



Section	Page
I. REPORT ON THE BOOK	1
II. WHAT, ANOTHER BOOK?.....	2
III. THE LEADERSHIP AND MASTERY WORKSHOP	4
IV. DEFINITIONS OF CARRYING CAPACITY AND SUSTAINABILITY	7
V. NEW BOOKS AND REPORTS BY BALATON MEMBERS	10
VI. CORRESPONDENCE FROM THE MEMBERS	
- Hartmut Bossel (with a response from Dana Meadows).....	11
- Enrique Campos-Lopez	13
- Istvan Lang.....	13
- Niels Meyer.....	15
- Jorgen Norgard	16
- Chirapol Sintunawa.....	16
- Malcolm Slessor	17
VII. STORIES AND QUOTES	
- Do Good Anyway	18
- Yekepa, Liberia—When the Iron Runs Out	19
- What the Ants are Saying.....	21
VIII. ADMINISTRATIVE MISCELLANEOUS	
- Balaton Group T Shirts	22
- DYNAMO for the IBM-PC	22
- Information on STRATEGEM-1	23
- Funding for Joint Projects.....	23
- INRIC Incorporated	23

I. REPORT ON THE BOOK

Work on the compilation of our textbook Resource Systems slowed down after September, when Dana Meadows returned from IIASA and began part-time teaching and farming again. However, the transition has been made, a new IBM-PC has been set up in a new "Book Room" at the farm, and Dana now manages to put in half of her time on the book again. The

chapter on minerals has progressed greatly and will soon be sent back to Alexander Arbatov for further reworking. Dana will soon convert into American English the chapter on atmosphere and climate drafted by Sergei Pitrovanov. The chapter on energy will go through the same process when the draft arrives from the Netherlands/Denmark energy coalition. New stories have been gratefully received from Jaswant Krishnayya, Hilde Jervan, and Csaba Csaki. They are being incorporated.

Colorful stories, good and bad, about experiences with finding or extracting minerals, cleaning up for polluting) around mines and smelters, and recycling or conserving materials are very much needed at the moment. Good news stories seem especially hard to find, but bad-news ones are also useful. One of the few stories from the mineral chapter is included in the Stories and Quotes section of this Bulletin, as an illustration of the kind of report that is needed.

II. WHAT, ANOTHER BOOK?

Dana has been musing on the juxtaposition of three mutually-inconsistent facts:

- the resource textbook, or some publication that is drawn from it, is needed soon to demonstrate the work of The Balaton Group to a wide community,
- there is still a great deal of work work to be done to complete the book and bring it to the highest standard of clarity and completeness, and
- the amount of time everyone has to put into the book is limited.

Seeing no feasible way to resolve the inconsistency, she has come up with a brilliant new suggestion for your comments. Since there is not enough time to produce one book quickly, why don't we produce TWO books?

First, it would take a long time to put the resource textbook into published form. even if it were ready for the publisher now—it is very complex, with many computer programs, diagrams, references, and permissions to reproduce materials. Second, a great deal of writing and editing is still required before the book will be ready for the publisher. Musing about whether some part of the book might stand on its own and be ready sooner than the other parts, Dana hit upon the idea of separating out just a selection of GOOD-MEWS STORIES. The stories are the most interesting part of the book to most people, especially to non-academic readers. If the stories are carefully selected, they communicate by themselves many of the main points we want to make with the book - that sustainable resource use:

- is not only possible but preferable,
- can be achieved in all cultural, political, and economic situations and
- involves looking at the long-term, total picture.

Most important, the good-news stories are the easiest part of the book to get into publishable form quickly. The climate of opinion is very open right now to good news, especially in the United States, and the book should make some fine publicity for the Balaton Group.

So here is a proposal. A good-news story book would be most effective, if the stories were not reproduced from other sources (as many of the stories in the current book are), but were written originally by Balaton Group members. We write stories best if they come from our

own experience; if we are in some way personally familiar with the story or the people involved. And if they are stories in some way near to us, it should be fairly easy to supplement them with good photographs and with a few personal anecdotes that communicate the human qualities of the endeavor. The book could be a collection of about 20 stories, each 5-10 pages long, with photographs, and with a little bit of editorial writing, especially at the front and at the end, to explain the Balaton Group, the idea of sustainable resource management, and some of the common threads in the stories.

We could actually do this book, and rather quickly, if a significant fraction of the members of the Balaton Group could produce a draft of a story from their region or nation by June. Then Dana could edit it over the summer and have an essentially complete draft available for everyone's corrections by the September meeting. Here, for example, are some possible stories we could do---suggested by Dana and intended only as examples. Your own ideas will be better.

- USA
 - The bioshelters of the New Alchemy Institute
 - the organic farm in Kutztown, Pennsylvania
- Coasta Rica
 - a successful agroforestry operation
 - an example of mining that does not distriub a watershed
- Mexico
 - an ejido in the arid zone that uses water efficiently
- Switzerland
 - the real story of Elzeard Bouffier (is he real?)
 - something on preventive health care and nutrition
 - the sto4y of Joan Davis's village
- Norway
 - Norway's forest policy, or its oil policy
- West Germany
 - another example of organic farming
- The Netherlands
 - the country's paper recycling system?
- Denmark
 - a report on energy conservation or on windmills
- Hungry
 - cleaning up Lake Balaton
 - Bablona farm
- USSR
 - cleaning up lake Balaton
 - something on the Soviet industrial system that uses wastes as inputs to other productive process
- India
 - the Jamkhed health care project
 - something on a successful reforestation project
- Thailand
 - Nam Choam Dam
 - the village reforestation system

You can see even from this preliminary and incomplete list that we could put together an exciting book. There is one feature of this proposal that is especially attractive - every member of The Balaton Group can contribute and he represented in this book, since the time required to prepare a contribution is very much less than is required to develop a chapter for Resource Systems. It would even be possible for Dana to prepare the story from a collection of newspaper clippings, research reports, and notes that you Submit.

Before you put this Bulletin deep within your pile of things to do, please send Dana:

- your general reaction to the scheme and any constructive suggestions. Would there be

a market for this book in your country? What would it be?

- a brief description of any story you are willing to prepare from your region. Think close to home for ideas. Find some experiment or program that you know about and admire and something that illustrates, at least partially, the idea of sustainable, efficient resource use, and
- the deadline by which, absolutely, you could have the story done.

