural areas (the value per hectare of a standing crop can vary by a factor of 1000, depending on the crop and the state of the market -- thereby keeping farmers on their land, or forcing them to leave),

- Political changes (for example, decolonization spawned the need for new government and academic centers),

- Defense expenditures,

- World tourism fashions,

- Age structures and demographic waves (which can stimulate retirement cities like Phoenix and Miami, for instance).

Because each city has such a specific economy, dependent on so many complex factors, it's not only dangerous to generalize, it's also dangerous to extrapolate. In 1973 the U.N. projected the

year-2000 population of Mexico City would be 32 million; now it's expected to be 16 million. Projections for Calcutta have been cut from 20 to 13 million.

The environmental problems of cities can be sorted into three qualitatively different kinds. Within the city they consist of biological pathogens (because of inadequacies of infrastructure and management), physical hazards from floods, landslides, traffic (especially for the poor), and chemical pollutants from industries and motor vehicles. Regional problems come when city demands for resources such as water and energy and waste absorption capacity cause shortages and damage well beyond the city. The planetary problem occurs when city-based resource consumption and emissions of wastes are incompatible with global limits.

We should focus less on the absolute size of cities, said David, and more on their functions and impacts. It doesn't matter how big a city is. What matters is that people want to live there, their children live in health, the city pays its full and fair resource costs, minimizes its throughputs, and keeps its wastes within the absorptive capacity of local and global sinks.

Herbie Girardet (Footprint Films, London) got interested in the metabolism of cities when he saw in the port of Belem, far up the Amazon, a huge stack of lumber marked to be sent to London. Even here,, so far away, he thought, the tentacles of London reach. Cities should be described not so much as centers of civilization but as centers of mobilization of resources from all over the world.

Some of the physical flows into London include (in million tonnes per year):

water		1,000
total fuel (mtonnes oil equiv)		20
diesel/petrol	3.4	
aviation fuel	3.0	
fuel oil	1.2	
coal	.092	
natural gas	6.0	
electricity	6.3	
food		2.4
timber		1.2
paper		2.2
plastics		2.1
cement		1.9
bricks, sand, asphalt		6.0
metals		1.2

And out of London comes (also in million tonnes per year):

sewage sludge (wet)	7.5
industrial & demolition waste	11.4
civic & commercial waste	3.9

household solid waste	2.4
carbon dioxide	60
sulfur dioxide	0.4
NOx	0.28

As an economy London is about the size of Saudi Arabia or Russia. It is particularly bad at closing its resource cycles, turning its outflows into useful resources within the city. Vienna recycles 53% of its solid waste, London recycles only 3%. Better insulation and greater use of district heat could cut London's heating bills in half. Its organic waste could be used as nutrient for urban agriculture. Much of its wastewater could be purified (preferably organically) and re-used. Its carbon dioxide effluent could be recycled back through reforestation. Closing the cycles is one of the first and most obvious steps toward sustainable cities.

It's much cheaper to offset carbon dioxide emissions with energy use efficiency than with reforestation, commented **Ashok Gadgil**.

Rising transport costs (up to their full internalized real costs) would cut off the tentacles of cities pretty quickly, added **John Peet**.

Miklos Persanyi asked whether it makes sense to chart urban metabolism -- whether there is in effect really only one global system now.

The cycles are closed, said **Herman Knoflacher,** they are just postponed in space and time, which is the way the politicians like it.

Twenty years ago I did a study of the metabolism of Hong Kong, said **Stephen Boyden** (Australian National University, Canberra). (*An Integrative Ecological Approach to the Study of Human Settlements* Paris : Unesco, 1979. International Co-ordinating Council of the Programme on Man and the Biosphere) We were interested in analyzing the system in terms of both its bio-metabolism and its techno-metabolism. This involved describing flows of energy, nutrients, and water into, through, and out of the city and collecting information on the built environment and the transportation system. We were also interested in the human components of the system. That part of the study involved not only demographic data, but investigations of lifestyles, behavior patterns, and patterns of health and disease.

There was an underlying assumption throughout the project that important relationships exist between flows of energy and materials on the one hand and the quality of human life on the other. We were interested in learning more about those relationships. The study can be justifiably criticized for not taking into account the abstract, cultural part of the system, which clearly plays a crucial role in influencing the biophysical realities.

biosphere <====> economic sphere <====> human culture

In retrospect, after the Hong Kong study we have asked, "Was it all worthwhile?" From our personal points of view the answer is certainly yes. We learned a great deal from the

experience, and we saw many things differently afterward. But our naive assumption that social scientists and policy-makers would be interested in our work was totally wrong. To us the analysis clearly highlighted serious causes for concern and called for re-appraisal of social priorities (and of the criteria for desirable progress). But as far as we are aware, our work had virtually no impact on anyone else's thinking, on any policies, or on any human activities.

As a result, we become more acutely aware of the seriousness of the gap in comprehension and interest between those concerned with biophysical actualities and those concerned with societal arrangements. That awareness influenced the design of a later project, which focused not on a city, but on Australia as a whole. It consisted of two parts. Part 1 involved an analysis of the biophysical actualities -- resulting in a book with the title *Our Biosphere Under Threat*. Part 2 was a deliberate effort to invite social scientists to discuss the implications for Australian society.

Many publications came from that second activity, but I have to admit some personal disappointment in the results. It seems to me that most of the participants did not really come to grips with the ecological realities. Nevertheless, I think it was a step in the right direction.

Now I work through a small organization in Australia known as the Nature and Society Forum. Our operating assumption is that changes in patterns of human activity will not happen unless there are profound changes in the dominant culture. The transition to what we call a "biosensitive" society must be a cultural change. Just for a start, it must involved the acceptance of two obvious realities of enormous relevance, neither of which is part of modern industrial thinking:

- The processes of life affect all we do.
- All we do affects the processes of life.

We have tried to form a new institution for people who already want to have a discussion about sustainability. (We call them CIPs -- "concerned, interested persons.") It is a community-based institute, which teaches the physical bases of life and the human role in the biosphere. It's an "upside-down university," in which people can learn, communicate, and take information out to other community organizations. [Editor's note: It sounds like a local community version of the Balaton Group!]

In any human community, a distinction exists between total knowledge and widely shared social knowledge. It is critically important what parts of the TK flow across to find a place in the SK. Today TK has reached astronomical proportions, and only a small fraction of it is represented in SK. The SK of human communities does not contain, even in elemental form, basic knowledge about ecology, the evolution and biology of our species, the health needs of humans and ecosystems, or the interplay, past and present, between human society and biological systems. Until that knowledge (which, until someone comes up with something better, we call biohistory and biosophy) is widely shared, the metabolism of cities, and indeed of all human activities, will remain inappropriate and unsustainable.

Clearly the biosensitive city of the future must satisfy the health needs of all sections of its human population; not interfere with the satisfactions of the health needs of humans in other places; and promote satisfaction of the health needs of the ecosystems of which it is a part. This will require major changes in patterns of resource and energy use. Those changes will not take place unless there occurs a significant change in the abstract cultural dimensions of society.

> Budapest car owners spend a total of $1.2 billion on their cars each year (direct expenses, not counting externalities). The annual budget of the Budapest Public Transportation Company -- which moves twice as many people as the car traffic does -- is $250 million.

This is the 25th anniversary of the classic study *Urban Dynamics* by Jay Forrester, said **Dana Meadows** (Dartmouth College, Hanover NH). The policy implications of that study made city planners furious back then, and still make people mad now -- because they shatter myths and question fashionable urban policies. The Urban Dynamics study was brilliant, original, insightful, complex, widely misunderstood, full of flaws, and based on one enduring idea about cities -- the "attractiveness principle." We "systems folks" in the Balaton Group should be aware of this principle.

The behavior mode that interested Forrester was not the growth of cities, but the end of growth. Cities can't and don't grow forever. (That statement is already enough to make people mad.) The historical behavior -- clearly shown by American cities -- is one of exponential growth, overshoot, and decline into a stagnant city of dying industries, unemployed people, and deteriorating housing.

The most mobile people and businesses try to escape the declining central city by moving outward in rings, but the dynamic repeats itself as the city spreads. The inner three rings of Boston, for example, have stagnated (see p. 12), in the fourth and fifth rings growth has slowed, the sixth and seventh rings are now the growth centers of the city -- with huge implications for transportation. As Forrester says, "The better the transportation system, the less the interleaving of population classes and the less the proximity of housing to industry.... Transportation can span the deteriorating areas, helping to hide them and making renewal less pressing and less likely."

This stagnating behavior is caused by the interaction of numerous negative feedback loops, each of which determines the relative attractiveness of the city to businesses, to housing developers, and to people of various socioeconomic status. Relative attractiveness is a complex mixture of perceptions, compiled by each potential in- and out-migrant (or builder or business owner), reflecting the characteristics that person is looking for in a settlement, relative to elsewhere. For example, to a low-income or unemployed person, relative attractiveness might consist primarily of cheap housing, plus a good chance of getting a job, plus a chance of that job leading to upward economic mobility. High-income people, more assured of housing and jobs, might be concerned about environmental quality, about urban amenities like parks or concerts or museums, about ease of transport and absence of crime.

However people make their judgements of relative attractiveness, as long as they perceive one city as being more attractive than others, and as long as they are freely mobile, they will move toward attractiveness. As they move, they will begin to saturate whatever element of attractiveness brought them there. They will fill up the housing, take the jobs, crowd the transportation system, lower the environmental quality, until the city is no more attractive than anywhere else. At that point, net in-migration will stop. Since there are long delays in this feedback loop (people's perceptions lag behind reality, people don't act immediately on their perceptions, and stress on urban infrastructure may not be immediately apparent), the equilibration will not be smooth. It will overshoot and oscillate.

Businesses and industries are also acting on their perceptions of relative attractiveness in deciding whether to move into, expand in, or move out of a city. Some of the same aspects that attract people also attract industry (low taxes, ease of transportation, low crime). Others are in direct opposition. Low wages attract industry but repel workers, as do easy environmental regulations. Low taxes or tax breaks for industry may translate into higher taxes for people. Housing developers also have their criteria for deciding to build housing of various qualities and prices in the city -- cheap land, high rents, low interest rates, etc.).

These feedback loops influence each other as in- and out-migrations of people, foundings and failings of businesses, and construction, aging, and demolition of housing change relative attractiveness for all sectors, and also as they occupy or release the main limiting factor of the central city -- available land. The dynamics can get very complex. Forrester's model keeps track of only three categories each of workers, housing, and enterprises -- many fewer than in a real city.

But its behavior does track that of real cities, starting with rapid growth, and eventually settling, after several oscillations, into a long-term equilibrium with high unemployment, few new enterprises, little upward mobility, decaying housing stock, and, of course, zero net migration and construction. (For simplicity Forrester assumes a constant attractiveness of the world outside the modeled city, which is why the ultimate equilibrium is so stable. If outside attractiveness were going systematically up or down, the city's attractiveness would follow, oscillating, after a delay.)

The morals of this model are not what anyone wants to hear:

- As long as there is free mobility, no city, and indeed no rural area, can be more attractive in the long run than any other.

- Fixing any problem (a housing shortage, a job shortage, a transportation tie-up, for example) will make the city relatively more attractive, thereby increasing the population, until some other aspect of the city declines sufficiently to stop in-migration and form a new equilibrium. (In particular, Forrester pointed out, building subsidized housing for low-income people while doing nothing about jobs for those people, attracts migrants until unemployment soars so high that it counteracts the pull of the available housing. Demolishing low-income housing, on the other hand, especially badly deteriorated housing, creates space for new enterprises, increasing employment and upward mobility -- at the cost of crowded or expensive housing.

This conclusion infuriated city planners of the 1960s, who were all advocating public housing programs.)

- No city can control its overall level of attractiveness -- it can't be higher or lower than that of other place to which people or businesses can go. (GATT, by the way, insofar as it frees the mobility of businesses to cross international borders, will result in all the cities of the world coming to the same degree of relative attractiveness -- for business.)

- What city officials can do is choose deliberately the elements of unattractiveness they are willing to live with, in order to maintain high attractiveness in other elements. They might deliberately choose high taxes, for example, or poor highways, or strict zoning regulations, or scarce housing, in order to balance off better-than-average schools, or job possibilities, or environmental quality. Overall attractiveness is not controllable, but the mix of attractiveness is.

If a mode of behavior is to be sustained, there must be some restraint against which the system presses to ... anchor the system against drifting into some other mode of operation.... A system without internal pressures is probably one whose behavior mode will drift in an uncontrolled manner until it is captured by a set of pressure that represent a self-sustaining mode.... Growth modes are not forever sustainable, so we must always look toward the choice of some equilibrium mode .... In choosing a mode, we are choosing the ensemble of pressures under which we want to live. To sustain that mode, we must be willing to accept and in fact maintain the corresponding pressures.
-- Jay Forrester, *Urban Dynamics*, Cambridge Mass, MIT Press, 1969. pp. 126-127. Now available from Productivity Press, Cambridge Mass.

This model makes me mad, said **Alan AtKisson**.

Space is the most precious, limiting, and expensive factor in central cities, but it is given away to cars without question. In Budapest commercial space costs around $600 per square meter per year, but one can park a car two meters in front of a shop for free. The space occupied by the 500,000 cars parked in public spaces in Budapest is worth $170 million per year. (The parking authority actually collects $400,000 per year.)

Day Two: Food, Water, and Solid Waste

By paving our precious topsoil, we preserve it for future generations.
-- Michael Ableman (tongue in cheek)

Michael Ableman (Goleta, CA) runs the last remaining farm in the urban area of Santa Barbara, California. The farm is small -- 12 acres or 5 hectares -- but it grows 100 kinds of fruits and vegetables, it employs 12 people and it feeds 400-500 families. Perhaps more important , it

serves as a wildlife refuge (it's an organic farm) and as an education and demonstration center for sustainable agriculture and sustainable living. "We want to put the culture back into agriculture," said Michael. The farm hosts concerts and kids' programs, it provides horticultural therapy for troubled or handicapped persons, it becomes a center for neighborhood activity -- and it recycles the neighborhood's kitchen garbage into compost.

