

The Courier

1993-1994 - 8. August 1994



MAN AND THE BIOSPHERE

*a partnership
for sustainable
development*

A time to live ...



Photo George Rodger © Magnum, Paris

The staff of life

Smiles of satisfaction light up the faces of these Egyptian village women as they complete the time-honoured ritual of baking bread. In many parts of the world bread has been a staple of human diet for some twelve thousand years. The first bread, made in Neolithic times, probably consisted of crushed grain, moistened with water and baked by being laid on heated stones and covered with hot ashes. It is to the ancient Egyptians that we owe the invention of the bread oven and the discovery of the fermentation process in wheat dough that makes possible the baking of light aerated bread.

Editorial



October 1987

40th year

One of the highlights of 1987 has been the publication of *Our Common Future*, the report of the independent World Commission on Environment and Development, commissioned by the United Nations. "The environment," says the report, "is where we all live; and development is what we all do in attempting to improve our lot within that abode. The two are inseparable."

The report goes on to say that "the changes in human attitudes that we call for depend on a vast campaign of education, debate and public participation. This campaign must start now if sustainable human progress is to be achieved."

In this issue of the *Unesco Courier* we hope to further that campaign by publishing extracts from a forthcoming report on Unesco's Man and the Biosphere (MAB) Programme, entitled *Man Belongs to the Earth*, in which a serious attempt has been made to marry strict scientific accuracy with a style accessible to the general reader.

The extracts published here do not by any means cover the entire range of MAB activities. In particular, forests are deliberately not mentioned since we shall be devoting a future issue of the *Unesco Courier* to this subject. The extracts do, however, underline the message of the World Commission on Environment and Development that development and conservation of the environment, far from being incompatible, are inextricably linked.

The year 1987 also marks the 150th anniversary of the birth of the Georgian writer and poet Ilya Chavchavadze and the 100th anniversary of the birth of Les Kurbas, founder of Soviet Ukrainian theatre. To conclude this issue, we publish articles on the life and work of these two men, each of whom played their part in the enrichment of world culture.

Cover: Man's partnership with nature and the progress being made along the road to sustainable development are symbolized by this view of farmland near Ruijin, in the grain-rich province of Kiangsi, in the middle Yangtze region of China.

Photo Georg Gerster © Rapho, Paris

Editor-in-chief: Edouard Glissant

Man and the Biosphere

Sustainable development <i>by Bernd von Droste</i>	4
The urban maze	8
Food for thought	12
Return of the griffon	13
Nature and culture	16
Painting the future	18
Islands at risk	20
Pirates, parasites and population <i>A case study</i>	23
Information please	24
The canopy raft	25
Mountain challenge	27
Lake Baikal	30
The poetry of Ilya Chavchavadze <i>by Gaston Bouatchidzé and Edouard Glissant</i>	31
Les Kurbas, founder of Ukrainian theatre <i>by Nelly Nicolaevna Kornienko</i>	32
Food for all—The 'Paris Appeal' <i>by Yannis Coutsocheras</i>	34
A time to live ... EGYPT: The staff of life	2

The environmental section of this issue was compiled in association with Malcolm Hadley, of Unesco's Division of Ecological Sciences, and Howard Brabyn, science writer and former editor of the English edition of the *Unesco Courier*.

The Courier

A window open on the world

Published monthly in 33 languages
by Unesco
The United Nations Educational,
Scientific and Cultural Organization
7, Place de Fontenoy, 75700 Paris.

English
French
Spanish
Russian
German
Arabic
Japanese

Italian
Hindi
Tamil
Hebrew
Persian
Dutch
Portuguese

Turkish
Urdu
Catalan
Malaysian
Korean
Swahili
Croato-Serb

Macedonian
Serbo-Croat
Slovene
Chinese
Bulgarian
Greek
Sinhala

Finnish
Swedish
Basque
Thai
Vietnamese

A selection in Braille is
published quarterly in English,
French, Spanish and Korean

ISSN 0041-5278
N° 10-1987 - CPD - 87 - 1 - 450 A

Sustainable development

by Bernd von Droste

Conservation and development are
two sides of the same coin



A quarter of a century has passed since American biologist Rachel Carson sat down to write *The Silent Spring*, a book which was to become a watershed in the brief history of ecology.

The graphic picture she drew of a world in which, as a result of the indiscriminate use of pesticides, the song of birds at spring-time would be lost for ever, captured the imagination of the public. Suddenly there was a new awareness of the intricate relationships that link living organisms and their environment, of man's oneness with nature and the extent of his influence over it.

More importantly, perhaps, *The Silent Spring* drew attention to the fact that there were limits to the absorptive and regenerative powers of nature; whilst man had always manipulated his environment, he

could no longer use it as an unyielding, bottomless sink for pollutants and man-generated wastes.

It is difficult today to believe that we should still have needed to be reminded of these seemingly self-evident facts. After all, as far back as Aristotle's day, Theophrastus, his disciple and successor as head of the Lyceum in Athens, had written at length about the inter-relationships between organisms and their non-living environment, and the idea of the unity of organisms and environment has long been a part of many religions.

For centuries, however, botanists and biologists, geologists and demographers, went their separate ways, and it was not until the latter part of the nineteenth century that the German zoologist Ernst Haeckel,

Right, a stretch of the Great Barrier Reef and, above, a close up view of part of the most remarkable coral formation in the world. The Reef is inscribed as a World Heritage site.



The Simen National Park and World Heritage site, Ethiopia

the man who coined the term *oekologie*, once again stressed the importance of "the relation of the animal both to its organic as well as to its inorganic environment".

Strangely enough, Haeckelian *oekologie* was overshadowed rather than enhanced by the Darwinian revolution and, throughout the early part of this century, ecological research was based on the scantiest of theoretical foundations. It was not until 1942, when R.L. Lindeman developed his theory of the hierarchical trophic (food chain) structure of ecosystems, which laid emphasis on the flow of energy through ecosystems, that ecology started to become an organized modern science.

The subsequent development of computers and of new techniques, such as labelling with radio-isotopes, stimulated studies of both energy and nutrient cycling through ecosystems, and, as a result, the ecosystem, as a functional unit made up of interacting biotic (living) and abiotic (non-living) components through which energy flows, became one of the unifying concepts of ecology and the focus of much ecological research.

This was a great step forward, but it was not enough. The multidisciplinary approach to research came up against serious difficulties. The research time span for a botanist studying crop succession, for example, could be a matter of months, whereas that required for, say, a forester, or a biologist concerned with population dynamics, could run into decades. Similar problems arose over the size of the ecosystem under study. Furthermore, despite Rachel Carson's warning, there remained a tendency to look at ecosystems from the "outside" and thus to overlook the vital feature of man's impact on ecosystems.

Two events were to help change all this: the launching, in 1971, of Unesco's Man and the Biosphere (MAB) Programme, and the United Nations Conference on the Human Environment, held in Stockholm in 1972, both of which stressed the role of man as a major environmental force.

The MAB Programme went further; it stressed the need for an integrated, *inter-disciplinary* rather than *multi-disciplinary* approach and brought the social sciences into ecological research as an equal partner with the natural sciences. As a result, the past fifteen years have seen the imple-

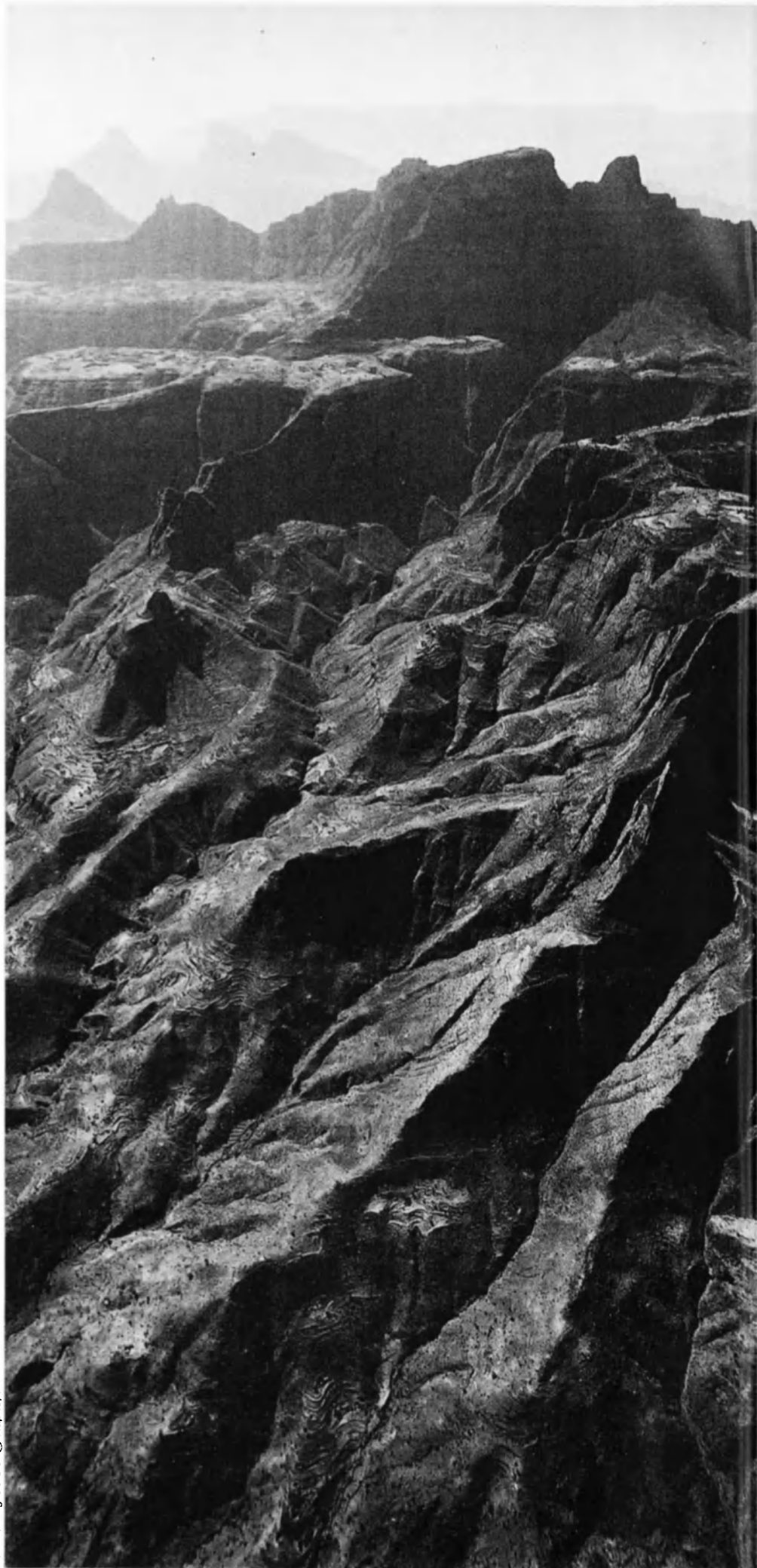


Photo Georg Gerstler © Rapho, Paris

mentation of a wide range of pilot projects throughout the world, the building up of research facilities in the developing world, the accumulation of an impressive quantity of environmental data and the forging of an exciting new research tool—an international network of biosphere reserves.

Underlying all this work was a new concept of fundamental importance—the concept of “conservation for sustainable development”. In other words, ecologists in MAB were no longer saying “Stop doing that or you will destroy the environment”. Rather they were saying “Try doing this and you can enjoy the benefits of development and conserve the environment”.

Nevertheless, as a Scientific Advisory Panel pointed out to the International Co-ordinating Council of MAB at its ninth session held in Paris in October 1986, a number of theoretical and practical problems remain.

One major problem has been the tendency to disregard the evolving nature of ecosystems. We have tended to look at ecosystems as the outcome of evolution rather than as being constantly subject to evolutionary processes. Disturbance in an ecosystem may well be a moulding, driving force in an evolutionary sense rather than a destructive force.

In turn this attitude tends to colour our approach to environmental “conservation” or “restoration”, words which seem to imply a return to a pre-existing state, when we should perhaps be thinking in terms of achieving a new equilibrium equally if not more beneficial to man.

On the more practical side, the Panel proposed to build on past achievements in a number of ways. It suggested that:

- fuller use should be made of data from the biosphere reserve network in the development of comparative studies of ecosystem functioning, such as the comparative study now being undertaken on the improvement of tropical soil fertility through biological processes.

- increased emphasis should be given to approaches for handling the management and re-development of ecological resources degraded by man.

- research on the changing relationships between economic driving forces and ecological systems should be intensified.

- greater use should be made of sophisticated modern risk assessment methods to provide guidance for policy-makers concerning investment and resource use.

- expert systems should be established which could offer decision-makers rapid, easy access to relevant information from the vast wealth of ecological research data already accumulated.

Finally, the Panel emphasized the complexity and increasingly global extent of man's impact on the environment, in particular where environmental disturbance is concerned. What once were local incidents of pollution confined to one watershed or air basin now tend to involve many nations, as witness the Chernobyl incident and the growing problem of acid rain.

All this underlines the fact that the MAB Programme itself is an evolving system, and this implies not simply change, but also the selection of successful trends and the elimination of undesirable or ineffective components.

The opening chapter of *Our Common Future*, the recently published report of the World Commission on Environment and Development (often referred to as The Brundtland Report, after its Chairman, Gro Harlem Brundtland, Prime Minister of Norway) contains these words:

“Humanity has the ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. ... Technology and social organization can both be managed and improved to make way for a new era of economic growth. The Commission believes that widespread poverty is no longer inevitable. Poverty is not only an evil

in itself, but sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other catastrophes.”

It is the proud aim of Unesco's Man and the Biosphere (MAB) Programme to do all in its power to ensure that such catastrophes do not occur. ■

BERND VON DROSTE is Secretary to the International Co-ordinating Council for the Man and the Biosphere (MAB) Programme and Director of Unesco's Division of Ecological Sciences.



Photo Unesco/Christian Zuber

▲ *The Galapagos Archipelago, Ecuador, is both a MAB biosphere reserve and a World Heritage site.*



Photo Unesco/G. Cerović

Left, the Durmitor National Park and MAB biosphere reserve, Yugoslavia



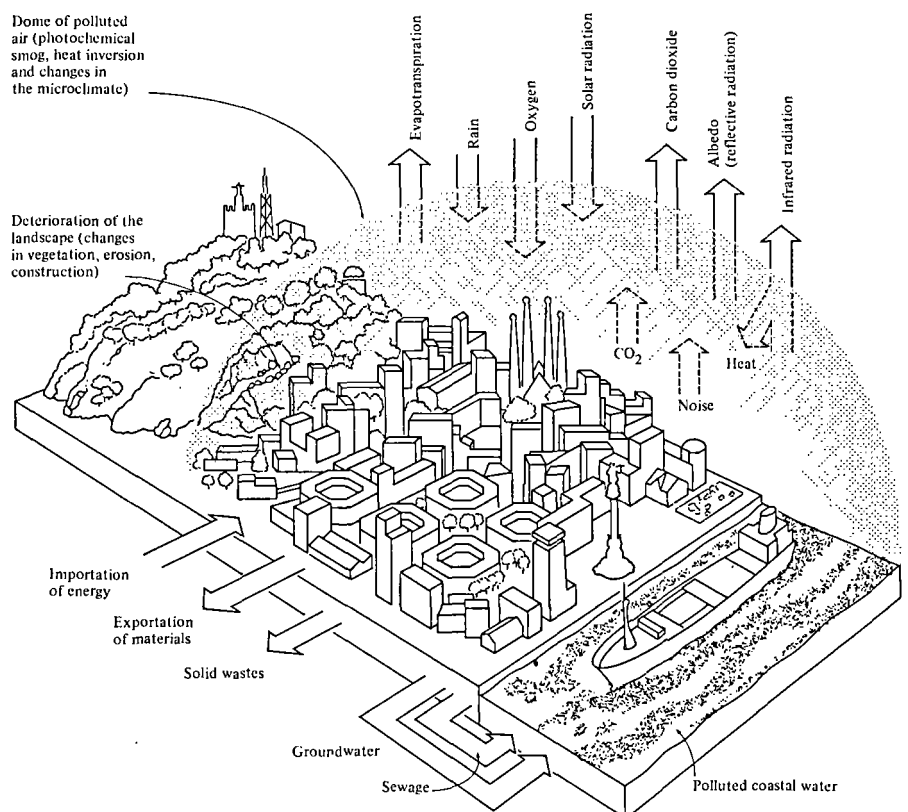
The urban maze

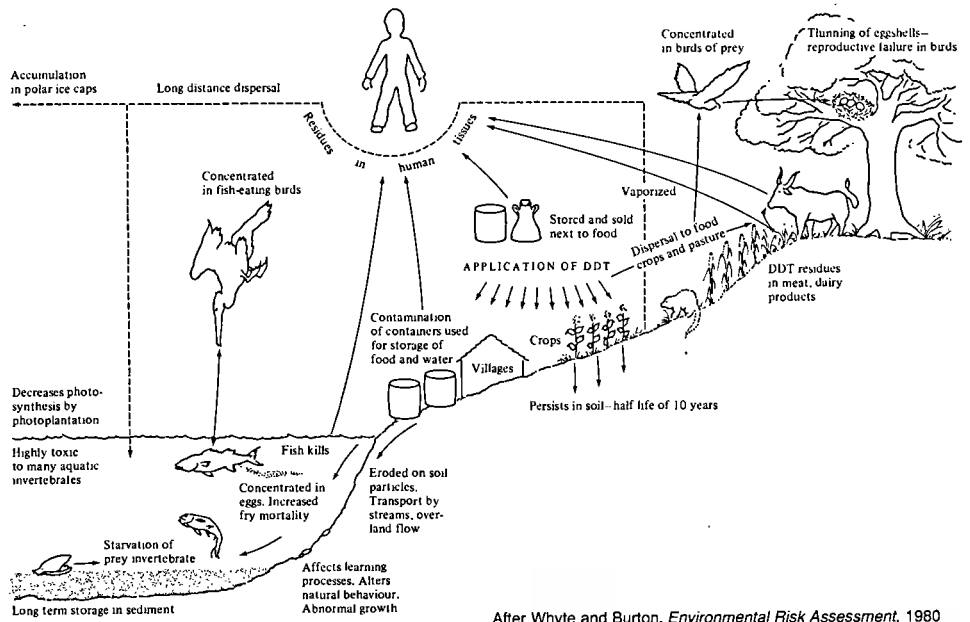
No single thread has yet been found that can guide us through the tortuous labyrinth of the city

In a famous phrase recorded by his biographer James Boswell, that peerless eighteenth-century man of letters Samuel Johnson once declared that “when a man is tired of London, he is tired of life, for there is in London all that life can afford”.

