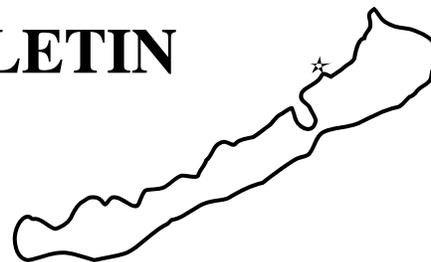


THE BALATON BULLETIN



Newsletter of The Balaton Group

SPRING 1998

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THE IPCC ENERGY-FUTURE SCENARIOS

by Bert deVries

The IPCC has asked for a Special Report on Emissions Scenarios (SRES). After several workshops to discuss the scope and nature of the scenarios to be investigated, the SRES writing team decided to formulate a general framework and ask several modelling groups to work out four scenarios in quantitative detail. The RIVM group of the Bureau for Environmental Assessment has recently finished its interim-report to the SRES; Bert de Vries is project leader. The following excerpt is part of the second chapter, in which the scenario templates are discussed.

The responsibility for this text is fully RIVM's, not of the SRES: it is Bert's interpretation of the so-called narratives or storylines. It can serve as a think-piece for our annual meeting in September. It turns out that most 'official' scenarios are akin to the A1 future. The B1 Sustainable Development world assumes a global concern and global action towards sustainability — but without explicit climate policy. In fact, this is what BG-members have been discussing now for over 15 years. The A2 world diverges from the Recent Conventional Wisdom in that it assumes that globalization trends to be halted or reversed. This could spell catastrophe for some regions, autarchy and a new cultural identity for others. The B2 world of Regional Stewardship is even more challenging to imagine; yet, it is even closer to much of what is dear to BG-members. Can we come with plausible, imaginative sketches of such a future and for a variety of regions?

To forecast energy emissions, one must obviously forecast population, economy, technology, and their interactions. The group working on the scenarios has decided on four clusters.

- In the first cluster, **A1**, assumes a high degree of global governance and limited social and environmental concern and policies. This is a high-tech, high economic growth and low population growth world. (This is the scenario everyone finds easiest to write — it comes straight out of official documents.)
- In a second cluster, **B1**, there is a globally successful effort toward sustainability, with lower economic and population growth and technology directed towards community and environment issues.
- The other two scenarios picture a world in which globalization has come to a standstill, and cultural pluralism, self-reliance and trade limitations are leading values. Both of these worlds have relatively high population growth and low economic growth and differ in their orientation toward equity and environment issues (low in **A2**, high in **B2**).

The differentiating elements of the four scenario families are governance and values. The differentiating element in governance is the degree of globalization as expressed in, for example, convergence of market-based mechanisms and instruments, trade liberalization, large interregional capital flows, and fast dis-

semination of technical innovations. Values refer to the concern in society about equity and environment issues. These express themselves in widespread support for, for example, solidarity between the rich and the poor, “green” lifestyles and technologies, and community-oriented experiments towards a more sustainable future.

| | | |
|---------------------------------------|--------------------------------------|-----------------------------------|
| | high global governance | local governance |
| little social & environmental concern | A1 Golden Economic Age | A2 Divided World |
| high social & environmental concern | B1 Sustainable Development | B2 Regional Stewardship |

The names for the four scenarios have gone through various stages. At present they are labeled:

- A1 Golden Economic Age,
- B1 Sustainable Development,
- A2 Divided World, and
- B2 Regional Stewardship.

These names are still in a process of change: Golden Economic Age was formerly called “Tiger World,” Divided World had been “Cultural Pluralism,” Sustainable Development was referred to as either “Environmental Success” or “New Sustainability Paradigm.” Regional Stewardship is the new name for “Mixed Bag/Benign Ineptness.” The various names suggest already the difficulty of straightforward interpretation.

A1/B1 are considered economic success stories, which differ in the degree of social and environmental awareness (and hence in the corresponding policy actions). A1/A2 are environmentally “Business-as-Usual” futures, which differ in the degree of [international] cultural and economic pluralism, trade and technology transfer, cooperation and stability. The distinctions are further blurred by the fact that the IPCC mandate says the scenarios should not contain climate policy measures.

In the discussions about the scenario story lines, the concept of global governance was narrowed down to the amount of interregional trade, the costs of transport, the degree of technology dissemination, and the implementation of international environmental protocols. The notion of social awareness was understood as more convergence in income levels among regions. Environmental awareness was supposed to show up in the rate and magnitude of the so-called “environmental Kuznets-curve,” that is, in the stringency of the environmental measures which people are willing to support if their level of affluence rises and environmental amenities become more important.

The exercise of classifying the scenarios suggests that the differentiation between the A1 and B1 scenario is most straightforward with regard to environmental awareness; the equity issue is a more difficult one. The cultural diversity assumed for the A2 and B2 scenarios leads to a huge spectrum of possible narratives; all of them, however, should feature a focus on regional resource endowments and reduced interregional trade flows. Most of the “official” scenarios put out by government agencies can be considered as variants of the A1 scenario, although in some of them explicit reference is made to the need to deal with rising inequity and pressures on resources and environment.

Basic assumptions for all modeling groups

Using the starting points as formulated above, the writing team agreed on a set of specific issues to be used by all modeling groups. The data will be aggregated into four regions:

- OECD-members of Annex-1 (Canada, USA, OECD Europe, Oceania, Japan);
- non-OECD-members of Annex-1 (Eastern Europe, CIS);
- Asia outside these first two groups (India, South Asia, China, East Asia);
- Latin America, Africa and the Middle East.

In this report we will occasionally refer to the Annex-1 countries as Industrialized Countries (IC) and to the other two groups as Less Industrialized Countries (LIC).

More detailed disaggregation to 9, 11 or 13 regions is up to the various modeling groups. Reporting of results should be for the years 1990, 2000, 2010, 2020, 2030, 2040, 2050, 2075 and 2100. Standardized projections have been agreed upon for population and Gross World Product and for assumed fossil fuel and non-fossil resources. Final energy use is to be reported for the sectors Industrial, Transport, Residential and Commercial and for the fuels coal, oil, gas, electricity and traditional. Tentative lists for primary energy supply and greenhouse-gas emissions have been discussed, too.

We now proceed with a description of the four scenarios in more detail. These descriptions rely on the zero-order draft papers written by working group members and discussed during various workshops. Here we focus on those elements of the narratives that provide guidelines for translation into quantitative assumptions on model parameters. Some elements show up in all four scenarios — for example the expectation of an increasingly service-oriented economy and a continuation of the communications revolution. For other aspects, however, the construction of plausible narratives is as much a matter of imagination, values and art as of scientific facts and compelling logic.

Golden Economic Age: A1

The present trends of globalization and liberalization continue. In combination with a high pace of technological innovation, this leads to high economic growth in both the developed and the less developed regions. Affluence, measured as per caput Gross Regional Product (GRP), converges among the world regions although the absolute difference keeps growing. Increasing affluence supports a rapid decline in fertility levels and world population starts to drop after 2050 from 9-10 billion downwards to 7-8 billion people. More and better medical services lead to higher life expectancy, and aging becomes an important global phenomenon. Economic growth results largely from technical innovations, not from increasing factor use. In combination with an increasing service and information orientation, this will lead to a significant decline in the intensity of energy and materials (in unit/\$) — dematerialization. The fraction of electricity in total energy will rise significantly. Tropical regions make up a larger share of world energy demand.

The decline in population after 2050 will have consequences for the functioning of regional economies. One can think of changing consumption patterns, la-

bor force relations, savings rates and interregional migration flows, to mention a few. Such interactions have been considered only to a limited extent. For example, the WorldScan simulations use average labor participation rates based on 15-65 year cohorts.

To give the scenarios somewhat more content, we put together narratives for four important items in each of the future worlds: mobility and transport, communications, manufacturing and land/food.

Mobility, transport and communications. The trend towards declining transport costs, both for passenger and freight, will continue as a result of improved logistics and other technical innovations. Passenger transport will be dominated by the private car; freight transport by trucks and [underground] pipelines. The frequency and intensity of vehicle use will go up. The shift in transport modes towards more air travel will continue, and the average trip will be faster and further. In the developed regions, saturation will occur in relation to population density, traffic congestion and the like. In regions with low population density, saturation levels for car ownership will move towards present US-levels. Governments cope with congestion problems by giving widespread support for road infrastructure investments. International financial institutions support governments with low-interest loans. Public transport will be limited in most regions, because political will and public funding are insufficient; it will be confined to, for instance, high-speed trains for medium range and bus/tram for urban regions. Tourism will become an ever more important source of income for parts of Asia, Africa and Latin America.

The expansion of communications technology allows a further convergence in life-styles and in technical and managerial values and skills. Electronic transfer of data and knowledge will enhance the globalization of the financial service sector and trade. This may cause highly volatile capital flows and result in economic and political instabilities, which however are effectively countered by global institutions.

In the developed regions with high-density and aging populations, tele-working and tele-shopping will help to slow down the growth in physical flows of people and goods and services at the local level. Media such as TV and internet, on the other hand, induce a further growth in long-distance traveling and the marketing of exotic goods. These factors also strengthen the trend towards more and more knowledge-intensive economic activities in these regions. Some less developed regions will see an accelerated penetration of mobile phones - thus avoiding heavy infrastructure investments. This induces a faster transition towards a service- and information-oriented economy.

Communications technology and media will support family planning programs and accelerate the exposure of the young to "western values." It will also facilitate small businesses in regions with low population density, enhance the equalization of economic production factors (capital, labor) and speed up the integration of regions such as the former Soviet-Union into the global economy. The "first", the "second" and the "third. world will be less and less a geographic differentiation. Instead, inequality will show up increasingly *within* societies. Some countries that have no marketable resources or turn into political chaos run the risk of becoming marginalized — and treated as if non-existent.

Manufacturing. Use of basic materials will saturate towards the present values in the OECD-region. A global, competitive business environment will induce a high rate of technical innovation, which will generally be less resource-intensive. Worldwide production of basic materials such as steel and plastics will increasingly take place in coastal regions along major transport routes and in connection with coal and oil trade. Both financial and physical flows will increasingly become part of global business.

In a strongly globalized world, multinational corporations increasingly dominate research, development, and production and compete on the basis of flexibility and global cost minimization. Robotization accelerates the rise in capital-labor ratios; in some regions this is a response to labor shortages, in other regions it reinforces the trend toward a dual economy. Nanotechnology and recycling cause major reductions in materials-intensity. Car manufacturers will be increasingly producing for a global market with rapid diffusion of innovations, low transportation costs and high rates of return on private capital.

Land/food. This future will be characterized by a further expansion of the industrial food system, with increasingly western-style meat-rich diet and ready-made meals, frozen and concentrated foods, use of microwave etc. Subsistence agriculture gives way to commercial farming for domestic consumption and export, which is increasingly dominated by high-tech intensive methods using more irrigation and artificial fertilizer, pesticides etc. Use of these inputs will become much more productive thanks to the application of precision agriculture and biotechnology. Technological innovations will be disseminated rapidly throughout the world. Management schemes will become economically optimized with help of satellite observations, computerized seeding and feeding, irrigation schemes etc. Biotechnology will play an ever more important role in all parts of the food chain. Financial flows will be large and managed by the multi-

national agro-industry complex. Food will widely be traded based on comparative advantages.

The developed regions (North America, Europe) will keep the lead in high-tech capital-intensive mixed farming, introducing controlled greenhouses, hydroponics, bio-engineering etc. As productivity rises further, land will become less and less of a constraint and large areas become available for other uses (reforestation, recreation, biofuel plantations). Some countries will keep importing animal food (soy, corn); most will export cereals. Export of seeds and of patents will increasingly become part of the agro-business. China and India will push for a second “green revolution” with loans from international institutions. Regions such as Africa and Latin America may specialize in tropical products for export while importing an increasing fraction of their local food needs and inputs (fertilizer, machinery). They — and also regions like India and China — will import genetically modified, patented seeds. Fuelwood is rapidly replaced by commercial fuels.

Challenges and threats in the Golden Economic Age. Obviously, there are significant forces that could interfere with the projected high growth future of the A1 world. The widening gap between rich and poor and the breakdown of solidarity and community values, in combination with the high pace of (technological) change, could involve large adjustment and transaction costs and cause marginalization of large groups within society. In the developed regions social tensions may grow as a result of extreme consumerism and hypercompetitive individualism, resulting in rising crime rates and use of legal and illegal drugs. In less developed regions mounting inequity, aggravated by increasing [urban] population densities and failing infrastructural provisions, may show up as social unrest in the form of food riots, anti-western terrorism, ethnic and religious conflicts and the like. In response regions may learn to develop — or return to — their own cultural and political values. This can result in a whole spectrum of possibilities, from more spiritually and/or community oriented societies — as in Kerala, for example — to (para)military and authoritarian governments as the only alternative to anarchy. Such a course of events could block further trade liberalization as countries opt for protectionism.

Another impediment to the unfolding of the Golden Economic Age is that there are insufficient long-term investments made into infrastructure (education, health, transport) because of the dominant short-term private gain orientation and the large and increasing burden of social security payments. This could significantly slow down the assumed increase in productivity and innovation.

Thirdly, the intense search of international capital for high and quick profits may — apart from financial instabilities as seen in the 1990’s — cause serious overexploitation of the natural resource base in many regions in the world. The resulting deforestation, desertification and toxification of soil, water and air may pose huge survival problems for many in a world with twice as many people as today.

These threats may trigger another course of events which could be part of the narrative of the Divided World A2 scenario. On the other hand, they may also cause a strengthening of international institutions to avert such threats. This could pave the way for effective governance, at all levels, oriented toward reducing income inequalities and unsustainable resource use practices. Such a course would become the narrative of the Sustainable Development B1 scenario, which is now described in more detail.

Sustainable Development: B1

In this future, present trends of globalization and liberalization continue but there is a strong commitment among national and international governments towards sustainable development initiatives. These are initiated by widespread support for “green parties” in the IC and increasingly supported by multinational firms and governments in the LIC. Technology development and life-style trends incorporate principles of sustainable resource use; a more equitable income distribution, both within and between regions, is seen as a precondition for sustainable development. Because business takes an active role, the pace of technological innovations is high. Increasing and more equally distributed affluence, supported by policies oriented towards education for women and community-based initiatives, cause a rapid decline in fertility levels: world population starts to drop after 2050 from 8-9 downwards to 6-7 billion people. Urbanization trends are halted or even reversed as orientation shifts to more decentralized living supported by the information revolution. International organizations are successful and effective. Affluence, measured as per caput Gross Regional Product (GRP), converges among the world regions at a faster rate than in “Business as Usual” expectations of the 1990’s. In combination with an increasing service and information orientation, there is a huge decline in the intensity of energy and materials (in unit/\$). Fossil fuels and energy-intensive materials are increasingly replaced by renewable sources. The growing energy demand in tropical regions and the high degree of energy efficiency measures makes electricity the most important energy carrier.

Mobility, transport and communications. To solve environmental and congestion problems, there is an

active policy to invest in infrastructure (subways in large cities, bicycling lanes, clean electrically driven buses etc.). Intercity traffic is increasingly by fast trains, with excellent local transport systems (including car rental). New and efficient ways for freight transport such as underground pipelines and rail systems are gradually introduced. Air traffic is for the largest part intercontinental. Although the private car remains the most important passenger transport option, both ownership and mileage saturate in most regions at much lower levels than present-day U.S. levels. Average fuel efficiency drops with a factor 5 to 10; electric and hybrid ([m]ethanol-based) cars make up a larger share of the market as they are appreciated for their convenience and low noise and pollution levels. The over-all economic activity related to transport (car manufacturing, gasoline, roads etc.) grows at lower rates than in Business as Usual scenarios — after all, the value-added per unit of bicycling time is small. This is one explanation for the relatively lower rate of economic growth in this scenario.

The rapid expansion of telecommunications and information technology gives the less developed regions important leapfrogging opportunities. For instance, sparsely populated regions in Africa and Latin America jump into satellite communication systems, bypassing material-intensive infrastructure. Government and community-based programs for education, medical aid and resource management rapidly become available for rural populations, which in combination with energy supply from local and renewable resources enhances earning opportunities and slows the growth of megacities. Global communications networks have to comply with certain standards which regulate, for instance, the amount and nature of commercial advertising.

Manufacturing. The trends toward lower energy- and material-intensity is reinforced by increased efforts to boost efficiency. Technology transfer from the industrialized to the less industrialized regions is accelerated to comply with national and international pollution abatement agreements. It is supported by large, regulated capital flows from the rich to the poor regions. As a result, industrial energy demand starts falling, despite growth in output as the 10-15 materials which make up 80% of industrial energy demand are produced ever more efficiently. Nanotechnologies become a spearhead in R&D, sparking off a revolution based on development of new materials and an ever-decreasing use of materials per function. The introduction of mechanization and robotization is slowed down to safeguard employment. Yet, some regions reap the benefits of emerging communications and transport technologies and make a fast shift toward a service- and information-oriented economy. In poor rural regions, governments support small-scale,

labor-intensive industry but enforce strict environmental regulations — following the example of Taiwan in its first decades of industrialization but avoiding environmental mismanagement. Materials recycling becomes a global business, profitable because governments enforce interregional waste management laws.

Land/food. The trend is away from the high-meat western-style diet, initially as a health-hype among the affluent but later also in land-poor regions, as people become aware of its implications. Selective application of biotechnology gradually makes agriculture in many regions less environmentally damaging, while maintaining or raising average yields in combination with vastly more efficient irrigation schemes. The use of fertilizer and other agricultural inputs starts declining, because even more than in the Golden Economic Age farmers are taught to use inputs more selectively or switch to sustainable agriculture practices altogether. For environmental reasons subsistence agriculture and fuelwood use rapidly decline. The virtues of locally grown crops and traditional farming practices are re-discovered. In some cases this may require more land, but the pressure on land is in most regions bearable as populations grow only modestly or — in the second half of next century — decline.