Most of Michael's presentation consisted of beautiful slides he had taken on a tour of urban gardening projects and traditional agricultural communities around the world. It was so striking that many of us requested a more leisurely evening showing, so we could stop and ask all the questions we liked. There were scenes of young people and old people in gardens -- a natural place for them to be and to contribute. There were gardens in prisons, gardens on rooftops and in vacant lots, gardens in poor urban neighborhoods transformed both physically and psychologically by the clearing away of junk and the planting of food.

It makes sense to interpolate food production into cities said Michael. Even small areas can be incredibly productive. And the open space, the cheap, nourishing food, the contact with nature, are all needed much more in cities than in the country. Michael suggested a way of preserving open land in market economies (which will, unless restrained, convert all city land to structures of "higher value.") That is to distinguish land ownership rights from development rights and legally remove the development rights through a "conservation easement." Land under conservation easement can be privately owned, bought, sold, farmed, but never, under present or future ownership, can it be paved or built upon. The consequence is that two markets are created -- one, with high prices, for developable land, and another, at prices farmers can afford, for undevelopable land.

> *I traveled over 100,000 miles and across five continents. Through my travels came the realization that a common thread connects all these stewards of the earth. Titus, the Hopi farmer singing to his corn on a remote desert mesa in Arizona; a community of some sixty people in the steep mountains of Peru ...; Dick Harter, an organic rice grower in Chico, California who cares as much about the number of birds on his farm as the number of grains of rice; and Alta Felton, an eighty-year-old woman whose cotton, black-eyed peas, and yams grow below the railroad tracks in South Philadelphia -- all represent a small but far-reaching movement: they all reclaim and renew the earth one spadeful at a time, one bucket of compost at a time, one handful of seeds at a time.*
> Michael Ableman, *From the Good Earth*, New York, Harry N. Abrams, Inc., 1993. (This book contains all the pictures Michael showed us at Balaton.)

Costa Rica doesn't fit the average statistics for Latin America or the Third World, said **Rosendo Pujol** (University of Costa Rica, San Jose). We have a young population, a good health system, and a 72-year life expectancy. Our infant mortality rate is lower than that of minorities in the United States (but polls show that one-third of our population would like to live in the United States). Half of our national population lives around the capital of San Jose. This is also the area of our best soils and climate. The city is growing with very low density -- it's essentially a one-story city -- and so the coffee plantations are on their way out.

The San Jose basin was once the site of four small cities -- San Jose, Cartago, Heredia, and Alajuela -- which have grown together now. People live a long way from nature. There is a reserved greenbelt, but it doesn't seem to be hard to get government permission to build there. The area has no sewage treatment at all -- sewage goes directly into rivers, all of which are polluted and must be recovered.

San Jose's municipal dump is filled to capacity and still rising, with no plan yet for an alternative. It is on high land, draining directly into a river, because that piece of land happened to be owned by the Ministry of Health when they decided they needed a dump. Solid waste is less of a problem than it is in the North, however, because we generate less of it per capita (about 1/2 kilogram per person per day) and there is a lot of informal recycling, because people are poor. About 25-30% of paper is recycled; some mills are being built especially to reprocess recycled paper. We have a problem with plastics, especially with littering in tourist areas like beaches. It might be better to ban some products or types of packaging than to recycle them, however. Recycling is not always the answer.

Composting is done extensively in rural areas in Costa Rica. Most of the solid waste of the countryside is actually agro-industrial waste, from banana plantations and such. We could see that not as a problem, but as an opportunity for still more composting.

Road investment has been driven by ridiculous cost/benefit analyses specified by the World Bank, which count, for example, the value of the crops raised along new roads as a benefit (not even subtracting the costs of the growing the crops). There is never an ex post analysis after the road is built to correct the faulty assumptions. In the developing countries in general, there should be much more ex post analysis.

Cities don't have to be high to be dense, observed **Enrique Ortiz**. Mexico City is one of the densest cities of the world, and it's essentially all two stories.

The morning's presentations ended with a "water extravanganza" -- four case studies in urban water management, starting with **Bob Wilkinson** (Santa Barbara, CA) and the story of southern California in general, and Los Angeles in particular -- a huge, rich city (if it were a country, it would have the world's seventh-largest economy), surrounded on all sides by either salt water or desert. It is, said Bob, a world-class example of limits to growth.

For years the explicit policy in southern California was growth at any price, and the only question about water was where to get more. ("Water runs uphill toward money.") Through a massive system of dams and pumps and ditches (and a great deal of political chicanery), the Los Angeles water system has now overshot the capacities of three watersheds. The amount of water available is going down, because of pollution, dam siltation, saltwater infiltration, the collapse of aquifers, deforestation and overgrazing, and new court decisions requiring the city to leave enough water running in rivers to maintain endangered species. The myth of limitless supply, to be increased by engineering, has finally been shattered. The city has to confront its water limits.

It is doing so only slowly and reluctantly. The latest draft water plan admits only limits to the water conveyance system. ."Water resource management in California is at a critical juncture as evolving policies and physical limits of the State's water supply infrastructure collide.")

The concepts that will eventually help Los Angeles include real (not distorted by subsidies) cost/benefit analysis (especially considering the marginal cost of developing the next unit of water flow) and full pricing, both to allocate existing supply and to reduce demand. Once the incentives get right, there are many ways for Los Angeles to meet the same water end-uses at far lower environmental and economic costs.

For instance (a back-of-the-envelope calculation):

15 million people x 7-10 toilet flushes per day = 105 to 150 million flushes per day

x 3.75 gallons saved per flush with low-flow toilets = 394 to 563 million gallons saved per day

÷ 325,872 gallons per acre-foot = 1208 to 1726 acre-feet saved per day

+ 166 more acre-feet saved per day through associated leak reduction = 1374 - 1892 AF/day

x 365 days per year = 502,000 - 691,000 AF/year (about equal to what could be gained from the construction of one major dam and diversion project)

This water saving would also save over 2 billion kWh of pumping electricity, at a cost (depending upon electricity price) of $100-200 million per year. The capital and installation cost of the low-flow toilets would be about $180 million. The payback time -- just counting pumping cost, not the cost of water supply infrastructure or the savings in the sewage treatment system -- would be less than two years.

And low-flow toilets are not the cheapest efficiency option for Los Angeles -- subsidized, irrigated agriculture is.

Of course increasing water efficiency would not force Los Angeles to confront its limits -- it would postpone that necessity for awhile (keeping relative attractiveness high enough to bring in more people and businesses until some other limiting factor stops growth!) The morals of the story are that there are vital missing feedback signals in the pricing system, that there is no whole-system accounting, and that there is no ultimate measure of the carrying capacity of the Los Angeles basin and not even any desire to look for one.

Drew Jones (Rocky Mountain Institute, Snowmass CO) started off with the Hydro-Illogic Cycle:

drought

apathy concern

rain

(and was immediately questioned by the audience as to how concern causes rain -- or even more worrisome, how apathy causes drought -- but then, we all knew what he was getting at!)

Drew gave us a list of good-news water stories, starting with one right in the middle of fabled Los Angeles:

- The L.A. utilities offer a rebate of $80-$100 for anyone who installs a low-flow toilet, but this program bypasses the poor, who can't afford the switch even with the rebate. So an NGO called Mothers of East Los Angeles has arranged to get the toilets in bulk for only $25 apiece and to give them away (for a $25 installation fee, which employs local installers). They have distributed over 75,000 toilets so far, saving each recipient family $30-$50 per year in water costs. (They should have some sort of a big ribbon-cutting ceremony, says Drew. They've saved as much water as they'd get from a new desalination plant.)

- As opposed to L.A., New York City has plenty of rain, but it has water problems anyway.. Its four wastewater treatment plants are overloaded and a new one would cost $800 million. Its supply system has been drawing beyond its dependable long-term capacity for years. Needed pumping and filtration improvements would cost $1 billion. Rather than make any of these major investments, the city has decided to replace 1.5 million toilets, to repair system leaks, and to improve metering. It floated a $270 million capital bond to pay for these steps. It provides a $240 rebate to homeowners for each toilet replaced, and it employs local plumbers to do the job. It expects to cut total water use by 5-15%, at much lower cost, and with much less political grief than expanding the supply and treatment system.

- Mexico City has changed 350,000 toilets to more efficient ones that will cut water use by 17%.

- Jerusalem realized a 14% drop in water use from 1989 to 1991 through better fixtures, leak repair, and efficient irrigation.

- Singapore saved 10% through leak repair alone.

- Bogor, Indonesia, faced with an expensive water supply investment, hiked its water rates, and residential use dropped 30%.

- Better toilets and leak detection could save the city of Bangkok the cost of constructing a major new dam now being planned.

The installation of just one high-efficiency showerhead (Drew has stopped calling them low-flow showerheads), would save every year:

- 5,600 - 15,000 gallons of water
- 600-1,700 kWh of electricity
- 700-1,800 pounds of carbon dioxide emissions
- 1.2-3.0 pounds of NOx
- 2.5-6.4 pounds of sulfur dioxide
- or 26-75 therms of natural gas
- $25 - $170 in energy and water bills
- plus indirect environmental and economic benefits.

Water-saving projects like these have to be done with public involvement from beginning to end, Drew cautioned, to be sure that another feedback cycle proceeds in a hydro-logic, rather than a hydro-illogic direction.

In 1985 Tegucigalpa, the capital of Honduras, had a potable water crisis, said **Carlos Quesada** (University of Costa Rica, San Jose). Even the hotels were short of water. The population of the city had been growing at 6% per year and the water system had not been able to keep up.

Half the water for the city came from a cloud forest 20 km away. The natural and constant condensation in this forest supplied 25 small intakes with very high quality water, requiring little or no treatment, and supplied to the city through gravity feeds. The only alternative to this supply was a highly contaminated river, from which water was being simply pumped into barrels, left to settle, trucked to the slums, and sold at a high price.

The forest was set aside as a natural park, but it had only one guard, who received death threats as settlers tried to move in. The recommendation was made to the city government to protect this park at all costs, not only for the sake of nature, but for the sake of the water supply. (Hundreds of military soldiers, said Carlos, but nobody to guard the most precious resource necessary for the security of Tegucigalpa.)

The recommendation wasn't followed. It's hard for peoples' minds to connect the integrity of forests with the integrity of water supplies.

Many Third World countries have enormous water problems, said **Joan Davis** (EAWAG, Zurich), mainly due to bacterial pollution, or the lack of water. In Second World countries there are increasing problems of chemical pollution. In both worlds, little is done, mainly due to a lack of finances.

The 'over-developed' world on the other hand, should have enough money for solving its (mostly chemical pollution) problems, but one quickly sees that 1) it's not so cheap and simple and 2) new problems can arise out of the solutions.

Examples:

1) It only costs a couple of Swiss francs to buy a kilogram of the herbicide atrazine, but it can cost around 400,000 francs to remove it from drinking water with activated carbon.

2) The removal of nitrates with reverse osmosis also removes essentially all the minerals. The clean product is unusable until it's mixed with other water. For this, water is used that also has a high nitrate concentration, since it can be reduced by mixing. However, after mixing, the water is corrosive for the pipes that distribute it, and sometimes for the stomachs of those who drink it.

These two problems are caused by our chemical agriculture, which claims to produce food cheaply. In order to produce cheap food, we use expensive fertilizers and pesticides, which cause water pollution, which is fixed by high-cost treatments systems, which are paid for through taxes, so we never notice the feedback.

We can't afford that kind of cheap food.

Another example: in Switzerland (as in many other areas) industries are often allowed to use water that lies below their property. In Zurich some industries have used ground water to the extent that the city has to draw more of its drinking from the lake, which requires more treatment -- which is, of course, charged to the whole populace, not to the industries that cause the problem.

An even more worrisome example: many chlorine-containing chemicals, such as PCBs, dioxins, and organochlorine pesticides such as DDT, are now known to be estrogen-inhibitors or estrogen-blockers. Even in vanishingly small concentrations, they can have a devastating effect on the development of eggs, sperm, and fetuses in all sorts of animals, including people. They are the apparent cause of hermaphrodism in fish, of birth defects in polar bears, seals, and whales, of sex changes in salmon and crocodiles, and perhaps even of the widely observed 50% crop in the sperm count of human males. (As a woman scientist recently said, in presenting this information to a U.S. Congressional panel, "Senators, you're only half the men you used to be!")

What to do about these insults to the water, which feed back to become insults to ourselves? First of all, help people to realize how valuable good water is -- and to understand that its real value is in no way indicated by its low price. Water shouldn't be seen as simply a way to transport wastes. It isn't a big garbage bag. Its value is much higher than any price we can put on it.

And then, concretely:

- inform people how their product criteria (food!!) and everyday use of chemical substances affect water quality
- internalize externalities -- charge appropriately for pollution and for clean water use. (When water price to industrial users was raised in Sweden, industrial use turned around completely, from a steady rise to a steady fall.)
- install water meters (in most apartments, the water is not individually metered, i.e. no feedback as an incentive for saving)
- encourage policies that foster water recycling in industry and organic practices in agriculture.

Day Three: Energy and Transport

The City is of Night, perchance of Death,
But certainly of Night; for never there
Can come a lucid morning's fragrant breath
After the dewy morning's cold grey air.
-- James Thomson (1880)

Along the east coast of India, Bangladesh, and Thailand is spreading a new strain of cholera that kills within 20 hours. There is no vaccine against it, said **Ashok Gadgi**l (Lawrence Berkeley Laboratory, San Francisco, CA). It is spread through impure drinking water. There is a new device, however, that uses UV-C light, tuned to the same resonant frequency as DNA, which can kill single-celled pathogens in water, using 1/40,000th the energy it would take to purify the water by boiling. Ashok is setting up 40 such devices now in 40 villages for testing.

There are hundreds of other ways beside the pathogen-killing UV light for cities and nations in the South to save energy.

- The average 1976-model refrigerator uses 2000 kWh.year -- the average 1990 model uses 800.

- Incandescent residential lights give 14 lumens/watt; compact fluorescents give 60.