This was less a panegyric of London *per se* than an affirmation of the fact that cities are the melting-pot of ideas and invention, market-places for the exchange of information and centres of learning, the fount of human culture and creativity—in short, that cities are the *sine qua non* of civilization.

For the medieval peasant, city life held an additional attraction—residence in a city for a year and a day brought emancipation from serfdom. “*Stadluft macht frei*” (City air brings freedom), declared Emperor Henry the Fifth in drawing up the charters of the cities of Speyer and Worms. And even today, this same desire to escape the poverty and servitudes of rural life remains the major driving force behind the explosive expansion of many cities in the developing world.





Right, a descriptive risk assessment model illustrating what occurs when DDT is used in a developing country and is recycled through terrestrial and aquatic ecosystems.

After Whyte and Burton, *Environmental Risk Assessment*, 1980



▲ Chang an jie Avenue, Beijing, China

To the ecologist, however, a city may appear to be a very artificial system. It is true that the sites of man's earliest fixed settlements, such as the rich valleys of the Fertile Crescent, were chosen for their favourable environmental conditions, but with each new technological advance the city-dweller became increasingly divorced from his "natural" environment until, today, man is able to use almost any environment for town living. Indeed, as Soviet space experiments have shown, man can now live for months on end in a totally artificial, wholly man-made environment.

What is a city?

In these circumstances, the question arises as to whether the ecological approach is applicable to urban systems. What, indeed, is a city? Is it an organism, and, if so, is it a "parasite" with the natural environment as its host? Is a city an organism within an environment, or itself an entire ecosystem? Urban ecologists are thus still seeking to

establish their discipline on a firm theoretical basis, while at the same time being swamped with demands for advice from politicians and city bosses on how to handle the horrific problems resulting from the urban explosion.

The threat of massive failure of cities, through resource depletion, disease and famine, which has always existed, seems more menacing than ever. In the general confusion about the nature of the urban phenomenon, ecologists have performed adopted an *ad hoc* approach.

As a result, urban ecology has come to include a heterogeneous ragbag of study topics. These range from studies of energy and materials flows and the use of ecological indicators to measure urban environmental quality, to traditional and experimental building forms and the carrying capacity of urban systems and ecological support systems.

In practice, most urban studies undertaken within the MAB framework have focused on one aspect only, such as the

Left, a qualitative input-output model showing the energy and materials flows involved in the metabolism of the city of Barcelona.



Photo Eckhard Supp © Rapho, Paris

distribution of flora and fauna within urban areas, or the human ecology of children in the city.

One study, which explicitly aimed to integrate city-wide studies of energy, food and water flows with a bio-social survey of individual quality of life and human adaptation (Hong Kong), was unable to demonstrate how a change in one level affected the other, even though it seemed reasonable to suppose they must be interlinked.

Although many of these case studies have succeeded in providing a valuable scientific basis for handling urban planning problems specific to particular cities, the original objective, of setting up an internationally agreed comparative data set for urban systems so that case studies could be contrasted and compared so as to provide answers to common, process-oriented questions, has been virtually abandoned.

This is because, owing to the sheer speed and magnitude of the urban explosion, the problems themselves are changing, both in scale and in nature, almost as fast as the necessary data can be collected and collated.

Under these circumstances it has been well-nigh impossible to establish agreed data collection standards, and without standardized units of measure and similar descriptive parameters the individual studies are doomed to remain no more than isolated case studies.

The way ahead

Today, a critical point has been reached in

the development of ecological approaches to urban systems. No single thread has yet been found that can guide us through the tortuous labyrinth of the city.

The auguries, however, are good. In the fifteen or so years since MAB was launched a wealth of experience has been gained and an impressive store of research data acquired. The advent of the new generation of micro-computers means that it is now possible to make speedy and effective use of these data to make comparative analysis a reality and to realize the full potential of systems analysis. Furthermore, introduction of the technique of risk assessment offers new horizons for urban ecology.

Comparative analysis

The option here is, in part, to go back to basics and take up the work begun a decade ago in setting up a comparative data set for urban systems. The time is now ripe to develop and agree a detailed, international framework for data collection which will include: (a) common parameters for describing urban systems, and (b) the variables required for specifying key system relationships. This is a prerequisite for development of valid comparative analysis of urban systems.

There remain considerable difficulties. It may not be easy to formulate common parameters that will encompass the older cities with their history of slow, organic growth and many modern cities which are rapid, *ad hoc*, one might almost be tempted to say "artificial" creations.



Photo Georg Gerster © Rapho, Paris

Systems analysis

With the arrival of the latest generation of micro-computers, the full potential of systems analysis as applied to urban systems can now be realized. The work done in constructing input-output matrices and plotting metabolic city flows can now be incorporated into policy-oriented decision models.

These models will allow policy-makers to assess the consequences for an ecosystem of proposed actions, whether the specific proposals be about green spaces, housing or transport.

In this connection, a state-of-knowledge report is at present being prepared by a joint working group* to assess the status and potential of integrated economic ecological models for understanding urban systems. These models provide rapid, graphic feedback and are one important way of putting existing results into the policy arena.

Risk assessment

Although risk assessment methods were originally developed for technological and

Photo Wellington Lee, USA © UNFIAP International Photo Competition



“New Construction”, one of the entries in an international photo competition organized in connection with the United Nations Conference on Human Settlements (HABITAT), 1976, in Vancouver, Canada.

Left, city centre of Frankfurt, Federal Republic of Germany

Harar, Ethiopia



chemical risks, such as nuclear power and heavy metals, risk assessment is essentially an application of the ecosystem approach. It translates information about ecosystem relationships into probability statements about likely harm and integrates these with social value judgments about the acceptability of risk to provide a basis for policy-making.

Risk assessment, then, whilst not a panacea, provides a general paradigm for looking at urban vulnerability and resilience from the perspective of decision-making under conditions of uncertainty. It is ecosystem thinking within a management framework.

The balance sheet

The biennium 1985-1986 saw a re-examination of basic principles and a subtle re-shaping of the practical approach to problems of urban ecology along the lines suggested above. These trends are reflected in the practical achievements of the period.

The next milestone in the evolution of an integrated ecological approach to cities may well be the development and use of “expert systems” and inclusion of the decision-making process as part of the ecological system to be studied. ■

*Representatives of MAB, the International Council of Scientific Unions (ICSU), the Scientific Committee on Problems of the Environment (SCOPE), and the International Federation of Institutes for Advanced Study (IFIAS)

The role of MAB in urban systems research

Food for thought

Is one answer to hunger, under-employment and poor quality of life among the urban poor to be found in our own backyards?

- Concern about urban development centres on the sustainability of urban systems, both as suitable habitats for mankind and in terms of their ecological and support systems.

- With its worldwide research network, MAB is uniquely well placed to carry out comparative studies of the environmental and social effects of rapid urban expansion. The data already acquired from case studies of such widely differing cities as Kuala Lumpur, Rome, Barcelona, São Paulo, Mexico City, Beijing, Frankfurt-am-Main, Dakar, Khar-toum and Lae (Papua-New Guinea) provide a firm scientific basis for the development of guidelines for planners and decision-makers faced with problems of rapid urban growth in other parts of the world.

- The change from a mainly rural to a predominantly urban habitat for the majority of the world population demands major psychological and physiological adjustments at both the individual and the community levels.

- Many MAB projects contain a strong social science input to ensure that the vital social, psychological and physiological aspects of "total environment" are not overlooked.

- Involvement of all sections of local populations—local personalities, women's and youth groups, decision-makers, etc.—as well as on-the-spot training of local technicians, is also an integral part of most MAB projects.

- Cities are in many ways dangerous and "unnatural" biological habitats for mankind, yet they are the "natural" homes of human culture and creativity.

- Conservation in itself is not enough; it must also contribute to the development and the improvement of man's relationship with his environment. In seeking to ensure a viable future for cities as the major human habitat, MAB is fulfilling one of its most fundamental objectives. ■

In a notable passage in his satirical work *Candide*, the French philosopher and writer Voltaire declared "*Il faut cultiver notre jardin*" (We must cultivate our garden), a phrase that might well have been adopted as the motto of a remarkable research project undertaken by the *Centro de Estudios Urbanos y Regionales* (CEUR), Argentina, and backed by the United Nations University and Unesco/MAB.

Voltaire, of course, was referring to the individual, spiritual garden which each of us must cultivate if we are to become self-reliant and realize our full potential. A report on the first stage of the project, published in 1986 under the title *Agricultura Urbana y Periurbana en el Gran Buenos Aires* (Urban and Peri-urban Agriculture in Greater Buenos Aires), goes a step further than Voltaire. After detailing the results of a thorough evaluation of the economic, social and environmental consequences of urban and peri-urban agriculture for self-consumption in the Greater Buenos Aires region, it comes to the conclusion that the literal cultivation of back gardens, unused building lots and green spaces on the outskirts of our great cities might offer some of the urban poor a way of escape from the trap of hunger, under-employment and wretched living conditions.

The report points out that, at comparatively low cost, urban gardening for self-consumption could have the following desirable effects:

- Make quickly available to the section of the population in greatest need a supply of highly nutritive food which the normal workings of the food market denies them.

- Increase the real incomes of poor urban families.

- Make use of urban resources now lying idle (vacant land, some household wastes, the unused working capacity of the under-employed).

- Provide opportunities for re-cycling urban wastes in soil reclamation projects for the provision of new gardens.

- Improve the quality of life in the most deprived urban areas.

- Inculcate a sense of pride, self-reliance, community spirit and liberty by offering the urban poor an opportunity to act positively on their own behalf.

- For local authorities faced with the huge expenditures required by traditional improvement schemes, the urban garden proposal offers an effective, low-cost opportunity to improve rapidly the lot of the urban poor for whom they are responsible.

It has been estimated that, on average, a plot of land of 40 or 50 square metres would be sufficient to provide a family of, say, two adults and four children with all their needs in fresh vegetables and other green foodstuffs. The labour input needed to achieve this would amount to the equivalent of one and a half days work a week which could be shared by all the members of the family.

It might be objected that, as has sometimes been the case with imports of food for famine relief in Africa, the introduction of new sources of food supply would distort food markets to the detriment of rural farmers.

This objection melts away under closer scrutiny. Standard methods of stimulating food production rarely benefit the hard core urban poor, who remain outside the normal food market chain because they simply have not the resources to enter the market as buyers.

Brazil, for example, has become the world's third largest exporter of meat, after the United States of America and the European Community, yet 25 per cent of its population still lives at the poverty line and does not benefit from the country's increased meat production. India and China have recently become net exporters of cereals, yet it is far from being the case that everyone living in those countries is adequately nourished.

Clearly, urban gardening for self-consumption is not a panacea for all the ills of modern urban life. However, if combined with other initiatives being studied within the larger framework of the CEUR project on *Alternative Strategies for Improving Food and Energy Availability in Cities*, it offers more than a glimmer of hope for the millions of urban poor now held in the icy grip of poverty. ■

A cultivated backyard plot in a workers' barrio in Greater Buenos Aires





Return of the griffon

The griffon vulture is one of several species being re-introduced into the Cévennes Biosphere Reserve in southern France

THE road from Nîmes to Florac, headquarters of the Cévennes Biosphere Reserve, winds into the southern highlands of the French central mountains. Skirting terraced hillsides and deep ravines, with jagged mountains looming above, it seems to be leading the visitor back into another age, when life was harsh yet man was still in close communion with nature.

Geologically and ecologically diverse, the Cévennes region is an ideal site for a biosphere reserve. Spread over some 300,000 hectares, it includes a granitic massif to the north, a schist zone in the centre, a schist and granite mountain to the south and a limestone plateau to the west.

Mont Lozère, the northern granitic massif, is 40 kilometres long and 15 kilometres wide, reaching 1,700 metres at its highest point. The central schist valley is slashed by valleys opening towards the Mediterranean

basin. Aigoual, the composite mountain to the south, is a high zone cut by an important hydrographic network. The sedimentary plateaux of Causse de Sauveterre, Causse Mejean and Causse Noir, to the west, are rolling regions bounded by deep canyons.

The geology, geographic location and great range of elevations mean that many kinds of vegetation are present, including sub-Mediterranean and Mediterranean forest, Atlantic forest, middle European mountain forest, shrub and grass moors and rock vegetation. In general, the flora is sub-Mediterranean.

The Cévennes contains 50 species of mammals, 150 species of birds, 30 species of reptiles and amphibians and 20 species of fish. Rare or threatened species include the golden eagle (*Aquila chrysaetos*), the peregrine falcon (*Falco peregrinus*), and the eagle owl (*Bubo bubo*). Attempts are being made to re-introduce some species, including griffon, beaver and capercaillie.

Already a dozen or more great griffon vultures can, from time to time, be seen in majestic flight against the dramatic backdrop of the mountain slopes.

The interest of the Cévennes as a biosphere reserve lies not only in its rich flora and fauna but also in the character of its diverse landscapes, where the natural and the cultural heritages are intricately mixed.

The region shows many signs of human occupation dating back centuries. The original forest was destroyed in Roman times to provide firewood for the great pottery kilns of Banassac and La Graufesenque. This deforestation led to the development of an architecture of superimposed vaulting capable of supporting heavy roofs of limestone tiles.

Traditional rural architecture, dating back to the seventeenth century, is based mainly on local geological materials (schist, granite, limestone) which are still the basis of today's buildings, such as the *clèdes*, used

The Cévennes Biosphere Reserve and National Park

Inhabitants are encouraged to respect traditional building styles and methods (right and below). Any additional cost involved is borne by the National Park.

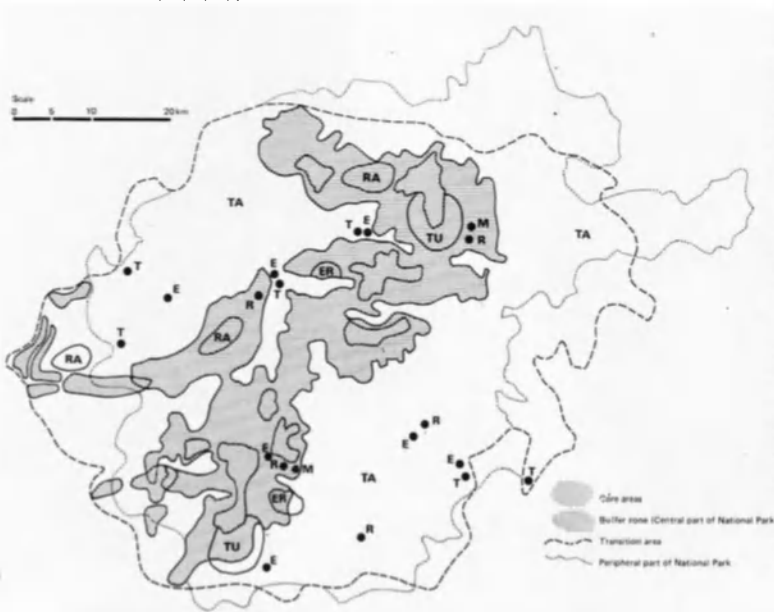
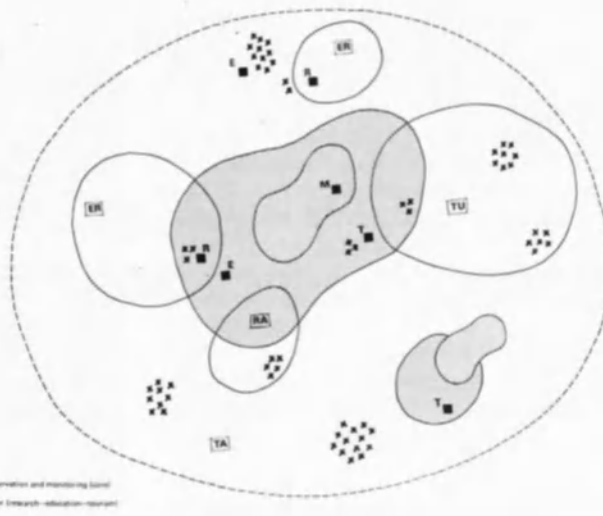


Photo © Cévennes National Park, France

Biosphere reserve functions

Biosphere reserves can be envisaged as geographic "hubs" for conservation of landscapes containing the characteristic ecosystems of a given biogeographic region and for ecological monitoring, research, education, demonstration and training relating to the wise use of these ecosystems. Right, a schematic zonation of a biosphere reserve. In this zonation the core area is strictly protected. The buffer zone can be used for regulated, non-destructive activities and is strictly delineated. The transition area covers other biosphere reserve functions including such activities as experimental research, traditional use, and rehabilitation.