Although most governments opt for a some degree of (regional) food self-sufficiency, food trade is large in a safe world. Logging is restricted to sustainable practices; most wood is produced from plantations following Scandinavian practices. In some regions, production of commercial biofuels becomes large business. Large forested areas are converted into conservation areas to safeguard biodiversity. Human settlements are controlled by promoting compact cities and major transport/communication corridors based on improvement of current infrastructure rather than extension.

How plausible is “Golden Green?” Clearly, also this future may not unfold for a variety of reasons. The commitment to sustainable development will lead to regulations of trade and finance, of workers’ rights etc. and to all kinds of environmental regulations. Present trends show that, even if the large multinational corporations cooperate in a vein of “enlightened self-interest,” there are huge opportunities for governments and unconverted business people to circumvent regulations. International institutions may never become sufficiently effective to prevent free-rider behavior. People in the ICs may not be willing to sacrifice their present life-styles — and the more affluent in the LICs may be equally unwilling to search for alternatives.

A failure to shape international governance structures may lead the world into a future in which re-

gions increasingly rely on community-based, local forms of governance and resource management. To this purpose they may wish to protect themselves from free trade and financial market practices. They may also increasingly cherish their own cultural and religious roots as an alternative to western-style consumerism. Such a course would become the narrative of the fourth scenario: the Regional Stewardship B2 scenario, described later. But first an environmentally uncaring world that does not hold together.

Divided World: A2

Globalization trends, among them trade flows and migration, slow down or even reverse, due to renewed cultural awareness and value differentiation between regions. Such a world of “cultural pluralism” can be characterized by negative forms of fragmentation (“a very diverse world”) with protectionism and conflict. On the other hand, it may show the way for some regions to strengthen their own values and may work out peacefully and positively: autarchic China, US isolationism in high-tech high affluence, Africa recovering tribal identities.

The problem with quantification of such a scenario is that there are no rules of the game in terms of consistency — imagination may lead us in many directions. The best way is to list explicit “cultural blocks” with their own trajectories. For example, fertility and urbanization trends may be region-specific, economic growth and business practices will be affected by differentiation in traditions and life-styles, and government initiatives with regard to health, education and transport infrastructure will be shaped and constrained by regional endowments and skills. Diets may change toward western standards but more slowly and unevenly than in the more affluent Golden Economic Age. In less developed regions the growth of the car system may be constrained by lack of purchasing power because of high income inequality (e.g. Latin America) or by a lagging infrastructure because of ineffective government (e.g. Sub-Saharan Africa). As to energy use, one may expect a regional orientation focusing on the use of available resources and on research and tax policies towards energy conservation and renewable energy sources, triggered in part by imminent depletion of regional fossil fuel reserves. Fuelwood may be replaced by commercial fuels but in some regions large numbers of people would still depend on it.

Obviously, for some regions this future could become gloomy — or at least the transition towards a brighter future could be quite turbulent. As population pressure increases, conflicts may arise in the

search for cultural, ethnic and religious identity. Scarcity of water, food or energy could easily exacerbate such conflicts. Transboundary resource-related issues that are already emerging at present, could cause disastrous developments in regions that are not able to cope or are not supported by others. Failing institutions may cause a decline into dictatorships or anarchy. In some cases border conflicts will be unavoidable. These possibilities are not dealt with, or at best implicitly, in model simulations.

Regional Stewardship: B2

In coping with equity and environmental issues, regionally diverse response strategies may emerge. At the global level, initiatives may be ineffective due to a lack of global institutions in a world of good intentions but no action. At the regional and local level, however, people increasingly seize the means to manage their own situation in an equitable and sustainable manner. In some regions this may take the form of decentralized settlements on the basis of bioregions; in others society may opt for centralized but highly energy- and material-extensive infrastructure. Some regions may develop ways to maximize the sustainable use of their indigenous renewable resources; others may shift the focus to changing socio-political structures or find ways to turn consumption into less materialistic and more spiritually and psychologically rewarding directions. Other developments in such a future could be: redefinition of the notion of work and [un]employment; operating supplementary economies modeled after, for instance, the Local Exchange Trade Systems (LETS); creative ways to finance small-scale rural development on the basis of renewable energy sources.

As with the A2 scenario, quantifying such a scenario poses the problem that there are no rules of the game in terms of consistency. The emphasis, however, will be more on sustainability and stewardship than in A2. In the industrialized regions, an increasing appraisal of nature, clean air and water may, in combination with less land-intensive food production methods and the possibilities of traveling in cyberspace, lead to drastic changes in land use patterns and mobility behavior. Revised tax schemes may stimulate much larger use of locally available food and fiber resources. Equity and employment issues are increasingly organized at the community level. Here, too, all kinds of tensions, some of them directly or indirectly emanating from resource scarcity or mismanagement, may evolve, but they will generally be less severe, if only because population pressure is less intense.

WHAT CAN BALATON CONTRIBUTE?

As you can see from the scenarios outlined above, the world community can imagine only a limited range of possible futures. It has a hard time going beyond globally aggregated, numerically expressible, business-as-usual, trend-extrapolating concepts. It can hardly deal with real diversity. It has only vague ideas about a true Sustainable Development or Regional Stewardship world. It cannot envision a future of actual, major economic or ecological collapse or one of transcendence, growth in moral/spiritual directions, sustainability deeply motivated by values rather than imposed by fiat.

Futures we cannot imagine or discuss are futures we cannot prevent, prepare for, or bring into being.

Surely we can do better than that! The question before us is: can the Balaton Group members, together or separately, help expand the world's ability to envision the future?

The objective of the upcoming Balaton Group 98 meeting can be formulated as twofold:

- to use the capacities of the members and participants to construct Scenarios for Sustainability, that is, to work out a sustainable future in some qualitative and quantitative detail and for various regions of the world;
- to use the results as an input to the "open process" of the IPCC emission scenario construction program.

Other objectives are: to review critically methods and ways of charting the future of the globe; to contribute by exploring novel ways; to construct a vision of the future that reflects the views and discussions of Balaton Group members over the past 17 years; and to contribute to the LEAD (Leaders in Environment And Development) program and the Global Environmental Outlook (GEO) process.

Important conditions for a successful meeting are therefore that:

- the IPCC process is laid out at the beginning, as a background to the meeting;
- the participants get a feel for present key trends, with regional diversity;
- the participants are given examples of past scenario construction efforts;
- the group is supported by a scenario con-

struction methodology and facilitation process.

These considerations have led to the tentative program outlined below. Most speakers are confirmed, but Balaton programs are always subject to change.

Day 1, September 10, Afternoon : Looking into the future - Who sees what?

Scenarios for climate change policy: The IPCC process (**Bert de Vries**).

Outline of the IPCC scenario process; overview of the four scenarios and the quantitative results with the IMAGE2/TIMER model; focus on the missing links i.e. for better (vision of sustainability) or worse (overshoot and collapse)

The SEI scenario project: between transformation and barbarism (Gilberto Gallopin).

Overview of the study by the Global Scenario Group "Branch Points: Global Scenarios and Human Choice," possible unfolding of Barbarization and Great Transitions futures

Worldviews and principles behind two different scenarios for the future (**Hartmut Bossel**).

Overview of path A and path B futures; relation between scenario construction and orientor theory; the systems dynamics and bifurcation aspects of the unfolding of the future

The State of the Future 1997: many roads are open (Jerome Glenn).

Overview of method and results of the UNU Millennium Project; the key issues and drivers; brief outline of the scenarios Cybertopia, Rich Get Richer; Trading Places, and Passive Mean World

Day 2, September 11, Morning : Experimenting with scenario construction.

Methodologies to construct scenarios: a prelude to the afternoon sessions (**Dennis Meadows**).

Overview of some methods; some warming-up in the form of vision construction exercises, simple systems insights in game-form

Can models help? - experiences with the Threshold 21 model (**Thomas Fiddaman**)

Introduction to the Threshold 21 model; how it is being developed and used; usefulness in exploring sustainable, efficient and equitable futures

Systems insights from modeling material and energy flows: constraining the imagination (Matthias Ruth)

What physically oriented system dynamics models can teach us about the [im]possible; feasibility tests for scenarios; implications for climate change policies

Alternative future histories Phase I (**Ferenc Toth**)

Start-up of a collective exercise to construct scenarios of how to get from today's world to a specified endpoint; sessions in small groups: glimpses of desirable endpoints

Afternoon: continuation of scenario exercise and/or other working groups

Day 3, September 12, Morning : Baselines: What's going on in the world — from India to California and beyond.

India in the next century (**Aromar Revi** and colleagues)

Governance in relation to entitlement, resource and distribution issues; political economy and social transformation; liberalization and the dual economy; the role of religious fundamentalism and of the state system; leverage points for a sustainable India

California dreaming: visions and values from the richest part of the world (**Robert Wilkinson**)

Climate change as a catalyst for intelligent policies towards sustainability; let's assume we get smart - what does the sustainable, equitable, desirable [energy] future [of California] look like; can/should Californian values lead the way, and into which future?

Alternative future histories Phase II (**Ferenc Toth**)

Continuation of the collective exercise to construct scenarios of how to get from today's world to a specified endpoint; sessions in small groups: possible pathways towards the desired endpoint

Afternoon: continuation of scenario exercise and/or

other working groups

Day 4, September 13, Morning : More baselines - tales from East and West

Futures for Eastern Europe and Russia (Vladimir Kollontai)

The basis of social change, drawing lessons from the former USSR which collapsed in part because all aspects of social cohesion failed at the same time - hence the stress on how to manage the transitions; examples of Siberian forest exploitation, oil/gas policy etc.

China in the next century (**Qi Wenhui**)

Prospects for socialist market-economy'; pressure on natural resources; China's position in the world economy e.g. food imports; one nation; income inequality rural-urban

African myths and futures (**Joan du Toit / Michael Ochieng Odhiambo**)

South Africa's future (the four scenarios); breaking down of territorial boundaries; impact of AIDS; evolution of democracy and sustainability.

Futures for the affluent: North America and Western Europe (who want to take this on?)

Where will affluence lead — boredom, crime, cyberspace, religion, third world support; what will aging mean; the emergence of a rentier class; changes in consumer values; alternative notions of development and in this way support a scenario for "appropriate development" in so-called less-developed regions.

Day 5, September 14, Final session

[still open — visions of workability, clear to-do mandates needed here!]

Guiding questions for the scenario construction exercise:

How will we be living and consuming: uniformity or diversity? Will, can, should consumption styles converge? Consumption styles, patterns and behavior; media, and poverty and income inequality, as factors determining consumption; the universality of the Western "modern" way?

Health and aging: how will they develop and affect societal views on fertility dynamics; determinants of

mortality; nature, effectiveness and technology of medical service sector and its relation with the economy?

Transport of people and goods: how much and how? Systems envisaged for urban transport; role of communications technology; relation with work and leisure patterns?

The development of technological and manufacturing systems: ever rising productivity, unemployment and uniformity? Global convergence in manufacturing; role of technology transfer; prospects for further resource productivity and renewables; rising labor productivity and green taxing; the role of MNCs and NGOs?

Resources systems: options and conflicts with regard to food, water and energy. Relation between market mechanism and resource [over]exploitation; probabil-

ity and desirability of technological breakthroughs and lock-ins (e.g. biotechnology); interrelationships between food, water and energy?

Institutions: how effective can and should governance be? Subsidiarity principle: what is adequate level; social stability vs. environmental sustainability and security; which roles for the nation-state (education, health, infrastructure)?

Culture: which role for country and religion in a culturally diverse world? Relation between culture and economic and technological developments; cultural diversity in a globalizing world with Internet? Scenarios for paradigm and worldview changes; for human transcendence? Descent into barbarity, ascent into sainthood, are those our only alternatives?

STEPS TO DEVELOPING SCENARIOS

by Peter Schwartz

Peter Schwartz, formerly a planner for Royal Dutch/Shell, is now president of Global Business Network. The following is excerpted from his 1991 book The Art of the Long View, Doubleday, New York. The philosophy is what Russell Ackoff — quoted in the last Bulletin — calls pro-active — trying to foresee the future and prepare for it, rather than trying to choose, influence, or co-create the future. It calls for cleverness and opportunism more than for morality or heroism. Therefore it is popular in a business context. In that context and many others, when there are larger forces beyond the control of the decision-maker, it is absolutely appropriate. The challenge is not to assume away our power over the larger forces!

Scenarios first emerged following World War II as a method for military planning. The U.S. Air Force tried to imagine what its opponents might do and to prepare alternative strategies. In the 1960s Herman Kahn, who had been part of the Air Force effort, refined scenarios as a tool for business prognostication. Scenarios reached a new dimension in the early 1970s with the work of Pierre Wack. In 1968 Wack was a planner in the London offices of Royal Dutch/Shell, in a newly formed department called Group Planning.

Pierre and the other planners were looking for events that might affect the price of oil, which had been more or less steady since World War II. Oil was seen as a strategic commodity; consuming nations would do what they could to keep the price low. But there were several significant changes in the air. The United States was beginning to exhaust its oil reserves, but American demand for oil was steadily rising. The emerging Organization of Petroleum Exporting Countries (OPEC) was showing signs of flexing its muscle.

Looking closely at the situation, Pierre realized that the Arabs *could* demand much higher prices for their oil. There was every reason they *would*. The only un-

certainty was *when*. It seemed likely to happen before 1975, when old oil price agreements were due to be renegotiated.

They wrote up two scenarios — each a complete set of stories about the future, with tables of projected prices. One story presented the conventional wisdom at Royal Dutch/Shell: somehow the oil price would stay stable. In order for that to happen a miracle would have to occur; new oil fields, for instance, might appear in non-Arab countries. The second scenario was an oil price crisis sparked by OPEC. It actually looked more plausible.

Shell's directors listened carefully as Pierre presented these two scenarios. They understood the implications; they realized that they may have to change their business drastically. Pierre waited for a change in policy, but no change came. That's when he developed his breakthrough: scenarios, as he later put it, should be "more than water on a stone." To be effective, they had to "change our managers' view of reality."

In this new type of scenario, there were no simple tales of possible futures. Instead, Pierre described the

full ramifications of possible oil price shocks. He tried to make people feel these shocks. “Prepare!” he told refiners and marketers. “You are about to become a low-growth industry!” He warned driller and explorers to get ready for the possibility that OPEC would take over their oil fields. He vividly pointed to forces in the world and what influences those forces had. He helped managers imagine the decisions they might have to make.

He was just in time. In October 1973, after the “Yom Kippur War,” there *was* an oil price shock. Of the major oil companies, only Shell was prepared emotionally for the change. During the following years, Shell’s fortunes rose. From one of the weaker of the “Seven Sisters,” it became the second largest (after Exxon) and the most profitable.

Pierre was not longer concerned with prognostication; his concern was the mind-set of decision-makers. His 1985 article in the *Harvard Business Review* was titled “The Gentle Art of Re-Perceiving.” To operate in an uncertain world, people need to be able to question their assumptions, so they can see the world more clearly. *The purpose of scenarios is to help yourself change your view of reality* — to match it more closely with reality as it is and reality as it is going to be. The end result is not an accurate picture of tomorrow but better decisions today.

Step One: Identify Focal Issue or Decision

When developing scenarios, it’s a good idea to begin “from the inside out,” with a specific decision or issue, then build out toward the environment. First what are the decisions that have to be made in your life, your company, your nation? Then what is likely to impact those decisions?

Shall we build the major capital facility now on the drawing board?
Shall we pass a carbon tax?
Shall I change careers?

Step Two: Key Forces in the Local Environment

If the identification of a focal issue or decision is the first step, then listing the key factors *influencing the success or failure* of that decision is the second step — facts about customers, suppliers, competitors, etc. What will be seen as success or failure? What are the considerations that will shape those outcomes?

Step Three: Driving Forces

The third step involves listing driving trends in the macro-environment that influence the key factors in the local environment. In addition to a checklist of social,

economic, political, environmental, and technical forces, another route to the relevant aspects of the macro-environment is the question: What are the forces behind the micro-environmental forces identified in Step Two? Some of these are predetermined (for example, demographics) and some are highly uncertain (for example, public opinion). It is very useful to know what is inevitable and necessary and what is unpredictable or still a matter of choice.

It can help to imagine oneself in the future saying, “If only I had known” that inflation would fall, or a new competitor would emerge, or regulations would change drastically. It is not hard to remember such comments in the past. What guidance do they provide for the future?

This is the most research-intensive step in the process. Research may cover markets, new technologies, political factors, economic forces, and so on. One is searching for the major trends and the trend breaks. The latter are the most difficult to find.

Step Four: Rank by Importance and Uncertainty

Next comes the ranking of key factors and driving trends on the basis of two criteria: first the degree of importance for the success of the focal issue or decision identified in step one; second the degree of uncertainty surrounding those factors and trends. The point is to identify the two or three factors that are *both* most important and most uncertain.

Step Five: Selecting Scenario Logics

The results of the ranking exercise are, in effect, the axes along which the eventual scenarios will differ. Determining these axes is one of the most important steps in the entire scenario-generating process. The goal is to end up with just a few scenarios whose difference make a difference. If the scenarios are to function as useful learning tools, they must be based on issues basic to the success of the focal decision. And the “scenario drivers” must be few in order to avoid a proliferation around every possible uncertainty. Only a few scenarios can be developed in detail, or the process dissipates.

The process for getting to those few is not simple or mechanical. It is more like playing with a set of issues until you have reshaped and regrouped them in such a way that a logic emerges and a story can be told.