- Air-conditioned buildings in the Third World typically have no insulation and only single-pane windows. If the windows could be replaced by argon-filled, low-e coated, double-pane superwindows, there would be less solar heat gain and less infiltration of heat from the outside. Air conditioners could be downsized and run on so little energy that the windows would easily pay for themselves -- not counting the capital

savings because less electric-generation capacity would be needed. (Each square meter of superwindow saves 60 kWh/year in a climate like Bangkok's)

BUT -- in the developing countries electric utilities are large government sectors, run by powerful bureaucracies, committed to supply-side thinking. They see nothing to gain from energy efficiency. They subsidize residential electricity use -- but not efficient appliances. Furthermore low-income consumers understandably have very high discount rates (40-80%). So even if energy prices weren't skewed, householders wouldn't buy efficient appliances.

The institutions and mechanisms of modern capitalism work especially badly in the Third World. There are few corrective institutions (private foundations, independent think-tanks, etc.). Decisions tend to be made on the basis of ferocious turf-guarding instead of performance. There are steep pyramids of hierarchy within organizations. Furthermore most technologies have to be "hardened" to perform well in tropical and low-maintenance conditions. So, though energy efficiency may make more sense for low-income countries than for anyone else, its implementation is poor, its constituency is not awakened, it has few champions.

Policies and institutions have to be designed within these constraints. Here are some examples of how they could be.

The Bombay Efficient Lighting Large-scale Experiment (BELLE) is an alliance of utility, manufacturers, financial institutions, and consumer and environmental activists. The utility buys compact fluorescent lights (or any other efficient appliance) in bulk from the manufacturer, who gets a guaranteed market. The utility leases the lights to the customer and collects lease payments with the ordinary electric bill (which will be lower, because the lights use less energy) The consumer faces no high first cost and saves money immediately. The utility saves money by not having to build more capacity. The society as a whole has lower energy imports and an improved environment.

It's a win/win/win/win solution -- which takes strong team-building skills to get going. In Bombay it foundered on hard-currency requirements, but similar arrangements are working now in Guadalajara and Monterrey, Mexico, and in Guadalupe.

A similar kind of scheme could finance efficiency by setting up a market in "carbon-free" goods and services. ("Carbon-free" gasoline, "carbon-free" tennis shoes.) It would work like this: there would be a tax of 5 cents a gallon (or whatever) on gasoline and other carbon fuels -- and on products made with carbon fuels. The tax would finance a compact-fluorescent light factory (or efficient refrigerators, or high-efficiency showerheads). The tax rate would be set, and the efficiency technology would be chosen, so the technology would offset in carbon savings the amount of carbon in the gas (or tennis shoe). Pay $250 extra for a Honda Civic and offset enough carbon to balance its first 150,000 miles of driving!

Ideally this scheme would produce financing for energy efficiency so fast that the opportunities for efficiency improvements would soon be exhausted. At that point, further financing could go into developing solar and other renewable energy sources.

A third new institution would be an Energy-Efficiency Impact Statement (EEIS), required of every new factory producing any device that consumes energy. A factory that produces an energy-guzzling appliance has a large and long-term impact on national energy efficiency. Therefore just as important as an Environmental Impact Statement (which 45 nations now require) would be an EEIS, which would identify early in the design process those changes in manufacture that could produce a much more efficient product. Utilities could even be required to pay the incremental design costs to improve efficiency -- which would be much cheaper than building new power plants. Reducing environmental externalities would be a "free" benefit.

A complete life-cycle analysis of all energy and materials would be even better than an EEIS, said **Wim Hafkamp**.

Very true, answered Ashok, but energy we already know very well how to do.

> Industrial energy use in Budapest decreased 40% between 1987 and 1992 (because of inefficient plants shutting down), while residential energy use increased by 10%. Heating with coal is rapidly being replaced with natural gas; the share of natural gas increased from 43% to 67% between 1980 and 1992. Thirty percent of Budapest homes are heated by district heating, but the pipes and the homes are poorly insulated and control devices are primitive, so the system is astonishingly inefficient. As the formerly subsidized energy prices rise to world-market level, there is increasing incentive to improve efficiency, but little capital to invest in doing so.

Kaj Jorgensen of the Technical University of Denmark, Lyngby, started off by celebrating Denmark's goal to reduce its carbon dioxide emissions by 50% by the year 2030 -- but pointed out that transportation would increase by 20% over that period, given current trends. Therefore a 70% reduction in carbon dioxide emission per mile traveled will be necessary!

That will probably not be possible through technical changes in vehicles alone -- it will require a larger logistical approach, especially since technical improvements in car efficiency tend to be eaten up by increases in luxury, power, comfort, safety, and gadgets.

To look at that larger approach Kaj has been studying grocery distribution (with a system dynamics model) as an example.

In Denmark, as in most of the industrial world, the production and distribution of food have become highly centralized. The number of retail food outlets has gone down by 75%, the number of food industries by 70-90%, the number of primary producers by 90%. One has to travel five times as far now, on average, to buy food. It's almost impossible to travel that far by foot or bicycle, one has to do it by car.

At the same time consumption patterns have changed. There is a vastly greater diversity of products (low-fat milk, strawberry-flavored yogurt), each of which has to be shipped and displayed separately. There are no delivery services any more, no milkmen or vendors of fruits and vegetables going down the streets. In principle there could be fewer shopping trips, since people

need visit only one big generalized store, can carry more in cars, and have larger refrigerators and freezers. But it's not clear that fewer trips are actually made.

Here are some revealing numbers:

- average grocery consumption per family: 4-5 kg per day

- average transport energy from manufacturer to wholesale storage (300 km, 23 t truck, 11 t payload, 4 km/liter diesel): 70 Wh/kg

- average transport energy from wholesale storage to retail shop (235 km, 16 t truck, 6.5 t payload, 4.5 km/liter): 95 Wh/kg

- average transport energy from retail shop to home (6 km, VW Golf, 15 kg payload, 13 km/liter): 280 Wk/kg

Vans and light trucks would be the best vehicles for local distribution of groceries and other goods, but at the moment they are the most inefficient and pollution-emitting vehicles on the road. That is partly because of poor utilization patterns -- low capacity utilization, empty return trips, too many non-freight trips, urban traffic with lots of idling -- and partly because of poor vehicle design -- poor aerodynamics, too heavy, too-large engines in comparison with vehicle weight, but too small engines for good efficiency. Many improvements could be envisioned, ranging from incremental improvements on existing models to models with electric propulsion to "supercars" that, according to **Amory Lovins**, could get 10-20 times as many kilometers per liter of fuel.

> The cost of air-pollution related illness is conservatively estimated as $30 million per year. One-fourth of foreign tourists have said that because of pollution, they will not come to Hungary in the future. Damage to buildings and loss of property value in Budapest due to pollution, noise, and other aspects of automobile traffic is estimated at a total of $3 billion, which is about equivalent to the value of all the automobiles in Budapest.

Getting people out of their cars is about as easy as getting them out of their skins, said **Herman Knoflacher** (Institute for Traffic Planning and Technology, University of Vienna). The traffic system is like a dragon threatening to eat politicians, so they feed it regularly with new roads. People keep buying more cars and making more trips, they say. So we have to build more roads. They don't look at the feedback effect by which the presence of the roads contributes to car-buying and car-driving.

The same reasoning would apply to bicycle paths -- if you build it, they will come. We build cities as ideal places for cars, so we get cars. That kind of stupidity uses up an enormous amount of land and energy. (Here Herman showed a multiple-cloverleaf motorway intersection, superimposed on the old city of Salzburg -- they are of roughly equal size.)

Given how fast we can now go, there must be an enormous surplus of time building up somewhere,. Where is it? Nowhere, because the urban system turns increased speed into

increased distance. We don't get more time, we get more space, more sprawl, less open land, more energy use. Our high speed buys us nothing. Even our perception of the world shrinks, because at high speeds we lose all detail. The world becomes small and all alike. (And so the multinational monster eats up "shrinking Carinthia." Sorry -- you had to see the slide to understand the joke.)

When you plot GDP/km driven against car ownership/1000 persons, the slope of the line goes down -- as more people get cars, they move around more instead of being smart and productive. (How much brain do you need with 200 horsepower under your leg?)

People are like bees, you see. If a tube is put on the beehive exit, so the bees have to crawl a distance before they can fly, they signal to the other bees that the nectar is much farther away than it really is. What they measure, apparently , is personal energy expenditure. Likewise people have evolved for eons to minimize personal energy expenditure -- as they perceive it. (They may perceive it wrong. People who have to walk through an ugly environment report the trip as being much longer than the same distance through a pleasant environment. And whatever the environment, people have a nonlinear perception curve. As they walk farther, they report that they have walked much farther.)

That's why people want to park right next to the house, the shop, and the office. They will come to work one hour early to get a parking space to avoid a 20-minute walk. This isn't a rational decision; it is implanted deep in the brain. Our evolutionary equipment has prepared us perfectly for the car. (The physical position we assume while driving is even similar to the position we took back when we were clinging to trees -- only now the trees move!)

Clearly it doesn't help to tell people to bike, if they can have access to a car. So what to do to get people out of their cars?

Design cities so the personal-energy distance to the car and the public transport is the same. Put parking lots under tram stops. Make walking paths to transport stations at least as pleasant as walking paths to cars. Don't give people reserved parking places (in Vienna people who have reserved places use public transport 1/3 as much as others.) Reconsider the assumption that cars automatically be allocated more space in cities than pedestrians. (Imagine, said Herman, each of us walking around with a frame hanging from our shoulders as large as a car. Think of the space we'd need! The entrance to this meeting room would have to be a four-lane doorway!)

[Unfortunately for Balaton members who weren't present, many details of Herman's rollicking presentation can't be reproduced here, because they went by too fast (especially the jokes) and because the slides were in German. This was one of those "you had to have been there" events. By popular demand and quite a bit of pressure from **Dennis Meadows**, Herman has agreed to translate his data slides and to dictate his lecture into a tape recorder and have it transcribed, so it can be published.]

Herman, who is responsible for a magnificent set of bike paths in Vienna, rides a bike to work instead of a car, because he has measured more pollution in his blood after driving than after

riding. [The meeting audience did not believe this. **Dennis Meadows** pointed out that traveling with a bike takes you through more detailed and varied zones of pollution, so you perceive the pollution more -- though, like the walk through an ugly environment, it may not actually be more.]

> Commuters and tourists lose more than 1 million hours a day because of traffic congestion in Budapest. If you divide the average number of kilometers driven by a Budapest driver by the amount of time he or she spends driving the car, maintaining the car, and earning the money for the car, the average speed comes out to 3.4 km/hour -- less than that of a pedestrian.

> In the car-free zones of Köln retail business income increased by 25-35%, in Munich by 40%, in Hamburg by 70%. In both Zurich and Budapest, property values and rents are much lower on heavily-trafficked streets than on streets in the pedestrian zone.

Cities offer a valuable opportunity to operationalize sustainability planning -- and their operation is crucial to the human/environment interaction, said **Marina Alberti**. She has been working at the Commission of the European Communities in Brussels on urban environment indicators for the report "Europe's Environment" (now available from David Stanners, European Environmental Agency, Kongens Nytorv 6 DK-1050, Copenhagen, Denmark, tel 45-3314-5075, fax 45-3314-6599). This report covers 46 countries, and 51 cities. Two chapters are devoted entirely to cities.

The choice of indicators was constrained, unsurprisingly, by data availability. The data were limited to physical measurements only. They were highly variable in quality and often incomparable from one city to another. (For example, energy supply and demand are aggregated differently in different countries; some countries do and some do not collect data at local as well as national levels; etc.) Agreed-upon indicators include:

- urban population (in city and in conurbation)
- urban land use (total area, total built-up area, open area, motorway length, railway length, area devoted to transportation as % of urban area)
- derelict area (% of total)
- urban renewal area (% of total)
- urban mobility (number and average length of trip per inhabitant per mode of transport per day, number of commuters into and out of conurbation, inflow/outflows in vh-kms, number of vehicles on main routes)
- water flow (consumption/inhabitant/day, % of ground water resources in total water supply, % of dwelling connected to a sewage system, number and capacity and types of sewage treatment plants)
- energy flow (electricity use in GWh/year, energy use by fuel type and sector, number and type of power and heating plants in conurbation area)
- materials and products flow (quantity of goods moved into and out of city in kg/person/year)

-waste flow (solid waste collected/person/year, composition of waste, % recycled, number and capacity of incinerators, number of landfills and volume received there by waste types)
- water quality (days/year that WHO drinking water standards are exceeded, oxygen concentration of urban surface water, number of days pH is above 9 or below 6
- air quality (annual mean concentrations of SO2 and TSP, days/year air quality guidelines are exceeded)
- noise (exposure above 65 dB and 75 dB)
- traffic safety (people killed and injured per 10,000 inhabitants
- housing quality (square meters per person)
- green space (% of people within 15 minutes walk of green area)
- urban wildlife (number of bird species)

Marina showed preliminary samples of data grids (see for example p. 27 -- where dark squares indicate unacceptable quality, white squares acceptable). At this point the data are uncertain enough that the main value of such grids may be to show which indicators are widely measured, which are inadequately measured, and which cities have the best data availability.

35-40 thousand cars are abandoned in Budapest each year. In 1993 6000 of these were disposed of by the city government, at a cost of $600,000.

Day Four: The Citadel, the City, the Village

By community, I mean the commonwealth and common interests, commonly understood, of people living together in a place and wishing to continue to do so. To put it another way, community is a locally understood interdependence of local people, local culture, local economy, and local nature.... It is at the community level (including families and individuals), and only at the community level, that the definition of a sustainable society can inform appropriate actions equal to the magnitude of the problems.
-- Wendell Berry

What can you do to implement sustainability at the city level? asked **Alan AtKisson** (Sustainable Seattle, WA). There are seven generic categories:
- public education
- examples and demonstrations
- technical assistance
- incentives and regulations
- monitoring and reporting
- roundtables and other public discussions
- comprehensive planning

Sustainable Seattle is doing only one or two of these, with its major emphasis so far at the level of citizen-defined indicators of sustainability.