Key (both diagrams)
 ER = Experimental Research
 TU = Traditional Use
 RA = Rehabilitation
 TA = Co-operation (Transition Area)
 XX = Human Settlements
 Facilities for: R = Research
 E = Education
 T = Tourism
 M = Monitoring



Diagrams source: M. Batisse, 1986



for drying chestnuts, and the *magnaneries*, where silkworms were once raised.

The schistose area of the Cévennes is a difficult area for human settlement because of its steep slopes. For centuries people have climbed these slopes carrying the soil that each Mediterranean storm washed down into the valleys. Patiently and with great effort they built terracing and hamlets on the mountain sides.

This long and extraordinary interplay between man and nature was recognized by the French authorities and led, in 1970, to the creation of the Cévennes National Park. Like other French National Parks, the Cévennes Park has a central zone, in which some 600 people live, where Park officials have extensive statutory powers (supervision of hunting, building licences, traffic, etc.), and a peripheral zone in which they can advise and attempt to influence the communities within the zone to conserve natural features.

In the field of architecture, for example, the park administration asks farmers to respect traditional building methods and pays the difference between the cost of a contemporary construction and a traditional one.

As far as agriculture is concerned, environmental planning helps farmers to improve their profits without damaging the environment. Farmers also sometimes work directly for the Park under special contract, at times when they are not too busy in their own fields, on such projects as clearing undergrowth to prevent forest fires and restoring communal buildings in the villages.

The similarities between the objectives of the Cévennes National Park and those of the MAB international biosphere reserve network are evident, and in 1984 the Park was designated a biosphere reserve.



A rocky landscape typical of parts of the Cévennes

This has enabled it to deal more effectively with a number of ecological problems. For example, the boundaries of the Park had been established on the basis of administrative and political demarcations, which rarely coincide with ecological limits. As a biosphere reserve, its new boundaries have been drawn up according to such criteria as geological patterns and vegetation distribution.

Furthermore, scientific objectives are often better defined in a biosphere reserve and are related directly to human uses. In addition, the Park now has access to the vast MAB data base compiled from research undertaken in biosphere reserves all over the world.

Within the framework of the MAB international network of biosphere reserves, a suitable policy is being developed for the environment outside the central zone of the National Park.

The objectives of the Action Plan for Biosphere Reserves have been enthusiastically adopted and this was reflected in a workshop on the *Implementation of the Action Plan for Biosphere Reserves in the Mediterranean Region*, organized by the French MAB Committee and held at Florac in September 1986. Some fifty specialists from eight countries (Algeria, Egypt, France, Italy, Portugal, Spain, Turkey and Tunisia) attended, including representatives from two other French biosphere reserves: Fango, in Corsica, and the Camargue.

A recurrent theme of the Florac workshop was that consideration of the human element was vital to the understanding and better conservation of Mediterranean landscapes. Biosphere reserves like the Cévennes can give a lead in testing ways of conserving landscapes that have long been shaped by the hand of man. ■

Arid and semi-arid zones

- Arid and semi-arid zones, lands of highly variable and sparse rainfall, cover one-third of the surface of the globe.
- The boundary between "arid" and "semi-arid" may—at the risk of over-simplification—be taken as the division between places where rainfall farming is possible, even though with great variance from year to year, and those where it is impossible to be certain of a crop in most years.
- The transition from extremely arid to sub-humid regions is gradual and, except where it coincides with a distinctive feature such as a mountain range, is best delimited by a band of varying width. Within this variable band the rainfall is highly irregular, falls in contrasting dry and humid periods, and on average is less than 600 mm in summer or less than 400 mm in winter humid periods.
- Climatic conditions give rise to very different situations. It is possible to distinguish between arid and semi-arid regions on the basis of rainfall, but it is also very important to consider the duration of the rainfall and the duration and timing of the dry season. It is evident, for example, that the problems of irrigation, of dry farming and of the movement of livestock differ greatly as between the northern fringes of the Sahara (where the rain falls in winter and is connected with the fronts and depressions of the temperate zone) and the southern fringes (where the rain falls in summer and is linked to the shifting of the inter-tropical convergence zone).
- Not only precipitation registered by rain-gauges has to be taken into consideration. There are many coastal arid and semi-arid regions (in Chile, Mauritania, Morocco, etc.) which benefit from the condensation of dew (attributable to greater humidity of the air in these parts). And while evaporation is always difficult to measure and calculate, it is evident that thermic conditions vary widely from one arid region to another (with all the resulting repercussions on the life of human populations and on vegetation).
- The presence of allogenic rivers (rising in non-arid regions) may radically modify the hydrological conditions which largely determine the development of a region. They have often made it possible to extend irrigated areas considerably.
- The nature of the flow of these rivers (degree of irregularity, high-water period, etc.) exercises a considerable effect. The flow of the Nile, for example, which is governed mainly by tropical precipitation, is very different from that of mountain rivers of higher latitudes, which are affected by the phenomena of snow retention combined, sometimes, with karst retention. Furthermore, conditions for the use of surface and underground water resources differ as a function of topography and of geological features.
- Soil conditions are very variable, depending upon the distribution of the parent rocks. Silty soils are more propitious in certain respects than sandy soils, yet like sandy soils they are vulnerable to erosion, hence the importance of soil fixation, conservation and restoration.
- The position occupied by the arid and semi-arid regions in the countries concerned (whether they form a marginal, an important or an essential element in the national economy) obviously affects the attention governments pay to them and the investment, private or public, that is available for their development.
- The approach to development problems will differ greatly according to whether or not traditional populations and civilizations exist, and also to what part nomads, semi-nomads and sedentary peoples play in a country. The availability of mineral or power resources is another decisive factor.
- Thus the great variety of natural parameters and the diversity of socio-cultural and historical backgrounds makes it extremely difficult to elaborate general models for development. ■

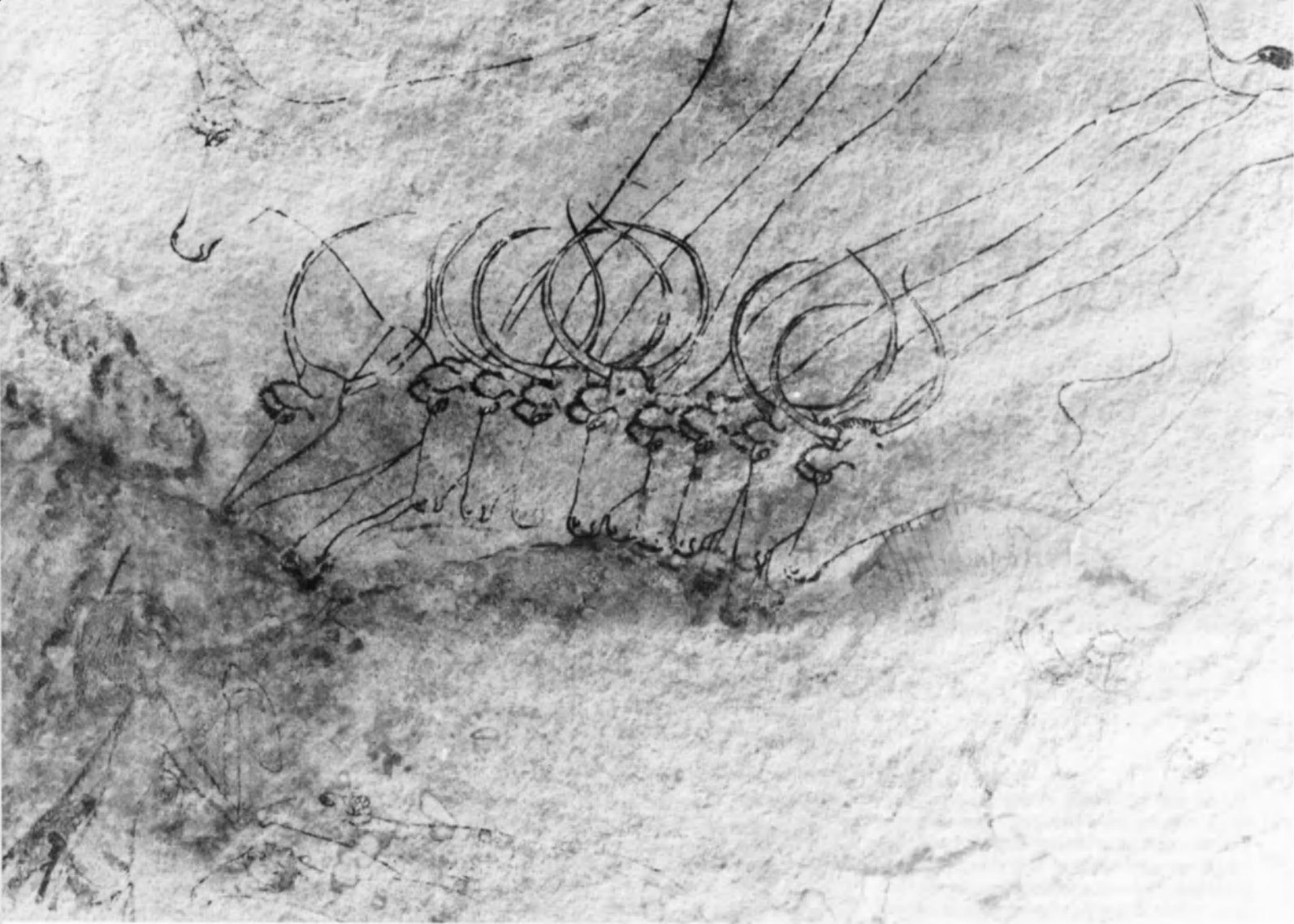


Photo J.D. Lajoux © Rapho, Paris

A priceless heritage of universal value

Nature and culture

THE Convention for the Protection of the World's Natural and Cultural Heritage, more commonly known as The World Heritage Convention, was adopted by Unesco's General Conference in November 1972 and came into force in December 1975 after ratification by twenty nations. As of mid-1987 there are 247 natural and cultural sites on the World Heritage List and the Convention has been ratified or accepted by 95 States.

The Convention marks a new departure in international co-operation, setting up a system whereby the international community can participate actively in protecting those parts of the natural and cultural heritage that are agreed to be of great universal value.

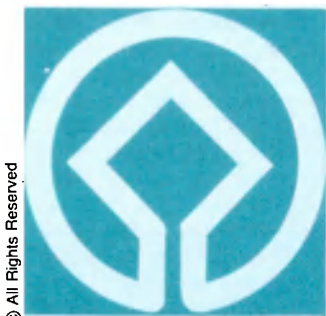
Traditionally, the preservation of cultural heritage and the conservation of nature have been regarded as two quite different problems, with responsibility for the protection of important cultural or natural sites being considered as lying exclusively with the country in which they are located.

The Convention breaks new ground by linking together the protection of the

cultural heritage and the natural heritage and in providing a permanent legal, financial and administrative framework for international co-operation in ensuring this protection. It also introduces the new concept of a "World Heritage" of natural and cultural properties of universal value which transcends all political or geographical boundaries.

The underlying philosophy which brought the Convention into being is that there are some parts of the world's natural and cultural heritage that are so exceptional and of such scientific importance to the world that their conservation and protection for present and future generations is a matter of concern not only to individual nations but to the international community as a whole.

Countries that are most richly endowed with artistic, archaeological, palaeontological, biological or ecological "treasures" are not, however, always the most prosperous and may have difficulty in providing adequate protection to this endowment. Through the World Heritage Fund established under the Convention, any nation,



© All Rights Reserved

The World Heritage emblem symbolizing the interdependence of cultural and natural properties. Tassili n'Ajjer, Algeria, famed for its rock paintings (above), is both a World Heritage site and a biosphere reserve.

Inclusion of natural properties of universal value on the World Heritage List

Under the World Heritage Convention, the natural heritage is defined as:

- *Natural features consisting of physical and biological formations or groups of such formations which are of outstanding universal value from the aesthetic or scientific point of view;*
- *Geological and physiological formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;*
- *Natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.*

Criteria

A natural heritage site, following the definition above, which is submitted for inclusion in the World Heritage List, will be considered to be of outstanding universal value for the purposes of the Convention when the Committee finds that it meets one or more of the following criteria and fulfils the conditions of integrity set out below. Sites nominated should therefore:

1. be outstanding examples representing the major stages of the Earth's evolutionary history;
2. be outstanding examples representing significant on-going geological processes, biological evolution and man's interaction with his natural environment; as distinct from the periods of the Earth's development, this

focuses upon on-going processes in the development of communities, of plants and animals, land-forms and marine and freshwater bodies; 3. contain superlative natural phenomena, formations or features, such as outstanding examples of the most important ecosystems, areas of exceptional natural beauty, or exceptional combinations of natural and cultural elements; 4. contain the most important and significant natural habitats where threatened species of animals or plants of outstanding universal value from the point of view of science or conservation still survive.

In addition to the above criteria, the sites should also fulfil the following conditions of integrity:

- (a) The sites described in 1. should contain all or most of the key interrelated and interdependent elements in their natural relationships; for example, an "Ice Age" area would be expected to include the snow field, the glacier itself and samples of cutting patterns, deposition and colonization (striations, moraines, pioneer stages of plant succession, etc.).
- (b) The sites described in 2. should have sufficient size and contain the necessary elements to demonstrate the key aspects of the process and to be self-perpetuating. For example, an area of "tropical rain forest" may be expected to include some variation in elevation above sea level, changes in topography and soil types, river banks or ox-bow lakes, to demonstrate the diversity and complexity of the system.

(c) The sites described in 3. should contain those ecosystem components required for the continuity of the species or of the objects to be conserved. This will vary according to the individual cases; for example, the protected area of a waterfall would include all, or as much as possible, of the supporting upstream watershed; or a coral reef area would be provided with control over siltation or pollution through the stream flow or ocean currents which provide its nutrients.

(d) The area containing threatened species as described in 4. should be of sufficient size and contain the necessary habitat requirements for the survival of the species.

(e) In the case of migratory species, seasonal sites necessary for their survival, wherever they are located, should be adequately protected. The Committee must receive assurances that the necessary measures will be taken to ensure that the species are adequately protected throughout their full life cycle. Agreements made in this connection, either through adherence to international conventions or in the form of other multilateral or bilateral arrangements, would provide this assurance.

Each site should be evaluated relatively, that is, it should be compared with other sites of the same type, both inside and outside the State Party's borders, within a biogeographic province or migratory pattern. ■

institution or individual can contribute to the protection of the heritage in countries where national resources are insufficient.

Signatories to the Convention undertake to help in the identification, protection, conservation and preservation of world heritage properties. They recognize that the identification and safeguarding of those parts of the heritage which are located on their own territories is primarily their own responsibility and agree to do all they can, with their own resources and with any international assistance they can obtain, to ensure adequate protection. They agree, amongst other things, to "adopt a general policy which aims to give the cultural and natural heritage a function in the life of the community and to integrate protection of the heritage into comprehensive planning programmes".

The Convention is administered by the World Heritage Committee, composed of twenty-one States elected at a General Assembly of Member States held every two

years. The Secretariat is provided by Unesco and a number of its officials are also members of the Man and the Biosphere (MAB) Secretariat, in particular those concerned with biosphere reserves.

While the aims of, and criteria for selec-

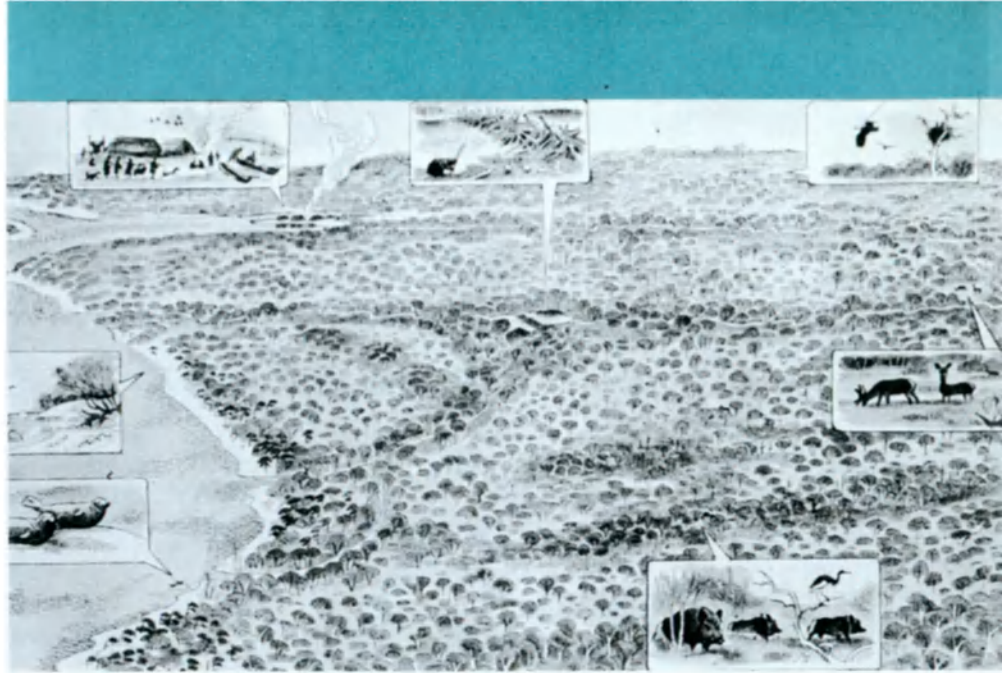
tion of World Heritage sites (see above) and biosphere reserves are different, far from being incompatible they are complementary. Indeed, twenty-five World Heritage natural sites also form part of the MAB Biosphere Reserve Network. ■



The Ngorongoro Conservation Area (right), United Republic of Tanzania, and the contiguous Serengeti National Park, are World Heritage sites. Combined they form a single biosphere reserve.