Once the fundamental axes have been identified, it is useful to present them as a spectrum (along one axis) or a matrix (with two axes) or a volume (with three axes).

The logic of a given scenario will be characterized by its location in the matrix of most significant scenario drivers. For example, if an automobile company determines that fuel prices and protectionism are two important drivers, there will be four scenarios: 1) high fuel prices in a protectionist environment (domestic suppliers of small cars will have an advantage). 2) high fuel prices in a global economy (fuel-efficient imports may capture the market); 3) low fuel prices in a protectionist environment (domestic gas guzzlers will have a strong market at home but not abroad); and 4) low fuel prices in a global economy (larger cars may enjoy strong foreign markets).

The scenario will usually want to be extended to encompass more subtle issues, like the evolution of consumer markets or government regulation. The resulting scenarios may find their core of logic less in the cells of a matrix and more in the themes and plots of a story.

Step Six: Fleshing Out the Scenarios

Fleshing out the scenarios can be accomplished by returning to the lists of key factors and trends identified in steps two and three.

Each key factor or trend should be given some attention in each scenario. Sometimes it is immediately apparent which side of an uncertainty should be located in which scenario, sometimes not. If two scenarios differ over protectionist or nonprotectionist policies, then it probably makes sense to put a higher inflation rate in the protectionist scenario. It is just such connections and assumptions that scenarios should be designed to reveal.

Then weave the pieces together in the form of a narrative. How would the world get from here to there? What events might be necessary to make the end point of the scenario plausible? Are there known individuals whose ascendancy in the public eye might facilitate or help to characterize a given scenario?

Step Seven: Implications

Once the scenarios have been developed, it is time to return to the focal issue identified in step one to rehearse the future. How does the decision look in each scenario? What vulnerabilities have been revealed? Is the decision or strategy robust across all scenarios, or does it look good in only one or two of them? If a decision looks good in only one scenario, then it qualifies as a gamble — a bet-the-company strategy — especially if the company has little control over the likelihood of the required scenario coming to pass. How could that strategy be adapted to make it more robust, if the desired scenario shows signs of not happening?

Step Eight: Selection of Leading Indicators and Signposts

It is important to know as soon as possible which of several scenarios is closest to the course of history as it actually unfolds. Sometimes the direction of history is obvious, especially with regard to factors like the health of the overall economy, but sometimes the leading indicators for a given scenario can be subtle. How, for example, should one calibrate the speed of economic restructuring from a smokestack economy toward an information economy? By help-wanted advertisements for computer programmers? By union memberships? By subscriptions to indicative periodicals?

Once the scenarios have been fleshed out and their implications determined, then it's worth spending time and imagination on identifying a few indicators to monitor. If those indicators are selected creatively, you will gain a jump on knowing what the future holds and how that future is likely to affect your strategies.

The logical coherence that was built into the scenarios will allow logical implications of leading indicators to be drawn out of the scenarios.

Additional Rules of Thumb

1. *Beware of ending up with three scenarios*, though in practice we often do. People will be tempted to identify one of the three as the "middle" or "most likely" scenario and then will treat it as a single-point forecast, and all the advantages of multiple-scenario planning will be lost.
2. *Avoid having too many scenarios*. Beyond four or so, the scenarios begin to blur and lose their meaningful distinctions.
3. *Avoid assigning probabilities to scenarios*, because of the temptation to consider seriously only the scenario with the highest probability. In no case does it make sense to compare the probability of an event in one scenario against the probability of another event in another scenario, because the two events are assumed to take place in radically different environments.
4. *Pay a great deal of attention to naming your scenarios*. Names should succeed in telegraphing the logics. If the names are vivid and memorable, the scenarios will have a much better chance of making their way into the decision-making process. Because the name was so evocative, Shell's "World of Internal Contradictions" survived for more

than a decade as a useful thinking tool, even as the world changed.

5. *Those who make and implement decisions should be involved in the creation of scenarios.*
6. *A broad range of functions and viewpoints should be represented in the scenario devel-*

opment team. Look for imaginative people with open minds who can work well together.

7. *You can tell you have good scenarios when they are both plausible and surprising; when they have the power to break old stereotypes; and when the makers assume ownership of them and put them to work. Scenario making is intensely participatory, or it fails.*

IMAGING THE TOTALLY OTHER

by Elise Boulding

The following essay is excerpted from a longer one written in the early 1970s for a book called Human Futuristics, edited by Magaroh Maruyama and James Dator. Elise Boulding is an international peace activist, the former chairman of the Sociology Department at Dartmouth College, and the wife of the late economist Kenneth Boulding. Her philosophy toward the future includes the possibility of total transformation of systems and mindsets, the sudden and unexpected — to the Western mind — imposition of morality and love.

It is of some interest to examine today's futurology in the light of the work of one of the first post World War II futurologists, Fred Polak. When he sat down at his desk in The Hague to write *The Image of the Future* in 1951, he felt driven by a sense of extreme urgency to point out that the imaging capacity of the West was becoming seriously impaired. Many great European thinkers had suffered, gone underground, or died, and he himself emerged from years of hiding as a Jew in the Netherlands determined to show that young people could still dream.

At a time when the next meal was the major preoccupation of many Europeans, he called people to look to the far horizon, *to imagine the totally other*. He saw the gloom settling in Europe as a disease of the imagination, and he became concerned about the self-fulfilling quality of expectations of disaster. His book documented the role of images of the future in the development of Western civilization, tracing inputs from Sumerian, Hellenic, and Judeo-Christian sources. Then, having shown how the Renaissance, the Enlightenment, and the early industrial era had been achieved through daring breaches of time, he turned angrily to the present and held up a mirror to mid-century Europe, clinging desperately to today for fear of what tomorrow would bring.

He was angry because he saw his contemporaries failing to exercise a capacity they still had but might soon lose. Failure to imagine other and better futures would lead to endless projections of present trends, which would in the end leave society crippled.

Social planning, blueprinting, and the technological fix were not what Polak had in mind. Prediction based on extrapolation or expectable breakthroughs

were not what he meant either. In Polak's view the ideal image of the future has two elements: eschatological and utopian. The *eschatological or transcendent*, is the element that enables the visionary to breach the bonds of the cultural present and mentally encompass the possibility of a totally other type of society. ["Eschatology," from the Greek *eschatos*, "last, farthest," means "a branch of theology concerned with final events in the history of the world or of mankind."] The *totally other* is, of course, not conceivable, but this term (an exact translation of the Dutch) is used because it emphasizes the notion of discontinuity as a key aspect of dynamic social change. It is clear that a society with an eschatological outlook, one that conceives the possibility, even the desirability, of drastic social change, is very different from a society that seeks familiar tomorrows.

The second element in Polak's ideal image of the future is the *utopian or imminent* element, which designates humans as co-partners with nature or God in the shaping of the Other.

Polak suggests that the Judaic image of the future was an ideal embodiment of these twin elements. The conception of the Covenant, a bonding between humanity and the supernatural, held man responsible for creating the new Zion out of the dusty materials of planet earth. Paradise was to be nowhere but here. But man had instructions, and he had to listen carefully to get them right. If he didn't, the deal was off, the Covenant broken. It was the character of the instructions that set a handful of nomads apart from their fellow-tribes in Syria-Palestine.

The delicately balanced concept of the relationship between immanence and transcendence, man and the

supernatural, has never lasted for long, through it has reappeared from time to time in the history of the West. Either God was taking care of everything and man had but to go along, or everything was up to man and he'd better get on with it. Furthermore, societies have alternated between optimistic and pessimistic views of the nature of reality. Four modes of imagining the future emerge from the combinations of these possible attitudes:

1. *Essence optimism and influence optimism.*
The world is good and humans can make it even better.
2. *Essence optimism and influence pessimism.*
The world is good, but it goes by itself and humanity cannot alter the course of events.
3. *Essence pessimism and influence optimism.*
The world is bad but humans can make it better.
4. *Essence pessimism and influence pessimism.* The world is bad and there isn't a damn thing we can do about it.

Clearly a society suffering from both essence and influence pessimism will not generate any dynamic images of the future. Social paralysis will lead to the death of that society, according to Polak. The most dynamic society is one with both essence and influence optimism, and if the image has eschatological elements, a sense of the possibility of breakthrough to a totally new order, this adds to the dynamism. These eschatological elements always present a danger, however, in that there is a tendency to spiritualize the other reality and think of it as realizable only in heaven or an afterlife or somewhere else not of this world. That is what happened to Christianity.

It is Polak's contention that the capacity to image the future is a core capacity in any culture. It is manifested in every aspect of that culture. Therefore a decline in the ability to envision totally other "realities," a compressing of the mental perceptions of time and space into the here and now, will be revealed not only in the literature of an era, but also in its art, architecture, poetry and music, in its science and philosophy, and in its religion. Polak documents this decline in the twentieth century. The predominantly Orwellian tone of twentieth century fiction is his most damaging evidence.

What went wrong? The rate of change itself is usually seen as the culprit. Whether or not the human imagination can adapt itself to reconceptualizing reality as fast as reality changes in this century of exponential growth is a subject for debate. An element usually left out of the debate, however, is the disappearance of the eschatological sense of a totally other order of reality.

Polak points out that the utopian and eschatological modes are symbiotic; either without the other goes into decline. Once the eschatological otherness of images of the future was weeded out, utopias themselves came to be conceived as static images of a boring end-state.

A true utopia is not static, however, but historically relative. Polak says:

It carries within itself the seeds of its own elimination through progress in time. The vision which it holds up of the best conceivable future at any given time is by definition a vision subject to change, and utopias do change, both in form and content, with the course of history.

The social planners and systems designers, the brainstormers and technocratic futurists all operate within a cultural frame of reference that involves a world-wide extension of Western socio-economic and political developments. The most far-out changes they expect, apart from the usual technical projections of innovations in communication, transportation, and general productivity, are things like the extension of human life expectancy beyond 150 years, or interstellar travel.

Three concepts missing from their projections are:

1. The possibility of a totally other path to decent physical levels of living, by-passing the Western sequence of technological development, probably pioneered by the third world.
2. The possibility that the West will choke on its industrial effluence and will become a student of more modest third-world technologies.
3. Spiritual breakthroughs in developing the human capacity to love, which will lead to totally different cultural values and socio-economic patterns.

There are signs that a creative minority is climbing out of this century's pessimism concerning the nature of reality and human capacity. The discovery that the Colossus of Technology has feet of clay has encouraged creative thinking about alternatives among people who until recently felt oppressed and paralyzed by technology-based lifestyles. Furthermore, the cultural heritage of millennialism leads to a widespread feeling of hope that rounding the bend of this last thousand-year cycle will usher in a new and better era.

And perhaps it will.

IMAGES OF THE TOTALLY OTHER FROM SCIENCE FICTION

compiled by Dana Meadows

If, as Elise Boulding says above, the ability to imagine the “totally other” is an indicator of a flexible, free, and resilient culture, then the fiction writers who imagine utopias and dystopias, nearly always displaced from us in time and often also in space, make more of a cultural contribution than they are usually credited for. Here are a few of my favorite excerpts from “science fiction” books from my own culture — some of them 60 years old. These “scenarios” cause me to wonder: From where do we draw images of the “totally other”? What do those images say about the culture that formed us? What do they say about the writers? Or about imaginations, fears, and longings that could never be captured in an official government forecast — or a computer model?

Please send your favorite examples for the next Bulletin.

Islandia by Austin Tappan Wright, New York, Farrar & Rinehart, 1942.

“We ought to cut down those birches,” young Stellin remarked.

“Not at all!” said Stellina with a curious eagerness.

They argued a little, and I found that what interested them was the effect upon a certain view, rather than the value of the wood. They were in exact agreement as to the end to be obtained, though differing as to the means, and that end was the intrusion upon a spacious composition of a complex tangle in the foreground. It came to me quite suddenly that they looked upon their whole farm as a great living canvas, whose picture changed from moment to moment and hour to hour and to which they as artists made only little changes from time to time; for the larger picture was painted mostly by nature and by generations of Stellins before them.

It was strange that I had to be in Islandia eight months before I learned that no farmer merely farms but is an artist in landscape architecture as well, of course with greatly varying skill. That morning and all during lunch I questioned my hosts, and I learned.

“At home,” I said, “a farmer plants things where he thinks they will grow best.”

“So do we.”

Foundation by Isaac Asimov, Street and Smith, 1951

“Observe.” Seldon removed his calculator pad from the pouch at his belt. Its gray, glossy finish was worn by use. Seldon’s nimble fingers, spotted now with age, played along the hard plastic that rimmed it. Red symbols glowed out from the gray.

He said, “That represents the condition of the Empire at present.”

He waited.

“But you also consider how the field will look when they first come up through the earth, and when they are full grown — “

“And when they are dead and when they are stubble.”

“Which consideration is the most important?” I asked. But they could not tell me.

I told them how men at home ruined lovely views by unsightly structures. It never occurred to anyone that an ordinary view was worth saving when put into competition with a commercial interest.

They smiled.

That afternoon young Stellin took me for a hard walk. We returned tired, both of us. He told me so much about the principles upon which crops were planted, fields changed from pasture to meadow, and wood cut, that I felt as through I had been to school. The art in which I was instructed was neither agriculture nor architecture, but a combination of both; and the Islandian word connotes both, just as the word “agriculture” does, if one stresses a certain meaning in the last two syllable.”

Gaal said finally, “Surely that is not a complete representation.”

“No, not complete,” said Seldon. “I am glad you do not accept my word blindly. However, this is an approximation which will serve to demonstrate the proposition. Will you accept that?”

“Subject to my later verification of the derivation of the function, yes,” Gaal was carefully avoiding a pos-

sible trap.

“Good. Add to this the known probability of Imperial assassination, viceregal revolt, the contemporary recurrence of periods of economic depression, the declining rate of planetary explorations, the ...”

He proceeded. As each item was mentioned, new symbols sprang to life at his touch and melted into the basic function, which expanded and changed.

Gaal stopped him only once. “I don’t see the validity of that set-transformation.”

Seldon repeated it more slowly.

Gaal said, “But that is done by way of a forbidden socio-operation.”

“Good. You are quick, but not yet quick enough. It is not forbidden in this connection. Let me do it by expansions.”

The procedure was much longer and at its end Gaal said, “Yes, I see now.”

Finally Seldon stopped. “This is Trantor five centuries from now. How do you interpret that? Eh?” He put his head to one side and waited.

Gaal said unbelievably, “Total destruction! But ...

but that is impossible. Trantor has never been...”

Seldon was filled with intense excitement. “Come, come. You saw how the result was arrived at. Put it into words. Forget the symbolism for a moment.”

Gaal said, “As Trantor becomes more specialized, it becomes more vulnerable, less able to defend itself. Further, as it becomes more and more the administrative center of Empire, it becomes a greater prize. As the Imperial succession becomes more and more uncertain and the feuds among the great families more rampant, social responsibility disappears.”

“Enough. And what of the numerical probability of total destruction within five centuries?”

“I couldn’t tell.”

“Surely you can perform a field-differentiation?”

Gaal felt himself under pressure. He was not offered the calculator pad. He calculated furiously and felt his forehead grow slick with sweat.

He said, “About 85%”

“Not bad,” said Seldon, thrusting out a lower lip, “but not good. The actual figure is 92.5%.”

Stranger in a Strange Land by Robert Heinlein, G. P. Putnam’s Sons, New York, 1961.

“Yes, but Martian is so much more complex than English — and so wildly different in how it abstracts its picture of the universe. An Englishman and an Arab can learn to think in each other’s language. But I’m not certain that it will ever be possible for us to think in Martian.”

“Take this word ‘grok.’ Its literal meaning, one which I suspect goes back to the origin of the Martian race as thinking creatures — and which throws light on their whole ‘map’ — is easy. ‘Grok’ means ‘to drink.’”

“Huh?” said Jubal. “Mike never says ‘grok’ when he’s just talking about drinking. He —”

“Just a moment.” Mahmoud spoke to Mike in Martian.

Mike looked faintly surprised. “‘Grok’ is drink,” he said.

“But Mike would have agreed,” Mahmoud went on, “if I had named a hundred other English words, words which we think of as different concepts, even antithetical concepts. ‘Grok’ means all of these. It means ‘fear,’ it means ‘love,’ it means ‘hate’ — proper hate, for by the Martian ‘map’ you cannot hate anything unless you ‘grok’ it, understand it so thoroughly that you merge with it and it merges with you — then you can hate.”

Mahmoud screwed up his face. “‘Grok’ means ‘identically equal.’ The human cliché ‘This hurts me worse than it hurts you’ has a Martian flavor. The Martians seem to know instinctively what we learned painfully from modern physics, that observer interacts with observed through the process of observation. ‘Grok’ means to understand so thoroughly that the observer becomes a part of the observed — to merge, blend, intermarry, lose identity in experience. It means almost everything that we mean by religion, philosophy, and science — and it means as little to us as color means to a blind man.”

The Dispossessed by Ursula LeGuin, Harper & Row, New York, 1974.

Ini and Aevi were entranced by his description of a curriculum that included farming, carpentry, sewage reclamation, printing, plumbing, roadmending, playwriting, and all the other occupations of the adult community, and by his admission that nobody was ever punished for anything.

“Though sometimes,” he said, “they make you go away by yourself for awhile.”

“But what,” Oiie said abruptly, “what keeps people in order? Why don’t they rob and murder each other?”

“Nobody owns anything to rob. If you want things, you take them from the depository. As for violence, would you murder me, ordinarily? And if you felt like it, would a law against it stop you? Coercion is the least effective means of obtaining order.”

“All right, but how do you get people to do the dirty work?”