If enough replies come back to indicate that the idea is feasible, Dana will send a basic outline and style sheet to each person volunteering a story, so the stories will be in roughly the same format. If not enough replies come back, the next Bulletin will announce the demise of this idea.

III. THE LEADERSHIP AND MASTERY WORKSHOP

Over the past four years Professor Peter Senge, a member of the MIT System Dynamics Group, has developed a three-day seminar for senior corporate managers. The seminar is conducted by his company, Innovation Associates, and it is designed to help its participants develop a long-term vision of their own professional goals and to create organizations for attaining them. The seminar has been extremely successful. About 60 groups of 30 people have taken it around the US, for an average fee of \$1000. Now a number of firms in Europe are arranging for the seminar to be offered to their senior managers. Peter admires the work of The Balaton Group, and he has volunteered to conduct a session of his seminar for us at a time and cost that would permit everyone who is interested to participate.

At the September meeting we mentioned this possibility very briefly. It was decided that a few other members of the Group should take the seminar before we discuss the opportunity further. Since then Joan Davis, Jorgen Randers, and Karen Adler have come to Boston to take the workshop, and Dennis Meadows sat in to review it (he, Dana Meadows, and Tom Adler took it four years ago). Their responses to the workshop are reproduced below after an excerpt describing the workshop from an Innovation Associates' brochure:

"Leadership and Mastery is about leading an organization capable of inspired performance:

- creating and communicating a personal and organizational vision to which you are wholeheartedly committed,
- revitalizing and recommitting to the vision in the face of obstacles,
- understanding an organization as a complex system whose structure may enable or thwart realization of the vision, and
- empowering yourself and being the sort of person around whom others are empowered.

Leadership requires balance between intuition and rational analysis. There are no rules for creating a vision that inspires people---visioning is a deeply intuitive process. Yet, intuition alone is insufficient. Leaders must be able to examine and clarify complex organizational dynamics and analyze often ill-defined issues. Great leaders develop a unique interplay between intuition and reason. They use intuition to guide their analysis and they continually subject their intuitive insights to rational examination.

Leadership and Mastery incorporates explicit tools for enhancing intuitive comprehension, deepening insight into organization problems and expanding creativity. First, the system dynamics methodology developed at the Massachusetts Institute of Technology is presented as a basis for conceptualizing and analyzing organizational and social systems. The result is a deeper understanding of the structures underlying organizational dynamics and a unique communication vehicle for complex issues. Second, an explicit model of human consciousness is developed that serves as a foundation for developing intuition and creativity. Through a variety of techniques, participants demonstrate and build confidence in untapped intuitive skills that continue to develop beyond the workshop. Finally, the analytical and intuitive skills are incorporated into an overall organizational leadership context that shows their relevance and transferability to your own organization.

Leadership and Mastery is a challenging, three-day program offered to senior executives and other top level managers. As an advanced course, it requires a high degree of personal commitment and integrity. The course is designed as a complement to, and not a substitute for, basic training and skill in managerial leadership. The workshop is conducted for a group of about thirty people. Some of the course material is present by lecture and videotape, but the majority of the course is devoted to individual and small group exercises."

Review by Joan Davis

It was with mixed feelings that I went to take this course at the end of November. On the one side I was quite skeptical, because I had heard that the course deals with the use of system dynamics and intuition in goal-setting, and I felt already rather "initiated" into system dynamics. I had difficulty imagining what could be taught to the s.d. "uninitiated" (mostly business people) in a 3-day course that I wouldn't already know. Further, since I use intuition as a normal information source all the time, also here I couldn't imagine what would be new to me.

On the other hand, I had heard such convincing reports from people I am willing to be convinced by, that I felt the course must be something more than the simple sum of its two parts. Looking at it now retrospectively, I see it as being very much more than the sum of its parts. Peter Senge's way of combining the two parts provided an unexpectedly creative and valuable experience for all involved. Being simultaneously intro- and extro-spective. It not only helped me gain insight into personal goals, but also opened paths for their realization.

At the last Balaton meeting we talked about the possibility of the members of the Balaton Group taking this course together. I see in it an excellent chance to intensify our individual and mutual goals---to make them clearer to ourselves and to be more creative about paths we can utilize for their fulfillment.

It would also seem to be a unique opportunity to deal with individual and group goals among people coming from a wide variety of cultural and social backgrounds, who nonetheless all aim in essentially the same direction, giving us a strong sense of alignment. This feeling of alignment is certainly one of the main uniting elements of the Balaton Group. It seems to me that increasing our awareness of 1) this unity of purpose, 2) what each wants to contribute to the group, and 3) what each plans to do on his own, we can more effectively work together.

The course deals not only with goal pursuance, but also with goal set-ting---or to put it in the language of the course, creating one's vision. This, as most see during the course, lies far beyond what each has set as a goal. We all have in fact a common vision. We are all involved in creating a sustainable society, which commitment goes beyond our everyday goals. Frankly, I feel this course would not only intensify this commitment, but would help us see

more clearly how we as individuals and as a group can bring it about.

Review by Dennis Meadows

Dana, Tom Adler, and I took one of the first Leadership and Mastery seminars four years ago. The seminar deals with three major topic areas: tools and concepts for structural thinking (system dynamics without the DYNAMO or a computer), goal setting and visioning, organizational psychology and management. The seminar links these three in a creative and useful way. Several of the concepts and techniques that I learned there have turned out to be permanently useful to me.

This time I was at the seminar more as an observer. Since I am working to develop a 3-5 day resource management seminar for senior managers, I was sure I could learn some useful techniques that could be incorporated in the INRIC workshop. This time I did not learn much of personal use, but I did have a chance to watch how other people responded to the seminar. During the seminar, I also spent much time wondering how well the seminar was suited to the present needs of The Balaton Group. I ended up with mixed feelings. I see some difficulties with the seminar for our group, but I could also imagine that an experience of this sort could move many Balaton Group members to a much greater sense of shared purpose and greatly improved vision of what all of us are trying to accomplish.

The seminar is based on a set of goals and procedures that are especially well suited to the U.S. culture. For example, the seminar includes many "processes" where participants work in groups of two to experiment with different intuitive techniques and then to discuss the results with each other. To work very well, these processes often touch on very personal feelings, goals, fears, and beliefs. I do not know whether members of The Balaton Group have yet developed enough trust in each other for this to work.