Sustainable Seattle is a loose network of volunteers, with no official status and no paid staff. They spent their first 6 months defining "sustainability." The definition they finally came up with was: long-term cultural, economic, and environmental health and vitality. To avoid argument, "cultural, economic, and environmental" were listed in alphabetical order.

Next Sustainable Seattle decided to define indicators of urban sustainability. Why indicators? To raise awareness, to achieve a concrete goal (any goal), to make long-term trends visible, to explain sustainability by example, to institutionalize the concept, to help the community discuss and set priorities, and to serve as a foundation for action.

About 30 people drafted a preliminary set of indicators and presented them to a meeting of 300 civic leaders. That began a 6-month process by which hundreds of people formed committees, argued about indicators, and finally came up with a list of 99 of them in four general categories -- environment, population and resources, economy, and culture. (Some of the indicators are listed on p. 29.) The list of 99 indicators was presented in public, interspersed with poems, jokes, and songs to make them digestible. (For example, a quote from Will Rogers, "Too many people spend money they haven't earned to buy things they don't want to impress people they don't like." And from Fred Hoyle: "Technology is like strong liquor. A little won't do you much harm, but too much is apt to drive every sensible idea out of your head. So far as technology is concerned, it is my opinion that our modern society is dead drunk.")

Getting that far -- just selecting indicators -- took a total of three years and required a lot of patience. The process of involving and listening to so many people from many walks of life was almost as important as the product. Because so many people had been involved in developing them, the indicators had an immediate legitimacy. They point to aspects of the city that people really care about. The government took them seriously, and more important, took the goal of sustainability seriously. Something about the concept of people choosing their own indicators hit a deep human chord. Groups from all over the world have taken an interest in the Seattle project and are working on duplicating it.

Once Sustainable Seattle had indicators, the next step was to get data on them and see how the city was doing. They decided not to set targets or benchmarks -- that would have generated too many arguments. It was easier just to ask, with regard to this particular indicator, is the city moving toward or away from sustainability? When they knew the answer to that question, indicator by indicator, they published it widely, in a one-page format that anyone could understand (p. 29). Some indicators are improving. Some are holding constant. Most are moving in a direction away from sustainability.

It's a long way from a list of sustainability indicators to a sustainable city, and Sustainable Seattle is thinking about what to do next. They are developing a concrete, things-you-can-do education program for sustainable homes and businesses. They're thinking about dramatic presentations for schools, and about sustainability impact assessments for proposed development projects, and about sustainability awards. They'd like to draw up a list of basic principles of sustainability (as in the last *Balaton Bulletin*) and to get people to see the linkages between the different indicators (the number of children living in poverty affects street safety, and that affects the

amount of driving people do as opposed to walking, and that affects air and water quality, and that affects the number of salmon). The important thing is to do any of these things through a process of citizen dialogue.

Alan listed a series of "proverbs" that sum up the philosophy behind Sustainable Seattle:

City metabolism is a function of human consciousness.
Human consciousness expressed in its most concrete form in economics and politics.
All politics is local.
All economics is environmental.
Cities must change.
Citizens must change them.

"What legacy will we leave to future generations?" is printed on everything Sustainable Seattle does.

A study in San Francisco found that people who live on streets with 16,000 vehicles per day knew on average 3.1 of their neighbors. On streets with 8,000 vehicles per day, they knew on average 4.1 neighbors. On streets with 2,000 vehicles per day, they knew 6.3 neighbors.

Enrique Ortiz (Habitat International Coalition, Mexico City) gave us a passionate presentation based on "my own reflections from 30 years of work in the grassroots, government, and NGO sectors, in a big city with many problems." He read from an address he had given at the Autonomous University of Guadalajara -- and his words were so moving that we reproduce them here directly.

"As we see the advance of environmental deterioriation and poverty in our large cities, we also see how, paradoxically, are found in them growing investments, highly technical centers of production, large commercial centers, more and more sophisticated services. The megacities of the South and the North are the nodal points of the global economy. In them are concentrated the political power, the control of large businesses, the mass communication media, and the diffusion and control of new technologies."

"Electronic information management allows their rapid connection with other world centers, to which they feed and from which they receive information and orders. Those who perceive themselves as dynamic actors in the new global order manage an enormous amount of information, much more than that available even to the most powerful in other historic eras, and also much more than they can digest and articulate."

"But parallel to that new world persists and subsists another world: one linked to place, to people, to neighborhoods and to communities. Even in the great modern city subsists this other world, which is increasingly marginalized from the flows of information and power, which which fights to make its voice heard, a voice with ancestral roots that intuit a different project entirely.

"The dominant development model implies unlimited growth, which necessarily demands an increasing and unlimited use of the planet's resources. The resources are taken from wherever they're found, with a global mindset that breaks the territorial controls exercised by local populations. The concentration of riches accelerates without measure, and with that the distance between the rich and the poor. Environmental deterioration and poverty are not separate realities, but consequences of one cause: the unjust and destructive development model that rules us.

"Globalization is treated as unquestionable in the media. It is proclaimed, for example, that thanks to television a poor indigenous peasant can see what's happening in other parts of the world. Although in part that is true, what the pretty images of the media achieve is to make more evident the apparent deficiencies of the marginalized peoples. If in some way their voices, aspirations, and struggles reached the world, instead of the other way around, then we could say that they begin to be active beneficiaries of the process.

"But the globalization of the economy -- based on structural adjustment measures, the unlimited free market, the information revolution, and the unterritorialized use of resources, promoted by the mass media, and directed by decision-makers always farther and farther away from the society that they claim to represent -- appears condemned to failure. Does there exist another option for those of us who refuse to be dragged along that path? Is there anything more than mere defensiveness and hopelessness before a model imposed relentlessly upon the world?

"I prefer to look for the answer among those who still live in places, the people who build their options and defend their spaces against the bruising logic of the others. In the last 25-30 years we have seen the development of multiple experiences by rural communities, urban groups, and social movements that one way or another introduce concrete values and practices that point in a different direction. Though they may be unconnected and disperse experiences, many times frustrated by the difficult context in which they develop, we can see in them seeds of a different future.

"For example, in Xochimilco, on the southern edge of Mexico City, voices were raised in the following statement: 'We are responsible for the conservation of our lands for the benefit of the community that inhabits the Valley of Mexico and of future generations. Our lands have an agricultural capacity of the highest in the world; we intend to conserve them to produce food; we do not want our children to inherit a country like that which we now have; our land provides food, plants and flowers, drinking water, oxygen, jobs, and life for Mexico City; to conserve it signifies saving a great part of our Prehispanic culture, our roots, and our history.'

"In our large urban centers in Mexico and other Latin American countries new neighborhoods are erected thanks to the organized struggles of diverse groups to fulfill the right to a place to live. These groups assume in many cases the management of productive activities. They act in the areas of health, gender problems, education, recreation and sports. They are generators of expressions of artistic creativity. They hold the basis of a new urban community, much more democratic, free, and creative, plural and diverse, than that conceived by the homogenized mind of the technocrats. In general they are groups with scarce resources, but they still conserve the great richness of the poor -- the genius, the creativity, the ability to make things with their hands. Despite

their limits, setbacks, and conflicts, these are present-day concrete experiences that point toward a different model -- a model that rescues the wise relationship of humanity with nature, a model that puts limits on infinite economic growth but at the same time opens new paths to a more just distribution of the goods and services produced by society. A model that implies a change in the consumption patterns of our societies toward more austere ways of living, ways that guarantee sufficient means for a dignified life for all.

"It appears very pretentious to see in the experiences that I have mentioned the alternative to the current model. I recognize that. I recognize that the current development model is closing the spaces which allow the direct social practice of the people. But I intuit that in that practice there are bases for the future, and I have made the decision to work very close to this type of practice, to be attentive to its evolution, and to support it within my possibilities.

"It is not time for discouragement. The evidence of what is happening convince more people every day of the invalidness of the modern development model. We will have to prepare ourselves for a profound change and put our energies and abilities into strengthening all experience built on the values of justice and sustainability, to protect and broaden the spaces earned, so that the experiences multiply, and so that the legal, financial, and administrative instruments are created to allow their development.

"For that end we will have to overcome the isolation in which the new experiences develop. We must articulate them, accumulate critical knowledge and theoretical formulation, and build social power to promote and disseminate them. We will have to act politically and vigorously contribute to the building of public opinion. We must strengthen our organizations by building stronger and stronger coalitions and alliances at the local, national, regional, and international level. We must do all of this from our local reality, from our place, because we understand that the only way to be a citizen of the world is to do so through and from the place in which we live.

" The great city is no longer Mexico, Buenos Aires, Tokyo, Paris, or Manila, but the planet itself. At the same time, we can only understand and make viable a democratic project of ecological sustainability and social equity on the scale of the place where we live. Only that way can we guarantee that the great city will not be the boring and homogeneous product built by capital and its technocrats, but it will be the rich, varied, and intense city built from the culture and specific circumstances of each place, each village, each community, and each person committed to action."

The United States prides itself on being a melting pot of people from all over the world, said **Vernice Miller** (Natural Resources Defense Council, New York), but in fact different peoples live in distinct places. We have had slavery, we have had institutionalized apartheid, we have had genocide of the indigenous population, and we have exported all this globally. Even now our pattern of land use preserves racial segregation. In New York City the poor and the rich live very close together, but there is a starkly obvious border between them. And guess which side of the border receives all the polluting, environmentally destructive facilities.

In 1987 there was finally a formal study call "Toxic Waste and Race in the United States." It looked at the location of PCB dumps, garbage incinerators, mine tailings and so forth. It

correlated postal zip codes with waste facilities and then overlaid maps of the racial composition of the population. It tested 135 variables -- education, income, family size, etc. -- against probability of living near a polluting facility, and the most statistically significant of all was race. There is widespread and increasing environmental racism.

This study made me more aware of conditions in the community where I live, West Harlem in New York. There are 20 million people in the New York metropolitan area, 1.1 million live on the island of Manhattan, 78,000 in West Harlem, nearly all of them black. West Harlem is also the site of two hazardous waste processing facilities, a marine transfer station for garbage, bus garages, many polluting industries, and the largest sewage treatment plant in New York (across the street from where I live). The sewage treatment plant has never worked properly; it is a source of constant emissions and odors. West Harlem has the second highest asthma rate in the U.S. and the highest infant mortality rate in the Western world.

Obviously this situation is both ecologically and socially unsustainable. Sustainability requires avoidance of disproportionate impact across social, intergenerational, and geographic borders (and across species).

What's needed to counter environmental racism? A long list: clear public health indicators; economic opportunity; energy conservation and better public transport; cleanup of hazardous wastes; safe, affordable, sustainable housing; urban gardens and farms; safe work places; changes in general consumption patterns; public education. What's most needed is to provide local communities with the tools to control their own environments.

Environmental racism can be found in the heart of Europe, observed **Milan Caha**, in the living conditions of the Gypsies.

Sustainability is more about people and control structures and power than it is about pipes and plumbing, said **Aromar Revi** (The Action Research Unit, New Delhi). Cities are the largest, most complex self-organizing structures on the planet, and the fundamental reason they are so unsustainable is that the city is an instrument of war -- war on women, war on nature, war on other peoples, war on other corporations. Organizations that promote war are ultrastable in cities; they have been the central structural elements of cities for thousands of years.

The citadel (temple, palace, place of governance and power) forms the center and purpose of every city -- with a wall or some other clear separation between the people of power and the other people in the city, whose purpose is to serve the citadel. Another wall of some sort separates the city people from the people in the surrounding villages who supply the city with resources. The larger the territory dominated by the war structure in the citadel, the larger the size of the army (or trade network) necessary to defend it, the more food and revenue needed to supply the citadel, the larger the territory that must be dominated. Hence the logic of the growth of power, and of citadels, and of cities.

We respond only to the problems of city life, rarely to its potential.
-- Kenneth Schneider

Reports from Working Groups

Talking to Decision Makers about Sustainability

Participants: Gerardo Budowski (organizer), Alan AtKisson, Jørgen Nørgard, John Peet, Genady Golubev, Dana Meadows (part time).

Justification: Many of us have an obligation to influence decision-makers but feel uncomfortable or clumsy about it. We could learn a lot by sharing experiences and discussing the best measures, the clearest language, and the pitfalls to be avoided.

Question One: "I am the director of an industrial plant in Russia. We pollute, but the cost of abating or eliminating the pollution is high and the workers (who are also stockholders) fear that we cannot afford to be less competitive by increasing our productive costs. What should I say to them? What should I say to government regulators?"

Some suggestions:

- We should become pioneers in combating pollution. Produce an "environmentally friendly" product and capitalize on it (as an advantage over your competition). The product will have an added value, and the buyers may be willing to pay a higher price for it. The government should be willing to support this financially and technically.

- Because of the intention of abating pollution, you may qualify for a grant from a foundation or funding agency.

- Appeal to the workers to accept a certain hardship to shape a better life for their children. (A Russian response -- "We've heard that line for over 70 years now, and we don't want to hear it any more!")

Question Two: "I am a government official, and I am all for sustainable development. What, exactly, should I do?"

- Sustainable development is a process, not a specific goal and not a package. Let's look at the formula I= PAT (impact = population x affluence x technology and see systematically how you already do affect each part of the equation, and how your effect can be improved.

- Start by avoiding those actions that clearly lead to unsustainability, which is usually easier to define than sustainability. Like "justice" -- it's not always clear just what is "justice," but it's usually clear what is an injustice.

- Don't maintain unsustainable practices on the basis of "saving jobs." Jobs won't last, if they are based on unsustainable production. Rather than save those jobs, retrain workers for more sustainable industries and skills.

- Get sustainability into the government accounts with a natural capital balance sheet and the new methods of "green accounting." Keep track of opportunity costs, contingent costs, and other externalities.

- Operate from your sense of responsibility to future generations.

- Prioritize -- don't try to solve all problems at once. Try to deal with the most critical and unsustainable practices first.

Question Three: "I realize that we cannot continue to grow in numbers of people as fast as at present. But population is a controversial and politically dangerous issue. Can you give me some arguments I can use to discuss this touchy topic?"

- Justify policies and actions that will promote the idea that every child should be a desired child.

- Children are a precious commodity that need all the care, schooling, time, and love they can get. It is obviously easier, and not so expensive, to plan to have just a few.