“What dirty work?” asked Oiie’s wife, not following.

“Garbage collecting, grave digging,” Oiie said; Shevek added, “Mercury mining.”

“Well, we all do them. But nobody has to do them for very long, unless he likes the work. One day in

each decade the community management committee can ask you to join in such work; they make rotating lists. Then the disagreeable work postings, like the mercury mines, normally they’re for one-half year only.”

“But then the whole personnel must consist of people just learning the job.”

“Yes. It’s not efficient. But what else is to be done? You can’t tell someone to work all his life on a dangerous or hateful job. Why should he do that?”

“But then why do people do the dirty work at all? Why do they even accept the one-day-in-ten jobs?”

“Because they are done together. And other reasons. You know, life on Anarres isn’t rich, as it is here. In the little communities there is a lot of work to be done. So if you work at a mechanical loom mostly, it’s pleasant every tenth day to go outside and lay a pipe or plow a field with a different group of people. And then there is challenge. Here you think the incentive to work is money or profit, but where there’s no money, like on Anarres, the real motives are clearer maybe. People like to do things. They like to do them well. People take the hard, dangerous jobs because they take pride in doing them. After all, work is done for work’s sake. It is the lasting pleasure of life. There is no other reward on Anarres, no other law. One’s own pleasure and the respect of one’s fellows. That is all.”

Ecotopia by Ernest Callenbach, Banyan Tree Books, Berkeley, California, 1975.

I checked my bag and set out to explore a bit. The first shock hit me the moment I stepped out onto the street. There was a strange hush over everything. I expected to encounter something at least a little like the exciting bustle of our cities — cars honking, taxis swooping, clots of people pushing about in the hurry of urban life. What I found was that Market Street, once a mighty boulevard, has become a mall planted with thousands of trees. The “street,” on which electric taxis, minibuses, and delivery carts purr along, has shrunk to a two-lane affair. The remaining space, which is huge, is occupied by bicycle lanes, fountains, sculptures, kiosks, and absurd little gardens surrounded by benches. Over it all hangs the almost sinister quiet, punctuated by the whirl of bicycles and cries of children. There is even the occasional sound of a bird, unbelievable as that may seem on a capital city’s crowded streets.

The bucolic atmosphere of the new San Francisco can perhaps best be seen in the fact that, down Market Street and some other streets, creeks now run. These had earlier, at great expense, been put into huge cul-

verts underground, as is usual in cities. The Ecotopians spent even more to bring them up to ground level again. So now on this major boulevard you may see a charming series of little falls, with water gurgling and splashing and channels lined with rocks, trees, bamboos, ferns. There even seem to be minnows in the water — though how they are kept safe from marauding children and cats, I cannot guess.

Despite the quiet, the streets are full of people. Since practically the whole street area is “sidewalk,” nobody worries about obstructions — or about the potholes, which, as they develop in the pavement, are planted with flowers. I came across a group of street musicians playing Bach, with a harpsichord and half a dozen other instruments. There are food vendors pushing gaily colored carts that offer hot snacks, chestnuts, ice cream. Once I saw a juggler and magician, working a crowd of children — it reminded me of some medieval movie. There are many strollers, gawkers and loiterers, people who simply take the street for granted as an extension of their living rooms. Yet the Ecotopian streets seem

ridiculously lacking in security gates, doormen, guards, or other precautions against crime.

Ecotopians setting out to go more than a block or two usually pick up one of the white-painted bicycles that lie about the streets by the hundreds and are available free to all. Dispersed by the movements of citizens during the day, they are returned by night crews to the places where they will be needed the next day. When I remarked to a friendly pedestrian that this system must

be a joy to thieves and vandals, he denied it heatedly. He then put a case that it is cheaper to lose a few bicycles than to provide more taxis or minibuses.

Ecotopians, I am discovering, spout statistics on such questions with reckless abandon. They have a way of introducing “social costs” into their calculations. It would be interesting to confront such informants with one of our hard-headed experts from our auto or highway industries — who would, of course, be horrified by the Ecotopians’ abolition of cars.

Earth by David Brin, Bantam Books, New York, 1990.

Each of the allies had its own reason for entering the bloody conflict now variously known as the “Helvetian War,” the “Secrecy War,” and the “Last-We-Hope” — perhaps the most bizarre and furious armed struggle of all time.

A leading factor in the industrial north was the laundering of profits for drug merchants and tax cheaters. Overburdened with TwenCen debt, citizens of America and Pan-Europe demanded those groups at least pay their fair share, and resented the banking gnomes for sheltering criminals’ ill-gotten gains.

International banking secrecy was even more hated in the developing world. Those nations’ awesome debts were aggravated by “capital flight,” whereby leading citizens had for generations smuggled mountains of cash to safe havens overseas. Nations like Venezuela, Zaire, and the Philippines tried to recover billions removed by former ruling elites, to no avail. Eventually a consortium of restored democracies stopped railing at their ex-dictators and instead turned their ire on the banking havens themselves.

Still, neither taxpayer outrage up north nor cash starvation in the south would have been enough to drive the world to such a desperate, unlikely confrontation were it not for two added factors — a change in morality and the burgeoning Information Age.

Those were the days of the great arms talks, when mutual, on-site inspection was seen as the only possible way to ensure de-escalation. As each round of weapons reduction raised the verification ante, the interna-

tional corps of inspectors became sacrosanct. Words like “secrecy” and “concealment” began taking on their modern, obscene connotations.

To increasing numbers of children of century twenty-one the mere idea of secrecy implied scheming dishonesty. Their wrath soon turned against the one remaining power center in which secrecy was paramount and unrepentant. By the time the members of the Brazzaville Consortium gathered to write their final ultimatum, they were no longer in a mood for compromise. Belated conciliatory words broadcast from Bern and Nassau and Vaduz were too little and far too late to stifle the new battle cry. “Open the books. All of them. Now!”

Knowing what we do now about what lay buried under the Glarus Alps, most agree that the allies’ only mistake was not declaring war sooner. In any event, by the second year of fighting, mercy was hardly on anyone’s agenda any more.

Sleep little children, you be good,
Do your chores just like you should.
Eat your food now, clean your plate,
Poor kids dream of getting what you ate.
Play square always, don’t tell lies,
‘Cause secret-keepers always die,
Grumbling and all alone,
Underground just like a Gnome.
Do you like money? Just you know,
Some types help, while others glow.
Earth-Bonds serve us all our days,
But Swiss gold gives off gamma rays.

A HOT TEN WINTER DAYS IN KYOTO

A Personal View on the United Nations Framework Convention on Climate Change

by Haruki Tsuchiya

Haruki wrote this account for the Journal of Energy for Sustainable Development.

The delegates of 161 countries gathered in the Kyoto International Conference Center for COP3, the 3rd Session of the Conference of Parties for the United Nations Framework Convention on Climate Change, 1st to 10th December, 1997.

The purpose of COP3 was to reach a legally binding agreement to decrease greenhouse gas emission in 2010 from the 1990 level to mitigate global warming. We came knowing that if the conference was successful, it would be a historical milestone to end the limitless expansion of human activities in 20th century. Future generations will remember Kyoto 1997 forever. But if our generation continues to enjoy a convenient and comfortable life style and continues to emit greenhouse gases, our grandchildren will have a severe climate change on a global scale, as was suggested in the 2nd report of the IPCC (Intergovernmental Panel for Climate Change) issued at the end of 1995. They will look back and say, "why did you waste that opportunity at Kyoto?"

Every country emits greenhouse gases. But the historical record shows that the developed countries should have the major responsibility for this problem. Therefore it was commonly recognized that the developing countries would not be burdened by any duty as a result of this conference.

The reduction strategies

There were various kinds of green gas reduction policies favored by the participants. The most radical proposal was from the AOSIS (Alliance of Small Island States), which wanted to reduce greenhouse gas emissions by 20% from 1990 levels by the year 2005. Their lands are threatened by sea level rise caused by global warming. They have good reasons to be the most radical.

The EU (Europe Union) proposed to decrease emission gases by 15% in 2010 from the 1990 level. This was called as the EU Bubble. England would reduce emissions by moving to natural gas, and Germany would improve the inefficient ex-East Germany area. Portugal and Greece would be permitted to increase emissions for their economic growth. Europe is a mature society, and it seemed that the strong promotion toward European Unification also acted as driving force to make

global climate policy together. If they could agree on abating global warming together, it looks like a good sign of unification.

The United States proposed a zero per cent reduction, that is, to emit greenhouse gases (GHGs) in 2010 at the same level as in 1990. The US Congress also declared that they would not participate in any Kyoto Protocol, if the developing countries do not have any duties. Albert Gore, the vice president of the United States, suddenly decided to attend the conference just a week before the beginning of COP3. He is known as an environmental-based politician and was expected to play a key role in COP3. But nobody knew what he would do in Kyoto.

The Japanese Government was assigned to chair the conference. It proposed a global decrease of 5% in 2010 from the 1990 level with "differentiated conditions" — countries with high economic growth or high population growth would be permitted more emissions. That would have made the real reduction rate for Japan 2.5% for a mixture of three GHGs, and the reduction rate for CO₂ was estimated as only 0.5%.

The role of the NGOs

The main negotiations were done in the main building. The NGOs and the press were in the annex building, connected to the main building by a bridge over a creek. The environmental NGOs are known for their professional knowledge and powerful lobbying activities. Especially in the case of international conferences, they play an important role of communicators among governments.

The annex building was like an 8-story gymnasium. The world wide press occupied a hundred or more desks with many small computers. It was like a scene from the Olympic Games. There were also desks for NGOs. Greenpeace, the World Wide Fund for Nature (WWF) and the Kiko Forum (Japanese Alliance of Environmental Organizations) and others had their own booths in the annex building.

Technical jargon

All international negotiations look and talk like disarmament negotiations, full of technical jargons. The

“Basket Approach” was to treat many greenhouse gases such as CO₂, methane, N₂O, SF₆, and others together. The “Net Approach” was to include sinks such as trees as absorbing factors. “JUSSCANZ” was the abbreviation for the countries that proposed modest gas reduction rates — Japan, US, Swiss, Canada, Australia, Norway, and New Zealand. These countries were suspected of being eager to buy the “Hot Air”, the ghost emission gases, the reductions already realized by the “Transition Economy Countries” of Central Europe — reductions caused by the collapse of their economies.

“Budgeting or Banking” meant allowing a country to emit gases in one term, if it had accomplished excess reduction during a previous term. “Borrowing” was the idea that a country that did not succeed in reduction in the first term would be able to borrow some reduction from the next term. (In human society borrowing sometimes does not work.) “Emission trade” meant to deal with emission rights between countries.

This technical jargon shows how hard they worked to invent clever possibilities for emitting more or for keeping present levels of emission.

The ministers’ meeting

December 8 was the highlight day. Until then the conference focused on trivialities, and it seemed that COP3 would reach no conclusions.

At 10 in the morning of December 8 the High Level Segment of Ministers and other Heads of Delegations started meeting in the Main Hall. The annex building was filled with NGO and press people, who gathered to watch several TV screens conveying pictures from Main Hall.

Chairman Ooki, the Minister of the Japanese Environment Agency declared the beginning of the meeting. The prime minister of Japan, Rhutaro Hashimoto, gave the first speech, but it said nothing concrete on the numerical reduction targets. The president of Costa Rica followed. Then the president of the Republic of Nauru started his speech. “Our land is a small island only 2 meters above the sea. Already our land has become a rubble by mining of phosphate. Our backyard is ruined. And now on the front side the sea is coming up because of global warming. We can not go forward or backward. We hold our breaths to listen into what Vice President Gore is going to say.”

It was a surprise attack. Nobody was ready to hear such a speech. There came big applause. The words from the president of the Republic of Nauru grasped the heart of the audience. And then Vice President Gore began his speech.

Gore spoke just like a physics professor. He said that if the present trend continues, then the CO₂ emissions of the US would be 30% more in 2010 than in 1990, but that the US would be willing to reduce that CO₂ emission increase to zero per cent. Suddenly the annex building was filled with disappointment, because this was the same position offered by the US delegate before the conference began. It seemed nothing new would happen. Gore continued. “I talked with President Clinton by telephone last night. I suggested our negotiation team could show increased flexibility, if the basket approach and the net approach are included and if the participation of developing countries and emission trading are taken into account.” The annex building filled with roaring. There was a desperate atmosphere. Nothing would happen any more. The COP3 would be a failure.

The NGO delegates stood in line in front of their booths and conducted TV interviews. They spoke their criticism to the TV cameras. One person showed a leather attache case open with the poster written “Nothing,” which meant Gore brought nothing in his bag. The speeches by the delegates continued in the main hall. The rest of the country delegates expressed their opinions; it was a planned ceremony by the 161 countries. No one in the annex building looked at the TV screens any more. The press was typing and sending the news to their own countries. The building was filled with sound of tapping keyboards.

I remembered the word “flexibility” still sounding in my ears. Gore did not explain what that word meant. He caused a gust of wind and returned home.

Negotiations

Estrada, the chairman of the whole meeting, led the discussions in the Main Hall. Those who did not have authorized name plates could not enter the hall. It was guarded under strict control.

On the 9th there came some advancement. The US agreed to 3 - 4% reductions. It was a sign that the negotiators were succeeding in widening the framework of reduction conditions. On the 10th, the last scheduled day of COP3, the number went up to 5% for the USA. It was written in newspapers later that the US officials talked over the numbers with Japanese government. Gore spoke by international telephone from the US to Hashimoto and told him to raise the number by 1% from the original 5%, in order to accomplish the Kyoto protocol. The Japanese Prime Minister agreed with it finally.

They had no more time on the last day. Approaching the time limit, midnight on the 10th, the conference could not reach any conclusions. They still discussed

the details. Near midnight they decided that they could stop the clock and continue. So the conference continued until the afternoon of the next day. Finally the Kyoto protocol was agreed upon around two in the afternoon on the 11th.

The Kyoto Protocol

The main points of the Kyoto protocol are as follows:

- 1) Average 5.2 % reduction for developed countries. 8% for EU, 7% for USA, and 6% for Canada and Japan. Target numbers were determined for all the developed countries.
- 2) Basket approach. Included gases are CO₂, CH₄, N₂O, HFC, PFC, and SF₆.
- 3) Net approach is allowed.
- 4) Target years are 5 years from 2008 to 2012.
- 5) Banking is allowed. But borrowing is not.

6) Combined agreements by more than two countries are allowed to reduce gas emission together, like the EU bubble.

7) Emission trading is allowed among the developed countries.

The gas emission reduction targets are much lower than those required to stabilize the atmosphere, according to the IPCC 2nd report. There are many loopholes. The details will be discussed in COP4 in Buenos Aires, November 1998. When we are thinking of reduction numbers, our brain cells become upset and we think not how much we can reduce gases, but how much we can emit gases. If we want seriously to stop global warming, the protocol is far from enough. It is only the beginning of a direction change.

However the Kyoto protocol was concluded and this work will be remembered as an example of human wisdom to stop the expanding relentless activities of mankind — just three years before entering the 21st century.

It was an impressive conference. It took 25 years to reach the Kyoto protocol since the publications of *The Limits to Growth* in 1972.

MINGLED YARN

A Maniacal Naturalist Wanders Through Complex Webs.

by Peter Warshall

Indra's divine web, the first written web-story in human history, appears like this:

Far away in the heavenly abode of the great god Indra, there is a wonderful net that stretches out infinitely in all directions. ..The artificer has hung a single jewel in each "eye" of the net, and since the net itself is infinite, the jewels are infinite in number....If we now arbitrarily select one of these jewels for inspection and look closely at it, we will discover that on its polished surface there are reflected all the other jewels of the net, infinite in number. Not only that, but each of the jewels reflected in this one jewel is also reflecting all the other jewels....

Webs image patterns of movement, mental or physical. Sometimes webs are called nets. Webs or nets, both shimmer with entrapment of fish, spider food, slaves or electronic pulses. Webs and nets are patterns constructed of links between points. The links go by varied labels: strings, chains, filaments, threads, or metaphors. Threads of webs tend to lattice, knot, crisscross and loop. In some knitting and embroidery fabrics, on telecom wafers, and in food chains, the pattern includes backwards and forwards "jump" links. Many chains include devices or organisms at their "eyes" like a charm bracelet. Webs often channel non-linear flows of food, energy, water, spirit or information.

Threads and their webs always portray unstable interpretations of reality and its illusions. Indra's web tells the perfect story of the impossibility of "seeing" or mentally grasping the complete web.

But, don't conclude that all webs are mere images. In everyday life, webs can mean life or death. A desktop computer, for instance, is but one of 2.4 billion computers in an eye of the telecommunications web. If we start at the manufacturing point in the computer's chain-of-custody, more than 700 compounds from other industrial chains link at the workstation (see box). During manufacture, semiconductor workers experience illness rates three times higher than in other industries. Women who work in fabrication rooms have rates of miscarriage 40% above non-manufacturing workers. In Silicon Valley, 24 of the 29 Superfund sites owe their existence to high tech companies.

After breakdown or replacement, the US disposes of 12 million personal computers and 10 million TV sets each year (about 300,000 tons of electronic junk). Dead computers go to parts recyclers (about 3% of the waste stream) and then, especially on the West coast, the remainder travels to China, where it is burned emitting toxics such as dioxin and benzene.

These are not legal emissions in the US and, with worldwide mobility, the resistant organochlorides can come back to haunt us.

The chain-of-custody web tells the story of harm to the Earth, pain and suffering to worker families, and tax subsidies for clean-ups. Among the most important moral questions of our time is: how far does our sense of responsibility extend outward from a product found in the eco-industrial web? and how can business create lines of responsibility along this charm bracelet of link-ages?