The vocabulary of the seminar is very subtle - it could be difficult for those who speak English as a second language to follow all the discussions.

The seminar takes a lot of time - three full days from 9:00 until 19:00 each day. Certainly there are many ways for the Group to gain value from an investment of three days.

If some members took the workshop and others did not, it might create some barriers to communication within the group. I do not believe this is a serious threat, but it is worth mentioning.

On the positive side I can say that the seminar could provide a stimulus to the group that is required now. I sense a sort of stagnation in the activities of The Balaton Group. We have successfully created the administrative mechanisms for a network, and most of us have become well acquainted with each other. Now it is time for "the next step," some initiative that will build on capabilities and goals of all the centers and create something much more important than any of us could create alone. The book, game, and workshop . serve those purposes to some extent. But basically they are viewed as the property of Dana and me by all except a few of the other centers (the Soviet center is an exception; its members have clearly taken on big interest and responsibility for the success of the textbook).

There absolutely is inherent in the network the capacity to create collectively some globally-important results, but that will require something more than doing a little more of what we are doing now. I do not know what those results should be, and I still do not understand exactly how to "kick" the network centers into a new mode of collaboration and performance to achieve them. Senge's workshop is definitely one experience that might achieve both goals,

and at present I do not see another.

IV. DEFINITIONS OF CARRYING CAPACITY AND SUSTAINABILITY

Last September it was suggested that we begin to collect different definitions of carrying capacity and sustainability. Here are the first items in the set; please send us others, and they will be reproduced in future Bulletins.

from Eugene P. Odum, Fundamentals of Ecology, W.B.Saunders Company, Philadelphia, 1971, pp. 183-185.

We may designate two basic patterns,.. .namely, the J-shaped growth form and the S-shaped or sigmoid growth form.... In the sigmoid form, the population increases slowly at first...then more rapidly....but it soon slows down gradually as the environmental resistance increases percentage-wise until a more or less equilibrium level is reached and maintained. This form may be represented by the simple logistic model:

$$\frac{dN}{dt} = rN \frac{(K-N)}{K}$$

The upper level, beyond which no major increase can occur, as represented by the constant K, is the upper asymptote of the sigmoid curve and has been aptly called the carrying capacity....

The simple situation in which environmental resistance increases linearly with density seems to hold for populations of organisms that have very simple life histories, as for example, yeasts growing in a limited space.... In populations of higher plants and animals, which have complicated life histories and long periods of individual development, there are likely to be delayed responses which greatly modify the growth form.... In such cases.. .almost always the population "overshoots" the upper asymptote and undergoes oscillations before settling down at the carrying capacity level... .Deevey suggests that this growth form is perhaps the most common and the type most likely to be exhibited by the human population if controlled only by its own "self-crowding" effects.

(From P.M. Schneider, D.R. Godschalk, and M. Axler, "The Carrying Capacity Concept as a Planning Tool", American Planning Association, Report No. 338, 1978.)

Carrying capacity was originally associated with ecosystems management. It was defined as the maximum population density for a given species in an environment, which could be supported without degradation of that environment.... Planners have enlarged the definition to include the many variables inherent in man-made systems. Carrying capacity, as the term is generally used by planners, may be defined as the ability of a natural or man-made system to absorb population growth or physical development without significant degradation or breakdown.....Certain assumptions underlie the use of the concept in planning:

1. There are limits to the amount of growth and development the natural environment can absorb without threatening public health, welfare, and safety through environmental degradation. ...
2. Critical population thresholds can be identified beyond which continuation of growth or development at greater densities will trigger the deterioration of important natural resources such as water or air....
3. The natural capacity of a resource to absorb growth is not fixed, but can be altered by human intervention....

4. The determination of the limit of capacity of a given system is, finally, a judgmental act. Although grounded in scientific and engineering principles, choice is still required to draw the line between a "safe" and an "unsafe" and an "acceptable" and "unacceptable" environment.

(From Malcolm Slessor's "Carrying Capacity Assessment with a Pilot Study of Kenya" final report to UNESCO, Energy Studies Unit, Strathclyde University, December 1984.)

Carrying capacity is defined as that population, at any moment in time, which can be indefinitely sustained at a given standard of living. It is not a threshold, and can be enhanced by appropriate national development using physical and human resources. Socio-cultural factors can both enhance and diminish carrying capacity.

The development process should be sustainable. It is clear now that this requires that agricultural intensification and industrial development be sustained. That is to say, the country must be able not only to produce enough food, but be able to maintain its industry and enlarge its capital base at least as fast as its population growth. One necessary condition for this to happen is that energy supply be always maintained at a rate to match national needs. Long term self-sufficiency in energy may be considered one element in maintaining sustainability.

UNESCO's official definition (also quoted in the above document):

Carrying capacity is the number of people sharing a given territory, which can for the foreseeable future and in accordance with the socio-cultural values of that territory, sustain a given standard of living utilizing energy and other physical resources, as well as technology, enterprise, and skills.

(from D.H. Meadows and J.M. Robinson, The Electronic Oracle:):

Carrying capacity is defined by ecologists as the level of population that can be sustained indefinitely by the environment at a given living standard and set of technologies.....

- At any time the carrying capacity is determined by the most limiting factor needed to sustain the population. For instance, it would make no difference how abundant food might be, if oil were scarce, or vice versa. Adding more nitrogen to the soil would not increase yields if in fact calcium were the most limiting factor.
- The carrying capacity is dynamic. The levels of the various environmental resources, relative to the population's need for them, change constantly. Therefore the most limiting factor may shift from resource to resource over time. One that is safely in excess today may become the critical determinant of the carrying capacity tomorrow. (The relative abundance of food vs. oil may depend on weather fluctuations; the relative abundance of nitrogen vs. calcium may depend on the type of crop grown.)
- The shifts in relative abundance of the many resources that define carrying capacity are complicated by the fact that their availability may depend on each other (oil is needed to grow food, nitrogen availability in the soil may be linked chemically with the calcium concentration) and on the response of the population to its perception of the relative abundance (food and oil may be substituted for each other by shifting the balance between labor and capital; the demand for nitrogen-requiring crops may be increased and the demand for calcium-requiring crops increased; the whole population and its demands may grow faster or slower.)