- If everyone had a large number of children, look at all the schooling and other services we would have to provide. Look at all the land and water and jobs we would need. Be responsible not just to your own family, but to the whole community. Don't have more than two.

In general, appeal to the noble side of the decision maker (there is a noble side in there somewhere!) "I know that you have political courage. You are a father or mother, and you know what is the best decision for all our children. You can appeal to other fathers and mothers, to the common good of all of us. If you promote wisdom and frugality and equity, others will recognize the wisdom and morality of your decisions.

Pathways toward Cultural Change

Alan AtKisson, reporting for the group: A fervent Earth First! activist once told me he had a fantasy of hanging up the perfect banner, in the perfect place, at the perfect time, which would set off an unstoppable, catalytic social change toward environmental awareness. What events in history have ever done anything like that?

We surveyed the universe of such strategies, as far as we know them. We discussed religious movements, artefacts, writings or other cultural products and processes that could support shifts in mindsets away from unsustainable behavior. We discovered that they tended to be simple,

emotional, clearly understandable, easily replicated events or slogans or pictures or whatever -- and that their system-wide effects were largely unintended and surprising.

A comment from **Herbie Girardet**: Unfortunately they have tended not to be so much a poster hung up in the right place, but a person hung up in the right place!

Energy Efficiency on TV

Zoltan Lontay called this workshop to solicit advice from the group on a serious of TV shows he will be advising in Hungary trying to introduce the idea of energy efficiency. There will be 3-5 films, covering the range from the big global picture to practical advice for households. Filming will begin soon, and Zoltan has drafted a preliminary script, about which the group gave him reactions and suggestions.

Sustainable Livelihoods

Jobs versus the environment? Return to full employment? Jobs versus growth?

These apparent dilemmas were examined in the context of whether they were a) correct and b) consistent with sustainable development. Our discussion ranged far beyond these initial questions, to incorporated suggestions of a) citizen's income, b) ecotaxation, c) equity and distributional justice, d) local economic initiatives, e) insulation from the global economy, f) difference in the employment situation in the South and the North.

We were reminded (statistics from Paul Hawken) that a quarter of the world's GWP is producted by the top 500 multinational companies, who account, however, for only 0.1 percent of the world's employment -- and that the ten largest companies combined gross more revenues in a year than the combined GDPs of the poorest 114 nations.

We saw a major problem in the contradictory idea that people are both consumers (who must be cosseted, seduced, employed, and paid well) and workers (who must be kept to a minimum and paid as little as possible). How is human dignity to be respected, poverty to be eliminated, and all human contributions to be welcomed and encouraged, within such a contradictory (and demeaning) logic?

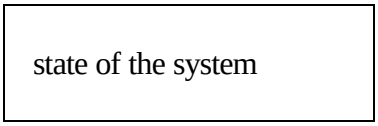
Policies such as citizen's income were seen as important steps toward sustainable employment, but not enough. We need to search for a new paradigm. We decided that there were at least three steps the BG could take toward that paradigm:

1) Collect information, literature, etc. on the state-of-the-art thinking on alternate paradigms of employment and the distribution of work, leisure, income, and goods.
2) Engage in, or piggyback on, a serious systems analysis of the current economy's employment (livelihood) behavior, and then test alternatives.
3). Address the issue in a Balaton meeting in the future. This could be part of the wider context of "after capitalism, after socialism, then what?" Good critiques of both

capitalism and socialism would aim to use the best of both these paradigms to come up with proposals to be tested in the model, and in society.

Sustainability Indicators

While you and i have lips and voices which
are for kissing and to sing with
who cares if some one-eyed son of a bitch
invents an instrument to measure Spring with?
-- e e cummings



No responsible decision can be made, no policy formulated, no action accurately directed, no system can be managed, without two essential pieces of information, namely:

- where we are (the perceived state of the system)
- where we want to be (the desired state of the system).

It's astonishing how often one or both of those crucial pieces of information is missing, distorted, delayed, poorly measured, vaguely defined, or counterproductive. For example, to use GNP as the primary measure of the state of an economy, and to define the desired state of the system as ever-increasing GNP, is to lead decisionmakers into frenzies of growth-oriented policies that can be expected to produce nothing except GNP -- not real human welfare, not environmental quality, not equity, not efficiency, and certainly not sustainability.

Because of our awareness of the importance of indicators in systems, we in the Balaton Group have for years been calling for and working on better indices to inform decisionmakers (at all levels, from families to governments to corporations to international bodies) about the state of the environment and the state of human welfare. We know that indicators are crucial leverage points in systems, and that skillfully chosen indicators could lead to radically different system behavior. We also know that, because of delays in implementing action and in system response, indicators have to be leading, fore-warning, to avoid overshoots and perhaps collapses.

We have devoted whole meetings to this topic. For us it's an old discussion, and one in which, for a long time, we could get few people to join.

That -- the loneliness of the indicators discussion -- is changing quickly now. A survey of the roughly 20 people sitting in on this workshop revealed that at least 15 of us know about or are involved in official efforts at some level to define environmental indicators. Defining better indicators is an idea whose time has come.

For example, we heard reports from:

- **Dana Meadows** -- The Scientific Advisory Committee of SCOPE (Scientific Committee on Problems of the Environment) has recently drafted and is circulating for comment a "Systematic Approach to Measuring and Reporting on Environmental Policy Performance in the Context of Sustainable Development." It has made several questionable decisions, such as defining resource stocks in monetary terms, and leaving out measures of nonrenewable resources (under the assumption that they are in great abundance). Also -- the National Center for Economic Alternatives in Washington DC is about to release an Index of Environmental Trends in 9 industrial countries. It lists France as the environmentally most rapidly deteriorating country and the Netherlands as the least -- but it tracks only rates of change, not the starting condition. (The Netherlands may be deteriorating least rapidly from the most deteriorated starting point!)

- **Bert de Vries** and colleagues at RIVM have been asked by UNEP to design a framework and methodology for reporting on the environmental state of the world. They are suggesting an integrated modeling framework to make clear dynamic linkages and to pinpoint early warnings.

- **Carlos Quesada** -- The Latin American Balaton Group (the Irazu Group) is planning its next meeting on urban environmental indicators.

- **Jørgen Nørgard** -- The National Statistical Bureau of Denmark is cooperating with the Environmental Agency on developing environmental indicators.

- **Alan AtKisson** -- Many cities and regions are picking up ideas from Sustainable Seattle's exercise in citizen-defined indicators. The state of Minnesota has a particular slick presentation called "Minnesota Milestones."

- **David Satterthwaite** -- IIED is using indicators in a project on participatory watershed management.

- **Marina Alberti** -- OECD has developed a set of model environmental indicators, and is developing a new set of project performance indicators. Canada has developed sustainability indicators. The UN Habitat Conference will discuss indicators for urban areas.

- **John Peet** -- The EC will be holding a meeting in Paris (to be attended by John and by **Malcolm Slesser**) on non-monetary indicators for managing resources. The New Zealand Ministry of Environment is currently warring with the Treasury Ministry about environmental accounting.

- **Joan Davis** -- The Ministry of Environment in Switzerland may be starting an indicators project. Just about every country in Europe is doing such a study.

Upon hearing about all this activity, some of us immediately became nervous, We began talking about the pitfalls of indicators:

- They can be so aggregated as to be meaningless (like GNP). Especially if they are additive, they can cover over problems in one area with successes in another. (The global fish catch stays roughly constant though population after population is collapsing -- smaller fish or new species are caught to replace the ones that are depleted.)

- They focus on what's measurable, rather than what's important. Especially in the sustainability discussion, the important idea is quality, not quantity -- but indicators by definition have to be about quantity (area of forest, not health of forest; employment rate, not quality of work; quantity of hazardous chemicals, not their relative toxicity; etc.).

- As soon as there's an indicator, especially if it reflects badly upon a government, there's a temptation to lie about it, jiggle the numbers, make them up, change the definitions, delay the data, or find other ways of muddying the information. Governments don't like revealing indicators. (For example, the U.S. government counts as unemployed only people who are actively looking for work, not people who have given up looking for work -- because it looks better that way.)

- Overdependence on official numbers leads to under-dependence on direct experience and common sense. Too many people think they need a scale to know whether they're eating too much, or wait for the weather report rather than look out the window, or look at the GNP statistics to decide whether they're well off. Indices can be unempowering to the unempowered.

- Even worse, indices can be empowering to the powerful, who may come to think that an index tells them all they need to know. They can then make decisions without ever having to consult the people.

And having said all that, the group realized that indices are with us and always will be, that the ones currently used are dreadfully misleading, and that we can and must do better. Here are some guidelines we came up with for the design of better indices:

- They should primarily measure things people can't measure for themselves (like radiation, or the carbon dioxide content of the atmosphere) -- or things where people can be involved in doing the measuring (like local river water quality, or nesting songbird surveys).

- There should be many indicators, not one big aggregate one. (Hazel Henderson says guiding the economy looking only at the GNP is like flying a Boeing 747 looking only at the tachometer -- and assuming that the faster your engines are turning, the better!) A doctor doesn't just take your temperature, he or she measures blood and urine chemistry, heartbeat, blood pressure, reflexes -- and a good doctor will also take a good intuitive look at the whole you.

- Environmental indicators should never, ever, ever, be measured in money terms. Money and prices are not only indirect and incomplete measures, they are also inconstant. Using them is like using a stretchable, compressible, floppy rubber ruler.

- Units of measure should be clearly stated and should make sense. It makes more sense to measure hazardous chemicals by their toxicity, for example, than by their weight or concentration. A ton of DDT is not equivalent to a ton of plutonium is not equivalent to a ton of lead. Flow measures (in units per time period) should be carefully distinguished from stock measures (in units, period).

- Indicators should be compelling to the ordinary person, stated in ways that are psychologically graspable. Avoid big, eye-glazing numbers. Put measures in per capita terms (meters of unspoiled beach per person, hectares of arable land per person) or in per minute terms (25 children starve to death per minute, $1 million is spent on armaments per minute), or any other terms that brings them down to imaginable and understandable sizes.

- Indicators should be measured at the appropriate scale. It makes little sense, for example, to talk about global soil erosion, because soil erosion is a very local (and difficult to measure) phenomenon. It also makes little sense, except perhaps in Antarctica, to talk about local ozone layer depletion. Insofar as possible, indicators should be used in ways that emphasize, rather than smudge over, both local diversity and global generality.

- Avoid false precision -- but imprecision is better than no information. Numbers should not be listed with three decimal places if they are in fact not reliable to the nearest order of magnitude. In many cases simple directional arrows showing that things are getting better or worse may be preferable to tables of dubious numbers. Conversely, important measures shouldn't be thrown out just because they are imprecise. If we DO know something is getting better or worse, though not by exactly how much, we should say that.

- Indicators should distinguish clearly the difference between sources, sinks, and throughput. A useful distinction is the "PSIR" scheme, measuring "pressure, state, impact, response." For example:

  pressure -- fossil fuel consumption
  state -- carbon dioxide in atmosphere
  impact -- average global temperature
  response -- energy efficiency policies

  Or:

  pressure -- fishing boat capacity
  state -- fish populations
  impact -- harvest per fishing effort
  response -- fishing quotas

  For leading indicators, emphasis should obviously be on measuring pressures, not responses!

- Use of indicators should always be accompanied by warnings about their pitfalls. Audiences for indicators should be warned constantly that indicators only point at reality; they are NOT reality.

- Indicators should be viewed as tentative, until we know better what to measure or how. We should keep time series of useful indicators going as long as possible, but we should also be aware of and open to the possibility that an indicator is perverse (like GNP), or that we have learned enough to define a better one.

The group came up with a useful distinction between environmental indicators, sustainability indicators, and human welfare indicators -- all of which are necessary, especially to counterbalance economic indicators. Here are the differences, with some examples:

Environmental indicators measure the state of the environment -- such as the size of the ozone hole, or the pH of rain, or the phosphorus content of a lake.

Sustainability indicators relate an environmental indicator to a limit, carrying capacity, or length of time the activity can continue -- such as the extent to which carbon dioxide emissions exceed the capacity of the atmosphere to recycle them, or the relationship of the fish harvest to the regeneration rate of the fish, or the length of time the Kuwait oil reserves will last at the current rate of extraction.

Human welfare indicators either relate an environmental indicator to human welfare (such as the percent of population living in zones that regularly exceed safe levels for tropospheric ozone), or simply measure welfare directly (the infant mortality rate; the percent of people without adequate housing; the literacy rate.)

More important than indicators themselves, we concluded, is the process by which the indicators are selected and defined. It can be bottom-up or top-down, technocratic or democratic. Who defines the indicators? For whom? By what authority?

Process is important, because defining indicators is above all a discussion about values. Indicators not only express present values, they have a powerful effect on future values. (Think what a difference it would make, for example, if the world's nations would pride themselves not on their GNPs but on their infant mortality rates; or if the World Bank would pride itself not on the GNP growth rates of member nations, but on the equity of their income distribution.) We would never feel the need to measure something, if that something were not of value to us.

So the indicator discussion begins with value. A bureaucracy takes up the question of measurement and may or may not end up measuring what's of value -- more likely it will measure whatever is measurable. Over time, unfortunately, what we measure becomes what we value. We run our lives and societies around the GNP, or the Dow-Jones and Nikkei Index, or the price of oil futures, or our personal cholesterol counts, because we have forgotten that an indicator is just a model, and a model may point to reality, it may have some characteristics of reality, but it is not reality.

We try to measure what we value. We come to value what we measure. We can only steer by the signals we get. Therefore the choice of indicators is one of the most important decisions we collectively make. It should be made carefully, consciously, humbly, democratically, and it should be remade often.

Team-Building Workshop

SUSCLIM

Urban Systems and the Global Environment

The working group explored the options to design a research project aimed at studying the interactions between urban systems and the global environment. The research focus is on "how urban patterns affect the interactions between population, resources, and environmental change." The project airm is to identify key variables that influence the performance of cities in reference to a sustainable scenario.