Because webs are part physical and sensual, and part imaginative, they can become vivid mental traps, especially ensnaring those who design them. Webs seduce with a shimmering power. Hear ye nerds that toy with nets! Beware mesmerized cyberholics! At least, that is how the Navajo explain the web in Spider Woman stories. She gave the Navajo nets and weaving (the web of warp and woof) as well as all the ill and good that accompany such a gift. Songs and stories praise her. But, sometimes, caught up in evil embroidery, humans must subdue her and flee from her alluring devices. Spider Woman is not unkind. She also gave the original Twins a bundle of talking prayer-sticks (sometimes called "life feathers"). They help unravel fabricated evil, so that good can be re-woven in its place.

An Eight-Inch Computer Chip Wafer...

... Consumes:

- * 4,267 cubic feet of bulk gases
- * 27 pounds of chemicals
- * 3,787 gallons of water
- * 3,023 gallons of de-ionized water

... Produces:

- * 9 pounds of hazardous solid waste
- * 29 cubic feet of hazardous waste gases

The web of our life is of a mingled yarn, good and ill together.

— Shakespeare, *All's Well That Ends Well*

Webs become part of a collective consciousness. In Medieval times, when a rooster laid an egg (a genetic aberration but it does happen), European society punished the rooster. The egg was dangerous: its yolk an ingredient in witch's ointments, and its egg the container of the basilisk or cockatrice (a venomous animal). In Basel, the courts condemned these heinous roosters to be burned alive. In China, there were no laws against egg-laying roosters. The Chinese believed in a natural order. The rooster's egg was a misfortune and foreboding for the Great Pattern. The egg was a sign that the triangle (Humans, Heaven and Earth) had gone out of balance.

These two different societal views of the life's webbing led to two different actions. The European mental web chartered its course through lines of law, based on what God had deemed right and proper for each and every animal. European courts punished the specific organism as if to undo a knitting mistake. In China, to counteract the rooster's egg, citizens looked to the emperor or provincial governor to reorganize society's webbing.

In post-modern times, the tendency to create illusionary causal networks remains strong. In the Pacific Northwest, the "witchcraft" crowd sports bumper-stickers: "Spotted Owls Taste Better Than Chicken;" while the "natural order" crowd blames Clinton/Gore for their failure to restore harmony to old-growth forest. Mind webbing can get truly scary: Nazi science linked Aryan genes to superiority and then ethnic cleansing. Recently *Whole Earth* magazine's mailbox received a tsunami of books on business organization, each purporting to "see the web or network" as it really is, and to supply sage advice on how to restore productivity and harmony to corporate life. We received a smaller storm of books on sustainability, and building just and compassionate webs for grassroots globalists.

Webs of the maniacal naturalist

Where I live, in the desert, allegedly a poor environment for animals, a typical food chain might go like this: golden eagles eat kit foxes who eat burrowing owls who eat ground squirrels who eat lizards who eat giant hairy scorpions who eat windscorpions who eat bark scorpions who eat *Mimetus* spiders who eat *Streatoda* spiders who eat comb-footed spiders who eat antlions who eat ants who eat termites who eat dead plant matter. From personal observation, from chatting with other maniacal naturalists, and from reading incredibly staid prose in journals, I slowly try to weave biotic chains and lattices. A caricature, a cartoon, of the community web eventually emerges.

Most naturalists recognize four types of thread/web complexity — intricate, involved, tangled and time-line.

Intricate Complexity

Intricate complexity occurs when there are hard to follow asymmetrical loops, loops-within-loops, and back looping of the "threads." This is the complexity for fans of *The Ashley Book of Knots*.

Golden eagles, for instance, can be cannibals, a kind of back-loop in which the consumer and producer merge. Older nestlings turn on younger nestlings and, when food shortages occur, kill and eat them. Many spiders, windscorpions, scorpions, and antelope ground squirrels thrive on cannibal loops. Closed loop cannibalism is like cyber-thievery by employees. It thwarts any tidy grillwork-diagram of organizational pattern.

[Figure goes here]

Trophic interactions involving a few of the 96 vertebrates that are resident in the Coachella Valley, Riverside County, California. No top predator exists in this subweb or within the Coachella Valley. An arrow returning to a taxon indicates cannibalism. A double headed arrow indicates looping via mutual predation. The bottom of this subweb is simplified.

Adult gopher snakes may hunt down and swallow burrowing owl eggs, while the adult burrowing owl hunts and eats young gopher snakes. A black widow spider catches three species of scorpion by using its web silk to lasso and pull them off the ground. The same scorpions capture the black widow, should it travel cross country. Creatures switch roles in these Möbius-strip, inter-species loops called “mutual predation.”

A coyote chomps down a dead rabbit and gets a tape-worm for free. The predator consumes its prey and becomes prey in the same event. A loop forms within a loop.

Vegetarian flea larva thrive on nesting material collected by mom coyote. The flea larvae then transform into adult fleas who blood-suck the mom that provided for them as children. The coyote fleas themselves are parasitized by mites (hyper-parasites).

Certain Diptera flies track down and steal the paralyzed victims of spiders. The “kleptoparasites” participate in an odd food chain event, often cartooned like a loop of predator/prey consumption, although the fly stole the flesh and did not kill it.

Intricate complexity is not universal. Chains-of-custody, for instance, within the wood products industry are intricate, but they are pretty straightforward in the energy industry.

Involved Complexity

Involved complexity arises when a single device, creature or event at an “eye” of the web has multiple properties or possibilities. The “Chinese box-within-boxes” or, to use the fancy lingo of in-machine model-makers, aggregate co-mingling or nested components are examples of involved complexity.

Termites, for instance, nurture an ecosystem in their guts. This invisible ecosystem of thousands of microbes breaks down the “indigestible” cellulose of plants that is unavailable to other herbivores. A complete image of the food web would not lump the microbes under the word “termite” but would cartoon the microbial web as a “subweb” within the termite’s web.

Exterminators clearly see the two ecosystems. They try to tempt termites to eat poisons that will wipe out their inner ecosystem. They need a Trojan horse to penetrate the enemy’s defenses.

Involved complexity also occurs when one package of protoplasm can be substituted for another, so that many paths for consumption and production radiate out from a single species. A rattlesnake can substitute three mice for one ground squirrel. We don’t get too emo-

tionally involved in the mice/squirrel substitution. But in market systems, there have been heated arguments about substituting steel studs for wood studs or, in Japan, plastic combs for turtle shell combs. At each intersection in the market system, substitutions raise important human issues of efficiency, materials and morality (e.g., what materials will do less harm to worker or consumer health).

Tangled Complexity

The naturalist doesn’t have the luxury of stable webs with predictable events. The events of nature take place in patches and during hard-to-predict encounter-events. Unraveling and raveling, Lady Luck plays an important and permanent role. The random twists of fate and stochastic encounters of the thread ends is the third type of network complexity: *tangled complexity*.

A goshawk perching at just the opportune moment and on just the right branch spots fledgling squirrels leaving their nest. The sunlight casts a shadow that hides the still bird from their watchful mother. But, an unexpected upslope wind shifts the goshawk just slightly in its stoop, and the targeted young scurries under a fallen log.

Tangled, involved and intricate complexities are major ingredients of nature contemplation — that stunning, grand melange of senses and purposes, movements, and emerging/dissolving patterning. The sensuousness comes from the way webs communicate by multi-media. The elk bugles. The moth releases a perfume into the calm night atmosphere. The thrush sings. The female squirrel drips her scent so the guys won’t forget to find her. The loon scouts for shimmering lakes on which to splash down. Migratory creatures jump ecosystems and live within multiple webs.

Time-Scale Complexity

Our survey ends with *strands of time complexity* (also called *rate-change* and *time-scale* complexity). Every web has a time-frame and driving forces that animate sub-webs or the whole web at special moments. Days, seasons, years or decades frame time-dependent webs.

Here in the desert, for instance, rain storms animate food webs in pulses. A single storm can trigger the flight of termites. During the next week, the whole food web eats winged termites. When the week ends, the web re-organizes to other resources. On a human scale, the California Gold Rush was a typical economic feeding frenzy.

Historical chronologies cartoon these invisible “strands of time” into purely mental memories of events

(e.g., the Boston Tea Party led to the Revolution). Websters ask how stable or real are these “threads” that tie two events together? Will the goshawk return to the same branch? Do the young squirrels always return to the same nesting hole? Is the goshawk/squirrel link stable? Or, in two to four weeks, when the juvenile squirrels wander off by themselves and the perch becomes useless, will the predator/prey thread become a mental memory that will not have active meaning until next year’s birthing? Over time, how persistent is the “thread?”

The Web That Weaves Itself

Engineers struggle mightily to design simple webs (“flow diagrams”) to shield machines or factories from reacting to weather changes, accidents, human error or component failure. Engineers prefer predictability — safety-nets, just-in-time deliveries, the shortest chain. No naturalist is surprised when operations fail at Three Mile Island or Bhopal or Chernobyl. Despite flow diagrams, these were classic cases of intricate, involved and tangled webs that overwhelmed human abilities to discern and navigate .

Contrast the engineer’s web with the Great Pattern, Gaia’s flow diagram which weaves and unweaves itself. Global warming melts glaciers which exposes more land on which peat bogs colonize and serve as sinks for carbon dioxide that slow global warming. We see it and marvel. The planetary web appears to have “thought” about excess heat before. But we hesitate to use intentional language, content with the joy of discovery. We explain these linkages as unintended flows within a complex adaptive or chaordic system. Indra looks at these formulations and smiles. Spider Woman looks at numerate intellects and whispers another entrancing and seductive idea over her coast-to-coast hook-ups.

These are the old stories and they warn us that webs can become ensnaring plotlines of confused desire. The tension - between incomplete and complete pattern never resolves. Pattern as beautiful tapestry, pattern to ambush curiosity and hide mystery, and pattern as a schemata for profit-maximizing organizations rarely merge into one pattern. So we choose. I prefer the beauty witnessed slowing down, taking silent and long walks, loving the unweaving as well as the weaving, goin’ fishin’ and tying flies.

BOOK REVIEWS

Which World? Scenarios for the 21st Century by Allen Hammond, forthcoming from World Resources Institute and Island Press, summer, 1998.

This review was forwarded to us by Alan AtKisson.

Which World? seeks to raise awareness of long-term sustainability issues and to provide insight into their causes. It argues that many current trends, if continued, will lead to a world we may not want, and it illustrates with scenarios the critical choices and possible consequences facing each major region of the globe. The book argues that our future is closely linked to these choices, that we have a huge stake in what happens in other regions. *Which World?* is ultimately optimistic. Although it gives a sobering analysis of the challenges ahead, it also outlines opportunities to shape a better world.

The book is based in part on the 2050 Project, a research program on long-term sustainability conducted jointly by the World Resources Institute, the Brookings Institution, and the Santa Fe Institute and on the work of a network of scholars around the world. *Which World?* also incorporates the results of regional workshops; work by the Global Scenario Group, an independent group of international scholars; field reports by anthropologists, political scientists, and other professional observers stationed in developing countries; and interviews collected by an informal network of journalists.

Looking 50 years into the future, the book analyzes persistent, long-term trends—demographic, economic, social, environmental, and security trends — based on country-by-country data from the World Bank, the United Nations, World Resources Institute, and other authoritative sources. It uses scenarios to go beyond trends and explore more complex possibilities for how the future may unfold — scenarios that reflect very different mindsets or world views as well as different trajectories into the future.

The scenarios are **Market World**—a future based on the belief that market forces and new technology will lead to rising prosperity and will offer humanity a bright future, a future in which markets rule and global corporations dominate; **Fortress World**—a grimmer future in which islands of prosperity are surrounded by oceans of poverty and despair, a future of conflict and violence, social chaos, and growing environmental degradation; and **Transformed World**—a future in which fundamental social and political changes offer hope of fulfilling human aspirations.

The book analyzes trends and scenarios separately for each of 10 major continental regions of the world, also bringing together information on political and cultural patterns, natural resource endowments, environmental and social problems, and level of development that make each region unique. It asks where each region is headed—toward Market World, Fortress World, or Transformed World—and identifies the critical issues (different for each region) that are likely to determine which regions succeed and which do not. The results may surprise—China’s future does not look as secure as the conventional wisdom would have it; Latin America, but for one problem, might well become the richest of any developing region; Southeast Asia, despite its current problems, may still have the brightest future of any developing region; and the most dubious and difficult future goes not to sub-Saharan Africa but (narrowly) to North Africa/Middle East. The book also asks whether the now-dominant industrial countries will continue to lead and to grow, or will turn inward and stagnate.

Which World? offers provocative views of the future and, in the process, sheds new light on the present. De-

spite the analytical underpinnings, this book is written in clear prose and offers vivid descriptions of the choices that human society faces and the opportunities for shaping a more hopeful future. Its insights make it invaluable to anyone interested in destiny of the human enterprise or the challenges facing particular regions—from political leaders to global business executives, from educators, scholars, and students to a concerned general audience.

About the author:

Allen Hammond is senior scientist and director of Strategic Analysis for the World Resources Institute, a non-profit, non-partisan policy research institute located in Washington, D.C.. His responsibilities include institute-wide leadership in the use of analytical methods and information tools for policy research, direction of the Strategic Indicator Research Initiative on environmental and sustainable development indicators, development of web-based communication tools, and writing and research on long-term sustainability issues. He was formerly the editor-in-chief of the World Resources report series.

Special issue of *Environment and Urbanization* on “Beyond the Rural-Urban Divide” Available from IIED, 3 Endsleigh Street, London WC1H ODD, UK..

Reviewed by David Satterthwaite.

The April 1998 issue of the journal *Environment and Urbanization* highlights both the positive and the negative aspects of rural-urban interlinkages. For more than forty years, ‘rural development’ and ‘urban development’ have been considered separately in Africa, Asia and Latin America. Yet the livelihoods of many households straddle the two, as some members work and reside in rural areas and others in towns and cities. There are large and varied flows of people, goods, information and money between rural and urban areas. And many urban enterprises rely on rural produce or rural demand for their profitability while many agricultural enterprises rely on services provided by urban enterprises. There are also the transfers of costs - for instance the waste and pollution flows, as urban enterprises and citizens dispose of wastes in surrounding areas, to the costs of the inhabitants and the ecosystems.

Several papers in this issue show the importance of different rural-urban linkages, including case studies for Gaborone (Botswana), Harare (Zimbabwe), Dakar (Senegal) and Durban (South Africa). A paper on Mexico City contrasts the migration patterns of low and middle income groups - as the first tend to move into Mexico City and the second tends to move out. Another paper discusses the influence of household structure and gender on migration patterns between rural and urban areas.

It is also generally assumed that rural populations are primarily agricultural producers while urban dwellers engage in industry and services — yet there is increasing evidence of the importance of ‘rural’ activities in urban areas (especially urban agriculture) and of ‘urban’ activities in rural areas. The “urbanization” of rural economies and employment structures is often most pronounced in the areas immediately around urban areas. And, as illustrated by a paper on Manila and its surrounds, this is often characterized by conflicts between low-income groups and wealthy and well-connected individuals and businesses for access to land and water. Another paper describes the importance of agriculture in peri-urban areas, focusing on the often neglected aspect of the health problems facing producers, inhabitants and consumers.

Other papers in this issue cover:

- a guide to the literature on rural-urban interactions,
- what we have learnt from projects that seek to reduce poverty in urban areas,
- street children in Cairo,
- Women vendors’ work histories in Port-au-Prince,
- An evaluation of the Egyptian government’s housing policy in Cairo.

ANNOUNCEMENTS

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NEWS FROM THE MEMBERS

From the Balaton Bard, **Alan AtKisson**:

Well, this so-called sabbatical year hasn't gone anything like I expected, but I suppose that's what a sabbatical is for! It's become a kind of working sabbatical, with a focus on writing and songwriting and — surprise — indicators.

An idea that occurred to me during a meeting of the Balaton working group on indicators is picking up steam. Here's a summary of the "Compass of Sustainability":

Basically, it's an aggregation and organizing scheme for indicators, using the four points of the compass as a mnemonic and top-level interface over a nested hierarchy of indicators and indices. Here's the trick (it works in English and German): N = North = Nature (environmental indicators); E = East = Economy (economic indicators); S = South = Society (social capital indicators); W = West = Well-being (human capital indicators). The four aggregate indices can be super-aggregated into a Sustainable Development Index. In a hypermedia (web) environment, the indices become gateways to the disaggregated indicators and raw data, together with whatever interpretive text and pictures the creators care to attach to it.

Obviously, this draws on Daly's triangle, but it replaces the pyramidal structure with a circular one. There are many devilish details to be worked out, such as the actual weighting and indexing schemes (!), but these are being tackled by the Consultative Group on Sustainable Development Indicators, which (in addition to me and **Dana**) includes indicator people from World

Resources Institute, the World Bank, UNEP and other institutions. It's run by **Laszlo Pinter's** senior colleague at IISD, Peter Hardi (another Hungarian). And it is already being put to use at the local, state, and national government levels, thanks to my network of local and state indicator clients, and Peter Hardi's presentation to the UNCSG group.

The Compass, at least in my experience, is already having the desired effect of bringing people more deeply into the sustainability worldview, by forcing them to broaden out their indicator sets and think about linkages. By this time next year, there should be working "Compasses," helping to steer communities and perhaps even countries more toward sustainability, all thanks to the creative and intellectual collaborations of the Balaton Group.

Balaton members are welcome to follow the development of the Compass, contribute ideas, put it to use with their governments, NGOs, and academic projects.

Meanwhile, I've finished writing (1) a one-man play about the poet Rilke, using my songs from the Book of Hours and his letters as the main text; and (2) a long serious-comic poem inspired by our last year's meeting on time. It's called "Chronosphere," and it's dedicated to **Wouter Biesiot**. I'll circulate it to the group somehow.