V. NEW BOOKS AND REPORTS BY BALATON MEMBERS

The final report for UNESCO on the Kenya carrying capacity study by Malcolm Slessor, Ian Hounam, and Jane King (among others) has been completed and is available from the Energy Studies Unit, Strathclyde University. It is an excellent account of the general concepts behind the study and its conclusions and should be required reading for Balaton Group members interested in becoming more precise about the concept of carrying capacity. The report does not contain a complete program listing for the carrying capacity model; that can be obtained as a separate report from the Energy Studies Unit.

The Electronic Oracle: Computer Models and Social Decisions by Donella H. Meadows and Jennifer W. Robinson will be available from John Wiley & Sons, London, early in 1985 (final proofs and index were returned to them in November). It will be a hardback book, price has not yet been announced.

Environmental and Resource Dynamics on the Microcomputer by Hartmut Bossel will appear shortly in German (Umweltdynamik - 30 Programme fuer kybernetische Umwelterfahrungen auf jedem BASIC-Rechner, by Hartmut Rossel, Te-wi Verlag, Munich 1985). The book presents the background, programs, and documentation for 29 computer models plus the DYSYS simulation program to run these models on the five most common microcomputers: the IBM PC and compatibles, the APPLE II, the Sinclair Spectrum, the Commodore 64, and the Epson HX-20. The models describe basic dynamic systems from the areas of population dynamics, predator-prey systems and food chains, nutrient cycles, biomass growth, ecosystem development, water management, agriculture, energy supply and conservation, mineral resource use, and global models.

Apart from environmental models, the DYSYS software can be used to compute any kind of dynamic system on small microcomputers. The user specifies the model equations in BASIC as well as the parameters, the interactive input and the desired output. DYSYS handles the interactive query, the simulation itself, and the graphic output (providing DYNAMO-like plots as well as high resolution time and phase graphs).

Diskettes and cassettes containing the programs and DYSYS will also be available. Editions of the book in English and other languages are planned. The book will sell for about \$15. Balaton Group members who are interested in obtaining the German edition should write to Hartmut Bossel, Galgenkoepfel 6, D-3501 Zierenberg, F.R. GERMANY.

VI. CORRESPONDENCE FROM THE MEMBERS

Hartmut Bossel

I now hope that it will be possible for us to gain access to the electronic mail system over the next few weeks.

The first stage of our project on consultation software for organic agriculture has been completed. We now have a tremendous collection of agricultural data on field crops, nutrient and energy flows, and a prototype simulation software for crop rotation planning.

Our work from a two-year project that simulated the dynamics of forest die-back has been completed and will appear as a book. The major components of the model are submodels of the tree processes (nutrient and water uptake, photosynthesis, accumulation and distribution of photosynthesis, leaf and feeder root growth and decay, and biomass accumulation), of nitrogen mineralization in the soil, of soil water, and of soil chemistry (acidification).

Among the important results from the investigation are:

- Trees can take a certain amount of pollution-caused damage of leaves or feeder roots without breaking down, if the damage stays below a critical value. However, growth may be significantly reduced.
- If the damage exceeds a critical threshold, an irreversible die-back process begins which will lead to a sudden breakdown of the vital functions some years later. The forest die-back now observed in the forests of the Northern hemisphere is therefore a "natural" response of trees to chronic pollution stress.
- The tree breaks down as a system. The symptoms are therefore identical, irrespective of the damage path (leaves or soil).
- Forests can only be saved if air pollution is reduced quickly and drastically.

The documentation of the model and the simulation results will be published as a 270-page text by Springer Verlag Berlin/Heidelberg/New York in the spring of 1985 in German, Dynamik des Waldsterbens-Mathematisches Modell und Computer simulation. H. Bossel, W. Metzler, & H. Schafer (Eds.)

During the Balaton meeting and on the train to Vienna I talked to several people concerning this year's Balaton meeting. We all agreed that somehow this year it didn't go too well, and that something was missing. V/e couldn't quite put our fingers on the reasons, but I will try to pass on to you some thoughts which might be helpful for preparing next year's meeting.

(1) I think the fact that some of the senior Balaton members did not attend (Enrique, Malcolm, Jane, Victor, Carsten) had a considerable effect on the meeting. The younger scientists, many of them new to the group, don't have the self-confidence and experience to motivate and shape the meeting. To be sure Niels and Gerardo made very valuable contributions, but there should have been at least a dozen such people in order to have the kind of fruitful dialog which we have come to expect of the Balaton Group.

(2) Probably as a result of this lack of self-organizing ability, you (Dennis and Dana) played a rather dominant role in the meeting. I think this discouraged some of the participants, who would otherwise have played a more active part, from contributing to the meeting. I think it was definitely a mistake that both of you simultaneously chaired some of the meetings and dominated the discussions (for lack of other contributions). Hut this I really attribute to the composition of the group, realizing that we don't have much control over it.

(3) It seems that it would have been better to have a written schedule distributed at the beginning of the meeting (or with the invitations). This agenda should be more or less adhered to. If changes are made, the whole group should decide.

(4) Most people had come with the intention of doing some serious work on this year's theme (carrying capacity) but this was really not treated as thoroughly as it should have been. I think the one day lost in Budapest really hurt us here. Next time, the public meeting should really be on the last day (or the day after).

(5) All of us support the Balaton network because we feel that our work in this context can make a difference to the future of the globe. We would therefore like to see it prosper—as a self-organizing viable structure. However, this would mean that members would have to share more of the burdens, the responsibilities, as well as the visions and the setting of goals

and objectives. As it is now, this is practically all in your hands. For the sake of efficiency, this is probably the best solution, but for the sake of motivation of members, and of the self-organizing properties of the network. this is quite detrimental. In my opinion the organization should remain as it is (i.e. in your able hands), but the members must be given more of a say.

(6) There is universal agreement that in getting the Balaton network to work In so many countries with very different backgrounds you are making an enormous contribution to solving some of the urgent resource and environmental problems. All of us are committed in helping you with this effort as best we can. It will be hard for most of us to keep up with your energy and pace—so don't despair if you still have to do most of the work while getting 'good advice' from guys like me. It's the sum of the net positive rates that increases the level eventually.