The pictures on these two pages give an illustration of the Visual Impact Analysis Method and the results obtained. They show the locality of Dybäck on the south coast of Sweden and its development from Mesolithic forest.

Right: Mesolithic landscape of Dybäck. The Baltic Sea level was then about 4 metres above the present level. The animals shown are all species that have been identified in excavation material. The existence of the human settlement was inferred from a large number of finds in and around the estuary. The vegetation was closed forest, densest in the wetter areas, thinning out to a shrub of oak and pine along the coast. The hydrology is based on topography, evidence of peat in some areas and the evidence of 18th and early 19th century maps.



Painting the future

Using 'Visual Impact Analysis',
Swedish MAB scientists and
artists are charting future changes
in their country's landscape

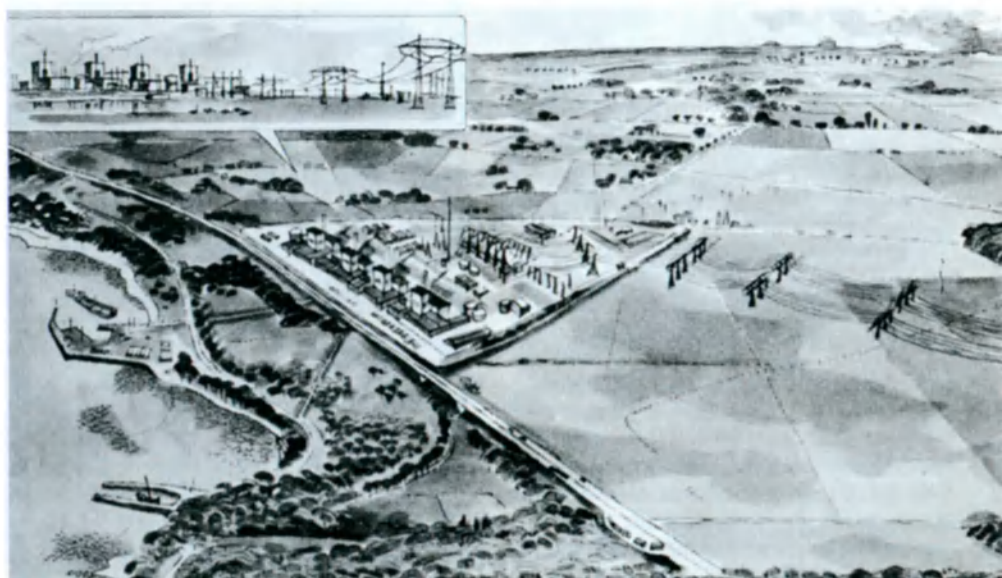
TOWARDS the end of 1986, the Riksdag, the Swedish Parliament, was the setting for an art exhibition with a difference.

Consisting of a series of attractive water-colour landscapes, the exhibition was designed to bring home to the nation's leaders the visual impact that their decisions could have upon the Swedish landscape.

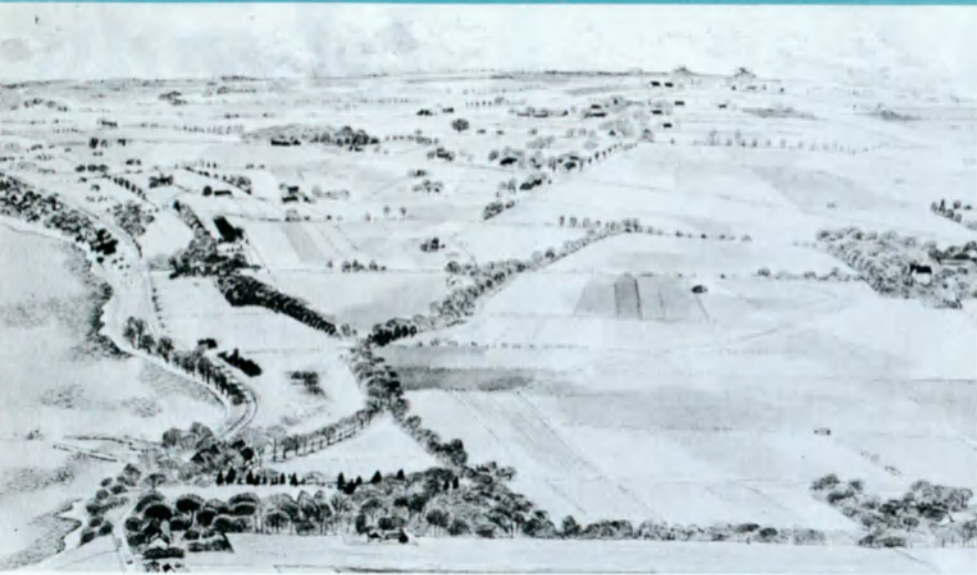
The watercolours were, however, much more than an artist's personal impression of what might lie ahead. They were the fruit of a serious scientific research project which started in 1978 under the aegis of the Swedish National MAB Committee and the Committee of Future-oriented Research (both under the Swedish Council for Planning and Co-ordination of Research).

The Swedish landscape has undergone major changes since 1940. Approximately a quarter of all agricultural land has been taken out of production and has reverted naturally to forest or been planted with conifers. Rapid urbanization, road building, the construction of recreational housing and the development of industrial sites along

What will the future bring for this landscape? Two visualizations are presented here—the two energy scenarios, "Nuclear Sweden" and "Solar Sweden".



Right: "Nuclear Sweden" in 2015. Picture shows a nuclear power station with four 100 MW reactors. Location and configuration are based on the Barsebäck plant and information supplied by Sydkraft AB. The road is as projected in long-term road plans. Land use outside the immediate vicinity of the power station is assumed not to be radically altered.



Left: Dybäck in 1980. The landscape is dominated by the agricultural activity of the Manor (centre right of picture) with its pattern of large consolidated fields. In the middle distance, left and far distance the pattern of agriculture is dominated by smaller farms laid out in the land reform of 1824. A summer housing development can be seen along the shore above the fishing village of Hörte, which was constructed in 1937.

the coast have also contributed to this transformation.

The object of the Swedish MAB study was to develop a method of *Visual Impact Analysis* and to test it on a number of localities in Sweden, using scenarios produced by others, so that it could be incorporated into the planning and decision-making process.

The first step was to select from a number of previously completed future studies dealing with forestry, energy and agriculture those scenarios that were sufficiently detailed to enable their visual impacts to be deduced with reasonable precision.

Four such future studies were deemed to fulfil these conditions: two alternative energy scenarios, "Nuclear Sweden" and "Solar Sweden", presented by a project group of the Secretariat for Future Studies; a "High-Yield Alternative" for Swedish forestry, produced by a government commission on the future of Swedish forestry; and an alternative agricultural scenario produced by the Swedish Agricultural University.

The Visual Impact Analysis method is

divided into three basic stages: (a) the analysis of a scenario and its application to a given locality; (b) the integration of information into instructions for the production of pictures; (c) the production and successive modification of a series of visual impact pictures.

Once a locality has been chosen, a thorough study of all the background material is made including a historical reconstruction of the development of the landscape. Information on the geology, hydrology, past and present vegetation and land use of the area is gathered and a search is made in local, regional and national archives for maps and other documentary evidence.

Specialists from a wide range of disciplines are consulted concerning the background material and reconstructions and a series of aerial and ground photographs are taken and drawings made at different times of the year.

Field studies are made and checked against maps and other documentary evidence and all this background material is integrated into a series of maps and transparencies and superimposed on the aerial

photographs. Similar methods are used in elaborating the "portraits of the future".

The degree of confidence that can be placed in these reconstructions varies, of course, with the type of evidence available. With regard to the future projections and Visual Impact Analyses, the assumptions of the respective scenarios are followed whenever these are explicit.

None of them involves technology or practices that are not now current and they all assume a "surprise-free" future. In the forestry alternatives, for example, normal and orderly forest development after planting is assumed.

A master perspective is used for each locality for the production of a complete series of pictures. The time of the year is also held constant.

The artist draws preliminary pictures from the background material and the master perspective is produced by watercolour on a drawing. In fact, acrylic paint is used for these "watercolours" so that changes can be made later if necessary.

The pictures are then reviewed by a number of the experts who were consulted on the background material as well as by other independent experts. On the basis of their assessments the original pictures may be modified or new ones made. ■



Left: "Solar Sweden" in 2015. Wind power development with a station of 4 MW wind turbines. Height about 100 metres, blade length 80 metres. The configuration follows guidelines for location proposed by the National Board for Energy Source Development. Cables are laid underground, but this would not be the case in less favourable soil conditions.

Islands

IS Paradise an island? The ancient Greeks believed that the spirits of their dead heroes inhabited the Elysian Fields in the Isles of the Blest, far away to the west beyond Calpe and Abyla, the Pillars of Hercules.

Centuries later, searching for Paradise, the Irish monk Saint Brendan (484-578) sailed far into the Atlantic Ocean, where he came upon an island of unsurpassed beauty and fertility which he believed to be the "Promised Land of the Saints". Saint Brendan's sacred island remained clearly marked upon most maps for over a thousand years. Even today most travel agents have at least one "island paradise" on their books with which to tempt clients anxious "to get away from it all".

Is Hell an island? For millions of Africans sold into slavery, the Island of Gorée off the coast of Senegal, near Dakar, where they were held before being transported across the Atlantic, was the gateway to Hell, and few names so readily evoke the notion of Hell on earth as that of Devil's Island.

Paradise or Purgatory, Heaven or Hell, islands leave no one indifferent, least of all scientists. It was no accident that Darwin's momentous *The Origin of Species* was the outcome of a voyage to the Galapagos, the *Islas Encantadas*, the "Enchanted Isles" as they were also called, for by their nature islands offer the scientist special opportunities for research. As Darwin wrote of the Galapagos in his Journal on 8 October 1835, "The archipelago is a little world within itself...", and "The natural history of these islands is eminently curious and well deserves attention".

Echoes of these words can be heard in those written almost a hundred and forty years later by a group of experts gathered in Paris, in 1973, to outline the scientific content of the MAB project on *The Ecology and Rational Use of Island Ecosystems*: "Islands offer an exceptional opportunity to study, under relatively controlled conditions, the entire spectrum of ecological, demographic, economic and social factors that influence population/environment relationships. This is particularly true as population/environment systems on islands are small and easily modelled, and can at the same time be representative of larger systems." The final sentence of the above declaration not only re-introduced the notion of the island as a microcosm, Darwin's "little world within itself", it also explains why MAB island research is concentrated on small islands. The 1973 meeting of experts defined "small" as meaning having a surface area of 10,000 square kilometres or less.

Briefly stated, the objective of MAB island research is to promote sustainable



Photo © Ogm Jemalujevic, tanjug, Belgrade, Yugoslavia

The world's five billionth (5,000,000,000) inhabitant, Matej Gaspar (pronounced Matey Gushpar) is greeted by United Nations Secretary-General Javier Pérez de Cuéllar, above. The baby is pictured in the arms of a nurse at a hospital in Zagreb, Yugoslavia, where he was born early in the morning of 11 July 1987.

The day of five billion

Born at 7.00 am on Saturday 11 July, 1987, Matej Gaspar was the symbolic focus of worldwide celebration of the day the world population reached a total of five billion (5,000,000,000). The date, too, is symbolic since nobody knows exactly when the five billion total was actually reached. What we do know is that the number of human beings is now growing at a rate of 150 every minute, 220,000 a day, 80 million a year. At this rate, according to the 1987 State of World Population Report, published by the United Nations Fund for Population Activities (UNFPA), we will reach six billion by the end of the century, seven billion by the year 2010, and eight billion by the year 2022. Most of this growth will take place in the developing countries. It is estimated that world population will finally stabilize at around ten billion in about a century from now.

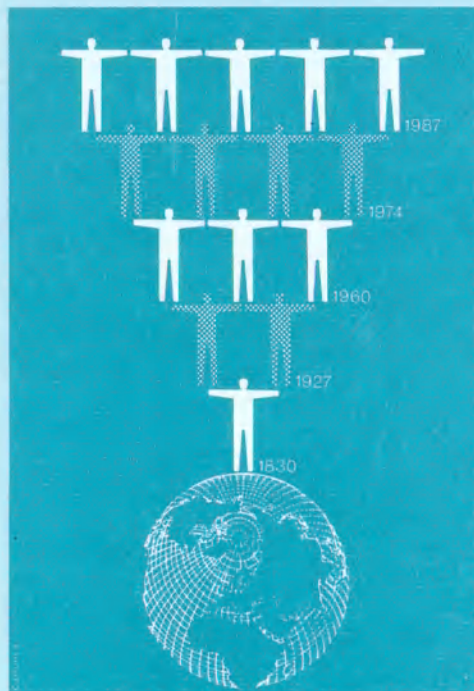


Illustration Héctor Cattólica © UNFPA

at risk

development of small islands and rational management of their natural resources.

A number of primary research themes have been selected as being necessary for the achievement of this objective:

- the management of environmental resources by island populations;
- the impact of external forces on islands, in particular the effects of tourism;
- the impact of the introduction of alien plants and animals on island ecosystems;

- the impact of migration;
- the impact of agrochemicals on island environments and societies;
- the islander's perception of his or her special social and natural environment.

Implementation of these general lines of island research within MAB has been largely shaped by the situation and problems of each specific island or island group.

The South Pacific was the focus of initial island research work in MAB, followed by

studies in the Caribbean, Mediterranean and other regions.

Experience from a selection of these projects provided one of the basic inputs to an inter-oceanic workshop on sustainable development and management of small islands, held in Puerto Rico in November 1986.

Organized by the US-MAB Directorate on Caribbean Islands, the workshop was sponsored by the MAB Committees of the United States and Canada, Unesco, UNEP and UNCTAD.

The thirty invited specialists who took part came from five ocean basins and nineteen countries, from cultures as diverse as those of Australia, Barbados, China, Fiji, France, Hawaii, Japan, Malta, St. Lucia and Yugoslavia, and from disciplinary backgrounds ranging from anthropology, ecology and economics to geography and sociology.

This diversity among the participants attending the workshop mirrored the very wide diversity to be found amongst islands. Quite apart from the major division between continental islands (those that are unsubmerged parts of the continental shelf) and oceanic islands (those that rise from the floors of the ocean basins), there is a world of difference between the very small islands of the eastern Caribbean, the Pacific and the Atlantic, and, for example, Puerto Rico (8,897 square kilometres), Jamaica and Fiji.

Islands are to be found in every latitude and in all climates. They occur singly, in groups, in archipelagos and in island arcs. There are high islands of continental rock, high volcanic islands, raised limestone islands, coral atolls and sand cays. They may be populous or uninhabited, independent States or politically part of a continental State, richly or poorly endowed by nature.

Underlying this diversity, however, is the fundamental fact that small islands are in several respects specialized and rather fragile environments. They have a much higher proportion of endemic species than most continental regions, are subject to the action of the sea on all sides, and have only small fresh water catchments so that rainfall and eroded material are constantly being lost to the sea.

Island peoples have often evolved cultures that are distinct from those of continental peoples and to which they feel a



Photo Ledru © Sygma, Paris

Tahiti, the largest island of the Windward Group of the Society Islands, French Polynesia

strong allegiance. At the same time they are very vulnerable to the effects of outside economic, technological and social forces which can disrupt both their natural and cultural environment.

Because small islands have only a limited range of exploitable resources, the options for ecologically and economically sustainable development are restricted.

Ultimately an island's natural resources—its water supply, soil, wildlife, forests and fisheries—will determine its capacity to accept and sustain development.

Moreover, on a small island the margin for error is small. Even a comparatively minor miscalculation over the acceptable level of forest exploitation, for example, could seriously endanger the water supply, diminish animal wildlife, and result in excessive soil erosion and sedimentation with consequent adverse impacts on estuarine and marine resources. Even quite a small upswing in population can have devastating ecological and social effects.

Much is still unknown or unclear regarding the mechanisms that regulate the relationships between man and a limited environment, yet without a thorough understanding of the resources available for development and the vulnerability of island resource systems to human activities, sustainable development will remain a hit-or-miss affair.