Plus the usual crop of new songs, including one that finally manages to use the word "Sustainability." (See the end of this *Bulletin*.)

So, I'm traveling around, singing and writing and consulting with people doing sustainability and indicator work, feeling something like the troubadours of old — but with a lap-top.

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A cliff-hanging and ultimately happy series of email bulletins from **Valdis Bisters**:

February 10 — Our baby arrived on last Saturday. We named her Dita. Agija feels very well and after three days is at home already. Unfortunately, there were complications with Dita. She had to undergo an operation because there was something like narrowing and in places mechanical stops of her digestive tract. Now the situation is stable, and she is recovering. We just need to wait. We both take it as it is and feel that everything will be all right.

February 12 — We can say that Dita is doing well. The situation after the operation is stable but recovery proceeds very slowly, as usual after such operations. The fact that the doctors decided that she could undergo an operation 12 hours after birth was a good sign that she is strong. In the world on average 5% of newly born babies have different problems which need some special treatment. So we fell into these five.

From tomorrow she will start to receive mother's milk in small portions through a small pipe. That will be while the gullet heals. Than doctors expect that Agija can start to feed her and there will be no "bottle intermediate period," which is very important.

February 25 — Dita is doing well. She stays with Agija in the hospital in one room. The doctors said that Dita helped them a lot, being so strong a child. Now she gets mother's milk 8 times per day and there was no "bottle period." Agija succeeds to manage it. Our guess is about two weeks in hospital and then home. Usually after such operations it takes much longer.

March 11 — Dita is with us at home already one and a half weeks. Yes, my everyday and night schedule has been changed but not so much as I expected. Dita is well and keeping up good spirits for all of us.

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From **John de Graaf**:

Here's my news. We recently completed work on the sequel to AFFLUENZA, called ESCAPE FROM AFFLUENZA. It will be broadcast nationally in the US on Tuesday, July 7th at 9 pm on the PBS network, following a national re-broadcast of AFFLUENZA on July 2nd. It tells the stories of several people who have

learned to cut back their consumption sharply while improving their lives as well. We are looking for people who might want to review it for US publications.

AFFLUENZA continues to be a mini-hit. It is the best-selling video of our distributor, Bullfrog Films, which distributes more than 600 titles, was the most called-about program on public television last year for many PBS stations, is being used widely in churches and universities and has spawned common use of the term "affluenza" in the US. The United Methodist Church now has a six-part curriculum for all its churches called "Curing Affluenza," for example. Oh, and its **Alan Atkisson** music video tops the charts! (Well, that last statement is a bit of an exaggeration).

Since I traveled to Freiburg, Germany in November to show AFFLUENZA at the Oekomedia International Ecological Film Festival (and got together with **Joan Davis** in Zurich on the way!), an environmental group called TACIS has been making translations of AFFLUENZA into Russian, Ukrainian and Georgian. They will be placed in 100 libraries throughout the former Soviet Union. The interest in a less consumptive lifestyle seems to be building.

Best wishes to all of you. Balaton is a really wonderful group and I learn a lot from these communications.

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From **Bert de Vries**:

The latest news? Well, we worked hard here at RIVM and are finalizing the interim-report on the IPCC scenarios as we interpreted and quantified them. The report will be sent to a couple of BG members in preparation of the September BG meeting. I will leave mid-April for Bangkok to work at AIT, and I hope to meet Chirapol in his homeplace finally, after so many years. Then, I leave for Delhi as part of our cooperation with two Indian institutes within the Global Environmental Outlook (GEO) project. In the same week we have a panhectic synoptic aquarian brainshop on the next 100 years with **Aromar Revi** and colleagues, in an attempt to structure the September BG meeting in advance. Then, ridiculously I know, I fly from Delhi via Amsterdam to Washington for an IPCC related meeting. My guess is I have to walk to Csopak this year if I wish to remain within my personal carbon budget.

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From **Joan Dutoit** in South Africa:

Have been busy as usual since our December meeting in Zurich. I think I told you that our first Energy

Indicators document was published and sent out. It will hopefully be greatly improved and updated when we produce it again next year. I have been involved with our National Science and Technology Foresight initiative on the Working Group on Energy and came back late last night from Johannesburg where the second workshop was held. If any of you Balatonners have been through a similar exercise and have any good advice to give, please do so. We are in the final throes of organizing our annual Domestic Use of Electrical Energy conference, which takes place from 6-8 April in Cape Town. So as you see, the energetic activities are still being carried on.

Love to all from Southern Joan

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From Washinton State, **Tom Fiddaman** writes:

I just got back from a quick trip to read lots of nice news about fellow Balatoneers and lots of alarming news about the world. I don't have much world news to report myself (except maybe that interest is picking up in my dissertation research, which shows that efforts to avoid climate change should be greater than conventional models indicate). But I did rescue a stranded hummingbird from a neighbor's skylight today. Sometimes saving a few grams of biomass is as much fun as a few tons. Aside from trying to push some climate policy publications out the door, I'm enjoying lots of quick bike rides up the local mountain between Northwest rain showers.

I've been working a lot at developing system dynamics training materials for Ventana Systems. I've been toying with the idea of teaching a 2 or 3 day system dynamics course before the Balaton meeting, focused on environmental modeling with the free Vensim PLE software. I haven't investigated the logistics for this yet, but if there's a critical mass of interested participants, I'll pursue it. Please let me know. (TomFid@premier1.net)

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Ashok Gadgil emails:

We just got funding from DOE and LBNL for setting up two more field test/demonstration sites in South Africa of UV Waterworks. The first is outside of Durban at an HIV hospice. We also finished calculations to determine how much CO2 emissions and non-CO2 greenhouse gases (GHGs) one unit would save if it replaces disinfection of drinking water by boiling over a biomass cookstove. (Disinfection of drinking water by boiling over biomass is the only alternative thinkable for about a billion people, and is reportedly practiced

commonly in rural China).

We found that each UVWaterworks unit, serving a population of 1000 saves about 275 tons of carbon-equivalent GHG emissions annually. This is equivalent to moving 275 average US cars off the road (each emits 1 ton-C annually), or planting a forest of 40,000 large trees on denuded soil and bringing it to maturity over an area of 200 hectares (2 sq. km)., or saving and managing a 10 sq. km. mature forest of 200,000 trees.

Of course, the actual GHG emissions avoided depend on whether the biomass that was substituted was sustainably-harvested or not. If it was sustainably harvested, then all the CO2 emitted in combustion is captured in biomass regrowth. In that case, each UVWw saves 175 tons of carbon-equivalent emissions of non-CO2 GHGs annually. If the biomass were non-sustainably harvested, each UVWw saves 305 tons of carbon-equivalent GHGs annually.

I had the pleasure of meeting **Bert DeVries** here in Berkeley when he visited for an IPCC-related meeting earlier this year.

By end of this summer, my work helping the Industrial Development Bank of India with setting up their loan policies for industrial energy efficiency and environmental management will come to a close.

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Gwen Hallsmith reports from the trenches of real city management:

As I am approaching my third year anniversary here in Randolph, it is somehow rewarding to consider things that I have done to make Randolph a more sustainable community. Sustainable development, after all, is always located somewhere - the local level is the front line of this sustainable development campaign. So maybe this is a report from the front. (And believe me, here in Randolph, the battle analogy is apt).

TRANSPORTATION

We completed three years of construction that has made the downtown more pedestrian-friendly. This was accomplished through the use of traffic calming improvements, the addition of benches, new sidewalks throughout the area, and lots of steps and ramps to make the hilly area easier to negotiate.

I managed to convince Amtrak to provide a train stop in town, after a fifty year hiatus. Now Randolph is a regular stop on the Vermonter line. This makes it possible to travel to and from Randolph from a variety of destinations without using the dreaded automobile.

SOLID WASTE

The operation of the first public state-of-the-art landfill in the state also fell to me. We have extensive recycling facilities, regular household hazardous waste collection days, along with programs that help businesses and homeowners generate less problematic waste. Thank heaven the landfill is finally closed and capped at this point - the recycling and hazardous waste programs continue. The operation of the landfill has left the Town with a \$3 million surplus that they can now spend on badly needed infrastructure improvements. Lower taxes are one way Vermonters define sustainability.

COST OF SERVICES

Another way I've lowered taxes over the long run involved a dispute I had with the state retirement system about how they were billing Randolph. I got them to lower their rates, and over time this will result in a \$2 million savings to town.

WATER AND WASTEWATER

I've overseen the implementation of a major Combined Sewer Overflow (CSO) project, which has dramatically reduced the volume of material that bypasses the sewage treatment plant during heavy rains. Work we have done reducing infiltration into the system has also helped in this regard.

The water system in town has been improved through better management of the chemical treatments we are required to do. We have replaced lots of deteriorating water pipes. I managed to stop a development that was being planned within the 200 foot protection zone of the well - a bus garage that would have had underground fuel storage and bus washing facilities.

ECONOMIC DEVELOPMENT

Although I don't manage the program, Randolph has a very active low interest loan program for start-up businesses. This program takes applicants that don't meet the bank's criteria for collateral. Using the loans, we have encouraged several new businesses in town that have been quite successful to date. There are no empty storefronts in the downtown at this point.

SOCIAL SERVICES

We also have been working hard on a federally funded program to "Build a Caring Community." The development project that has resulted from this work is a new Family Center that houses most of the social service organizations in town. It is a warm, friendly place - including the Head Start day care, visiting nurses, the

Success by Six program, and the Community Action Agency. This provides families that need the services "one-stop-shopping" and has helped eliminate unnecessary duplication and overlap.

DEMOCRATIC PROCESS

To make sure that citizens are on board and part of the decision-making process, I've created several committees of the Selectboard. These committees do a lot of the detailed review of the issues that come before the board, which makes the board's work more manageable at the same time it encourages participation and solicits expertise from a variety of sources. We also broadcast our meetings on public access cable TV.

Town management work can tend to be a thankless job. So forgive me if this seems like I'm blowing my own horn. It is a rare day when the Town ever looks back to see how far we've come in a few years. The majority of feedback we get tends to be complaints that the roads are snowy, or muddy, or otherwise imperfect. After being here three years, I can begin to understand why they had six Town Managers in six years before I started. But nonetheless, I think that Randolph is moving in the right direction. We would love it if friends from the Balaton Group want to visit and see a real sustainable community in action.

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Exciting news from **Drew Jones**:

We're going to have a baby!

My wife Anne Fitten is pregnant, and expecting in mid-August. The good news for the fetus is that AF has been both nauseated and ravenous for the entire past 3 months.

We both feel so lucky and happy.

I've been working on an interesting new project with the Sustainability Institute. We're building a system dynamics model to understand the drivers of increasing fossil fuel consumption and suburban sprawl. We hope to develop it into a game and workshop for city managers.

The project contains multiple Balaton ingredients — ideas on saving energy from **Amory Lovins** and Rocky Mountain Institute, Jay Forrester's Urban Dynamics model that **Dana Meadows** presented several years back at the Balaton meeting on sustainable cities, climate ideas from **Bert de Vries'** reports, and a literal borrowing of **Tom Fiddaman's** carbon cycle from his MIT thesis, so we can show the community the long term climatic effects of the fossil fuel use. Now the

challenge is understanding the powerful reinforcing drivers of sprawl.

We'd love any suggestions.

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From **Jaswant Krishnaya** and the Systems Research Institute in Pune:

This is going to be one of our busiest years, since we are now working on two very important research projects: One for the Space organization, attempting to define the rationale, role, functioning and financing of (what we expect will eventually be several hundred) ** Intermediate Institutions ** which will act as information transducers between the high-tech worlds {of computer hardware & software and space imagery} and the down-to-earth reality in the Grass Roots in rural areas and urban pockets. This is a 15-month exercise, and we are doing a pilot project for one District on the mainland across from Bombay (now Mumbai), and also testing out a lot of different GIS software which has generously been made available to us by the manufacturers..

The second project has, if possible, even more far-reaching consequences. It is a 3-year project financed by the Dept of Electronics, to develop a very-easy-to-use desktop GIS for Grass Roots Microwatershed planners and managers, which will be distributed in the PUBLIC DOMAIN with an integrated .html training module by the DoE. Initially (18-month deadline) we will be doing it in Win3.x 16-bit, and later switch over to 32-bit. This will include the ability to take in height information in a number of common formats, to display it as contours and other ways, and also, inter alia to be able to provide perspective views. Steepest descent; coverage of proposed checkdams, floodplain extents, etc... We expect to be able to DRAPE on the perspective a pre-analyzed FCC color composite drawn from satellite imagery too. However, there are many issues of projection matching between satellite imagery and vector base maps.

Anyway, we expect to be up to our ears in work, and may not have time for any foreign travel this year (we have not since 1995, actually).

One of our biggest problems is how to make up for the lower quality of personnel now available to us. I plan to do this by having a broad-based Advisory Board

of persons sympathetic to our project objective, who would be in a position to advise on:

(a) Technical issues — software tools, GIS engines that we should look into; database engines that seem to be good; algorithms sources, etc.

(b) Application issues — what options should we provide for our GRASS

ROOTS users?

If any Balatoners would like to help here, please e-mail me and I will send you a copy of our present thinking on the project.. (The Board will start in April).

All good wishes .. I am encouraged by all the wonderful things that so many of you are able to do.

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Zoltan Lontay checks in hurriedly from Budapest:

The reason I rarely appear on the e-mail is that the demand for my time grows more rapidly than my capabilities to manage it. I regularly fail to apply the nice principles presented at the last Annual Meeting.

After years of hard struggle to convince the relevant (reluctant) players, the demand for energy efficiency knowledge is exponentially growing in Hungary. My group is the best in this field, so we have more than enough to do.

The attention to energy efficiency can be explained by the continuous rise of energy prices (generated mainly by privatization) and by the fact that a growing number of energy users are able to plan on the longer term.

It is really enjoyable that we have the opportunity to work both on the academic level and in practice. After disappointing experience with certain studies (which are not even read) it is refreshing to fix the building envelope of a kindergarten or help an industrial plant cut their \$200 million/year energy bill by 1%.

Although we doubt that the people's behavior can be changed by education, we work on nice awareness development projects, too. Our "Energy ABC" is broadcast on the national TV channel every Saturday for 20 weeks. We organize all kinds of workshops to educate consultants, ministry officials, municipal experts or manufacturers. A big conference is planned for October for the front-line energy managers of the country.

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Amory Lovins writes:

Rocky Mountain Institute has some important new publications, all available via RMI's secure server www.rmi.org when published. Four merit special notice:

- *Green Development: Integrating Ecology and Real Estate*, with a free Web-linked CD-ROM of 100 case-studies, distills the practice of RMI's Green Development Services. It shows how integrated design can make buildings and real-estate projects environmentally responsive, resource-efficient, healthful, beautiful, productivity-enhancing, and superior in market and financial performance.
- "Climate: Making Sense and Making Money", downloadable from www.rmi.org (look under What's New and check out the .PPT presentation), shows private-sector executives how to turn ~60 obstacles in buying energy efficiency into business opportunities. It also shows that climate protection can be timely and profitable even at today's low and falling energy prices, because ability to respond to price matters more than price.
- A ~400-500-page semitechnical book, *Small Is Profitable: The Hidden Economic Benefits of Making Economic Resources the Right Size*, will be published around mid-year. It shows how ~75 "distributed benefits" can make decentralized ways to produce, store, or save electricity, such as photovoltaics, about an order of magnitude more economically valuable than had been supposed. The biggest increases in value typically come not from their electrical engineering advantages, but from financial economics, such as the reduced risk from small modules with short lead times.
- Around the end of 1998, Little Brown will publish *Natural Capitalism* a major book by Paul Hawken and Amory and Hunter Lovins. It explores the implications of fully valuing all forms of capital; the resource efficiency revolution (emphasizing new ways to make big resource savings cost less than small ones — "tunneling through the cost barrier"); and how the waste of resources, money, and people are intimately linked, as are the solutions. Outstanding examples of Factor Ten (or better) resource efficiency, or other ideas and anecdotes that would further

improve the manuscript, can still fit if sent promptly, please, to ablovins@rmi.org.

The Hypercar Center's page at www.rmi.org (add / hypercar) also merits periodic revisits: the ~\$3 billion so far committed by the private sector to this line of development is rapidly bearing fruit. RMI is expanding its consultancy on sustainable corporate practices, and is pursuing such intriguing concepts as considering the genome as a nanoecosystem reflecting all normal and possible Darwinian and ecological processes.

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From **Steven McFadden**:

Some of the news from this neighborhood of the Balaton network:

I heard John Jeavons of Ecology Action speak in mid-March. His topic was biointensive farming and gardening, and his context was the world agricultural scene. With measured words and a stunning array of slides, he drew a comprehensive picture of global agriculture in the 1990s, and the likely trends, citing "Beyond the Limits," among other works.

John did not paint a pretty picture — water pollution from runoff, water scarcity, topsoil loss, human poisonings, miserable social and sanitary conditions, and so forth. And yet, he noted, population statistics show 87 million more people a year are added to the overall global scene — each one rightfully wanting an adequate share of food and water.

Ecology Action's sustainable biointensive farm and garden techniques are in use in 107 countries around the world, and are reliably used to build quality and quantity of topsoil, to conserve water, and to provide a generous supply of clean food. That's a bright ray.

Then a few days after hearing John speak, I watched NBC Nightly News (Westinghouse) broadcast three riveting stories in a row. These stories — though the anchor and the reporters didn't see the connections, or at least didn't acknowledge them — added more brush strokes (albeit muddy ones) to the overall picture.