A reply from Dana Meadows

I will be most interested in the response of other Balaton Group members to Hartmut's helpful letter. I personally was very glad to hear this kind of constructive (and graciously-expressed) criticism, especially since it raises an issue that has been bothering me. Ideally, our network would operate in such a way that each of us finds it not a diversion from our primary work, which is to promote sustainable, efficient, equitable resource use in our own regions. Network business should not take us away from that work, but should enhance our ability to do it more effectively. Dennis and I have been careful not to impose group-administrative responsibility on anyone unless they express a strong interest in it. In fact, ideally, members should be almost unconscious of the network's administration and not have to spend much time (or space in the newsletter!) discussing it.

On the other hand, there is a good deal of central administrative work and planning to do, for the network to function well. It must be done in a first-class way. appropriate to the first-class quality of the people in the network, and it absolutely must reflect accurately the needs and intentions of those people. And it will be a measure of the growing strength of the group, as a group, when many of us produce that result together, still without letting it interrupt our work in our home centers.

Dennis and I have administered the network from its beginning, based on mutual agreement. Now is the time to spread the responsibility, not only because of the issues Hartmut has raised, but because the Meadows must also put more attention into our home center.

Let us now make explicit something that most have already known. Anyone who would like to take on any part of the administration of the network—fundraising, newsletter preparation, arrangements for meetings, mail system, finding new members, chairing meetings, preparing publications—need only ask to take it on. Anyone who would like there to be other major joint projects such as the game, the book, or the workshops, need only declare responsibility for them. Dennis and I will continue to do our best to carry out whatever we see needs to be done that nobody else is doing. And we will always welcome communications like Hartmut's that help the group see its needs and goals needs better. This is your network, and it can only serve you properly if you participate sufficiently to make your needs clearly known.

In that regard, Hartmut has kindly accepted responsibility for the program for the next annual meeting in September, and he needs to hear from you how you feel our time together can be best used.

Enrique Campos-Lopez recently called the Meadows to say that he and Roberto Armijo are now well established in Mexico City where they are involved in the creation of management training institute. They intend to visit the Resource Policy Center at Dartmouth around the end of February to discuss several concrete possibilities for joint projects. For the moment their connection to the electronic mail system is not working.

Istvan Lang (This communication is extracted from a lecture called "Toward an Adaptive Agriculture", given at a Hungarian theoretical conference on the further development of economic management.)

Hungarian agriculture can contribute to the improvement of the financial balance of the country in two ways. On the one hand, it satisfies the requirements of domestic consumption of basic food items and certain raw materials, and thus those products that can be produced with advantage in the country need not be imported. On the other hand it produces more than the domestic requirements and this surplus is exported.

A country where the social aim is to be self-sufficient in basic food items is in a relatively simple situation. The requirements can be estimated with great reliability, and the means to satisfy these requirements---machines, fertilizers, seed, labor---can also be determined. In such a country there are no sudden changes. The requirements and flows are relatively stable. (Let us go back 50 years and assume what a sweet-smelling freshly-baked loaf of bread would have been in 1934. We would willingly eat such bread today, and we can assume with great certainty that people will like such bread even in 2034. But let us envision a radio that was regarded as modern in 1934. We would smile at it now. Probably the modern radio of today will be a museum piece in 2034.)

A country producing food beyond its needs is in a more difficult situation, particularly if the products are sold in a market where hard currency can be raised or are exchanged for goods that are basic necessities for the country. A country's position is even less favorable if the foreign trade has a significant share in the national income. The situation is still worse in a medium-size country, where the share of agricultural export is relatively high in foreign trade, but because of its geographical size it cannot produce so much that it could be a determining factor in the world market.

Among the socialist countries, Bulgaria and Hungary are in this "multiple disadvantage" situation. Therefore we have to develop a new strategy in the fight for favorable food markets. We often use the terms "competitiveness", "flexibility", "better adjustment to the requirements", "increased adaptability", but we cannot exactly define what they really mean in their complexity.

So far, agricultural research has mainly analyzed how the quantity of production could be increased, how certain qualities could be improved, and how specific inputs could be diminished. Of course, these kinds of research are necessary in the future too. But another kind of research is also required; we must examine the regularities of changes, analyze thoroughly the possibilities and limits for flexible adaptation, and work out a better adaptability to changing requirements and conditions.

In the case of natural factors, a better adaptation to the soil, hydro-logical, geographical, and climatic conditions could result in the discovery of additional internal reserves of 15-20 percent. Among technical factors, first of all the possibilities---and, of course, the limits---of using new technologies could be analyzed in detail. One of the most important social factors is the changing requirements of foreign markets.

These natural, technical, and social factors are interrelated with each other and constitute a great, unified system. Therefore the scientific analysis of the adaptive agricultural system should require the coordinated work of representatives of many special areas. At the same time, an analysis like this could significantly contribute to the elaboration of the long-term development targets for domestic bio-industries.

Adaptive agriculture could better contribute to the establishment and stabilization of economic equilibrium, if the theoretical and practical possibilities and existing limits of adaptability were studied in a broader context. Several theoretical and practical questions could be answered in a relatively short time by a better coordination of the available intellectual and material resources. Therefore it would be worth dealing with problems of adaptive agriculture. It appears that a research program like this would be something new in scientific fields, and would be a pioneering work in an international perspective too.

Niels Meyer

Four of the Nordic countries (Denmark, Finland, Norway and Sweden) are planning an ambitious research project concerned with the future of this region. The proposal for the project originated with the grass-root movement in Norway called "The Future in Our Hands" in 1980. The idea is now supported by more than 100 grass-root movements in the Nordic region.

The background for the project is a desire to create a development different from the present materialistic growth philosophy which dominates the industrial world. The alternative goal is expressed in a so-called- "mandate". which includes among others the following points:

- protection of the natural environment,
- equity between nations, between people within the nations, and between the sexes.
- more self determination and local autonomy,
- alternative security policy, abolishing the arms race, and
- the economy must be adapted to these values, not vice versa.

The research project is going to analyze the barriers and constraints in the present international and national systems that might prevent the desired development. The report should also give a holistic and visionary description of possible future societies in accordance with the mandate.

Methodology:

In order to make the project broadly acceptable and credible it is planned to base the holistic vision on well-documented research reports on subjects such as alternative energy systems, organic farming, decentralized production, Nordic self-reliance in basic commodities, formal and informal economy, new working and production concepts, etc.