Furthermore, ecological change can both cause and result from economic and cultural changes. Effective resource management must therefore strive to establish an equilibrium between economic constraints, ecological imperatives and the social and cultural dimensions of each island society. ■

Poster by the French designer André François for the exhibition Iles (Islands), held at the Centre Georges Pompidou, Paris, from 24 June to 23 September, 1987

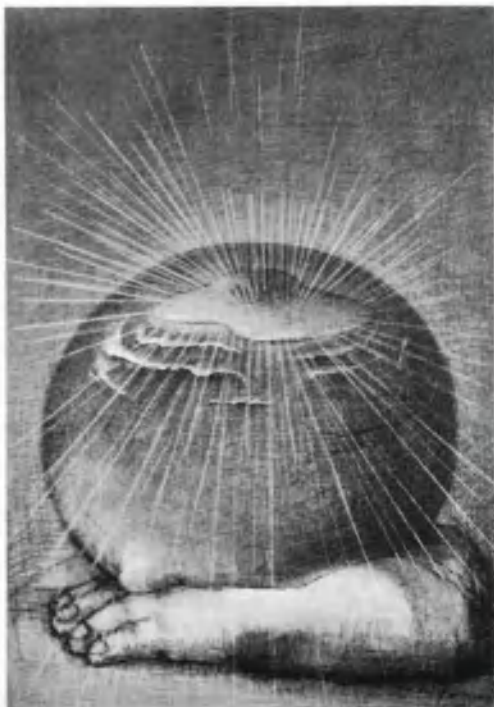


Photo P. Pitrou © BPI/Gallimard



Twenty key issues in island

Islands have many problems in common with certain continental areas. Yet at the same time they provide a special case in development, largely owing to specific characteristics of their natural resources, their economies and their cultures. The developmental opportunities and constraints with which small islands (10,000 square kilometres or less, population 500,000 or less) are faced were thrown into relief at a MAB inter-oceanic workshop on small islands, held in Puerto Rico in November 1986, at which twenty key issues, briefly stated below, were determined and discussed:

1. *Sustainable development.* Islands have a smaller capacity to absorb environmental impacts than larger areas. It is essential for islanders to understand and implement strategies of sustainable development.
2. *Diversity of islands.* Found in every latitude and clime, islands vary from quite large populous areas to tiny sand cays. With their small size, limited resource base, susceptibility to storm damage and drought, atolls exhibit many of the problems of small islands in their most extreme form.
3. *Open, specialized economies.* Openness and specialization are the hallmarks of an island economy. In many cases dependent upon the export of one or two specialized crops, small islands are often obliged to import many consumer goods, including food.
4. *Private sector involvement.* The private sector has much to contribute to development policy. Transnational and local companies have a major responsibility with regard to waste management, toxic materials control and energy conservation.
5. *Distortions in island economies.* Island economies are subject to distortions due to socially or politically motivated transfer payments of various kinds. The significance and effects of these distortions have not always been fully recognized.

6. *Transport.* Many small islands have serious external transportation problems. For island groups there is often a problem of maintaining an adequate outer-island transport service.

7. *Demographic issues.* Small islands are subject to cycles of rapid demographic change that go far beyond those related to natural birth and death rate balances (see Saliqa case study, opposite page).

8. *Employment.* Small population size and migration mean that the fine balance between manpower supply and demand is easily upset.

9. *Decision-making.* Integration of scientific concepts into managing island environments is often given low political priority. This stems partly from a lack of information available to decision-makers.

10. *Natural resources.* Natural resources, on which sustainable development ultimately depends, are among the most vulnerable sectors of island economies.

11. *Forestry.* Conservation of forest cover is essential for small islands for watershed protection and as a guarantee against soil erosion.

12. *Land management.* Land-use problems on islands largely result from the conflict between change and development and traditional systems. In many cases loss of traditional forms of land ownership is increasing the fragmentation of landholdings.

13. *Water.* Only the largest and wettest high islands have ample resources of water, and even on some of these there are seasonal shortages.

14. *Energy.* Many islands depend almost totally on imported fossil fuels, although use of wood and charcoal continues. Solar energy is already important on some islands and biogas digesters are in use in a few areas.

15. *Conservation.* Small islands are often the site of rare but fragile ecosystems, many of

Pirates, parasites and population

SMALL islands throughout the world have experienced cycles of rapid demographic change. This may be due to the impact of outside forces beyond their control or to the fact that their economies are based on a single specialized crop at the mercy of disease and the caprices of the market.

Pirates and parasites were the cause of the vicissitudes of Salina, a small island lying to the north of Sicily in the Aeolian Archipelago.

For centuries, fear of pirates in the Archipelago was such that only Lipari, with its powerful fortifications, had a stable population, while Salina and the other Aeolian islands remained virtually uninhabited.

Even Lipari finally succumbed. In the Aeolian islands they still commemorate the terrible siege of July 1544, when Khayrad-Din, the Barbary pirate better known as Barbarossa (Red-beard), seized the fortress and carried off into slavery some 9,000 inhabitants, almost the entire population of the island.

Salina remained largely unsettled until the arrival of the French and British fleets in the Mediterranean, and a campaign by Admiral Nelson, finally eliminated the pirate scourge.

Already in the mid-eighteenth century, as pirate power started to decline, the Benedictine order, a considerable landowner in the area, had begun leasing its lands on Salina on favourable terms to a number of private entrepreneurs. The latter brought in landless immigrants from other islands of the archipelago, as well as from Genoa, Naples and Sicily, to work the vineyards that had been established on terraces on the volcanic formation, about 900 metres above sea level.

The vineyards of Salina specialized in Malmsey, a wine much in demand in England. Trade prospered and the farmers were able to buy their lands. By 1860, Salina boasted 8,000 inhabitants, most of them engaged in the cultivation of grapes and the production and shipping of wine.

At the end of the century, however, an infestation of the *Phylloxera* parasite destroyed the vineyards on Salina. Earnings on the island dropped sharply and, lacking the capital to survive during the period required to restore the vineyards, local families began to emigrate in large numbers to Argentina, the United States and, later, to Australia. In a relatively short time, the population fell to under 2,000.

Although the vineyards were rehabilitated prior to the Second World War, the population has only recently risen to a total of 2,300.

Salina's period of economic development lasted only about sixty years. Its rapid settlement was based on a specific opportunity to take advantage of an existing market to earn a good living.

Rapid emigration followed the *Phylloxera* infestation. In the absence of long-term credit with which to restore their vineyards, and in view of inducements offered to emigrate to other areas where land was made available at low cost, many farmers took the easy way out, even though it meant leaving their native island and, in some cases, their families as well.

For Salina, dependence upon a single product led first to rapid population growth and then, following a natural disaster, to rapid emigration—a clear example of the risk involved for a small island of basing its economy on a single specialized crop. ■

development

which are in danger of disappearing through lack of conservation policies. The introduction of exotic species represents an additional threat to native wildlife species.

16. *Coastal and marine ecosystems.* An island's coastline is often its most valuable region, but unregulated industrial and tourist development projects are liable to cause irreparable damage. Pollution from mining and forest activities are causing extensive damage to coastal areas and marine life in some high islands of the western Pacific.

17. *Fisheries.* Island fisheries in the tropics and the Mediterranean are mainly small-scale and conducted on artisanal lines. In tropical islands, fishing for export is often hampered by problems of storage and marketing.

18. *Agriculture.* Island agriculture systems range from subsistence farming to the production of export cash crops. The fall in demand for sugarcane and copra has been a serious blow to certain island economies.

19. *Industry.* The smallness of islands is a severe constraint on industrial development. There is, however, some scope for value-adding semi-manufacture.

20. *Tourism and allied services.* Climate and beaches are islands' main tourist attractions, but tourism as a major industry requires investment in infrastructure. Military use of strategically placed islands is comparable with tourism in its economic effects. ■

Above, the Greek island of Halki, to the west of Rhodes, is one of a dozen small islands in the Mediterranean that are working together to solve their environmental problems with a helping hand from Unesco's Man and the Biosphere Programme. Right, the island of Salina, in the Aeolian Archipelago, is one of the sites studied as part of MAB research on the ecology and use of small islands.

Photo Unesco/Ayala

Photo © ENIT, Paris



The most accurate, up-to-date research data will be worthless unless they are presented with the end user's objectives in mind

Information please

In a tribute to the greatest scientist of the seventeenth century, Alexander Pope wrote:

*Nature and Nature's laws lay hid in night;
God said, "Let Newton be!" and all
was light.*

Somewhat more than two centuries later, in a light-hearted pastiche of Pope, Sir John Collings Squire paid his own wry tribute to the greatest scientist of the twentieth century:

*It did not last: the Devil howling "Ho!
Let Einstein be!" restored the status quo.*

The two couplets are of more than merely anecdotal interest. They highlight the tremendous volume and complexity of scientific advance in the 229 years between the publication of Newton's *Principia Mathematica* (1687) and of Einstein's *The Foundation of the General Theory of Relativity* (1916).

Publication of scientific information increased in parallel with scientific advance. Beginning with two journals that started publication in 1665 (the *Journal des Scavans* and the *Philosophical Transactions* of the Royal Society of London), the number of scientific periodicals has grown enormously. Estimates of the present number of such journals vary from 25,000 to 100,000 (the wide variation being due to differing opinions as to which publications qualify as scientific journals).

To publications such as these must now be added an overwhelming mass of report literature (the periodic reports often required by organizations sponsoring research), papers published by information-exchange groups, newsletters, reviews and abstracting services, reference books, handbooks and manuals.

For the scientist struggling to cope with this rising flood of information, with which he must contend if he is to keep abreast of his subject, the immediate solution has been to narrow his field of interest by increasing his degree of specialization. This in turn has contributed to the fragmentation of the major disciplines into ever smaller subject areas, each with its own specialized data bases, newsletters, periodicals, and so on. The net result has been a greater and greater amount of information accessible to fewer and fewer specialists.

This is not to suggest that there is, or ever will be, too much scientific information available. There is a striking parallel to be made between an apparent information glut and the "food mountains" that have grown in the West at a time when two-thirds of the world population is either malnourished or under-nourished.

Part of the food problem is that in many cases the surpluses produced in the West are unsuitable, if not indigestible, to those in need of food elsewhere.

The problem is somewhat similar with scientific research data. Decisions are made every day throughout the world which will affect the lives of millions of people, in complete disregard of scientific facts, simply because those facts are not available to decision-makers in a form which they can apply, or to the people who will be affected in a form they can understand.

To go back for a moment to Newton; the apocryphal story that his theory of gravity came to him when he was hit on the head by a falling apple while resting under an apple tree was related to the everyday experience of ordinary people. Because of this they gave credence to his assertion that the Universe was regulated by simple mathematical laws.

Einstein, whose theory of relativity related to events outside the direct experience of almost the entire population of the globe, was less well served by a limerick published in the magazine *Punch* in December 1923:

*There was a young lady named Bright,
Whose speed was far faster than light;
She set out one day
In a relative way,
And got home the previous night.*

Fortunately, two events have occurred which have gone a long way towards resolving the information dilemma.

The first, paradoxically, was the emergence of yet another scientific specialization—ecology, which originated as an offshoot of biology. By definition ecology is basically the study of relationships, of *ecosystems*, and, although it took some time to break their ingrained habits, ecologists found themselves working in teams made up of scientists from different specialities and therefore *obliged* to communicate between each other, to think in terms of

other disciplines, other time scales, other objectives than their own. Horror of horrors—they even had to work with specialists from the social sciences, which many of them did not consider to be "real" sciences at all.

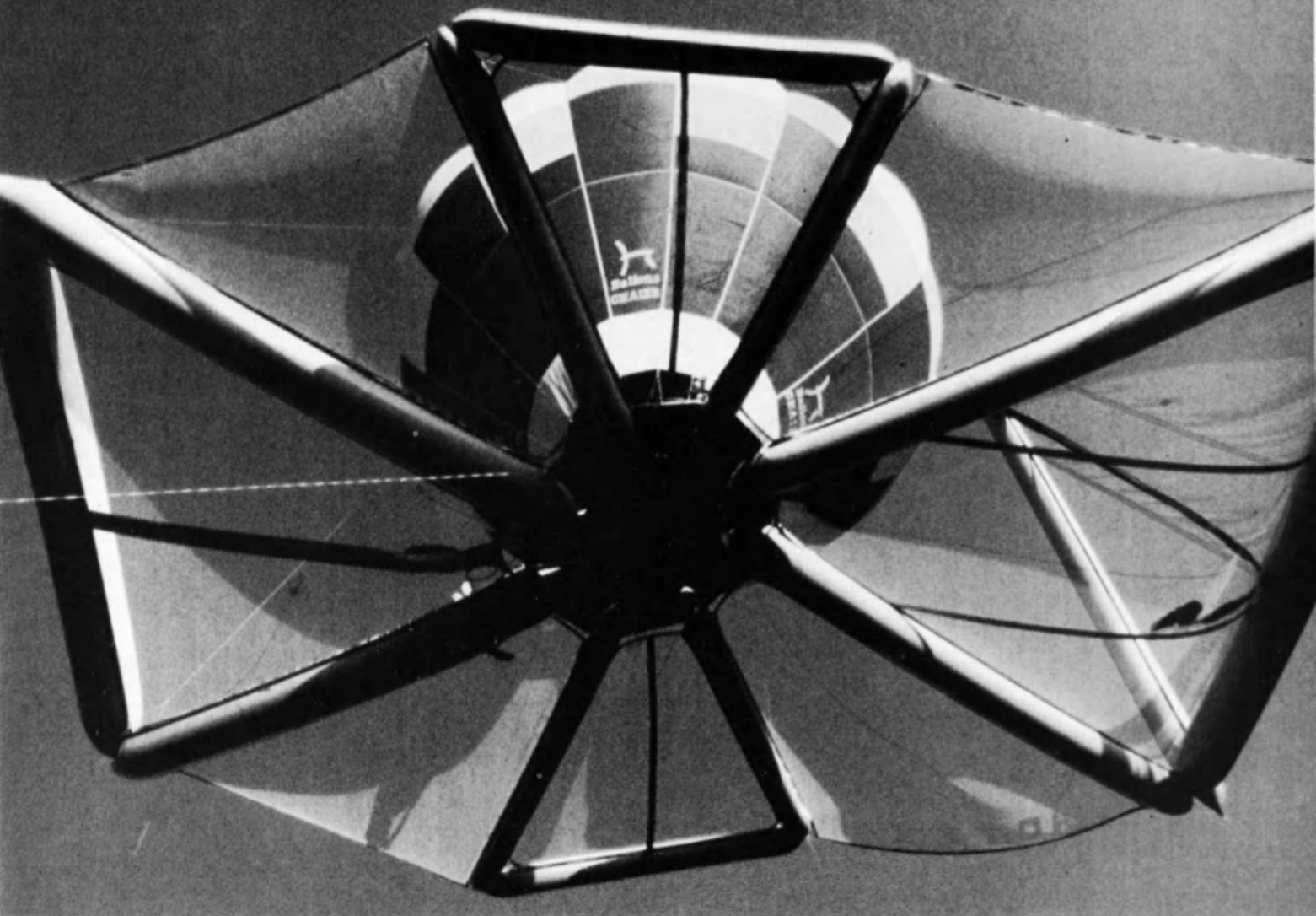
The second event was the arrival *en masse* of cheap, readily available computers capable of handling huge quantities of data flexibly and at great speed.

Suddenly the sum of human knowledge as related to a particular problem has become available at the price of a few strokes of the keyboard instead of hours, months or years of painstaking sifting through reams of paper.

Suddenly the prospect is in sight of being able to ask such questions as: "What would happen if we were to cut down 100 hectares of forest in West Africa?" and to get a reply which covers not only the forestry aspects of such an action but the economic, social, human, wildlife and public health effects as well.

As one of the world's major international ecology programmes, Unesco's Man and the Biosphere (MAB) Programme has played its part in this evolution. A computerized documentation system for MAB has been set up through an agreement with the *Centre International de Documentation Agronomique pour les Régions Chaudes* (CIDARC), at Montpellier, France. Research data on all of the 250 or so biosphere reserves are available on computer at the *Conservation Monitoring Centre*, in Cambridge, England, and a *Biological Diversity Program* to develop detailed computerized inventories of the biological resources of biosphere reserves following a standard protocol is being developed in co-operation with the Smithsonian Institution, in Washington, D.C.

More importantly, perhaps, MAB has tried to convince scientists that, to be effective, information must be presented in a *usable* form that takes into account the traditional knowledge, skills, and cultural, social and economic imperatives of those to whom it is being imparted. ■



The canopy raft



SATELLITES, aircraft, ultra-light aircraft and tethered balloons all enable photographs and measurements to be taken from above the forest canopy. Something else is needed, however, for taking measurements and samples from within the canopy, hence the use of walkways and vertical towers at MAB research stations such as Sakaerat (Thailand), Tai (Ivory Coast), and Dimonika-Mayombe (Congo).

Another approach is to climb up into the canopy, either using the trunk as a means of support or directly into the branches from the ground or from a neighbouring tree. Abseiling is among the devices borrowed from rock-climbing that have been used in scaling up and down the forest profile, but this is definitely not a technique to be recommended to the uninitiated or the faint-hearted.

