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# THE UNESCO COURIER



WITH A KEYNOTE ARTICLE BY  
**JACQUES DELORS**

EDUCATION FOR THE 21ST CENTURY

**LEARNING TO LEARN**

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# E N C O U N T E R S

We invite readers to send us photographs to be considered for publication in this feature. Your photo should show a painting, a sculpture, piece of architecture or any other subject which seems to be an example of cross-fertilization between cultures.

Alternatively, you could send us pictures of two works from different cultural backgrounds in which you see some striking connection or resemblance. Please add a short caption to all photographs.



## **Eternal Youth**

1992, sculpture (26 x 13 cm.)  
by Monique Faucher-Depledé

This head of a Nereid—a sea nymph in Greek mythology—is also inspired by Hindu influences. Her hair transformed into waves, she embodies the restless sea, bearer of life, mystery and wisdom.

*UNESCO's International Commission on Education for the 21st Century has just completed a 3-year world-wide enquiry (1993-1996). It was chaired by Jacques Delors, who gives the Courier an overview of what is at stake. (p. 6).*



Richard Meloul © Sygma, Paris



A. van der Stegen © Editing, Paris

**Learning to learn:** members of the Delors Commission and other contributors to its work diagnose the problems of education today and suggest guidelines for tomorrow (pp. 12-37).



Heidar Netocny © Panos Pictures, London

*The Tamanca-La Amistad Cordillera: a World Heritage site in the heart of Central America (p. 40).*



J. and J. Blassi © Incafo, Madrid

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Marie Curie

Cover: A student in physics and chemistry at the University of Vārānasi (Benares) in India

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Internet: [unesco.courier@unesco.org](mailto:unesco.courier@unesco.org)

**Director: Bahgat Elnadi**  
**Editor-in-chief: Adel Rifaat**

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This issue comprises 52 pages and a 4-page insert between  
pages 2-3 and 50-51.

### NEW TREATY TO COMBAT ILLEGAL ART TRADE

A big step forward in the struggle against art trafficking has been taken with the adoption of a new international Convention designed by the Rome-based International Institute for the Unification of Private Law (UNIDROIT). The Convention, which was adopted on 24 June 1995, complements UNESCO's 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property. Whereas the UNESCO Convention is applicable at the intergovernmental level, the UNIDROIT Convention is directed at the art market. It requires, for example, art dealers to enquire fully about an object's past ownership and also fills a legal vacuum which hindered the restitution of stolen properties to their owners. The Convention was approved by delegates from 70 countries and will enter into force 6 months after ratification by 5 countries.

### ECOTECHNOLOGIES FOR TOMORROW

From 4 to 8 February 1996, UNESCO organized an ecotechnology workshop in Madras (India). Among the participants were the American agricultural scientist Norman Borlaug, who won the Nobel Peace Prize in 1970, and the Indian agronomist M.S. Swaminathan. The questions discussed included the conservation of natural resources and the development of ecotechnologies.

### SOME RECENT UNESCO PUBLICATIONS

✉ *A History of UNESCO*, by Fernando Valderrama retraces almost 50 years in the life of the Organization. (460 pages, 185 FF).

✉ An indispensable trilingual (English/French/Spanish) reference book for libraries, documentation centres and research institutions, *UNESCO Statistical Yearbook 1995* presents the most complete available data on education, science, technology, culture and communication from 232 countries and territories. Co-published by UNESCO Publishing and Bernan Press. (876 pages; 450 FF).

✉ The main theme of the 1995 edition of UNESCO's biennial *World Education Report* is the education of women and girls. Other themes include "Challenges to Pedagogy" and "Education for peace, human rights and democracy". Appendices include country-by-country data on key aspects of education in over 180

countries as well as summary tables by major world region (174 pages, 150 FF).

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### ICOM CATALOGUES MISSING OBJECTS

As a contribution to the struggle against the extremely lucrative illicit traffic in cultural property looted from archaeological monuments and sites, the International Council of Museums (ICOM) published in 1993 and 1994 two bilingual (English-French) catalogues of missing objects, *Looting in Angkor* and *Looting in Africa*, which led to the recovery of a number of the listed objects. In 1995 ICOM published *Illicit Traffic of Cultural Property in Africa*, a book containing contributions to two workshops on the subject organized by ICOM and UNESCO in the United Republic of Tanzania (1993) and Mali (1994). The book also contains articles on France, the Netherlands and the USA.

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### UNESCO ON CD-ROM

✉ On the occasion of its fiftieth anniversary, UNESCO published in January 1996 a CD-ROM for PC entitled *UNESCO 1945-1995: An Ideal on the Move*, which retraces through images, text and sound the major events that have highlighted the Organization's history. An index of keywords makes the search for information very easy. In English and French (220 FF).