These theoretical analyses will be supplemented by social and technical experiments so as to gain experience in real life. The research is clearly normative in nature, and it is planned to carry it out with close cooperation between the involved experts and grass-root people.

Non-traditional methods should be used to communicate the results of the project, including TV, radio, theater, exhibitions, public seminars, educational material for schools, etc. During the progress of the project a large number of people should be involved in a number of different ways. It is believed that this process could be equally as important as the results of the project.

Some historical facts about the project:

In the fall of 1982 the Norwegian Parliament decided to fund 1.2 Norwegian kroner (about \$130,000) for a pre-project. During 1983 this grant was used to form a small research group in Oslo (4 people) who formulated the "problematique" and working program for the main project. An advisory scientific committee was formed to support the research group. This committee included scientists from Denmark and Sweden.

During 1983 a number of Nordic seminars were organized with participation of both scientists and grass-root people. It turned out to be difficult to overcome the intrinsic scepticism of each group towards the other. The experts do not like the non-scientific working methods of the grass-root people, and they on the other side are impatient with the narrow viewpoints of the experts. After a few seminars the communications have somewhat improved. The conclusion is that it seems possible to organize the main project such that advantage is taken of the different background of the two groups. But much experience remains to be gained about how this is best organized in practice.

The present situation:

In the spring of 1984 an application for about 100 million Norwegian kroner (about \$10 million) was submitted to the Norwegian parliament. This application for the main project is being evaluated in an ad hoc Nordic Scientific committee. In Sweden and Finland small research groups have been formed based on public funding (on the order of \$40,000 for the coming year).

In Denmark it is planned to submit an application to the Danish parliament. This application will be parallel to the Norwegian one concerning the budget and the philosophy of the main project. The Danish and Norwegian proposals include a planned cooperation with some developing countries. It is absolutely not intended to aim at a Nordic region in splendid isolation from the rest of the world. On the contrary, it is an important part of the mandate to work for a new world order with a high degree of global equity. A self-reliant Nordic region would have the freedom to promote an ecological sustainable and equitable global society.

Jorgen Norgard

Bente and I are going to Australia for three months starting early in February. I have been invited on a lecture tour to most parts of the country, talking on topics like: 1) energy- and resource-efficient technology, 2) future goals for mankind, and 3) long-term energy planning.

On our way to Australia we plan to stop in Los Angeles or San Francisco. Hawaii, Fiji, and perhaps New Zealand. Do any of the Balaton Group members have suggestions for whom we might meet in these places? On our way back to Denmark we plan to visit Chirapol in Thailand and to work with him for a few days.

The energy chapter has not come very far, but teaching stops now and I hope to go along with it.

Chirapol Sintunawa

Soon after I returned to Thailand I played the STRATEGEM-1 game and after the game I explained the principles behind the game (as I understand them). There were several people who played the game who became interested in the principles of working as a local network

similar to the Balaton network. This group now includes 8 regular members and 4 partly participating members from both government and private agencies. The group meets every Friday afternoon and this week made two cooperative research proposals to the National Research Council. In this stage the aim of the group is primarily in interagency cooperation. The main purpose of our regular meeting is to share and discuss each individual's work and progress.

There is one piece of very bad news that has a great influence on our work both now and in the future. My director, Dr. Mart Tuntawiroon and his wife (also a colleague in Chirapol's institute) were killed in their office on November 28th. This has been a great loss for our institute and for the Thai government. We also now have less professional staff to carry out the same load, and parts of their work have been assigned to me. The future of our Faculty will be decided by a smaller group of staff. There are now only two Ph.D. graduates in the Faculty; this means that many more students will be under the supervision of these two staff. Working in this situation I do need your support, but I cannot identify what kind of help I need from you now. I will try to solve all problems by myself and try not to burden you. I will keep you informed of my activities here.

Malcolm Slesser

My tenancy at the Energy Studies Unit ends at Christmas this year but my activities will not. I belong as a council member to a loose college of consultants called the Resource Utilization Institute (RUI), which will become my professional umbrella. It is too early to say what will happen to my association with the Unit, since we cannot say with any certainty at the moment that there will be funding for the continued work on our carrying capacity studies using the ECCO model. This does not mean that ECCO will not be widely used. Through Jane King quite a number of countries are going to get involved in the use of ECCO—but I cannot see it bringing to the Energy Studies Unit a contract; rather it might bring periodic consultancy and requests for training. For example, we are going to have a middle-level Kenyan here for a month to be trained in the operation of ECCO.

I fully intend to come to next year's Balaton Meeting. In this connection perhaps I could articulate one or two anxieties that I have. My first and major one is that I see us as a group becoming all too frequently involved in the micro level problems. While I accept that it is necessary to understand the nature of these problems (for example, questions like a sustainable agriculture), one of the problems we face in the world is that everybody is looking at the system in micro terms and solving little problems here and tinkering with other problems over there. I would like to think that the Balaton Group has the capacity and imagination to think in a more macro level and integrated way.

An example of the sort of problem that often occurs in my own environment as well as the Balaton Group is the concern for the disparity between the rich and poor, whether within nations or between nations. Now I think we have to decide what it is we are about, and I think these political issues of how we solve disparities within nations are irrelevant to our objective. I am sufficiently involved in politics here to know that nothing that the Balaton Group does or could do has any influence on this issue. On the other hand, it can have relevance to the issue of disparity of wealth between countries.

We see this very clearly in our recent analysis of the Kenya situation using the ECCO model, where quite the most effective way of helping Kenya to get on its feet is to offer interest-free loans, while at the same time assisting a stern measure of family planning.

I have also notice among the Group a tendency to set up normative goals, which might also

be called ideals about behavior, habits, and so on. For example, in the last Bulletin Niels Meyer is apparently keen on a low-energy society. Now it is perfectly true that 10 years ago I would have been much attracted to that option, but the work we have done here, especially in connection with our world energy supply model, convinces me that this is not either a particularly attractive or a particularly necessary plan. I have other views on energy such as the merits of energy rationing. It may be that Niels and I are not so far apart as the written word would make us.