Recognition of the shortcomings of these methods led to the idea of using a hot air balloon as a method for studying the forest canopy. The idea was the brain-child of Francis Hallé, a botanist who has long been interested in the architecture of tropical forest ecosystems, Dany Cleyet-Marrel, an

aeronautic designer and owner of the balloon, and Gilles Ebersolt, a young balloon enthusiast and constructor.

The *Radeau des Cimes* (canopy raft), as it was baptized by its French inventors, is 31 metres long by 22 metres wide and consists of inflatable rubber cylinders connected by a sort of net trampoline made of PVC-covered Kevlar. Weighing 750 kilograms, the raft serves as the nacelle for the hot air balloon of 3,000 cubic metres to which it is attached by twelve cables.

Once airborne, the raft skims downwind, just a few metres above the forest canopy. The two-man crew of pilot and scientist use a guide-rope to orient the raft and to land it on top of the canopy. Once the raft is landed and secured, the balloon is deflated and folded away and the scientific work can begin. Liaison with a ground team is established by means of a caving cable, which enables other scientists to have access to the canopy.

Initial results have been promising. After trials with a helicopter-landed, 12 by 12 metre prototype raft in the Forest of Pilat, in France, in October 1985, the first field trials in the tropics took place in October 1986 in



Photo Jean Becker © Sygma, Paris

French Guyana, in the region of Montsinery. Samples were taken of trees, lianas and parasitic plants, which were then conserved using a method perfected by the British Museum of Natural History in London. Ultra-violet lamps and interception nets were among the methods used for collecting insects, particular emphasis being given to two groups of beetles. Other observations and sampling concerned epiphytic plants, ant gardens and atmospheric pollen.

If all goes well, a second set of trials, to be held in late 1987 at the MAB project site of Makokou, in Gabon, will seek to associate other scientific disciplines in addition to those that took part in the first series—medical entomology and parasitology, bioclimatology and mammalogy, ornithology and floral biology.

First, however, a number of improvements need to be made in the basic opera-

tion of the canopy raft. These include an increase in upward force, improvement of visibility through the nets, improvement of access from the soil, improvement of night use and the addition of a directional movement capability. At a post-trial meeting held in Paris in December 1986, the feeling was that these various improvements should all be technically feasible, although a fair amount of financial sponsorship would be required.

It might well be asked what was the role of Unesco/MAB in all this. In truth, it was very modest—moral support plus a few thousand dollars. But, as in other similar instances, the small amount of financial support from Unesco (in this case a joint effort with UNEP, the United Nations Environment Programme) was "put up front". It was made available at the very early risk-taking stage of the project. This "pump-priming" support was useful to the

leader of the project, Francis Hallé, in attracting more substantive funding from public and private sources such as the French Ministry of the Environment and National Research Council, the Office for Scientific Co-operation Overseas (ORSTOM), the national petroleum company (Elf/Antargaz), and a national television channel, *Antenne 2*.

Already the initial success of the canopy raft has had considerable coverage in newspapers and magazines, both in France and abroad. In addition, one film, for the scientific audience, has just been completed and another, for a more general public, is in the making. Francis Hallé and his team hope that this publicity will help to attract further support for this novel way of entering the enchanted, unknown world of the forest canopy. ■

African Mountains Association created at Addis Ababa Mountains and Highlands Workshop

The need for research and development strategies, resource management and food security; man's role in changing the mountain environment in Africa; processes and consequences of change until the end of the century—these were among the issues taken up at an international workshop held in Addis Ababa, Ethiopia, from 18 to 27 October, 1986.

The workshop was attended by scholars from ten African and seven non-African countries. Some thirty-six papers were presented on a range of topics covering the characteristics of African mountain ecosystems, land use, environmental problems in general and soil erosion and conservation in particular. Both

in the papers and during an extensive four-day field excursion, practical responses to solving environmental problems were demonstrated.

The close inter-relationship between environmental degradation and rural poverty was a central theme for discussion. The general feeling of the workshop was that while the situation was critical in many regions there was also room for optimism.

Reflecting both this optimism and also the feeling that there was a serious need for remedial action, the workshop concluded with the creation of an African Mountains Association. The new Association intends to maintain

close working contacts between the participants and to enlarge progressively into an effective force for research and action, and will work closely with international programmes such as MAB.

A first step will be the publication of the proceedings of the workshop. Participants felt that the collated papers and field demonstrations would constitute the most important body of literature now available on African mountain and highland ecosystems.

The participants also unanimously adopted a series of resolutions which address issues of resource development in African mountain and highland regions. ■

Deforestation, erosion, population pressure, migration and social change all threaten the equilibrium of mountain ecosystems

Mountain challenge

IN Hindu mythology, a mountain is the centre of the universe and the axis of the world. This mythical golden mountain, Mount Meru, is the abode of the gods and the Himalayas are its foothills. It extends down into the nether regions of the Earth as far as it reaches up into the heavens. On Mount Meru, say the Hindu scriptures, "there are rivers of sweet water running, and beautiful golden houses in which live the spiritual beings, the Deva".

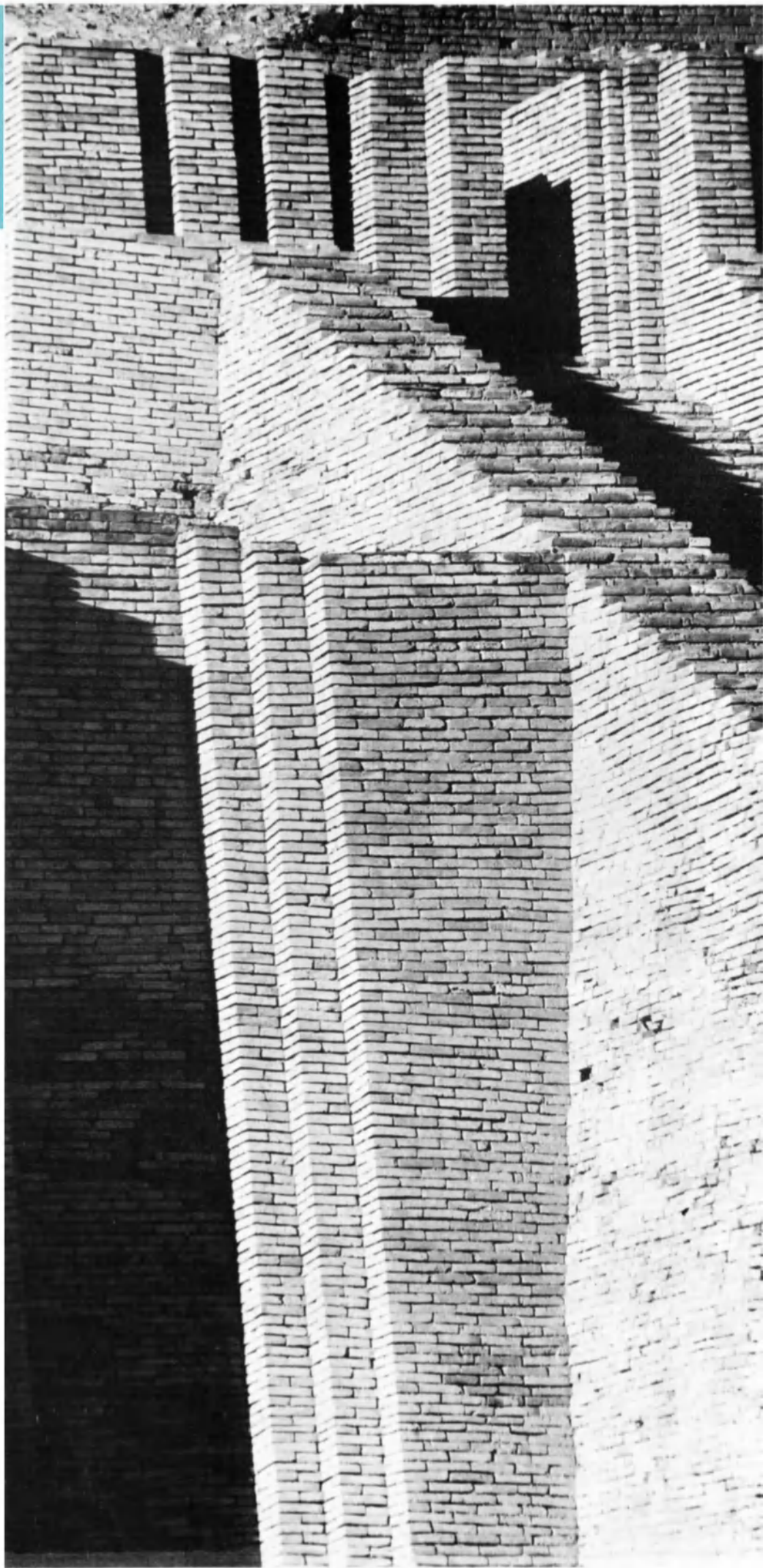
From Fujiyama to Olympus to Sinai, every high mountain has been looked upon with awe and reverence by those who live within its shadow. Indeed, so strong has been this instinctive sense of the sacred nature of mountains that even the plainsmen of Mesopotamia felt the need to construct artificial mountains, the "ziggurats", in an attempt to reach upwards to the gods.

Perhaps this is because each one of us has his own interior mountain to climb, to enjoy and to revere. Even today, when men have stood upon the summit of Mount Everest, the challenge and the reverence remain. A mountain must be climbed, revered and preserved, in the famous mountaineering phrase, "because it's there".

Strangely enough, for all our natural interest in mountains, there is no standard geological definition of a mountain. The most we seem able to say of them is that mountains are landforms that rise prominently above their surroundings, generally having steep slopes, a relatively confined summit area and considerable local relief.

View of the ziggurat at Ur (modern Tall al-Muqayyar), Iraq. These pyramidal, stepped temple towers were a characteristic feature of the cities of ancient Mesopotamia from about 2000 BC to 500 BC. They are thought to have given rise to the story of the Tower of Babel.

Photo Georg Gerster © Rapho, Paris





A Nepalese village in the Himalayas

Yet even if only areas above 1,000 metres in altitude are considered to be mountainous, the mountain regions of the world are vast in extent.

Some 10 per cent of the world's population actually live in mountainous areas and approximately 40 per cent or more depend on mountain resources, whether for minerals, timber, agriculture, water, energy or recreation.

Because man's impact on mountains is mainly in rather than above the vegetation belt, the mountain ecologist tends to think of mountains as areas, at all elevations, where there is significant ecological differentiation in the vertical sense, and where there are continuous interactions between the ecological belts at different altitudes, including, in particular, interactions associated with human activities, since man is the most important factor for change in most mountain ecosystems.

How great is man's impact on the mountain regions of the world? For centuries highlanders have lived in partnership and equilibrium with nature, creating some of the most harmonious landscapes in the world. Today, however, the world is shrink-

ing, and from the Alps to the Andes the pressures of population growth and movement and the demands of development are placing this equilibrium in danger. Two MAB research studies have shown how this has come about.

For many centuries, human habitation in the central Andes was concentrated mainly in the altiplanos, or high plateaux, with settlements spanning the range from isolated rural communities to large urban centres. The adjacent downslope areas were more sparsely settled, particularly the tropical forest areas in the lowlands adjoining the Andes. During this century, and especially since the 1950s, there have been great movements of population to the urban areas in the mountains, to the lower altitude areas and, above all, to the coastal towns and cities.

Emigration from the highland areas results in part from growing population pressure on a limited resource base and in part from a real or expected better quality of life in other areas. For a variety of social and political reasons the patterns of land exploitation established in the altiplanos after the Spanish conquest remained static and,



bacterial, viral, parasitic and microbial infections against which they have no natural immunity.

In the Alps, population movement has been in two directions. The traditional mountain populations are abandoning some of the higher altitude areas, while adjacent lower areas are becoming comparatively crowded. But the main cause for concern is the transformation of what was formerly a relatively stable agricultural and pastoral system, due to seasonal inflows of people from outside the area on such a vast scale that the carrying capacity of these areas may well be exceeded.

These inflows are made up of summer and winter tourists and weekend visitors from the densely populated neighbouring regions. To these must be added owners of second homes, who often become permanent residents upon retirement. Many traditional villages, Alpine pasturelands and, indeed, whole valleys can no longer meet the demands of this additional population for avalanche-safe building land, water, roads, energy supplies, ski-lifts and ski-runs.

Agriculture, too, is very much affected—not only in tourist areas but throughout the Alpine region. New attitudes towards agricultural work and rural life are as important as the increasingly marginal profitability of agricultural and pastoral use of steep and isolated mountain lands in provoking the abandonment of certain areas or the appearance of such phenomena as under-grazing. As fewer and fewer pathways for the herds remain available, the old practice of transhumance (the moving of livestock from winter to summer pastures) is disappearing in the western Alps. One side effect of this abandonment of grazing land is that changes in the vegetation cover create surfaces more conducive to avalanches.

The direct effects of the massive increase in the number of skiers over the past fifteen years must also be taken into

account. Aerial photographic surveys have shown how much the impacting of snow by thousands of ski descents every winter hinders the run-off of water in the spring. Vegetation is destroyed by the cutting edges of skis and it has been found that along the ski runs the insect population is decimated and the number of earthworms per square metre along some trails has been reduced from 130 to ten.

These are but two examples of the problems facing mountain regions throughout the world as a result of population pressure, social change and the needs of development. Even the mighty Himalayas are not untouched. In Nepal, for example, deforestation and erosion, coupled with an influx of adventure-seeking tourist-trekkers, are taking their toll.

To Edward Whymper (1840-1911), the artist and mountaineer who was the first man to climb the Matterhorn, an unclimbed mountain was "an affront to man's conquest of nature". Today, man's spoliation of the mountains he has revered for centuries will, if left unchecked, become the ultimate affront to nature. ■

when faced with rapid population growth, the capacity of the highland areas to support ever-increasing numbers was soon stretched to the limit. The result was over-use of land, particularly over-grazing, a decline in productivity and a consequent increase in emigration, especially among the younger and more dynamic people.

Migration on the scale experienced in the Andes over the past two decades has affected the environment through over-use in some areas and under-use in others. Today, for the first time, the down-slope areas below the altiplanos are being massively exploited. Unfortunately, lack of sound agricultural practice is leading to accelerated erosion of the soil which not only affects the productivity of these areas directly but also has a negative effect on lowland areas.

Migration is putting serious pressure on the housing and health services and other amenities in the urban areas, especially in the coastal towns and cities to which the population flow is greatest. The health problems are enormous since the altiplano populations arriving in the humid low altitude areas are especially vulnerable to

Aboard the famous mountain train from Cuzco to Machu Picchu, Peru



Photo H. Silvester © Rapho, Paris

Lake Baikal

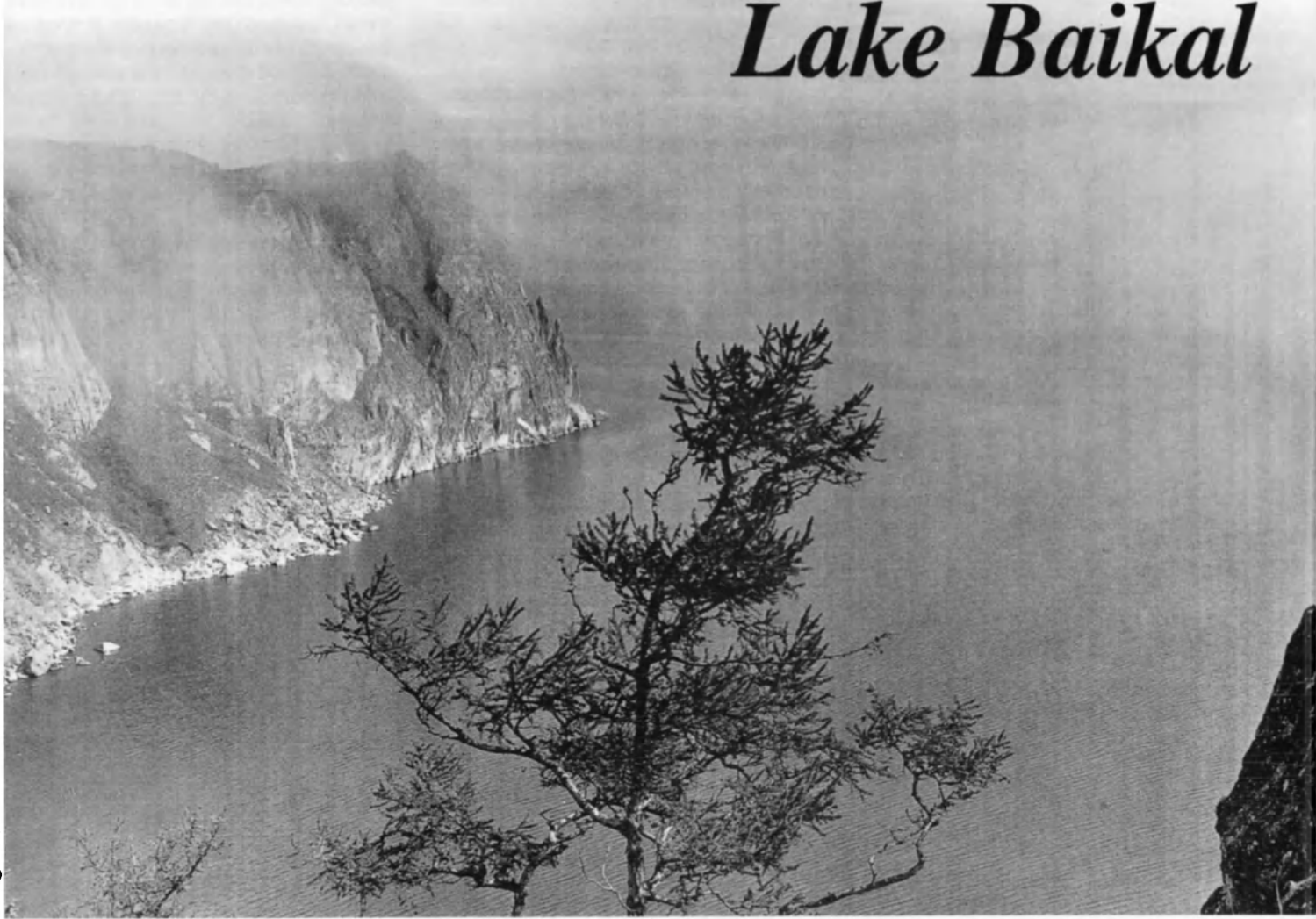


Photo © APN, Paris

The world's deepest lake holds one-fifth of the fresh water on the surface of the Earth

LAKE Baikal, the world's deepest lake, contains in its basin more than 23,000 cubic kilometres of fresh water. This represents about 20 per cent of the world's fresh water reserves and 80 per cent of the total surface fresh water reserves of the USSR. This is about the same amount as is contained in all the five North American Great Lakes put together.