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### 23 APRIL: WORLD BOOK AND COPYRIGHT DAY

At its 28th session (25 October to 16 November 1995) UNESCO's General Conference proclaimed 23 April "World Book and Copyright Day". The date was chosen in commemoration of 23 April 1616, the day on which William Shakespeare, Miguel de Cervantes and Garcilaso de la Vega died.

**APPEAL BY THE DIRECTOR-GENERAL OF UNESCO  
FOR THE CONTINUATION OF THE PEACE PROCESS  
IN THE MIDDLE EAST**

Peace is proclaimed in treaties but made in the hearts and minds of peoples. The premise on which UNESCO is founded remains as true as when it was affirmed fifty years ago following "the great and terrible war . . . made possible by the denial of the democratic principles of the dignity, equality and mutual respect of men, and by the propagation in their place, through ignorance and prejudice, of the doctrine of the inequality of men and races."

The Israeli and Palestinian peoples, sustained by the political vision and courage of their leaders, are engaged in an historic process of reconciliation aimed at bringing to an end long years of bloodshed and injustice and laying the foundations for the construction of a culture of peace within their societies, their territories and their region.

At this time when their commitment to peace is being so cruelly tested, I appeal to the Israeli and Palestinian peoples not to be deflected from their course by the terrorist's blind savagery. Let the actions of the extremists be seen for what they are—impotence in the face of the peace process, an attack on peace itself that is a challenge not only for the Israeli and Palestinian peoples but for all the countries concerned.

Such outrages must not be allowed to prompt a return to the vicious circle of retaliatory violence. The firmest measures must be taken to stamp out terrorism—which is why I strongly support current initiatives to co-ordinate action against terrorism in the region. We must show that our vision of peace with justice is stronger and more enduring than any sectarian doctrine of hatred and exclusion. Let peace be our common combat and shared victory.

I invite all those men and women who share the conviction expressed in this Appeal to manifest their steadfast commitment to the peace process in the Middle East by writing to me at UNESCO.

**FEDERICO MAYOR**

13 MARCH 1996

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UNESCO  
7, Place de Fontenoy  
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Fax (33 1) 47 34 85 57  
Internet: <http://www.unesco.org>

# Education for tomorrow

by Jacques Delors



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**JACQUES DELORS,** former French Minister of the Economy and Finance, was President of the Commission of the European Communities from 1985 to 1995. His published works include *Le nouveau concert européen* (1992) and *Our Europe: France and the European Future* (1994).

In 1993, UNESCO set up an independent International Commission on Education for the 21st century, chaired by Mr. Jacques Delors. The Commission, whose members (see inside back cover) and advisors were drawn from the major world regions, has now completed its work. Here Mr. Delors presents for *Courier* readers a roundup of the main issues studied by the Commission and previews some of its conclusions.

On the eve of the twenty-first century, intense thought and discussion are being devoted to the future of human society. Whereas advances in knowledge, especially in science and technology, bring hope of progress for humankind in the future, events each day remind us how the contemporary world is liable to drift off course, how exposed it is to dangers, in some cases extreme dangers, and how vulnerable it is to conflicts.

The increasing interdependence of peoples and nations, which is the hallmark of our time, is providing scope for unprecedented international co-operation. But the emergence of this global consciousness also reveals the extent of the disparities that beset our world, the complexity of its problems and the number of threats that are liable at any time to jeopardize the stock of human achievement.

Great demands are consequently being made on education, whose contribution to human progress is so vital. The idea is gaining ground that education is one of the most powerful tools with which to shape the future—or, to use more modest terms, to steer us into the future by taking advantage of constructive trends and trying to avoid pitfalls. What is education doing today to prepare the active citizens of tomorrow?

UNESCO has taken the initiative of bringing the light of its international experience to bear on this issue. Its Director-General, Mr. Federico Mayor, asked me to chair an International Commission on Education for the Twenty-first Century, mandated “to study and reflect on the challenges facing education in the coming years, and to formulate suggestions and recommendations in the form of a report that could serve as an agenda for action for policy-makers and officials at the highest levels”.