Elements of the research design discussed:

1) How to limit the research question?
- clarify who is going to use the results (local vs. national/cross-national policy makers, other concerned actors, etc.)
- stick to a few saturation problem areas linking local and global sustainability (e.g. air quality-energy-transport

2) What are the main steps involved?

- define reference scenario (threshholds, time scales)
- define a typology and select case studies (8 to 10 cities) in different biogeographic regions
- describe urban systems, sub-systems, and interactions between environmental performance (biosystems, health), urban patterns (human activities) and urban organization (governance, laws)
- identify key variables and processes
-select candidate indicators (differentiate by biogeographic regions)

3) How to approach the project design?
- organize interviews/workshops with the main actors to discuss saturation problem areas in candidate cities
- adopt a system dynamic approach to describe the urban systems and their behavior close to saturation
- test the methodology with a few examples.

Balaton Business

Finances

Steering Committee -- Joan Davis, Aromar Revi, Alan AtKisson

Next Year's Meeting

Networks and our environment -- how we use and manage space as a resource through transport, water, telecommunications, energy, trade, all on local, national, and international levels -- how that affects the environment, and how it might be structured to impact the environment less.

Balaton Bulletin

Final Thoughts

Gerardo Budowski -- I've been away from Balaton for a few years, and it's a tremendous feeling to get into the spirit again. I'm happy to see that some of our practices have now become treasured traditions, and that there have been innovations, too.

Drew Jones -- I've just left a happy job at a confortable institute (RMI), and I was feeling like a bright orange autumn maple leaf, falling slowly, blown around, not knowing where I would land. Here among you I felt like a swift, cool breeze had picked me up and blown me in new directions. One thing is clear: I'm not just going to fall right under the same tree.

Nasir Dogar -- This is my first meeting, and I came not knowing what to expect, not knowing if I would get any value from the meeting whatsoever. Now I'm full of ideas, concepts, and experiences.

Stephen Boyden -- This has been such an amazing experience, intellectually and emotionally, that I can't begin to express it in words. I can only say that I feel I'm going away a different person than the one who came.

Michael Ableman -- What we're really doing here is practicing community. How do we carry what we're learning about that to the broader community? How do we bring not only the ideas here, but the mutual support here down to the real physical world, the gardens and cities and systems where we work?

Alan AtKisson -- I have been moved to tears and to laughter, and I've felt the sharp edge of my own learning curve. I've felt stupid on occasion, and overjoyed and enriched most of the time. I'm grateful to all of you who have brought not only your minds and your cultures, but your absolute personal commitment -- commitment of the sort that's needed to bring about any change in the perpetual tug of war with the huge power of entrenched systems.

Herbie Girardet -- I've felt not a tug of war here, but a tug of peace. In these meetings, people never play the game of "I'm cleverer than you are." Somehow when we come together we find ourselves building together, serving each other. What I want is Balaton all year round. I want to carry this non-competitive spirit into the world.

Dana Meadows -- I can only think of my conversations with Wouter during this week, the kinds of conversations cancer patients have, in which we glowingly, joyfully, express our gratitude for the miraculous and undeserved privilege of life. Coming close to death makes one very much alive. So, in a different way but similar effect, does stepping into a community of love, as at Balaton.

There's a question in Deepak Chopra's latest book. Why do we need to have our lives threatened to become so alive? Is that dreadful stimulus really necessary? A similar question has been asked and answered by Alcoholics Anonymous, which used to assume that a drunk had to "hit bottom" -- totally mess up his or her life -- before becoming ready for recovery. That assumption proved false. The "bottoms" in AA become more and more shallow, as the group realizes that the commitment to recovery can come any time.

In Balaton we have come to assume that in the presence of each other's love, with people of shared values, in one little resthouse in Csopak Hungary, under these unique conditions, we can soften our hard masks, tell the truth about our dreams and fears, let ourselves be the loving, humble, vulnerable, non-competitive, beautiful souls we assume that we are not allowed to be in the "real world." But what if our assumption isn't true? What if we can be that way any time, any where? What if we really could take the spirit of Balaton into the world?

I'm very aware of how unreal our Balaton weeks can seem when we "return to the world." My beautiful Self can shrivel astonishingly fast when I walk into ungenerous, conflictual, egoistic, power-hungry spaces. Only a few hundred kilometers from the Csopak resthouse, the guns are firing this week on Sarajevo. And then there are the heart-rending pictures Aro showed us of children in the most abominable sections of Bombay -- where the streets are three feet deep in

garbage, where abandoned, ruined apartment blocks become, for lack of any alternative, multi-story public toilets, where children go to work at long hours for pitiful pay at the age of 8. The *Herald Tribune* this week says (next to a picture of North Belfast children grieving their murdered father), "Irish Leader Says: Don't be Afraid of Peace."

Yet in South Africa, in the Middle East, in the former Soviet Empire, the hardest masks have melted. Entrenched, institutionalized evil has softened like the thawing earth in spring rain (and has turned into, our Balaton participants from those areas would insist, a muddy mess). If fifty people from all over the world can come together once a year in Hungary and discover the beauty of who they really are, then I have to believe that any people can do that, any time, anywhere.

PRINCIPLES OF ENVIRONMENTAL JUSTICE

In response to our excursion into Principles of Sustainability in the last Balaton Bulletin, **Steve Viederman** sent the following Principles of Environmental Justice. They were adopted at the First National People of Color Environmental Leadership Summit in Washington DC, in October 1991.

1. Environmental justice affirms the sacredness of Mother Earth, ecological unity, and the interdependence of all species, and the right to be free from ecological destruction.

2. Environmental justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.

3. Environmental justice mandates the right to ethical, balanced, and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.

4. Environmental justice calls for universal protection from extraction, production and disposal of toxic/hazardous wastes and poisons that threaten the fundamental right to clean air, land, water, and food.

5. Environmental justice affirms the fundamental right to political, economic, cultural, and enviornmental self-determination of all people.

6. Environmental justice demands the cessation of the production of all toxins, hazardous wastes, and radioactive substances, and that all past and current producers be held strictly accountable to the people for detoxification and containment at the point of production.

7. Environmental justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement, and evaluation.

8. Environmental justice affirms the right of all workers to a safe and healthy work environmental without being forced to choose between and unsafe livelihood and unemployment. It also affirms the right ot those who work at home to be free from environmental hazards.

9. Environment justice protects the rights of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.

10. Environmental justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration on Human Rights, and the United Nations Convention on Genocide.

11. Environmental justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants which impose upon the government a paramount obligation and responsibility to the indigenous peoples whose lands it occupies and holds in trust, affirming their sovereignty and self-determination.

12. Environmental justice affirms the need for an urban and rural ecology to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities and providing fair access for all to the full range of resources.

13. Environmental justice calls for the strict enforcement of principles of informed consent and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color.

14. Environmental justice opposes the destructive operations of multi-national corporations.

15. Environmental justice opposes military occupation, repression, and exploitation of lands, peoples, and cultures.

16. Environmental justice calls for the education of present and future generations that emphasizes social and environmental issues, based on our experience and on an appreciation of our diverse cultural perspectives.

17. Environmental justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible, and to make the conscious decision to challenge and reprioritize our lifestyles to insure the health of the natural world for present and future generations.

SIXTY ENERGY SLAVES IN GERMANY

(The following article, sent to the *Bulletin* by **John Peet**, was originally published in the German weekly magazine *VDI Nachtrichten*, 4 Feb 1994, reporter Ellen Conrady. It was translated by Prof. Helmut Knapp, Visiting Erskine Fellow at the Department of Chemical & Process Engineering, University of Canterbury), April 1994.

Is it possible today to develop Utopia - a life that is worthwhile and just? Is the idea of sustainable economy such a Utopia? If "Yes", is it feasible? Paul Klemmer, Director of the Rheinisch Westfalian Institute of Economic Research at Essen says "No, the concept of sustainable economy

is as abstract as the concept of Justice." Tyll Necker, President of the Federation of German Industry, doubts the practical feasibility of the concept, and suspects that the demand for sustainable economy means a State-directed economy. He recommends reliance on market forces and competition.

Only Hans-Peter Duerr, Director of the Munich Max Planck Institute of Physics and Alternative Nobel Prize laureate, believes in Utopia and a civilisation that is ecologically sustainable, just, and worthwhile to live in. Above all he believes in the human individual, and the willingness of people to change their behaviour and lifestyle.

The concept of sustainable economy was defined by the Brundtland Commission. Ever since, scientists have argued and the public has questioned what it might actually mean. For example, the recycling system in Germany; is it sustainable according to the Brundtland definition? Is a recycling economy sustainable? Shall we enjoy, one day, a new prosperity, as the scientist Ernst Ulrich von Weiszacker, Director of the Institute of Climate, Environment and Energy in Wuppertal, has been asking?

We all have an inkling that sustainable development actually means abstention. And especially in the wealthy North - notwithstanding localised poverty. But old dedicated Social Democrats stand up and warn of wars of distribution or redistribution, or scientists such as Paul Klemmer worry about corruption of the free market economy. There is no indication, however, of the global challenge and the idea that the world is only a village. Maybe it is a village, but it is one in which house and field are still defended with archaic principles.

The metaphor of the technical slave presented by Hans-Peter Duerr is very appropriate. It begins with the assumption that a well trained adult can do work at a rate of 100 Watts. This should be compared with the average total consumption of energy of a North American citizen of 11 kW. This point can be illuminated by a metaphor; each citizen in the United States employs 110 slaves; a citizen of Bangladesh employs only one and a citizen in Europe employs 60 slaves. (Each person employs the slaves every hour, night and day)

This picture might terrify people; such a comparison seems to be too brutal in our modern democratic society. But for Duerr the metaphor is only the intellectual revelation necessary to reach the final goal. Assuming that the maximum conversion of energy that can be tolerated by the ecological system of the earth is 8 TW, then each of the 5.4 billion people on the Earth is entitled to not more than 1.5 kW primary energy. For the citizens in Europe it means that they have to reduce their conversion of energy to one quarter. Just by technical improvement, says Duerr, it could be reduced by one half. Another reduction by one half of the half can be achieved by taxes on non-renewable fuels such as coal, oil and natural gas. These taxes should be sufficient to increase present prices by a factor of 3-4. The same demand is made by von Weiszacker.

Although the demand for taxes on CO2 production was not accepted in the European Union, the two physicists have not given up. Duerr believes that there is a critical mass of individuals prepared to try a new style of life with less demand for energy. Restriction of energy does not mean a life in rags and ashes, but it does require a menu for energy; a list according to which each individual

consumer can make selections within the overall restriction to 1.5 kW. An example is the questionnaire for a personal balance of energy developed by Greenpeace in Switzerland.

These ideas are not only disturbing but also radical. However, they may not be as unrealistic as they seem. (German) Minister for Environment Toepfer has asked for a policy of restriction on use of resources, according to which the price should represent the "Ecological Truth" of a product. He presented this opinion recently before an illustrious audience of representatives of industry. And he was applauded. The question is, what happens to his suggestion when it goes through the mills of the lobbyists?

SUBIC BAY: GREEN BERET TRAINING SCHOOL TO GREEN SCHOOL

SUBIC BAY, Philippines, Aug 10 (IPS) - Once used by the Green Berets for jungle survival exercises, the lush rainforest of the former U.S. naval base here will soon be converted into a training ground for forest and marine park conservation.

The U.S. navy withdrew from Subic in 1992, leaving behind 11,000 hectares of virgin rainforest and 2,000 hectares of watershed. It is the last remaining lowland forest in the northern Philippine island of Luzon. The 15,000-hectare facility -- the United States' biggest overseas military installation -- was a vital staging post for the Vietnam War and a re-supply point during the Gulf War in 1991.

Now, the WorldWide Fund for Nature (WWF) plans to use it as a 'natural laboratory' to train South-East Asian experts on protecting forests and marine parks, with 100,000-dollar funding from the U.S. and Japanese governments.

"Subic Bay is an excellent venue for a national and regional biodiversity conservation training centre," says Dr Celso Roque, WWF regional director for South-east Asia. "It has excellent natural laboratories for research and instruction."

Unlike other forests in Asia, Subic's is easily accessible. It is only three hours from Manila by land. An airstrip built by the U.S. navy, renamed Subic International Airport in 1992, is three hours or less from key Asian cities.

Now that many countries in the region are focusing on protecting forests and marine resources, Roque says there is also an urgent need to train people in park management. "The worldwide effort to conserve biodiversity is hampered by the serious lack of expertise," said a WWF project

proposal. "The greater a country's biodiversity, the smaller the number of trained human resources to manage these resources."

With its tropical rainforests, coral reefs, mangroves and wetlands, South-east Asia is one of the world's most biologically diverse regions. But it is fast losing its biological diversity. The Philippines has only one million hectares of old growth forests left, from 10 million in the 1940s. Indonesia is losing 620,000 hectares per year while peninsular Malaysia's forest resources are expected to be exhausted by the turn of the century. This has led to large-scale extinction of many species.

Through the Global Environmental Facility (GEF), the United Nations Development Programme (UNDP), the U.N. Environment Programme (UNEP) and the World Bank are providing financial and technical support for projects to set up protected areas in South-east Asia. In the Philippines, 10 sites, including Subic Forest, will get 22 million dollars from the GEF. But Roque says the country has only two experts on park management.

"One of the outstanding needs of the region is training," says Roque. "There are very few people trained in park management -- making an inventory of the forest, designing a trail, using geographic information systems, mapping, ecotourism, designing and developing camping grounds." Schools in South-east Asia do not produce professional forest rangers, he said. There have only been some occasional training seminars on park management sponsored by conservation groups.

Initially, the Biodiversity Conservation Training Centre will focus on training Filipinos in park management. Since the country's protected areas programme stresses the role of local communities and non-governmental groups, Roque says thousands need to be trained.

If it succeeds, the WWF will set up a Subic Regional Conservation Training Centre. To show the training centre can work, the WWF has held 'trial courses' in Subic. Lecturers from the U.S. Forest Service have trained U.S. Peace Corps volunteers assigned to protected areas.
It has also trained 33 tour guides of the Subic Bay Metropolitan Authority (SBMA), which now manages Subic, on how best to explain the forest to tourists. An average of 3,000 tourists visit Subic daily during the dry season. Half of them visit the forest.