The lake, into which 336 rivers and streams flow, is home to some 2,600 species of plants and animals. Three-quarters of these species—as well as eleven families and sub-families and ninety-six genera—are endemic to the lake.

Scientists at the Siberian branch of the USSR Academy of Sciences, based at the Limnological Institute at Irkutsk, have been studying Lake Baikal for many years and have obtained a wealth of data on such aspects as water inputs, nutrient flows, sedimentation rates, trophic relationships, benthic and littoral fish communities, productivity of phytoplankton and zooplankton, and the effect of vertical stratification of the water column on the distribution of organisms of all trophic groups. Quantitative measures of biomass and productivity include an estimated average total net weight biomass of invertebrates of 750,000 tons, of which 40 per cent is comprised of 300 benthos.

Research has highlighted the dynamic nature of the Baikal ecosystem and the intricacy of the interactions between the lake and its surroundings. Pollution through water recycled by industrial (particularly cellulose) plants is a major threat to water quality, which in turn is crucial to the plant and animal communities living in the lake. One cubic metre of re-circulated water from a cellulose plant, normally diluted in more than 1,000 cubic metres of lake water, is not capable of supporting life. When it is considered that some of the larger cellulose plants are re-circulating more than 300,000 cubic metres of water per day (water containing highly toxic components which, even at low concentrations, may affect the life and behaviour of living organisms), the importance of the threat to the Lake Baikal ecosystem can readily be appreciated.

It is in this context that Dr. G.I. Galazy and fellow scientists from the Irkutsk Institute have mounted a sustained public education campaign to inform the Soviet people about the uniqueness of Lake Baikal, of the importance of its biota and of the present and projected effects of human activities on the lake.

Public awareness about these issues has been raised throughout the Soviet Union by a concerted programme involving the press, television and radio and calling

The poetry of Ilya Chavchavadze

by Gaston Bouatchidzé and Edouard Glissant

Gaston Bouatchidzé: The work of Ilya Chavchavadze (1837-1907) fits naturally into the literary tradition of Georgia, the origins of which can be traced back to the fifth century. The poetical works which preceded and paved the way for his own include, first and foremost, *The Knight in the Panther's Skin* by Shota Rustaveli (twelfth century), the *Davitiani* by David Guramishvili (eighteenth century) and the poetry of the romantic Nikoloz Baratashvili (first half of the nineteenth century). However, the period spanned by the life of Ilya Chavchavadze coincides with a unique chapter in the history of the country. The poet sets out to be its chronicler, and both his poetic inspiration and his craft are influenced by this, being shaped by the dictates of the author's views. If Rustaveli is the master of epic and philosophical poetry, a virtuoso of richly musical and varied verse, Guramishvili the craftsman of the most wide-ranging poetic metre and of constructions that are both brilliant and striking, and Baratashvili the lyricist of suffering and melancholy, the poetry of Ilya Chavchavadze is outstanding in its deliber-

ate purity of form and transparency, in keeping with his generous breadth of vision. Clarity and directness of impact are the essential characteristics of his work.

Edouard Glissant: The poetry of Chavchavadze does, indeed, have the power and refinement to be found in all literature which strikes a strong popular chord and marks a new departure. In this respect it is reminiscent of the French sixteenth-century poets such as Jean de Sponde or Jean-Baptiste Chassignet. At the same time, it is almost symbolist in its musical qualities, and speaks, besides, with the perfectly controlled voice of modernity. Here we find a lyrical encounter between personal feeling and collective destiny.

G.B.: I should like, in this connection, to

Still from the 1958 Soviet film "The Widow Otarova", which was adapted for the screen from Ilya Chavchavadze's 1887 novel describing the misery of serfdom and the decline of the feudal system.

on the skills of journalists, science writers and other communications specialists.

At the same time, government officials have been regularly informed about the situation, and this whole process has triggered a change in attitudes towards the economic policy in the Baikal drainage basin and the conservation status of the lake ecosystem.

In April 1986, as a result of these efforts to change public opinion and policy, the Lake Baikal Region Biosphere Reserve was approved by the MAB Bureau as a new addition to the international network of biosphere reserves. And on 2 April 1987, the Government of the USSR issued a new law concerning the protection and redevelopment of Lake Baikal and its surroundings, as well as plans to close the cellulose industry in the area within the next five years. The whole process is instructive of how scientists' observations and understanding can be put to good use in changing policy, and underscores the role of scientists in initiating and providing the basic information for educational programmes for the public at large. ■

Photo © APN, Paris



by *Nelly Nicolaevna Kornienko*

THE worldwide interest currently being shown in Les Kurbas (1887-1942) is by no means fortuitous. As the end of the twentieth century approaches, people are beginning to feel the need for a "Renaissance personality", a leader in the arts and a philosopher. Kurbas was such a personality. He was an actor, playwright, translator, stage and cinema director with original ideas about the function of the theatre. A disciple of Melpomene, the Muse of Tragedy, his greatest claim to fame is that he evolved a strategy of culture. That is why his ideas on aesthetics continue to interest people nearly half a century after his death.

The name of Les Kurbas, founder of Soviet Ukrainian theatre, figures among the greatest in the history of dramatic art—Konstantin Stanislavsky, Vsevolod Meyerhold and Yevgeny Vakhtangov, Max Reinhardt, Edward Gordon Craig and Bertolt Brecht.

Kurbas was born in Galicia (then part of the Austro-Hungarian empire), into a family of well-known Ukrainian actors, the Yanovichs. Educated at the universities of Vienna and Lvov, he studied several languages, including English, so that he could read Shakespeare in the original; Norwegian, in order to understand Ibsen; and Sanskrit, because he was particularly interested in the East. Thus he came to his national culture in the spirit of a reformer.

He established a Youth Theatre in 1917, with the intention of producing plays drawn from different cultures throughout the world. This quite exceptional and successful experiment in theatre work lasted until 1919. Enthusiastic audiences wearing sweaters and leg-warmers (it was the time of the Civil War and the country was in a state of economic dislocation) saw various plays—a brilliant production of *Oedipus Rex*, the first of Sophocles' works to be performed on the Soviet stage; Zhulavsky's fanciful, impressionistic *Yola*; Shevchenko's expressionistic masterpiece *Jan Huss*; intellectual plays such as Lesya Ukrainka's *In the Thicket*; one of the national folklore theatre's colourful Christmas productions; and, later on, plays by Shakespeare, Molière, Schiller, Hugo, Crommelynck and Grillparzer.

Kurbas brought Ukrainian theatre to the forefront of Soviet and European cultural life. As early as 1925, at the World Fair in Paris, the design for one of his productions won a gold medal for the Soviet Union. Osip Mandelstam, major Soviet poet and literary critic, who was anything but complimentary about the theatre, showed great insight when he said that Kurbas would be renowned as the founder of Ukrainian theatre.

Much of Kurbas' work in the theatre was

based on the idea that "man is a microcosm", as postulated by the eighteenth-century Ukrainian philosopher Grigori Skovoroda. Skovoroda's teaching on the "inner man", the value of the spirit and the worth of the human personality, had a marked influence on productions at the Berezil Theatre in Kharkov, where Kurbas did most of his work. In many of his productions, images inspired by Skovoroda were used to symbolize the unending search for spiritual truth.

Kurbas, like Vakhtangov, was an artist of the Revolution. He regarded the theatre as a model of society and a forum for the discussion of public questions. His vision of a theatre of "transfiguration", in which the world could be, as it were, re-created, was profound and idealistic. A firm believer in the ethical power of art and the insight it provides, he thought it was possible to change society through the artistic and moral life of the theatre.

But it is unorthodox ideas of this kind that leave their mark on history, especially when they are put forward by someone who is completely disinterested. Thanks to Kurbas, something of Craig's dream about a school to study the art of the theatre was realized. He established the Berezil Artists' Society comprising an extensive network of theatrical workshops, the prototype of the new Soviet Ukrainian theatre—which produced shows ranging from drama and opera to variety, circus, reviews and musicals—as well of the many theatre research institutes.

The political plays produced by Kurbas at the Berezil Theatre between 1922 and 1926 included Keiser's *Gas*, Shevchenko's *Haidamaks* ("Ukrainian Soldiers"), Sinclair's

Jimmy Higgins and Shakespeare's *Macbeth*. These performances were vivid, striking studies of extreme psychological and social experiences, very avant-garde compared with other contemporary productions.

Much can be learned from Kurbas' conception of the theatre. What was true in his time is true today. The Polish experimental theatre director Jerzy Grotowski's search for the "sacral life of the human spirit", the British director Peter Brook's vision of a new kind of culture, the subtle combination of irony, farce and insight found in the films of the Italian director Federico Fellini, the tragic symbolism of the Swedish director Ingmar Bergman—all these recall the Soviet experiments and, in particular, Kurbas' theatre of "transfiguration". The mysterious nature of his productions gives a feeling of timelessness to his conception of humanity. Their interplay of the serious and the farcical, the eternal and the mortal, the lofty and the base, is reminiscent of baroque art; everyday life is interpreted by reference to the fantastic. Kurbas' aesthetic ideas brought to theatre a new and dynamic form of realism based on fantasy, with an infinite capacity to reveal the complexities of the world and the absurdities of daily life. ■

NELLY NICOLAEVNA KORNIEENKO, of the Soviet Union, is a specialist in dramatic art and in the sociology of culture, subjects on which she has written some 40 works published in her own country and elsewhere. A former member of the sociology of culture sector at the Soviet Institute of Scientific Research into Art, she is currently a staff member of the Russian language edition of the *Unesco Courier*.

Scene from Jimmy Higgins, a strikingly innovative stage version of the American writer Upton Sinclair's anti-war, humanist novel (1919), produced by Les Kurbas in 1923.

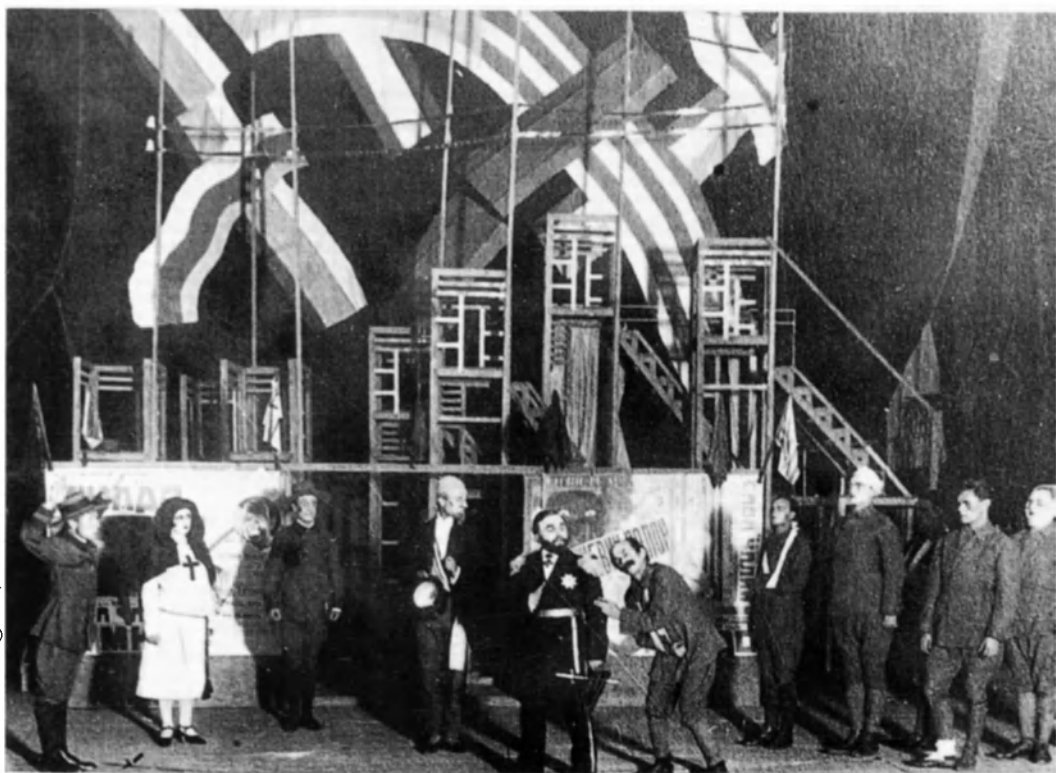


Photo Les Taniuk © APN, Paris

In the May 1987 issue of the Unesco Courier reference was made to a proposal by the Greek poet and politician Yannis Coutscheras, that the basic food products necessary to humanity should not be subject to market forces. In view of the importance of the question, we publish the following text by Mr. Coutscheras.

Food for all — The 'Paris Appeal'

by Yannis Coutscheras



Photo FAO

Threshing grain in Lebanon

TODAY'S so-called age of affluence is also an age of paradox. The mounting wave of individuals and peoples driven to despair by famine is reaching alarming proportions.

The brunt of this unacceptable state of affairs is borne primarily by the children of developing countries, where 15 million people starve to death every year and 50 million more are undernourished and suffer from the serious physical and psychological consequences of malnutrition, such as inability to attend school or to work.

Dire poverty is the rule in the population groups and peoples devastated by famine. Meanwhile quantities of foodstuffs that the market cannot absorb are being destroyed. The scientific advances that would make it possible to produce enough food to feed a population much larger than that of the world today are not being applied for fear of a drop in prices. Moreover, astronomical sums are being wasted on the arms race in order to prepare for a war which will never take place, since it is acknowledged that total war would mean universal suicide. Such poverty is a source of ever-growing despair, where bitterness breeds hatred, revolt, violence and war.

Free access to staple foods in order to guarantee the right to life is a fundamental requirement. The conception of human rights which has evolved over the years to include the right to health, the right to education and the right to work, seems to be lagging behind with respect to the basic right to life.

In 1975, as a member of the Parliamentary Assembly of the Council of Europe, I presented a proposal calling for universal free access to basic foodstuffs; subsequently, so that this ideal might be achieved by degrees, I restricted my proposal to children, wording it as follows: "In order to safeguard the lives of all children, certain basic food products should not be subject to market forces, and each child should be entitled to a free ration."

This proposal has been adopted by various organizations—the Council of Europe (1980), the Greek Parliament (1984), Unesco (1985), the International Association of Democratic Lawyers (1986) and by many distinguished figures. It meets with approval and support wherever it is put forward, since it is considered to be effective and capable of implementation without delay.

The onus is on intellectuals to take the first step and, unswayed by religion, culture,

nationality, political convictions, race or colour, to rise up against injustice and make a joint effort to bring this shameful situation to an end; so that we may never again read such headlines as "Rampant famine" or "Rising world toll of famine and malnutrition", and never again be told that hunger now afflicts 730 million people.

With this end in view, a group of distinguished persons from various countries has recently set up a Provisional Committee in Paris to make preparations for 16 October 1987, World Food Day, when a meeting will be held at Unesco Headquarters to launch the "Paris Appeal" for the early withdrawal of staple foods, in particular children's foods, from the arena of market forces. The appeal will go out to all governments and will be taken up by news agencies and the media to bring the campaign to the attention of the world. Subsequently, political will must come to the fore, since without it nothing can be done. ■

The Courier

Editorial, Sales and Distribution Office:
Unesco, 7 Place de Fontenoy, 75700 Paris.