I really find myself surprised by all this introspective discussion on the work "sustainability". If the Balaton Group is not working toward creating a sustainable society, then I can see no particular purpose in the Group. In my language, sustainability must mean the availability of energy on a continual basis to power the economy in question. We know from our studies that there are many, many ways in which the size, nature, and intensity of the economy can be enhanced without losing sustainability. One of the interesting possibilities is the utilization of the present, easily-accessible fossil energy stocks to create the presently-high capital investment in solar energy transformation systems, which can, in due course, take over. That is a very dynamic thing.

So summing up the future, during the coming year I expect to be involved in a small way as a consultant on the various carrying capacity studies that Jane King will be promoting through UNESCO. I myself will have a fair amount of time to do other things. I am at the finishing stages of a book about resource accounting. Communication with me is best from now on to be conducted through my home address, which is Nether Glastry, Dumblane, Perthshire, Scotland (telephone: 786 822444).

VII. STORIES AND QUOTES

Do Good Anyway

People are illogical, unreasonable, contradictory, and self-centered. Love them anyway.

If you do good, people are sure to accuse you of selfish ulterior motives. Do good anyway.

If you are successful, you win false friends and true enemies. Succeed anyway.

The good you do today will most likely be forgotten tomorrow. Do good anyway.

Honesty and frankness make you vulnerable. Be honest and frank anyway.

The biggest people with the biggest ideas can be shot down by the smallest people with the smallest ideas. Think big anyway.

People say that they favor underdogs, but actually they follow only top dogs. Fight for underdogs anyway.

What you spend years building may be destroyed overnight. Build anyway.

People really need help, but they may attack you if you help them. Help them anyway.

Give the world the best you have and you'll get kicked in the teeth. Give the world the best you have anyway.

(Source unknown)

Yekepa, Liberia—When the Iron Runs Out

Far inland in Liberia, near the borders of Guinea and the Ivory Coast, is Mount Nimba, a mountain that is made almost entirely of high-quality iron ore. Until the middle of this century there was no industrial infrastructure near that mountain---no roads or railroads or power sources or cities. There was only the African countryside of bush and rain forest, and a small village called Yekepa. Most of the families were traditional subsistence farmers, with very little contact with any cash economy.

In 1948 LAMCO, a multinational corporation owned by the Liberian government (50%) and by companies in the LISA, Sweden, and Canada, began to put in place all that was needed to exploit that iron. They cleared a 160-mile strip of jungle (salvaging the valuable hardwoods) to construct a railroad to a port; they enhanced the port to accommodate large ore-carrying ships. In addition to all the buildings and machinery they needed for the mine, they constructed in Yekepa 3000 homes for workers, schools, a hospital, markets, electrical generation and sewage treatment facilities. They trained African workers in everything from basic literacy to truck driving and machine maintenance. By 1963 most of this preparatory work was completed and ore production began.

As might be expected, the operation of the mine had a rapid and drastic impact on Yekepa. Workers migrated in, a cash economy began, ancillary services began to be demanded that stipulated still more in migration. The town grew and small stores sprang up, dependent upon expenditures of the mine workers. Labor was drawn away from traditional food production, and the area imported food for the first time. Yekepa became the second largest city in Liberia, and its required amenities and services were costing LAMCO \$5 million per year. Even this amount was inadequate. A slum with about 10,000 inhabitants formed on the edge of town.

In 1969 the Swedish general manager of LAMCO became concerned about the fate of Yekepa after the ore runs out. He assigned several LAMCO managers to work out a plan to avoid the possibility of leaving a "ghost town"; instead to establish over a twenty-year period a viable economy not based on iron ore.

The first step in the plan was to "spin off" to Liberian ownership and management all economic activities that were not directly related to the extraction, processing, or shipment of iron ore. Enterprises such as a supermarket, construction firm, furniture repair shop, and movie house were transferred to local ownership. However the transferred businesses did not thrive. Managerial and maintenance skills were insufficient. The Liberians were not able to jump into an entirely new culture within a few years.

In 1973 the company evaluated its spin-off policy and realized that something more was needed. After considerable study and search, they engaged a small non-profit development agency, Partnership for Productivity (PfP) to develop a three-year plan to enhance the Yekepa economy and to bring in international development financing to help in the process.

PfP agreed to assist the spun-off enterprises in management, to start six new experimental enterprises under Liberian ownership, to train local managers, to create new agricultural developments, to attract at least \$700,000 in outside investment, and to do all this in coordination with other Liberian development programs and objectives. The cost of this effort would be \$680,000, about half to be supplied by LAMCO and the other half from outside development funding agencies. The project began in 1974.

Between 1974 and 1980 all the goals mentioned above were met. By 1980 PfP had a staff of 50 (40 of them Liberian) in Yekepa and an annual operating budget of \$1 million, about \$100,000 of which came from LAMCO and most of the rest from USAID. Its primary work is creating and funding new economic enterprises and training local people to run them. Only about 25% of its work is done in Yekepa, where businesses have been created such as a saw mill, a car repair shop, a charcoal producer, a dressmaker, and a brick factory. The majority of the effort is in the surrounding rural areas, where extension agents are developing production of sufficient food for the area, so imports are no longer necessary, and also sufficient other products to maintain local industries and to stop the flow of in migration to Yekepa. Cocoa and coffee plantations are starting, and also wet-land rice production in newly-cleared swamps (far more productive than the traditional dry-land rice cultivation).

A demonstration farm now tests new production possibilities such as fish farming, vegetable production, and animal feed plots, and trains farmers in successful new techniques. A farmers' co-op has been organized and maintains cooperative pig and poultry farms. An appropriate technology center builds and demonstrates equipment suited to local materials, such as hoes, tree-planters, chick-brooders, and charcoal kilns.

Yekepa is still a long way from being a viable city apart from the operation of the iron mine. But a beginning has been made. PfP workers say that their most important contribution so far has been attitudinal—people no longer feel a sense of total dependency on LAMCO and the outside culture it brought to the area. Ideas of self-reliance, responsibility, and creativity are beginning to spread.

(Source: William M. Blaisdell and Lloyd R. Slater of Partnership for Productivity, unpublished report of the Fund for Multinational Management Education, New York, 1981.)