SBMA now has a division handling park protection. Many feared the forest would be destroyed after the U.S. pullout, but so far the 70 trained forest rangers here have managed to keep illegal loggers out. The Aeta tribe, a nomadic indigenous group, acts as "eyes and ears" of the SBMA, says Valerio Mendoza, WWF natural resources management coordinator for Subic. Since the U.S. navy left, there have been only four cases of small-time illegal logging in the area. Commercial fishing is also banned in Subic Bay.

"The world never expected that Subic can be kept intact," said SBMA chief Richard Gordon. "But we've gotten the message across that we're still enforcing the forest rules."

The U.S. navy protected the forest since they needed the watershed to supply the base with 10 million gallons of water daily. They also used it for jungle survival training, but never did any studies on the forest.

With assistance from private conservation groups, Roque says they are conducting studies on the forest. They will set up an ethno- botanic museum showing the relationship between plants and people and a centre to give tourists information on Subic's flora and fauna. Roque says they expect to discover new plant species in Subic during the course of the studies, and Gordon hopes that new products -- fabrics or medicine -- can be developed from the forest.

But some groups are wary of the U.S. government's support for Subic's forest. They have been pressuring Washington to make a scientific assessment and clean up the toxic waste believed to have been left by the U.S. navy in Subic.

Polly Parks, Philippines programme associate of the Unitarian Universalist Service Committee in the United States, says that by funding the project, the U.S. government only wants to deflect criticism on the toxic waste issue. The U.S. navy is believed to have dumped lead and heavy metals into Subic Bay while doing maintenance and repair at its ship repair facility. Subic allegedly generated 500 tonnes of hazardous wastes a year in 1990-91, only 20 percent of which has been properly disposed.

Parks says the U.S. government should first address this issue to allay suspicions that its 50,000-dollar yearly contribution to the Subic forest project is only meant to cover up the issue of toxic wastes.

THE HORNIGS TOUR ASIAN BALATONIA

by Jim Hornig

Retiring as Chair of the Environmental Studies Program at Dartmouth after 12 years carries the benefit of more flexible time. So it was that in Spring of 1994 Evalyn and I set off on our own version of around the world in 75 days.

First stop was the Hotel Balaton New Zealand, **Katherine and John Peet** proprietors. Never mind that Katherine had broken her arm the day before we arrived, the Balaton hospitality was fabulous. John filled us in on his work developing systems models of various parts of the New Zealand energy system and also introduced us to the people who designed the master's level Environmental Science curriculum at the University of Christchurch. John and Katherine then helped us design a short auto tour of some of their country. New Zealand is so filled with marvelous scenery and wonderful people, that it is difficult to sort out the highlights. Auckland, with its hills and harbors reminded us of San Francisco, and the fertile farmlands, the deserts, the towering mountains, the glaciers and the deep fjords could have been a world tour right there.

New Zealanders are universally friendly, very proud of their country, and very civilized (we admire them, for example, for closing their harbors to US warships that might carry nuclear weapons). It is our impression that no society in the world is doing a better job than the New Zealanders in attempting to deal equitably and with civility with the problem of integrating, but

not absorbing, a minority indigenous culture into the society. Our insights are certainly selective because of Katherine Peet's intense interest in the language and social status of the Maori, and of course all Balaton members remember that John always begins his talks with a Maori greeting. Our other dominant impression of the New Zealanders is how few of them!there are! Where else in the world are most of the bridges, even on the main highways, single lane? We were driving on one of the year's busiest holiday weekends, and seldom met another car on such a bridge. We even found one single-lane bridge that also accommodates a main-line railroad track!

Our next Asian Balaton stop was the Ecological Research Institute, in Wau, Papua New Guinea, **Lawrence Tjamei's** home base. Lawrence was away studying in Delft, but he made sure we received a warm welcome in Wau. Arrival in Wau is itself an adventure since the Wau airstrip is grass and on a five-degree slope! It is served by a scheduled, but very informal, airline whose route climbs from Port Moresby over the spectacular but forbidding Owen Stanley mountains which proved a barrier to the Japanese fifty years ago. It is alleged that for some months in the late 1920's, at the height of the gold rush around Wau, this was the busiest airport in the world! Since there were no roads there in 1920, all people, supplies, and equipment (including two enormous dredges) arrived by air, in what was the first major attempt to use aviation for freight transportation. The Institute is idyllically situated in a tropical rain forest, and our dormitory room seemed to be the focus of sunset and sunrise bird concerts that reminded us of the tune-up of a large symphony orchestra.

The Institute supports a variety of research projects on butterflies, birds, tropical ecology, and regional problems. I was particularly interested in a project, supported by the Japanese government, aimed at determining the level of mercury in people living and working in this area, where small-scale, sometimes family-sized, gold mining is still practiced. The risk arises from both the "tailings" of long-abandoned mines, and from the fact that mercury is used, and reused by distilling, in the small-scale operations to recover gold from low-quality ore. The Wau area is a combination of breathtaking beauty and ugly, depressing reminders of the exploitation of people and environment during the gold-rush years. The river in the valley just below Wau was the richest source of gold, and early panning and placer mining soon gave way to commercial dredging of the gravel river bed to depths of 100 feet. One of the dredges still stands rusting in the river valley, surrounded by mountains of rejected gravel, looking exactly like a dredge we had seen years ago rusting in the Yukon River in Alaska.

The encouraging aspect of this sad scene of greedy exploitation was the universal determination of the people that they would never allow it to happen again. Quite recently an Australian group proposed reopening the mining, using modern techniques to work with the lower quality ore. The local government insisted on stringent conditions of environmental protection and profit sharing, and most of the people were happy that the company decided not to pursue the project. The people were also proud of a forestry school in the nearby town of Bololo, many of whose graduates are employed by a plywood factory that claims to be using the forests sustainably, and that has built a school and supported other community development projects. The contrast with the earlier gold mining is dramatic; we hope it is genuine and lasting.

Future visitors to PNG should also be aware of another active research institute, the Christiansen Research Institute in Madang, on the north coast. The Christiansen Institute specializes in studies of the coral reef off Madang which is purported to be the most ecologically diverse reef in the world, along with other projects on the forest roof canopy and on butterflies.

Culture shock is going from the rain forest of PNG to Bangkok! Fortunately **Chirapol Sintunawa's** Bangkok Balaton Hotel is located on a beautiful and peaceful plot of wooded land outside of city and on the Chao Phraya River, providing relief from the tuk-tuks, cars, buses and trucks of the twenty-four-hour traffic jam that is Bangkok. Chirapol thrives on both scenes - the relaxed country gentleman at his riverside home, and the bustling commuter, driving with a cellular phone at his ear while his pocket beeper is spelling out messages. As always, Chirapol has a dozen important projects going, each of which could easily be full time. In his spare time, he is drafting an Environmental Policy document for Thailand, requested by his friend who is MP for Bangkok and Chairman of the House Committee on Environment. We met the honorable MP, Mr. Tinawat Marukpitok, and also Prof. Debanom Muangman, Dean of the Faculty of Environmental and Resource Studies.

We had many wonderful travels and experiences in Thailand, even including a dinner with the Dartmouth Club of Bangkok, hosted by a Thai alumnus, on the roof garden of a 36 floor condominium he had just designed! There is no way to describe briefly the richness and the variety of our impressions of Thailand. Perhaps the strongest image that persists is the incredible combination of an energetic, bustling, high tech-addicted culture, hooked on vehicles, motor boats, TV's and cellular phones, coexisting with a population living traditional lives in a traditional culture. Our biggest adventure in Thailand was experiencing what the newspaper touted as a "thousand year" rain -- reported at 18 inches overnight. Our hotel was in the Sukumvit area - one of the lower parts of the city, so we got full benefit of the flood.

Our final stop was at the Delhi Balaton with **Aromar Revi**. At the moment the Hotel was fully booked because of the recent arrival of Aro and Poonam's lovely daughter Kaholie, but we did enjoy a wonderful dinner at Aro's apartment. Aro arranged for us to stay at the India International Center, a wonderful facility which hosts concerts and lectures as well as providing guest rooms and a library. The Center is adjacent to the historic Lodhi Gardens, where it seems that all of Delhi strolls at 6:00 a.m. Aro continues guiding his incredible variety of projects, focused on stimulating appropriate development in poor rural communities. He described projects in natural resource management (water, soil), production systems (resource extraction, manufacture and distribution), and social structure (law, education). Unfortunately we were not able to observe any projects first hand, since they are scattered in rural areas, and we were not able to duplicate Bert's feat of traveling with Aro to some of the sites. Aro did demonstrate his talents as a guide in Delhi, however. Evalyn and I were particularly touched by the Gandhi memorial and the Gandhi museum, which includes a depiction of Gandhi's life in a series of still-life dioramas - a medium which surmounts linguistic barriers.

Our visit to India was further enriched by the presence in Delhi of a former Dartmouth student, Rupin Dang, and his father, Hari Dang, who publishes the journal "Sustainable Development." Rupin and Hari took us north to the area of the Ramganga River, Corbett

National Park, and the old Landhour "hill station" just north of Mussoorie. Putting on all the warm clothes we could find was a remarkable contrast to the 40+ degree early summer temperatures we had left behind in Delhi, Agra, and Sariska National Park. The visit to Corbett, the oldest of India's national parks, provided a wonderful treat! Driving out of the heavily wooded park at dusk we surprised a full grown Bengal Tiger lounging at roadside.

So,the Balaton hotel chain is alive and well, and the management continues to distinguish itself through its hospitality as well as its many professional and social achievements.

NEWS FROM THE MEMBERS

A note from Wouter Biesiot immediately after the Balaton meeting:

On September 9 Anupam (Saraph) had to answer something like 10 relevant and pertinent questions concerning his thesis, and he did it very well. It was a pleasant and worthwhile ceremony, with **Bert de Vries** and **Jodi de Greef** acting as well-dressed paranymphs. So Anupam has got a doctor in natural sciences.

He had a full day of nice things happening: the ceremony, a reception with a lot of people from Eelde (where he lived for 2 years with his family), a dinner where **Bob Wilkinson** and **Alan AtKisson** showed up , to his surprise, and a nice party. So he had to recover on the next day, while Nanda and I took Alan and Bob for a tour along the Waddensee area. (They had appointments there at the seal rehabilitation center.)

After his thesis defense, Dr. Anupam reports that he spent several days at IVEM conducting a workshop on the toolbox. Some professors in management and artificial intelligence are making use of the ideas in their work.

* * *

Here's the story of the same historic days in the Netherlands, as reported by Alan AtKisson:

Bob and I had a terrific time in Holland. We were there for Anupam's celebration (though we missed the medieval ceremony, having appointments at the Ministry earlier that day), and stayed with him for a couple of nights, which he seemed to appreciate. (We certainly did.) Good meetings all over the country, pages of interview notes, lots of new ideas and insights. It's hardly "Sustainable Netherlands" there, but I did manage to get both inspired and de-mythologized about the place, which was the purpose of the trip.

All Balaton people were fantastic -- Bert, Wouter, Wim, Joe, Anupam went out of their way to help or host. Bob and I traveled well together and took one day off to bicycle around the northern island of Schiermonnikoog (took half a day just to learn to pronounce it right!).

I came home to the news that our local National Public Radio affiliate wants Sustainable Seattle to develop a call-in talk show one night a week. Watch out, Rush Limbaugh!

Well, I'm back, and full of ideas and questions and energy. The "troika" that steers Sustainable Seattle met over breakfast yesterday, and discussed how to increase the boldness and vision of what we're doing -- something that struck me as needed after running around Holland and listening to BG folks. We need to creatively turn up the pressure on local decision- makers, and beef up our own understanding of the local political economy.

Just returned from a symposium on "Creating the Sustaianble Renaissance" in Pittsburgh. The event was, on the whole, more about growth (for Pittsburgh) than about sustainability -- green industry and such. But interesting. Also met Bill Clark, who spoke at the pre-symposium dinner and told horrid tales about unimaginably huge power plants in China.

* * *

Post-Balaton e-mail from Joan DuToit in South Africa (e-mailers, please note, her address was listed wrong in the participant list handed out at the meeting -- it is jdt@maties.sun.ac.za)

Back home at last. Just a few words to thank you for the very enlightening experience of the last meeting. It meant a lot to me to participate. Only regret I have is that it went too quickly. Are you modellers sure that that valuable resource TIME is not also being depleted at a faster rate than previously? Stephen Boyden apparently has interesting theories about the matter, but I never got around to asking him about it. Thanks once again - I feel as if my batteries have been recharged and that my head is full of new ideas.

* * *

Images of Thailand from Drew Jones, who is spending two months there working with **Chirapol Sintunawa**:

Walking from the bus to Chirapol's house: a small grey and white bird with bright yellow stripes, like a miniature heron, swoops over the murky canal. A crab scrambles out and a frog hops in. I look around for a mid-sized coconut to threaten the neighbor's dogs with. They only let me pass when I can convince them that I would win any battle. Next to the coconut I find is a meter-long snakeskin. (No snake inside.)

On the street a small woman, babe in arms, begs for money by holding out a discarded McDonalds paper cup.

Enormous billboards advertise a Thai company's new line of 4.5 liter water-saving toilets. The picture shows a toilet with four and a half bottles of a popular mineral water. Last year when I was here, this company exported 100% of its efficient toilets.

Last week 25,000 people showed up for the opening of a "Clean Up the Earth" week, which Chirapol is helping to organize.

Inspired by the presentation of Herman Knoflacher at Balaton, Chirapol and I are scheming how to de-automobile the streets of Bangkok.

* * *

Wim Hafkamp is moving from Tilburg University in Delft to Erasmus University in Rotterdam, where he will head the environmental studies center. He will maintain his interest in environmental management for industry and add an interest in environmental port management and environmental infrastructure.

* * *

Leonardas Kairiukstis sends a new study from the Lithuanian Academy of Sciences entitled "Ecological Sustainability of Lithuania," consisting of scientific papers by many authors on air, land use and soil pollution, water system, forests, and biodiversity. Leonardas adds in a note: "Thank you very much for sending information about what is going on in the Balaton Group. It is very useful information, new insights and skills, which help me in my efforts for sustainability. **Jonas Grigaliunas** and I hope that in the future the economic situation in our country will improve, and we will be able to join your meeting. We wish the greatest success for all participants of the Balaton Group."