Subscription rates

1 year: 90 French francs.
Binder for a year's issues: 62 FF
The *Unesco Courier* is published monthly.
Individual articles and photographs not copyrighted may be reprinted providing the credit line reads "Reprinted from the *Unesco Courier*", plus date of issue, and three voucher copies are sent to the editor. Signed articles reprinted must bear author's name. Non-copyright photos will be supplied on request. Unsolicited manuscripts cannot be returned unless accompanied by an international reply coupon covering postage. Signed articles express the opinions of the authors and do not necessarily represent the opinions of Unesco or those of the editors of the *Unesco Courier*. Photo captions and headlines are written by the *Unesco Courier* staff. The boundaries on maps published in the magazine do not imply official endorsement or acceptance by Unesco or the United Nations. The *Unesco Courier* is produced in microform (microfilm and/or microfiche) by: (1) Unesco. 7

Place de Fontenoy, 75700 Paris; (2) University Microfilms (Xerox), Ann Arbor, Michigan 48100, U.S.A.; (3) N.C.R. Microcard Edition, Indian Head, Inc., 111 West 40th Street, New York, U.S.A.; (4) Bell and Howell Co., Old Mansfield Road, Wooster, Ohio 44691, U.S.A.

Editorial staff (Paris)

Assistant Editor-in-chief:
Managing Editor: Gillian Whitcomb
Editors:
English: Roy Malkin
Caroline Lawrence
French: Alain Lévéque
Neda el Khazen
Spanish: Francisco Fernandez-Santos
Russian:
Arabic: Abdelrhahid Elsadek Mahmoudi
Braille:
Research: Violette Ringelstein
Illustrations: Ariane Bailey
Layout and Design: Georges Servat, George Ducret
Promotion: Fernando Ainsa
Sales and subscriptions: Henry Knobil
Special projects: Peggy Julien

All correspondence should be addressed to the Editor-in-chief in Paris

Non-Headquarters editions

German: Werner Merkli (Berne)
Japanese: Seiichiro Kojima (Tokyo)
Italian: Mario Guidotti (Rome)
Hindi: Ram Babu Sharma (Delhi)
Tamil: M. Mohammed Mustafa (Madras)
Hebrew: Alexander Broido (Tel Aviv)
Persian: H. Sadough Vanini (Teheran)
Dutch: Paul Morren (Antwerp)
Portuguese: Benedicto Silva (Rio de Janeiro)
Turkish: Mefra Iigazer (Istanbul)
Urdu: Hakim Mohammed Said (Karachi)
Catalan: Joan Carreras i Marti (Barcelona)
Malaysian: Azizah Hamzah (Kuala Lumpur)
Korean: Paik Syeung-Gil (Seoul)
Swahili: Domino Rutayebesibwah (Dar-es-Salaam)
Croatian-Serb. Macedonian, Serbo-Croat, Slovene: Bozidar Perkovic (Belgrade)
Chinese: Shen Guofen (Beijing)
Bulgarian: Goran Gotev (Sofia)
Greek: Nicolas Papageorgiou (Athens)
Sinhala: S.J. Sumanasekera Banda (Colombo)
Finnish: Marjatta Oksanen (Helsinki)
Swedish: Lina Svenzén (Stockholm)
Basque: Gurutz Larrañaga (San Sebastian)
Thai: Savitri Suwansathit (Bangkok)
Vietnamese: Dao Tung (Hanoi)

PUBLICATIONS

- **Only One Earth** video series of three 55-minute introductory programmes and eight 30-minute case studies, linked to the publication of *Our Common Future*, the report of the World Commission on Environment and Development. Three language versions planned (English, French, Spanish). Co-produced by Unesco, the British Broadcasting Corporation and North-South Productions, UK, 1987.
- **Man: The Key to Conservation**, slide-tape package consisting of 55 colour slides, 20-minute cassette, and brochure. (MAB audio-visual series 3, bi-lingual English/French.) Unesco, 1986.
- **InfoMAB**, periodical on the work of Unesco's Man and the Biosphere (MAB) Programme. *The World Heritage Convention*, reference map and list of recorded World Heritage Sites. Unesco, 1986. **MAB Urban and Human Ecology Digest**, by Brian Spooner. Unesco, 1986. (These publications available free of charge from Unesco's Division of Ecological Sciences.)
- **Ecology in Action**, an exhibit of 36 colour posters (120 cm x 80 cm) with drawings, photos and diagrams, accompanied by a users' guide and a descriptive note, which presents a synthesis of some of the main problems of land use, resource management and man-environment relations. MAB/Unesco, 1981.

- **Living in the Environment: A Sourcebook for Environmental Education**, edited by K.M. Sytnik. UNEP/Unesco, 1985. (Available free of charge from Science Teaching, Education Sector, Unesco.)
- **Fishes of the North-Eastern Atlantic and the Mediterranean**, edited by P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen and E. Tortonese. 3 vols., Unesco, 1985-1987.
- **Man's Dependence on the Earth: The Role of the Geosciences in the Environment**, edited by A.A. Archer, G.W. Lüttig and I.I. Snezhko. UNEP/Unesco, 1987.
- **Ecology in Action**, resource kit. Heinemann Educational Books/Unesco, 1987.
- **World Prospects: A Contemporary Study**, by John Molyneux and Marilyn MacKenzie. Prentice-Hall Canada Inc., Scarborough, Ontario, 1987.
- **Parks**, an international tri-lingual quarterly (English, French, Spanish) for managers of national parks, historic sites and other protected areas, published by Science and Technology Letters on behalf of the International Union for Conservation of Nature and Natural Resources (IUCN), with the support of Unesco. (Vol. 10, No. 3, 1985, on Unesco's MAB Programme.)

Nature and Resources



A quarterly in English, French, Spanish, Russian and Chinese, which provides international news and information on Unesco programmes concerning environmental activities, natural resources research and conservation. This recent issue, for example, featuring on the cover the Cévennes Biosphere Reserve in southern France, contains articles on the development of the biosphere reserve concept, on water resources management, and on design for energy-conserving cities. Each issue also includes bulletins on Unesco's Man and the Biosphere (MAB) Programme, the International Hydrological Programme (IHP) and the International Geological Correlation Programme (IGCP), plus book reviews and other news items of general interest.

Annual subscription 60 French francs
Single issue 18 FF

Where to renew your subscription

and place your order for other Unesco periodicals

Order from any bookseller or write direct to the National Distributor in your country.
(See list below; names of distributors in countries not listed, along with subscription rates in local currency, will be supplied on request.)

AUSTRALIA. Hunter Publications, 584 Gipps St., Collingwood, Victoria 3066; Publications: Educational Supplies Pty. Ltd., P.O. Box 33, Brookvale 2100, NSW; Periodicals: Dominie Pty. Subscriptions Dept., P.O. Box 33, Brookvale 2100, NSW. Sub-agent: United Nations Association of Australia, Victorian Division, 328 Flinders Street, Melbourne 3000. **AUSTRIA.** Buchhandlung Gerold and Co., Graben 31, A-1011, Vienna. **BAHRAIN.** United Schools International, Arab Regional Office, P.O. Box 726, Bahrain. **BARBADOS.** University of the West Indies Bookshop, Cave Hill Campus, P.O. Box 64, Bridgetown. **BELGIUM.** "Unesco Courier" Dutch edition only: Internationale Drukkerij en Uitgeverij Keesing, Keesinglaan 2-20, 2100 Deurne-Antwerpen. CCP 000-0012775-68. French edition and general Unesco publications agent: Jean de Lannoy, 202 Ave. du Roi, 1060 Brussels, CCP 000-0070823-13. **BRAZIL.** Publicações Técnicas Internacionais Ltda, Processing Dept., R. Peixoto Gomide 209, 01409, Sao Paulo SP. **CANADA.** Renouf Publishing Co. Ltd., 1294 Algoma Road, Ottawa, Ontario K1B 3W8. STORES: 61 Sparks Street, Ottawa, 211 Yonge St., Toronto. SALES OFFICE: 7575 Trans Canada Hwy, Ste. 305, St. Laurent, Quebec H4T 1V6. **CHINA.** China National Publications Import and Export Corporation, P.O. Box 88, Beijing. **CZECHOSLOVAKIA.** S.N.T.L., Spalena 51-113 02, Prague 1; Ve Smeckach 30, P.O. Box 790-111-27 Prague 1 (Permanent display); Zahranicni literatura, 11 Soukenicka, Prague 1. For Slovakia only: Alfa Verlag -Publishers, Hurbanovo nam. 6, 893 31 Bratislava-CSSR. **DENMARK.** Kobenhavn Export-OG, Tidsskriftservice, 35 Norre Sogade, DK-1970 Kobenhavn K. **EGYPT (ARAB REPUBLIC OF).** National Centre for Unesco Publications, No. 1 Talaat Harb St., Cairo. **FINLAND.** Akateeminen Kirjakauppa, P.O. Box 128, SF-00100 Helsinki. Suomalainen Kirjakauppa Oy, P.O. Box 2, 01641 Vantaa 64. Rauti-kinja Oy, Subscription Department, P.O. Box 1, 01641 Vantaa 64. **FRANCE.** Librairie de l'Unesco, 7 Place de Fontenay, 75700 Paris. CCP 12598-48. **GERMAN DEMOCRATIC REPUBLIC.** Buchhaus Leipzig, Postfach 140, 710 Leipzig, or from Internationalen Buchhandlungen in the G.D.R. **FED. REP. OF GERMANY.** For the Unesco Courier: Mr. H. Baum, Deutscher Unesco-Kurier Vertrieb, Basaltstrasse 57, D5300 Bonn 3. **GHANA.** Fides Enterprises, P.O. Box 14129, Accra. **GREAT BRITAIN.** See United Kingdom. **GREECE.** John Michalopoulos & Son SA, International Booksellers, P.O. Box 10073, 541 10 Thessaloniki. G.C. Eleftheroudakis SA, International Bookstore, 4 Nikis Street, Athens T 126. Kostarakis Brothers, International Booksellers, 2 Hippokratous Street, Athens. **HONG KONG.** Swindon Book Co., 13-15, Lock Rd., Kowloon.

Hong Kong Govt. Information Services, Publication Centre, Baskerville House, 22 Ica St. **HUNGARY.** Kultura-Bushimport-ABT, P.O.B. 149-H-1389, Budapest 62. **ICELAND.** Snaebjörn Jonsson and Co., H.F. Hafnarstraeti 9, Reykjavik. **INDIA.** Orient Longman Ltd., Kamani Marg, Ballard Estate, Bombay 400038; 17 Chitaranjan Ave., Calcutta 13; 36a, Anna Salai, Mount Road, Madras 2; 5-9-41/1 Bashir Bagh, Hyderabad 500001 (AP); 80/1 Mahatma Gandhi Rd., Bangalore 560001; 3-5-820 Hyderguda, Hyderabad-500001. Sub-depots: Oxford Book and Stationery Co., 17 Park St., Calcutta 70016; Scindia House, New Delhi. **INDONESIA.** Indra P.T., Jl Dr. Sam Ratulangi 37, Jakarta Pusat. **IRAN.** Iranian National Commission for Unesco, 1188 Enghab Ave., Rostam Giv Building, Zip Code 13158, P.O. Box 11365-4498, Teheran. **IRELAND.** The Educational Company of Ireland Ltd., Ballymount Rd., Walkinstown, Dublin 12. **ISRAEL.** Literary Transactions, Inc., o/o Steimatzky Ltd., P.O. Box 628, Tel Aviv 61006A.B.C. Bookstore Ltd., P.O. Box 1283, 71 Allenby Rd., Tel Aviv 61000. **ITALY.** Licosa (Libreria Commissionaria Sansoni, S.p.A.), Via Lamarmora 45, Casella Postale 552, 50121 Florence. **JAPAN.** Eastern Book Service Inc., 37-3 Hongo 3-chome Bunkyo-ku, Tokyo 113. **KOREA.** Korean National Commission for Unesco, P.O. Box Central 64, Seoul. **KUWAIT.** The Kuwait Bookshop Co., Ltd, POB 2942, Kuwait; for the Unesco Courier: Farafalita Press Agency, P.O. Box SAFA 4541, Kuwait. **LUXEMBOURG.** Librairie Paul Bruck, 22, Grande-Rue, Luxembourg. **MALAYSIA.** University of Malaya Co-operative Bookshop, Kuala Lumpur 22-11. **MALTA.** Sapientzas, 26 Republic St., Valletta. **MAURITIUS.** Nalanda Company Ltd., 30 Bourbon St., Port-Louis. **MEXICO.** Libreria El Correo de la Unesco, Actipán 66, Colonia del Valle, Mexico 12. **DF. MONACO.** British Library, 30 Bd. des Moulins, Monte Carlo. **NEPAL.** Sajha Prakashan Pochowk, Kathmandu. **NETHERLANDS.** Faxon Europa, P.O. Box 197, 1000 AD Amsterdam. **NEW ZEALAND.** Government Publishing, P.O. Box 14277-Kilbirnie, Wellington; 130 Oxford Terrace, P.O. Box 1721, Christchurch; Alma St., P.O. Box 857, Hamilton; Princess St., P.O. Box 1104, Dunedin. **NIGERIA.** The University Bookshop of Ife; The University Bookshop of Ibadan, P.O. 286. **NORWAY.** Johan Grundt Tanum, P.O.B. 1177 Sentrum - Oslo 1; Narvesen A/S, Littoraltun Jenesten, P.O.B. 6125 Etterstad, N 0602 Oslo 6; Universitets Bokhandelen, Universitetsentret, Postboks 307 Blindern, Oslo 3. **PAKISTAN.** Mirza Book Agency, 65 Shahrah Quaid-i-azam, P.O. Box No. 729, Lahore 3; Unesco Publications Centre, Regional Office for Book Development in Asia and the Pacific, 39 Delhi Housing Society, P.O. Box 8950,

Karachi 29. **POLAND.** Orpan-Import, Palac Kultury i Nauki, Warsaw; Ars Polona-Ruch, Krakowskie Przedmiescie No.7, 00-068 Warsaw. **PORTUGAL.** Dias & Andrade Ltda, Livraria Portugal, rua do Carmo 70, Lisbon. **SAUDI ARABIA.** Dar al Watan, Olaya Main Street, Ibrahim Bin Sulaym Building, Riyadh. **SINGAPORE.** Federal Publications (S) Pte Ltd. Times Jurong, 2 Jurong Port Rd., Singapore 2261. **SOUTH AFRICA.** American & Overseas Publications (Pty) Ltd., Subscription Service, P.O. Box 42476, Johannesburg. Universitas Books (Pty) Ltd., P.O. Box 775, Pretoria 0001. Van Schaik's Bookstore (Pty) Ltd., Libri Building, 268 Church Street, Pretoria 0001. Central News Agency Ltd., Group Overseas Periodical Div. P.O. Box 613, Cape Town 8000. **SRI LANKA.** Lake House Bookshop, 100 Sir Chittampalam Gardiner Mawata, P.O.B. 244, Colombo 2. **SUDAN.** Al Bashir Bookshop, P.O. Box 1118, Khartoum. **SURINAME.** Suriname National Commission for Unesco, P.O. Box 2943, Paramaribo. **SWEDEN.** For the Unesco Courier: Svenska FN Förbundet, Skolgränd 2, Box 150 S-104, 65 Stockholm; Wennergren-Williams AB, Nordenflynchtsvagen 70, S-104, 25 Stockholm; Essette Tidsskriftscentralen, Gambia Brogratan 26, Box 62 -101, 20 Stockholm. **SWITZERLAND.** Europa Verlag, 5 Rämistrasse, Zurich; Librairie Payot, Rue Grenus 6, 1211, Geneva 11. C.C.P. 12-238; Librairie Payot also in Lausanne, Basle, Berne, Vevey, Montreux, Neuchâtel and Zurich. **SYRIA.** Aleppo University Books Establishment, University of Aleppo, Aleppo. **TANZANIA.** Dar-es-Salaam Bookshop, P.O.B. 9030, Dar-es-Salaam. **THAILAND.** Nibondh and Co. Ltd., 40-42 Charoen Krung Road, Siyag Phaya Sri, P.O. Box 402, Bangkok; Suksapan Panit, Mansion 9, Rajdamern Ave., Bangkok. **TRINIDAD AND TOBAGO.** National Commission for Unesco, 18 Alexandra St., St. Clair, Trinidad W 1. **TURKEY.** Haset Kitapevi A.S., Isiklül Caddesi, No 469, Posta Kutusu 219, Beyoglu, Istanbul. **UNITED KINGDOM.** H.M. Stationery Office, Agency Section Publications CTR, Periodicals Section-Room 008, Nine Elms Lane, London SW8 5DR, and H.M.S.O. Bookshops in London, Edinburgh, Belfast, Manchester, Birmingham, Bristol; for scientific maps only: McCarta Ltd., 122 King's Cross Rd., London WC1X 9DS. **UNITED STATES.** Bernan-UNIPUB, Periodicals Department, 4611-F Assembly Drive, Lanham, MD 20706 4391. **USSR.** V/O Mezhdunarodnaya Kniga, Ul. Dimitrova 39, Moskva 113095. **YUGOSLAVIA.** Mladost, Ilica 30/11, Zagreb; Cankarjeva Založba, Zopitarjeva 2, Ljubljana; Nolit, Terazije 39, Belgrade. **ZAMBIA.** National Educational Distribution Co. of Zambia Ltd., P.O. Box 2664, Lusaka. **ZIMBABWE.** Textbook Sales (PVT) Ltd., 1 Norwich Union Centre, Harare.



Photo © APN, Paris

Ilya Chavchavadze, a great Georgian poet who was born 150 years ago (see article). This portrait, by Guigo Zaziachvili, is today preserved in the Museum of Georgian Art, Tbilisi (USSR).