WHAT THE ANTS ARE SAYING (Note the following is written by Archy, a cockroach, to his boss a newspaper' editor, on the office typewriter at night. Archy has to operate the typewriter by jumping onto the keys. so he obviously is unable to make capital letters or punctuation that requires depressing two keys at once.)

it want to be long now it wont be long
man is making deserts of the earth
it wont be long now
before man will have used it up
so that nothing but ants
and centipedes and scorpions
can find a living on it
man has oppressed us for a million years
but he goes on steadily cutting the ground form under
his own feet making deserts deserts desert

we ants remember
and have it all recorded
in out tribal lore
when gobi was a paradise
swarming with men and rich
in human prosperity
it is a desert now and the home
of scorpions ants and centipedes
what men calls civilization
always results in deserts
man is never on the square
he uses up the fat and greenery of the earth
each generation wastes a little more
of the future with greed and lust for riches

north africa was once
a garden spot and then came carthage and rome
and despoiled the storehouse

and now you have sahara
sahara ants and centipedes

toltecs and aztecs had a mighty
civilization on this continent
but they robbed the soil and wasted nature
and now you have deserts scorpions ants and
centipedes
and the deserts of the near east
followed egypt and babylon and assyria
and persia and rome and the truk
the ant is the inheritor of tamerlane
and the scorpion succeeds the caesars

america was once a paradise
of timberland and stream
but it is dying because of the greed
and money lust of a thousand little kings
who slashed the timber all to hell

and would not be controlled
and changed the climate
and stole and rainfall form posterity
and it wont be long now
it wont be long now
it wont be long
till everything is a desert
from the alleghenies to the rockies
the deserts are coming
the deserts are spreading
will be a bed of sand

ants and scorpions and centipedes
ants and scorpions and centipedes
shall inherit the earth

men talk of money and industry
of hard times and recoveries
of finance and economics
but the ants wait and the scorpions wait
for while men talk they are making deserts
all the time
getting the world ready for the conquering
And
drought and erosion and desert
Because
rainfall passing of in flood and freshet

and carrying good soil with it
because there are no longer forests
to withhold the water in the billion matriculations of
the roots

it wont be long now it wont be long
till earth is barren as the moon
And
dear boos i relay this information

without any fear that humanity
will take warning and reform

(Don Marquis, the life and time of archy and
mehitable, 1916)

VIII. ADMINISTRATIVE MISCELLANEOUS

Balaton Croup T Shirts

Anyone who has participated in one of the Balaton Group meetings is entitled to a free T-shirt with the group logo. Those who did not attend the last meeting and a few who could not find the size they needed last September are still missing this incredibly precious gift. Dennis has now restocked his supplies of shirts in the four U.S. sizes: Small, Medium, Large, and Extra Large. Let him know the size you need, if you still lack this prestigious badge of membership.

DYNAMO for the IBM-PC

A DYNAMO compiler is now available for the IBM-PC. The program is offered until the end of March 1985 to all Balaton Group members at a 20% discount by the developer, Pugh-Roberts, Inc. in Cambridge, Massachusetts. The program is rather slow; it requires two disk drives and 128 K of RAM. However, it does provide a way of developing and running standard DYNAMO programs on the PC. Those who are willing and able to pay for the program should send Dennis \$316. Those who could use the DYNAMO but cannot afford even the discounted price should send Dennis a letter indicating the computer they intend to use and describing the use they would have for it. It may be possible to find some modest funding to help support purchase of the programs for use by Balaton Group members.

A second language that offers DYNAMO-like capabilities has also just been announced for the IBM-PC. NDTRAM2 compiles and runs programs that are nearly identical to DYNAMO. The compiler has a slightly different set of functions, and it offers a variety of integration techniques in addition to the simple one used in DYNAMO. Normally it does not take much time to convert a DYNAMO program into one that will execute under NDTRAN2.

This DYNAMO substitute is only slightly cheaper, \$285, (though I expect I could successfully negotiate for a significantly lower price). I expect it runs large models much faster than DYNAMO, since it is designed to use the 8087 chip (the numeric math coprocessor) that can be installed in every IBM PC. The 8087 is not required to run the compiler, but its use doubles the speed of execution. To run this program requires:

- PC DOS 2.0 or higher,
- a minimum of 192 K RAM.
- 2 double side, double density disk drives or one OS DD disk drive plus a hard disk, and
- an 80 or 133 column printer.

The program can be ordered through Dennis or directly from Apogee Computer Designs, Inc., 583 Saratoga Road, Gansevoort, NY 12831, USA (518) 583-0251.

Information on the Game

In November forty copies of the STRATEGEM-1 game were distributed to Balaton Group members who had ordered it. Another 200 copies are being prepared. There is at last a detailed, 90-page user's manual. It lists the program and describes setup, operation, and debriefing of the game. Please send requests for game sets to Dennis.

The game continues to get good reviews. It has been adopted as part of the central curriculum by a U.S. organization that is developing short courses on global problems for foreign exchange students studying in U.S. universities. Dana and Dennis have been invited to

Nairobi by Genady Golubev in March to run the game and an abbreviated version of the resource management workshop for senior officials from UNEP and from the planning ministries of six African nations. Karen Adler recently ran the game in Zurich for a variety of university, government, and environmental group personnel. Several participants asked for copies to use in their own organizations.

Despite this reception, there are still many details that must be improved, even on this introductory version. Karen sent to Dartmouth a number of excellent suggestions for improving the game and making its operation more clear. Ferenc Toth has incorporated a useful set of six technology relationships in the structure of the model, but the coefficients have not yet been adjusted to make them active. Noone is yet satisfied with the protocol for debriefing the game. Dennis is eager to hear from others who have tried using STRATEGEM-1 with people in their own regions. Of special interest are suggestions for making the operation and the debriefing more efficient and more educational for the participants.

Funding for Joint Projects

Next June there is a possibility that INRIC will receive some funds to pay the expenses for teams involving any two or more INRIC centers that wish to develop a collaborative research or teaching project. If we are successful with this proposal, \$5000 - \$10,000 would be available to teams who wish to carry out the planning phase of a larger project on sustainable resource use. Consult with others in the network to see if you can cooperate with them to prepare a proposal to receive a portion of these seed funds. If there seems to be a possibility, send Dennis the outline of the proposal you would like to develop.

INRIC, Incorporated

The U.S. organization that serves as recipient of funds for INRIC has now officially been incorporated as a research and teaching organization in New Hampshire. Members for the first board of directors are Hartmut Bossel, Gerardo Budowski, Enrique Campos-Lopez, Joan Davis, and Dana Meadows. The first meeting of the board will be at the fourth Balaton Group meeting.