* * *

Liz Krahmer, having spent summer Saturdays helping **Dana Meadows** weed her garden, has started graduate school in system dynamics at MIT. She sends her new vital statistics:

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home address: 175 Summer Street #3
Somerville MA 02143
phone: 617-666-9108
school address: Sloan School of Management
E60-353
MIT
Cambridge MA 02139

* * *

Zoltan Lontay has faxed a report from the World Bank's Energy Efficiency Roundtable, held September 14 and 15 in Washington:

The mere fact that the Bank organized this meeting shows that they regard enegy efficiency as an indispensable element of development. It was emphasized by several speakers that without

improving energy efficiency -- in all countreis but above all in the developing world -- it will be impossible to meet the energy demand of the world

With more than 180 names on the participant list the Roundtable was actually a conference, addressing the institutional, legal, financial, and policy issues of energy efficiency. Experts were invited to the Roundtable from all parts of the world. More than 50 people attended from the World Bank and from other multinational development banks (MDBs). Apparently they wanted to learn, get acquainted with the state of the art, and express their willingness to promote energy efficiency.

Two basic strategy lines were discussed -- the "price" strategis and the "non-price" strategies. All the speakers from the MDBs urged that true energy prices be introduced in all countries, but representatives of the developing regions said that was impossible, at least in the short term. Within the non-price strategies, the role of utilities and private entrepreneurs was stressed.

If MDBs are to support energy efficiency, they have to work out new financing schemes, as the presently used lending practice gives preference to big projects, typically on the supply side. MDBs can also have influence on the policy of borrowing nations. They are, however, reluctant to intervene directly, as they have learned to be "humble."

The Roundtable was not intended to make decisions, and it did not make any. Still, I think it was useful. It raised hopes that the international financing organizations, which have significant influence on the world's economic systems, understand the need o support efficiency, a basic element of sustainable development.

* * *

The following is a combination of an e-mail message sent from Scotland by Ulrich Loening shortly before the Balaton meeting, plus a fax received at Csopak. It seems to be a suggestion for a future meeting on the questions once raised by Abraham Maslow: "How good a society does human nature permit? How good a human nature does society permit?"

Panic! Too much has accumulated and chaos will set in if I come to Balaton; after all my hopes, at the last minute I must cancel. I am heartbroken; but sometimes I have to be a bit 'realistic' which I cannot often achieve. Real realism is meeting you all at Balaton; pseudo realism is carrying on with all one's immediate activities. For the second time in the last few years, the latter wins.

I have to get on with students' theses, various workshop organisations, lecture series, next years' MSc intake and programme and my little ecological forestry company, which is just moving premises and needs me.

The *Balaton Bulletin* is priority reading the moment it comes. There news from friends, new understanding of something, and quotes and cartoons to bring it all to life. The last one was no exception -- the sharp commentaries on sustainability by Steve Viederman, the replies to the

President's Commission by Herman Daly, and the several other valuable contributions. When I say valuable, I really mean it; they are vital.

But I believe something is missing, something we all know, yet there seems little we can do. It is the problem of "wreckers," those who exploit while the going is good, for whom the principles of sustainability, however formulated, however understood and even agreed on, crumble in the face of the drive to forge ahead. We may overlook the fact that most of the world does not want sustainability.

The wreckers may not necessarily be wicked. There is a wide spectrum from outright corruption to the best of (inadvertently trouble-making) intentions.

Look up "corruption" or "crime" in the indices of either *Beyond the Limits* or *For the Common Good*. Apart from a brief mention of crime in the latter, these words don't appear. Yet some major social and ecological effects stem from corruption -- logging in most parts of the world, trade and aid deals mixed together. Equally damaging and more concealed seems to be the unconscious intelligence behind most of trade, commerce, and government. People know how their bread is buttered. So projects designed to solve some problem in effect achieve the opposite.

Some examples, from the big to the small:

- The World Bank is the extreme and obvious example, created ostensibly for reconstruction after the war, resulting in practice in a new colonialism.
- The Tropical Forestry Action Plan identified problems correctly but carefully avoided, in its implementation, doing anything at all.
- Last year we met to discuss trade; clearly 'free' trade as in GATT restricts freedom for most people.
- Energy conservation is high on many governments' agendas, but the programs must not be so successful that fuel use might actually be reduced to half or lower. God forbid that we ever reduce GNP and incomes (of oil companies)!
- The EU regulatory system for organic agriculture now prevents the smalller producers and retailers from selling organic produce. Instead of encouraging organic agriculture, it has in practice inhibited it.
- And finally I am no longer allowed by law to spray my plants with elder-leaf or stinging-nettle extracts against pests, because I have not tested and registered the material -- a safety law has destroyed a safe, harmless, valuable "biotechnology" in the interests of the pesticide industry.

The social structures that govern the western world, and indirectly most of the rest of the world, have survived because they have been "successful," We criticize them; the last few *Bulletins* do so brilliantly. What we seem not to have done is to tackle the central barrier to progress. Who wants all this beautiful understanding of justice and ecological feedback? Who wants to improve the situation, beyond just ameliorization so the system can continue? If people wanted real solutions, then surely they would act.

It may be that there is much wrong with human nature, but we as a society do not have to go out of our way to created structures that bring out the worst in us. The challenge seems to be to create social infrastructures that bring out the best in human nature, instead of the worst.

I miss you all and wish you a most exciting meeting! In sadness, sense of deep loss, but otherwise happy and optimistic, because actually all is going well - just I have to keep at it.

Should any Balaton member be coming anywhere near here, our Balaton Hotel is open.

* * *

John Peet says in a post-Balaton e-mail message from New Zealand:

I'm now home after a very stimulating 3 days in Paris with a group at the Centre Economie-Espace-Environnement (C3E) on a project about non-monetary indicators of sustainability. **Malcolm Slesser**'s model ECCO is a central part of that work. No doubt Malcolm will report about it in due course.

Spring is now sprung, cherry blossoms are on the trees, our tulips and daffodils are out, and I'm looking forward to the weather steadily improving from now on. The flip side is that I've got a pile of assignments to grade, which will take me ages at the present rate, so I'd better get on with them!

* * *

Johan Strumpfer e-mails from rapidly changing South Africa:

I have been meaning to write to you about SA and what is happening here, but I guess it will get written in small snippets.

I have good long-term hopes for SA, with two provisos: spending must be contained and expectations must remain reasonable/contained. These are two opposites, and expectations have been forced down so long that it is difficult to keep them low now. There has been a massive road blockade/strike in the country (part of a long series of ugly strikes) focussing on worker demands for pay raises. One of the companies hardest hit by the strike has the most liberal employment conditions you can imagine (eg. 3 months paternity leave). One of the truck drivers demanded on TV that the government makes it possible for him to be at home because he did not see his children grow up because he is a long distance driver.

Against such perceptions any government will fail. There are so many real and serious demands that do need to be rectified that the system in general will take some time to shed the unrealistic ones. WIll it respond fast enough before the government loses credibility?

(Tune in next time.)

STORIES, QUOTES, JOKES

Last-Night Banquet Limericks
(Written by Drew Jones and dedicated to **Malcolm Slesser**, **Jane King**, and **Niels Meyer**.)

Two physicists, one professor, and a writer
Lifted an auto 'cause they weren't much politer,
But imagining the mass
Of Ashok's carbon-free gas,
At least future cars should be lighter.

Less wine this year for them pranksters
They'll gulp it like filling some tankers.
But the rowdiest crowd,
Both sober and loud,
Were those debt-giving wild World Bankers.

There once was an Austrian named Herman.
"Don't use cars, we need bikes" went his sermon.
"We used to sit in trees,
Now we travel like bees."
But I'm not sure 'cause his graphs were in German.

Bad news for this toast, I fear.
Too much water is wasted for beer.
But tonight I'm waiving
My love for water-saving,
'Cause you all deserve one good "cheer."

Consumption Quotes
(Stolen by a paper written by Herman Daly for a Consumption Conference at the University of Maryland.)

Any discovery which renders consumption less necessary to the pursuit of living is as much an economic gain as a discovery which improves our skills of production.
-- Kenneth Boulding, 1945

I shall argue that it is the capital stock from which we derive satisfactions, not from the additions to it (production) or the subtractions from it (consumption): that consumption, far from being a desideratum, is a deplorable property of the capital stock which necessitates the equally deplorable activities of production: and that the objective of economic policy should not be to maximize consumption or production, but rather to minimize it, i.e., to enable us to maintain our capital stock with as little consumption or production as possible.

-- Kenneth Boulding, 1949

Man cannot create material things -- his efforts and sacrifices result in changing the form or arrangement of matter to adapt it better for the satisfaction of his wants -- as his production of material products is really nothing more than a rearrangement of matter which gives it new utilities, so his consumption of them is nothing more than a disarrangement of matter which destroys its utilities.
-- Alfred Marshall, 1961

Our civilization is, in effect, addicted to the consumption of the earth itself.
-- Al Gore, 1992

One-Liners
(Gleaned from the Internet by John Peet)

Daddy, why doesn't this magnet pick up this floppy disk?

Very funny, Scotty. Now beam down my clothes.

The gene pool could use a little chlorine.

The secret of the universe is @*&^^^NO CARRIER

Make it idiot-proof, and someone will make a better idiot.

Always remember, you're unique, just like everybody else.

Lottery: a tax on people who are bad at math.

There's too much blood in my caffeine system.

Give me ambiguity or give me something else.

Hard work has a future payoff. Laziness pays off now.

Ever notice how fast Windows runs? Neither did I.

Consciousness: That annoying time between naps.

Few women admit their age. Few men act theirs.

All generalization are false, including this one.

The Global Pothole Problem
(suggested by Joan Davis, from Garrett Hardin's book *Filters Against Folly)*)

Once upon a time there was a city whose streets suffered a pestilence of potholes. Plainly more tax money was needed to fix the streets, but the people marched to the slogan of "no unfair taxes." Since every tax is unfair to somebody, the mayor could not find the money needed to fill the potholes. Things went from bad to worse, until finally the holes became so monstrous that they broke the springs of the mayor's limousine and His Honor had to come to City Hall in a three-ton truck. The mayor decided things had gone far enough. He asked the local Genius for advice.

"The answer is simple," said the Genius (after spending six months and seven hundred thousands dollars on a study). "I have made a survey of all the natiions and have found potholes everywhere. Clearly we are confronted with a Global Pothole Problem. Everything is connected to everything else. Global problems call for global solutions. If we want to get our potholes filled, we must establish a Global Pothole Authority."

"The GPA will be responsible for first surveying and studying the pothole problem, following which it will resurvey and restudy it. At some point in time it will undertake to fill in the potholes. For uniformity and fairness, all requisitions for this work, from whatever part of the world, must be processed by the central office of the GPA in Geneva. Approval will be based on need. Financing will be by taxes based on national ability to pay. This means that for many years to come, all of the potholes filled will be in the poor countries, while the taxes will be levied only against the rich. This is only fair."

"Let me emphasize, Your Honor, that this is a great opportunity for polishing up your image as a citizen of the world. By taking the larger view, the global view, you can strike a blow against parochialism, provincialism, bigotry, and selfishness. Global thinking is the mark of the truly civilized person. Under your inspired leadership, our city can make the future happen."

The Global Pothole Authority was born. The future began to happen. Unfortunately the city's potholes remained unfilled. The Genius took his fee and bought a cottage in a fashionable lakeside community; he wasn't going to let the potholes bother him. The mayor continued to ride to City Hall in a truck.

Increase in numbers brings an increase in the possibilities of misunderstanding, an iincrease in the necessity for delegating, and an increase in the ways that delegation can malfunction. Other things being equal, large agencies are less efficient than small. The reason for this is simple. Self interest urges individuals to evade responsibility whenever they possibly can. The more distant the monitor, the more feasible evasion becomes. Globalization favors evasion. The wise rule to follow should be:

Never globalize a problem if it can possibly be dealt with locally.

This is not to say that there are absolutely no problems that are truly global. There are: not many, but a few. And they pose difficulties far more serious than most globalists realize.

The Futility of Global Thinking
(By Wendell Berry. Originally printed in *Harper's*, September 1989, reprinted in Bill Willers (ed.), *Learning to Listen to the Land*, Washington DC, Island Press, 1991, p. 150.

How, after all, can anybody -- any particular body -- do anything to heal a planet? Nobody can do anything to heal a planet. The suggestion that anybody could do so is preposterous....

In fact, though we now have serious problems nearly everywhere on the planet, we have no problem that can accurately be described as planetary.... There are also no national, state, or county problems, and no national, state, or county solutions.... The problems, if we describe them accurately, are all private and small. Or they are so initially.

The problems are our lives.... The large problems occur because all of us are living either partly wrong or almost entirely wrong.... The economies of our communities and households are wrong. The answers to the human problems of ecology are to be found in economy. And the answers to the problems of economy are to be found in culture and in character....

The planetary versions -- the heroic versions -- of our problems have attracted great intelligence. Our problems, as they are caused and suffered in our lives, our households, and our communities, have attracted very little intelligence.... We change our principles, our thoughts, and our words, but these are changes made in the air. Our lives go on unchanged.

The question that must be addressed, therefore, is not how to care for the planet, but how to care for each of the planet's millions of human and natural neighborhoods, each of its millions of small pieces and parcels of land, each one of which is in some precious way different from all the others. Our understandable wish to preserve the planet must somehow be reduced to the scale of our competence -- that is, to the wish to preserve all of its humble households and neighborhoods....

Only love can do it.... Love is never abstract. It does not adhere to the universe or the planet or the nation or the institution or the profession but to the singular sparrows of the street, the lilies of the field, "the least of these my brethren." Love is not, by its own desire, heroic. It is heroic only when compelled to be. It exists by its willingness to be anonymous, humble, and unrewarded....

We must achieve the character and acquire the skills to live much poorer than we do. We must waste less. We must do more for ourselves and each other.