First they reported, with many a dramatic film clip, on the global epidemic of mutated amphibians, especially frogs which are frequently found these days missing legs, eyes, testes, and so forth. According to NBC it is now thought that this ominous mutation is caused, in part, by the runoff of agricultural chemicals.

Then NBC presented a story on the abuse of children as laborers in the fields of U.S. agricultural corporations: the hot, hard work, the children's routine

exposure to toxic pesticides and herbicides, and in these conditions the death of one child every five days. They could have expanded the story beyond US borders for a truer, global picture, but did not.

Finally, NBC presented a story extolling the fabulous new things that are being done to food via genetic engineering, and how one day soon, thanks to this often publicly funded work, citizens may be able to buy and eat all the potato chips they want without worrying about excessive fat. In all this happy news there was not a whisper of concern, not one person to even cock an eyebrow in mild skepticism. Yet there are hundreds of reputable scientists, and thousands of informed lay people, who have valid and well-documented concerns about genetic engineering and the food supply (for one thing). We heard not a word from them. The story was completely one-sided in cheering the promise of GEOs (genetically engineered organisms).

In NBC's exultation about GEOs, there was a total disconnect from their just-reported stories on child labor and amphibian mutation — as if these were not all part of the same continuum of modern industrial agriculture.

Thus I came to understand even more vividly the need to get up off my duff and go out to inform the public about some of the many promising alternatives arising, in part in response to this same global picture. People need to be informed about Community Supported Agriculture (CSA), Associative Economics, and the 1,000 US farms and over 100,000 households participating with them — and many more in Japan, Germany, and Switzerland.

Community farms can be — and frequently are — islands of ecological and social health. Their goodness radiates out into their surrounding environments. Perhaps together they can serve as a kind of homeopathic antidote to some perversions that have arisen in industrial culture and agriculture, and help us bridge to a healthier state of affairs in our relationship with the Earth and each other.

As far as my new book *Farms of Tomorrow Revisited* goes, co-author Trauger Groh and I are still in the null zone. The book has been out since January, and widely disseminated to potential reviewers, but so far there has been no substantive comment. The commentary will come soon enough, as it does for every book. (Amazon.com has listed the "official" publication date as April 1. Hmmm? What do they know that we don't?)

Among the things I see clearly in the overall picture, is an opportunity opened up by this book and the global Ag context. It's time to leave the computer and

single-minded labor on the next manuscript for a while, and to go more widely into the world again — this time to tell the story of the emerging community farms. Thus, I am actively arranging talks at public libraries, at schools, and looking for more opportunities. The theme: "Our Food, Our Families, Our Farms, Our Earth."

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Dennis Meadows says:

I continue to refine and test the workshop curriculum, "Creating High-Performance Teams for Sustainable Development," and to construct a complete kit of materials that will let others conduct the 3-4 day program. In February I ran the seminar in Bonn for 30 senior German officials in the foreign aid ministry and in NGOs responsible for sustainable development aid programs. The technical assistance branch of the ministry, GTZ, has contracted for me to design a 4 day version of the workshop which they intend to offer throughout Asia and Africa with their own staff. My goal is to have a package (videos, computer programs, games, slides, instructor's manual, scripts, and related materials) that can be acquired by other Balaton Group members before the next BG meeting.

I have become the senior academic advisor to LEAD International, a project of the Rockefeller Foundation, helping them design the training program for the 180 mid career professionals who are enrolled into their two-year training program annually. In May I will spend two weeks in Zimbabwe conducting parts of the workshop as part of the graduation ceremonies for the participants and program leaders of the twelve LEAD nations.

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Ruben Mnatsakanian emails:

My year was devoted, besides direct university obligations, mainly to the work on the UNEP/GEO-2 report. I wrote chapter on State of the Environment in Europe/CIS and contributed to some other chapters. In relation to this project I visited Bahrein and Brazil and will go to Geneva and (possibly) Nairobi later this year.

We also tried (together with my colleague N.Dronin — **Genady Golubev's** colleague from MSU) to visualize a GEO database (at present it contains about 200 indicators for 202 countries and territories). We re-structured the existing database so that it allowed us to create simple maps, and made a series of global maps on the basis of the available information (in other words, sort of a statistical atlas on country-based information). We made more than 300 maps, but selected only about 60 for the final version. These 60 maps cover various

issues like acidification, water availability, biodiversity, etc. All information presented is based mainly on international sources (like WB, WRI, UNEP, FAO reports).

The next step in the GEO process will be checking of these data against national sources and revision of the database, but not for the GEO-2 report. (There is simply no time and resources to do it in the existing time-frame).

The maps in our "atlas" and their interpretation are sometimes controversial and difficult for drawing straightforward conclusions, but at the same time some ideas which came out are rather interesting. I am still uncertain what to do with it (at present it is considered as GEO-2 working material),. Maybe I will bring a copy to the Balaton meeting for group discussion and review. (I'll try to publish it as a technical paper beforehand, but it is not 100% certain at the moment.)

I also have one practical request. At present drafts of GEO-2 report are ready for review. I would appreciate if any of Balaton Group members would like to have a look at them and share their comments with me and UNEP headquarters. It can be either the European part or the whole global GEO report. Just let me know in what part are you interested in, and I shall send you a copy.

In the meantime, a new CEU recruitment campaign is starting, so I need to go to interview applicants for our 1998/99 MSc course in Prague, Bratislava, Zagreb, Moscow, Samara, Almaty, Tashkent, Bishkek, Kiev, Lviv, Chisinau... maybe somewhere else, it is not quite clear at the moment — all trips should be completed by the end of May. In the meantime there is a UNEP-related trip to Geneva and an important UNEP/EU PHARE training course for ministerial workers here in Budapest, which we are co-organizing... In July possibly I go to the 4th International Interdisciplinary conference on the Environment in Washington, DC. In August I have plans to go by car from Budapest to Edinburgh to visit **Ulrich Loening** and many friends on the way...

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Dick Norgaard writes from the ecological economic front:

I started 1998 by going on sabbatical leave to write an internal critique of how economists do not follow their own logic, in an effort to help diffuse some of this globalization and green market environmentalism frenzy. The first six weeks, however, were largely spent chairing a search committee for a new faculty member in "Energy and Society" for our Energy and Resources Program here at Berkeley. Since many of you helped

by either applying for this position or writing letters on behalf of those who did, I would like to thank all of you for your participation. An offer has been made and it looks like it will work out, but I think I should be discreet at this point.

In any case, the Energy and Resources Group is clearly in a strong position to sustain its unusual transdisciplinary graduate program. Once again our applicants competed successfully for the best of the best university fellowships (we have always known that it was the great students that find us that make the program a success). As the new President of the International Society for Ecological Economics, I am traveling a little too much. But I am now getting back to the book (though Nancy and I will be taking our raft down the San Juan River of S.E. Utah the last week of April).

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John Peet sends a very condensed review of a very productive journey:

Katherine & John Peet's
Supercalifragilisticexpialidocious Study Trip

I was granted sabbatical leave overseas for the second half of 1997, and (along with Katherine - the first time we'd been away together like this for 30 years, with no kids!) we enjoyed it hugely. We also found it immensely stimulating intellectually, as well as marvelous from many other points of view.

Probably the key period was spent with **Hartmut Bossel** in Germany, with a shorter period spent with **Jørgen Nørgard** in Denmark. We spent high quality time with many others, notably (Balaton friends listed in visit order) **Valdis Bisters** in Latvia, **Niels Meyer** in Denmark, **Bert de Vries** in the Netherlands and **Joan Du Toit** in South Africa. And, of course, there was the - as usual, marvelous - Balaton Meeting itself, together with the Indicators workshop that followed it!

The work with Hartmut (warmly supported by Rike's hospitality!) involved getting up to speed with his Orientors approach to System Sustainability, and applying it to the NZ situation; work which we shared with others at Balaton. I was then able to expose a number of other people and groups — academic and student — to the approach as we traveled, gaining both valuable feedback and strong support for it. Soon after returning home to Enzed, I presented a paper on it to the Institution of Professional Engineers NZ, which was well received. I'm currently working with some ministries and groups here, to take it further. [If anyone is interested in seeing the IPENZ paper, please email me (j.peet@cape.canterbury.ac.nz) and I'll send a copy. HTML is probably the best format, but if not let me

know and I'll see what I can do - there's always snailmail!]

All-in-all, in our 5.5 months away from NZ, we visited 16 countries; each for at least 2 nights! The list is: US, Germany, Latvia, Denmark, Sweden, Finland, Norway, Netherlands, Belgium, France, Switzerland, Spain, England, Zimbabwe, South Africa and Australia. Not only did we meet a lot of Balaton friends, but also we were able to make contact with many others we'd either heard about or had no more than email contact with, over the years.

We also had the opportunity to attend a Council meeting of INES, the International Network of Engineers and Scientists for Global Responsibility, which is centrally concerned with the ethics of applications of technology to militarism and nuclearism on the one hand, and sustainability on the other. (The INES web page is at <http://www.mindspring.com/~us016262/ines.html>)

While in London I attended the AGM of Scientists for Global Responsibility, and caught up with what they're doing in several areas. Probably the most disturbing - indeed, horrifying - part of that meeting was hearing about the latest technologies for political control — now that the Cold War is “over” and the arms industries desperately need new customers. (See <http://jya.com.stoa-atpc.htm> - or .zip for zipped version).

So we were pretty busy, and more than somewhat tired at the end of it all. But it was a marvelous experience, not least due to the incredibly warm hospitality we received from so many great people. Our heads are still (in March!) filled with what we did and saw (not least 20 rolls of film!), and I'm still working on the difficult task of dumping my (mental) hard disk contents onto the PC, so I can share better with others! I'll keep you in touch, and would welcome the opportunity to tap into the creative and critical faculties of BG group members.

* * *

From **Laszlo Pinter** at IISD in Canada:

A few noteworthy events since last Fall. It was a busy season. While **Ruben Mnatsakanian** was involved in UNEP's GEO-2 at the European end, I wrote two of the North American sections, one dealing with the effectiveness of selected environmental policies and another addressing compliance with multilateral environmental agreements. We are now gearing up for regional consultations in New York, involving Canadian, US and Mexican governments and NGOs. They managed to schedule the meeting for May 5th, exactly the day we are expecting our second child. I guess I know

what meeting I will attend.

I am starting another, GEO-related project for UNEP that involves the preparation and delivery of a training program to “build the capacity of institutions and experts in developing countries to carry out integrated EAs on national and regional scales in the mold of GEO”. We are scheduled to deliver the first regional training in Bahrain in June, but first there is the task of putting it all together.

We have two ongoing local indicator projects, helping the City of Winnipeg to establish and the Province of Manitoba to strengthen an integrated reporting system. There is also a recent initiative we will have a yet-to-be-defined role in to establish a “sustainable development report” and accompanying indicator system for Canada. This is a multiagency effort that will be modeled after Manitoba's system that we helped set up last year. I just finished a paper on building compatibility between the interpretation of sustainable development in the corporate and public sectors that I am presenting next week at the Woodlands in Houston. I try to get at this question through targets, measures and underlying objectives that are or aren't typically used by the public and private sectors.

Late last year, at the request of the University of Manitoba's Natural Resources Institute I created and currently teaching a graduate course, “Sustainable Development: Tools and Methods in Practice.” It is experimental in many ways, partly because of the way I tried to organize concepts and case studies around the SD framework, partly because I tried to use the web at least to some extent as a teaching medium, and maybe to the largest extent because of my lack of experience in doing all this. It appears the beta version went quite well, and I will likely teach it again next year. I am of course also a PhD student, but I was not able to do more than a reading course due to the workload during the last few months.

Finally, in case you didn't know, you can listen to **Alan AtKisson's** GDP song on the web. We were honored to have the opportunity to spread the message through our site. It's at <http://iisd.ca/didigest/alan/>.

* * *

A brief note from **Carlos Quesada**

Things have been going well for our Center. I feel we have consolidated it in the areas dealing with remote sensing and geographic Information systems. We have been making money and are moving to a new place. We are self sufficient and have actually invested over \$12000 in the remodeling of the house. We will be moving into it next week.

We are getting a good grant to transfer knowledge and team up with the famous Institute on Biodiversity INBio on issues of GIS. We have been very successful in teaching courses on this topics and linking into other Centers research proposal by means of our data bases and GIS and remote sensing technology.

My next move is aimed at strengthening the capacity on team building, since in the new home we will be able to have space for that, by doing some remodeling of the garages built in the backyard. I still need to find a support person in this area, and I am looking at two candidates. The problem is that, as with some staff on the GIS and remote sensing, the activity has to be self sufficient since the University will not hire people.

* * *

Melita Rogalj sends us an insider's view of an unusual conference:

From 2 - 6 March 1998 I participated in an international conference on "DIVERSITY AS A RESOURCE: Relations Between Cultural Diversity and Environment-Oriented Society" held in Rome, Italy. The main organizer was Cooperativa Technico Scientifica di Base (COBASE) an Italian NGO, with the contributions of European Commission DG XII, Municipality of Rome, and Italian Ministry of Foreign Affairs. The Conference forms part of the Diversity Project launched in May 1994 in Paris at the International Seminar organized by Cobase and sponsored by the European Commission's DG XII, which aimed to promote the encounter between formalized science and traditional knowledge working together at the same level.

The Diversity Project agenda, presented to the Convention on Biological Diversity, deals with:

- defining the guidelines of an international protocol for the protection of cultural diversity,
- establishing new methodologies for the dialogue between formalized science and traditional knowledge.
- introducing diversity as a quality indicator in environmental projects and management,
- developing a qualitative approach to biodiversity by taking into account bio-cultural areas,
- re-evaluating nomadism as from its ecological meanings and values.

This time in Rome was very moving and inspiring.

So full, so wonderfully provocative, emotional and challenging. One of the main aims of the conference was to find ways for the scientific community to recognize and accept traditional knowledge from the indigenous peoples; to recognize that the survival of indigenous cultures is essential for the survival of humankind because of their unique relationship to and therefore understanding of nature. The title of the event "Diversity as a Resource" means both cultural diversity as well as biodiversity. Much can be said about this - a whole field of research is forming, which takes into account the link between cultural and environmental diversity, drawing attention to the complex dimension of knowledge with its different forms and methods.

The participants were representatives of a number of indigenous tribes and were mostly chiefs, elders, medicine men and women and coming from Canada, USA, Peru, Brazil, Ghana, Nigeria to Australia. On the other hand there were a number of "western" mostly natural scientists, Jewish representatives (the main organizer of the conference is Jewish, only two Eastern Europeans, (an academic from Moscow and myself), UN representatives from the Human Rights division, UNESCO and World Intellectual Property Organization (WIPO) and unfortunately only an odd NGO representative here and there. I am highlighting the participants because that highly influenced the conference structure. To perhaps oversimplify, the dominant dynamic of the conference was the playing out of the tension between the oppressed and the oppressors, the emotions of victimization and guilt.

The indigenous representatives were all proud and beautiful people, yet there was a slight overdose of nostalgia for the long lost past of their own cultures and much accusation of western culture and science, which was mostly referred to as "western science." The initiators and organizers of the conference did not set out more clear objectives other than to give space for all the different participants to present their papers, work, projects but also emotions and true thoughts and then to write up conclusions about the importance of cultural diversity.

The conference started with a "Holy Ceremony." Many of the indigenous peoples dressed in their traditional ceremonial clothes and started performing a series of rituals: singing, smoking of the "peace pipe," playing the "didgeridoo" and a few other instruments that I unfortunately cannot name. The ceremony ended with "smudging," which means to bless each person performing and the whole room with smoke from aromatic herbs. It was an amazing and marvelous mixture. I had the opportunity to talk with a number of the indigenous people and to learn much about their thoughts, beliefs, feelings. I could not talk with the Latin Americans because they spoke only Spanish.

The indigenous people I did talk to, I experienced as being emotionally honest, even childlike and at the same time very present. Although they themselves characterize each other as being at different “stages” of development, I found that amusing and contradictory. Much of their accusation of western society is that it is imposing its interpretation of development, yet here they were also comparing each other on that dimension. Development is a very tricky thing it seems!

I also felt a kind of proud tendency in some of indigenous people, to keep their secrets away from the “west.” The native American Indians especially talked about the importance of keeping the purity of the races. This gives me much to ponder about because some of it is actually quite dangerous if taken too seriously. In my usual way I could easily communicate with both the victimized and the guilty and feel that this separation and judgment of each other will not solve anything.

This is why I concluded my presentation (which was about Culturally Diverse State of Environment reporting with a case study of the Global Environmental Outlook) by asking everyone to ask themselves what part of their culture would they like to preserve or revive and what part to change, because life is dynamic and evolving. Principles are maybe permanent, but they seem to be the same for everyone, maybe even every living thing...I don't really know. I just find myself more and more in a state of awe towards life and the hugeness it can encompass.

I liked very much when someone said that life is about acceptance and inclusion of all the different beliefs. We are looking at the same thing just from different angles, and if we can accept and understand the different angles that we are observing we can then understand the greater whole. In other words if I look at an object from the left I could be describing a very different picture from what you see from the right side, yet we are both looking at the same object!

Even though holism was stressed I felt a great dose of intolerance towards formalized science. I guess that this is because of the imbalance and the unhealthy domination of society by science at present and by the abuse of the original purpose of science. There were a number of outbursts and conflicts, because it takes great wisdom to peacefully merge and attempt at drawing conclusions and recommendations from such a diverse group — a skill that the conference organizers/leaders unfortunately lacked.

We had two lovely dinner parties, one in a beautiful restaurant under the stars called “Les Toile's” and another in an amazing private Villa Barberini. At these events the differences were set aside and much laughter and joy and gratefulness for having the opportunity to

meet each other and communicate so openly was expressed.

On Friday and Saturday I did my tourism and caught up with friends. Rome is a magical city, there are just layers and layers to discover. Besides visiting the fountains and Coliseum and Pantheon, I visited the St. Peter Cathedral, the Vatican museum and the beautiful lively streets of the old town. My friends also took me to Villa Adriana which is on the outskirts of Rome, a kind of expression of what the Roman emperor Hadrian constructed just for his leisure...it more looked like a small paradise village than a villa.

I came home with much food for thought and I need time to consider everything that I heard from all the different angles in order to get a more clear understanding of where this whole process of cultural change is going and how can individuals contribute to it. More realistically said : how individuals already are contributing to it, each one in his or her own unique way making this majestic web of life...

* * *

Jonathan Rowe (like many of us) is still brooding about Time:

I'm continuing to work on my book on the gap between the way economists describe and explain the world and the way people experience it.

Inspired by the meeting last summer I have written a long chapter on the economics of time and debt — or rather, on the failure of conventional economics to come to grips with these. The result is stress, which is burden on time we experience now; and debt, which is burden on time we haven't experienced yet. Exploiting time we diminish and impoverish it!

* * *

Anupam Saraph writes:

My partner, Raja Bellare, and I began our new organization “Change Reengineering” on 2nd October 1997, the birth anniversary of Gandhiji. Our vision is of a community empowered to manage change. To facilitate this, it is our mission to make change management accessible, practicable and valuable.

One of our first activities brought together 48 key stakeholders from Pune in the Confederation of Indian Industries (CII) Change Reengineering Round Table on Traffic Management in order to:

- Identify road traffic concerns and projects to alleviate the concerns,

- Align Guardians; the key stakeholders who have important stakes in the future of Pune,
- Seek constructive contributions on how to make an impact on Pune's traffic,
- Initiate action plans to impact the traffic.

What did it achieve?

- A shared vision for Pune's Traffic: 15 minutes to anywhere in Pune, safely, inexpensively,
- A commitment for undertaking the select projects listed in the concept paper,
- Initiating the creation of a Management Team responsible for all of Pune's traffic Vision, Projects and Implementation.

The projects identified center around two major strategies: Reeducating key actors participating in traffic and Reengineering traffic flows and control mechanisms. A major deviation from the usual strategy of increase infrastructure: roads, flyovers etc..

We would love to learn from similar experiences you may have, suggestions and help, especially you, **Hermann Knoflacher**, to help Pune achieve its traffic vision. We produced a concept paper for the round table run with the Confederation of Indian Industries (CII), and we would be happy to make a copy available to those of you who have any use of it.

We have also been commissioned to produce a report on the State of the Environment of Pune and would appreciate suggestions on what should be included in such a report. How can we leverage it to help those who are willing to make an effort have an impact on the environment?

What are the key common indicators for all cities? (All you indicator researchers, help!) What should be the time frames, are there any benchmarks, can any of you send us similar city studies? **Herbie** can we have a copy of your metabolism study for London and the one on Hong Kong? **Alan**, can we have tips from you based on your experiences in Seattle and Redefining Progress? **Dave**, can your work in Scotland help us? **Wouter**, your HOMES studies? **JGK**, do you have any maps which could help? **Dana, Dennis**, how can we effectively illustrate the salient lessons of limits to the city? We are planning to structure it to point to the limits, and also recommend options. We have no budget to do some dynamic modeling, but may end up doing it anyway...

The work you all do to change the world for the

better is a daily inspiration for the small efforts we are doing in this not so small city of Pune. Without the energies we get from your effort, we could not have made the miracle of having Pune's key industrialists and decision makers spend a day aligning to a traffic vision happen! In gratitude our hope, dear Balaton friends, is that you can continue to create change and be ever more successful in your efforts!

* * *

Petr Sauer would like to link up with other teachers of environmental economics:

I was asked to prepare a TEMPUS program proposal to teach a bachelor degree program with a working title "Bachelor of Applied Economics" to be taught in English at our university. It is a difficult decision for me (very busy with the work in my field). But it seems to be a good chance for an environmental economist to influence the curricula and a form of teaching of economists, isn't it? I would like to establish some college style of teaching within this program also (to use the experience from the Schumacher College), to combine science and arts (including art-crafts), to include courses like ethics, environmental/ecological economics and policy, conflict resolution, high performance team building, etc., etc.

I am wondering whether it is possible to include some short notice for Balatoners into the Bulletin that:

- * I am looking for any inspirations or patterns of similar (complex) bachelor programs in the world,
- * we are looking for university partners (especially from English speaking countries) from Europe to participate on the project.

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* * *

Michael Thompson announces a partial change of venue:

I now work in Norway where I have two part-time jobs (fortunately in adjoining buildings) but I still live in London. I'm here in Bergen every third week or so, which means there is often a delay in my getting my e-

mail. So if you ever need me urgently it's best to drop a fax to me in London as well (+44 171 354 5486).

I've been laboring away, over the last 5 years, together with about 100 others, on a Battelle Pacific Northwest Laboratories-initiated enterprise with the prosaic title: State of the Art Report on Social Science and Global Climate Change. It's being published next week (indeed I'm attending the launch at the Cosmos Club in Washington on Wednesday) in 4 volumes: "Human

Choice and Climate Change". You will all be pleased to hear that it is based, fair and square, on the cultural theory typology that is so familiar to the Balaton folk.

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STORIES, JOKES, QUOTES, POEMS, SONGS

A Poem for Niels Meyer

*The Danes Say No to Union
Beware the blurred borders,
the outlandish claims. Secure
your country: Soon
they'll come for the names.
It's all fun and games now
for the world's fattest banks.
You want to take our money
and give us yours? No thanks.*

- by **Alan AtKisson**

Human Rights and the Environment

The following article was sent over the Internet by UDHR50 News — a “magazine” to celebrate the 50th anniversary of the Universal Declaration of Human Rights. UDHR50 News is published by the Institute for Agriculture and Trade Policy. Subscription to the electronic version is free. To subscribe, send email to: Majordomo@igc.apc.org. Leave the subject line blank. In the body of the message say: subscribe udhr50-news. To view archived copies of the UDHR50 News and other IATP on-line publications, go to: <http://www.sustain.org/bulletins>.

An article by Aaron Sachs in a recent issue of the Sierra Club Magazine asks “what do human rights have to do with environmental protection?” The simple answer that follows is — “EVERYTHING.” Sachs supplies an inspiring and possibly precedent setting example of the relationship between environmental protection and the enjoyment of human rights with a story about the farmers in Bergama, an olive-growing region of Turkey which is known for its natural beauty.

Eurogold, a Turkish mining company owned by La Source, a joint venture of the Australian Normandy Poseidon Group, the French state-owned Le Bureau de Recherches Geologiques et Minières, and Inmet Mining Corporation of Canada, has pursued mining activities in Turkey for about seven years. Initially, the local people around Bergama were interested in Eurogold’s promise that the mine would provide employment as well as other social benefits. However, when test drilling made their water supply undrinkable for several months, the farmers began a protest to stop further development of the mine.

Their main objection was that Eurogold’s mining process involved cyanide to leach the gold from the rock. The locals, and the environmental rights groups from Europe and the U.S. who had joined forces with them, maintained that developing the mine would disturb the environmental balance in the region, thus threatening agricultural production and the local way of life. Eurogold maintains, with profound irrelevance, that none of its projects is illegal. The company, not surprisingly, had procured permits from eleven different ministries and affiliated agencies, issued by the seven different governments that have held office in Turkey since 1991.

However, Eurogold also defends its position by pointing to an environmental impact assessment conducted by the Ministry of the Environment, a positive report on human and community health by the Ministry of Health, and additional supportive reports detailing the design of a waste dam, precautions against possible violent earthquakes, and provisions for underground water basins by the State Water Works Department.

[Sources: “A Planet Unfree,” by Aaron Sachs, Sierra Club Magazine, Nov/Dec 1997. This article also appears currently on the Sierra Club website as part of the Human Rights and the Environment Campaign <http://www.sierraclub.org/human-rights/> Information also came from “Eurogold Goes for Silver,” by Meltem Bagis, Turkish Daily News, 20 June, 1997, on-line.]

The Sachs article says that the Bergama farmers consulted with environmental groups in Turkey, Germany and the United States concerning the possible consequences of the cyanide heap-leaching process and then filed a legal appeal. Eurogold responded by mounting a public-relations campaign to try and convince the farmers that their concerns were groundless and that they were being given misleading information by the environmental groups. The farmers called together a mass meeting of the population living in the vicinity of the mine site to explain the hazards associated with developing the mine, including the fact that the tailings pond had been located over an active fault line. Their presentation was so successful that when a local referendum on the mine was held in 1997, nine out of ten eligible voters in the area turned out, and not a single person voted in support of the Eurogold mining project.

The Turkish Government, however, upheld Eurogold’s rights to pursue the project, and for several months farmers interfered with the loggers who had come to clear land for the mine. In April 1997, the Turkish Government finally sent tanks to enforce the tree-clearing operation, and in response 10,000 farmers, with 1,000 tractors, staged a peaceful protest. The Sachs article points out that Turkey is very concerned to present itself to the world as a democratic state, so that, rather than suppress the demonstration by a show of force, the government allowed the farmers to take their case to the High Court. And within a few days, Turkey’s High Court had declared the mine unconstitutional.

Turkey badly needs foreign investment, and thus Sachs’s article notes that this decision is not likely to be the end of cyanide leaching or gold mining in the country, particularly since there is no scarcity of experts to produce reports affirming that, with certain precautions, the ability of the olive trees to produce healthy fruit would not be damaged.

The Turkish court, however, ruled that the Eurogold mine violated a provision in the Turkish Constitution that protects the individual’s fundamental right to a healthy, intact environment. “They set a precedent, in other words, for regarding pollution not as a matter to be debated among technicians but as an issue of basic human rights.”

America's Number One Export

I have long worried and continue to worry and am becoming more worried, not only about the messages of American culture but the medium in which they are delivered. There is no doubt that we are creating a consumer-driven culture that promotes values and ethics that undermine both capitalism and democracy. In fact, I think you could argue that the kind of work ethic, postponement of gratification and other attributes that are historically associated with capitalism, are being undermined by consumer capitalism. And I think you could also argue that the same relentless pressure for instant, simultaneous judgment and for people judging themselves based on their consumer materialistic attributes, is also turning people away from being citizens into being consumers. I think these are two very troubling trends.

In my own country, because we have a very broad understanding of our first amendment, because we are dominated by commercial television, we have a relentless, unstoping message of consumer, materialistic pleasure, combined with instant gratification that surely affects our children if not our adults. We combine that with the kind of programming that is popular on American television and we are beginning now to have research that demonstrates that the level of violence that our children see desensitizes them, affects how they view the world, decreases their empathy, makes them more apathetic and less likely to assess their lives in terms other than the purely materialistic.

Exporting that cannot be good for any culture.

— Hillary Rodham Clinton, at the annual meeting of the World Economic Forum, Davos, Switzerland, February 2, 1998.

Looms to Weave Facts into Fabric

(The following poem, author unknown, was sent to us by **John Peet.**)

*Upon this gifted age, in its darkest hour,
Rains from the sky a meteoric shower
Of facts ... they lie unquestioned, uncombined.
Wisdom enough to leech us of our will
Is daily spun; but there exists no loom
To weave it into a fabric.*

John comments: "I think the BG has at least the beginnings of one or more looms, but it made me think!"

Has Unesco been Reading *Beyond the Limits*? (Another submission by the energetic **John Peet**.)

All over the world, the citizens of today are appropriating the rights of the citizens of tomorrow, threatening their well-being and at times their lives Caught in the vortex of the immediate, oppressed by urgency, we do not have time to shape our actions or think about their consequences. We are hurtling into the future, without any brakes and in conditions of

zero visibility. Yet, the faster a car goes, the brighter its headlights must be. It is not, therefore, a question of adjusting or adapting.

We must take a clear-sighted approach, turned towards the future; we must turn a future-oriented eye on the world ... To have foresight is not merely a choice; it is an obligation and a moral imperative."

— From an address by the Director-General of Unesco, at the opening of the third meeting of Agenda for the: Ethics of the Future, Rio de Janeiro, 2-5 July 1997

Euro-English

The European Union commissioners have announced that agreement has been reached to adopt English as the preferred language for European communications, rather than German, which was the other possibility. As part of the negotiations, Her Majesty's Government conceded that English spelling had some room for improvement and has accepted a five-year phased plan for what will be known as EuroEnglish (Euro for short).

In the first year, "s" will be used instead of the soft "c". Certainly, sivil servants will resieve this news with joy. Also, the hard "c" will be replaced with "k". Not only will this klear up konfusion, but typewriters kan have one less letter.

There will be growing publik enthusiasm in the sekond year, when the troublesome "ph" will be replaced by "f". This will make words like "fotograf" 20 per sent shorter.

In the third year, publik akseptanse of the new spelling kan be expekted to reach the stage where more komplikated changes are possible. Governments will enkorage the removal of double letters, which have always ben a deterrent to akurate speling. Also, al wil agre that the horrible mes of silent "e"s in the languag is disgrasful, and they would go.

By the fourth year, peopl wil be reseptiv to steps such as replasing "th" by "z" and "w" by "v". During ze fifz year, ze unesesary "o" kan be dropd from vords kontaining "ou", and similar changes vud of kors be aplid to ozer kombinations of leters.

After zis fifz yer, ve vil hav a reli sensibl riten styl. Zer vil be no mor trubls or difikultis and evrivun vil find it ezi tu understand ech ozer.

Ze drem vil finali kum tru.

Get Your Own Government Official™ Now!

(Sent to us by **John Sterman**. Of course only Americans will understand this joke. Right?)

Dear Special Interest,

Congratulations on the purchase of your genuine Government Official™. With regular maintenance your Government Official™ should provide you with a lifetime of sweetheart deals, insider information, preferential legislation and other fine services.

Before you begin using your product, we would appreciate it if you would take the time to fill out this customer service card. This information will not be sold to any other party. It will be used solely to aid us in better fulfilling your future needs in political influence.

1. Which of our fine products did you buy?

- * President
- * Vice-President
- * Senator
- * Congressman
- * Governor
- * Cabinet Secretary - Commerce
- * Cabinet Secretary - Other
- * Other Elected Official (please specify)
- * Other Appointed Official (please specify)

2. How did you hear about your Government Official™?

(Please check all that apply)

- * TV ad
- * Magazine/newspaper ad
- * Shared jail cell with
- * Former partner of
- * Unindicted co-conspirator with
- * Procured for
- * Related to
- * Recommended by lobbyist
- * Recommended by organized crime figure
- * Frequently mentioned in conspiracy theories (on Internet)
- * Frequently mentioned in conspiracy theories (elsewhere)
- * Spoke at fundraiser at my church/temple
- * Solicited bribe from me
- * Attempted to seduce me

3. How do you expect to use your Government Official™?

(Please check all that apply)

- * Obtain lucrative government contracts
- * Have my prejudices turned into law
- * Obtain diplomatic concessions
- * Obtain trade concessions

- * Have embargo lifted from own nation/ally
- * Have embargo imposed on enemy/rival nation/religious infidels
- * Obtain patronage job for self/spouse mistress
- * Forestall military action against self/allies
- * Instigate military action against internal enemies/aggressors/targets for future conquest
- * Impede criminal/civil investigation of self associates/spouse
- * Obtain pardon for self/associates/spouse
- * Inflict punitive legislation on class enemies/rivals/hated ethnic groups
- * Inflict punitive regulation on business competitors/environmental exploiters capitalist pigs

4. What factors influenced your purchase?

(Please check all that apply)

- * Performance of currently owned model
- * Reputation
- * Price
- * Appearance
- * Party affiliation
- * Professed beliefs of Government Official™
- * Actual beliefs of Government Official™
- * Orders from boss/superior officer/foreign government
- * Blackmail
- * Celebrity endorsement

5. Is this product intended as a replacement for a currently owned Government Official™? _____

If you answered "yes," please indicate your reason(s) for changing models.

- * Excessive operating/maintenance costs.
- * Needs have grown beyond capacity of current model.
- * Defect in current model:
- * Dead
- * Senile
- * Indicted
- * Convicted
- * Resigned in disgrace
- * Switched parties/beliefs
- * Outbribed by competing interest

Thank you for your valuable time. Always remember: in choosing a Government Official™ you have chosen the best politician money can buy.

A Sustainability Song

*You will have to wait till the Balaton meeting to hear the tune — unless you catch **Alan AtKisson** in the meantime, which is likely, given the frequency with which he travels to Balaton-related parts of the world. This song originated when **Dana Meadows** — who likes to challenge Alan with impossible song topics — suggested that we need a song about sustainability. Well, if you can write a song about endocrine disrupters, you can write a song about anything!*

Sustainability

-for Dana, on her birthday-

Music and lyrics by Alan AtKisson, 1998

*Like a star that leads us on
Like a boat that takes us home
A compass we're steering by
A place that we someday hope to see
Sustainability
Let us save the things we love before they're gone
Sustainability
Let the beauty of the Earth live on and on
For generations
Not the rising of the sea
Not the fall of every tree
Could turn our eyes away
From what we someday hope to see
Sustainability
Let us save the things we love before they're gone
Sustainability
Let the beauty of the Earth live on and on
For generations
Nature's ways, people's work, all our cultures, families,
and every purpose-seeking
life on the Earth —
We can weave them together in the fabric of the world,
which is ours to create
if we know what it's worth
It's our science and our art
It's the song that fills our heart
And overflows into
The work that is our great joy to do
Sustainability
Let us save the things we love before they're gone
Sustainability
Let the beauty of the Earth live on and on
For generations
Generations ...*