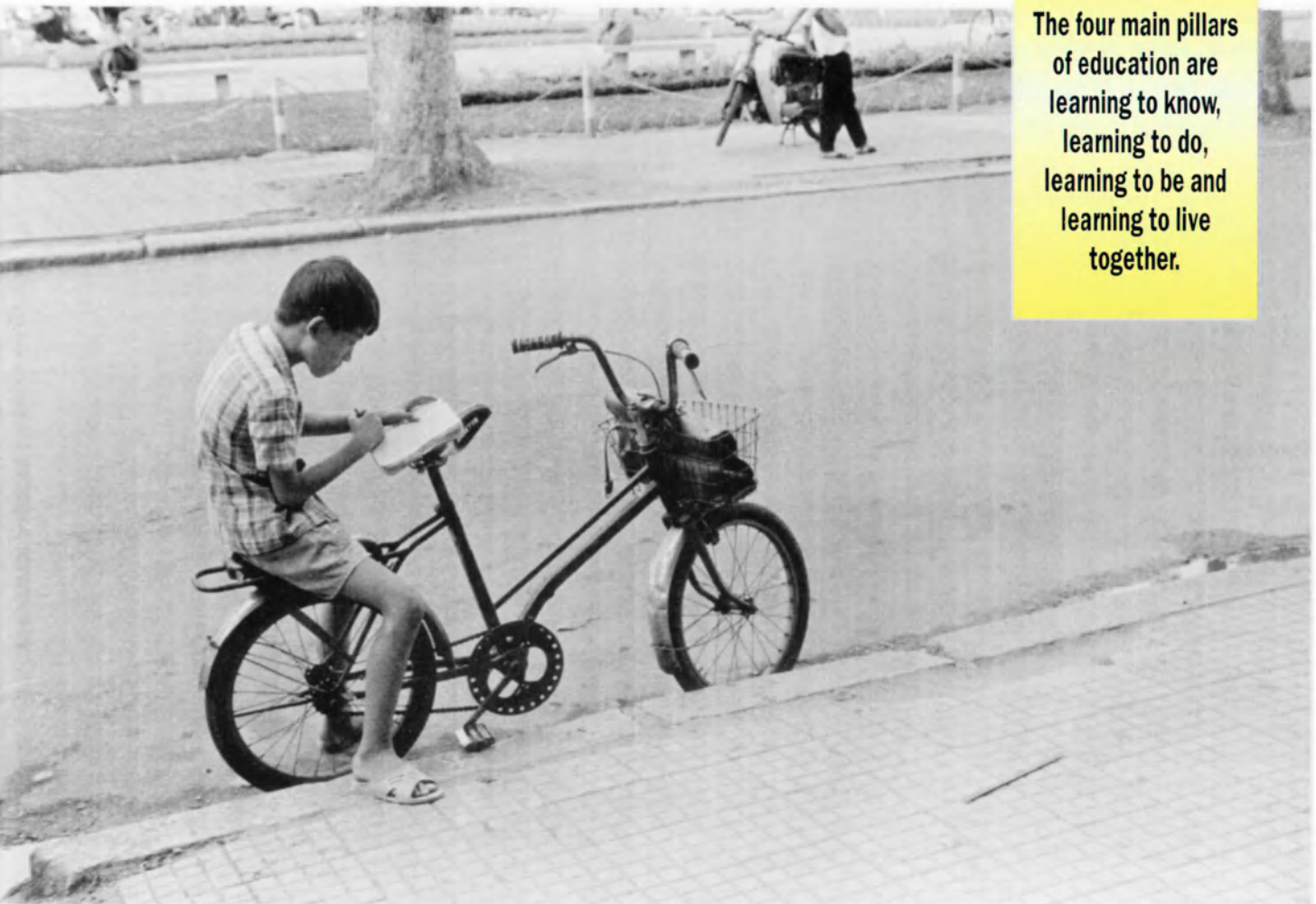
The following question from the Commission’s terms of reference formed our point of departure: “How can education play a dynamic and constructive role in preparing individuals and societies for the twenty-first century?” We were asking it some twenty years after another Commission, chaired by Mr. Edgar Faure, had published a report—which is still topical—under the significant title *Learning to Be*.

## Four crucial issues

The Commission did its best to project its thinking on to a future dominated by globalization, to ask the right questions and to lay down some broad guidelines that can be applied both within national contexts and on a global scale. Here I shall examine four issues which I believe are crucial.

The first issue is the capacity of education systems to become the key factor in development by performing a threefold function—economic, scientific and cultural. Everyone expects education to help build up a qualified and creative workforce that can adapt to new technologies and take part in the “intelligence revolution” that is the driving force of our economies. Everyone—in North and South alike—also expects education to advance knowledge in such a way that economic development goes hand in hand with responsible management of the physical and human environment. And, finally, education would be failing in its task if it did not produce citizens rooted in their own cultures and yet open to other cultures and committed to the progress of society.

The second crucial issue is the ability of education systems to adapt to new trends in society. This brings us to one of the funda-



The four main pillars of education are learning to know, learning to do, learning to be and learning to live together.

A high school student in a Hanoi street (Viet Nam).

Photo © Patrick Lagès, Paris

mental responsibilities of education—having to prepare for change despite the growing insecurity that fills us with doubts and uncertainties. Education must take into account a whole range of interrelated and interacting factors that are always in a state of flux, whether it is dealing with individual or social values, family structure, the role of women, the status accorded to minorities, or the problems of urban development or the environment.

The third crucial issue is that of the relations between the education system and the state. The roles and responsibilities of the state, the devolution of some of its powers to federal or local authorities, the balance to be struck between public and private education—these are just some aspects of a problem which, moreover, differs from one country to another.

The fourth issue is the promulgation of the values of openness to others, and mutual understanding—in a word, the values of peace. Can education purport to be universal? Can it by itself, as a historical factor, create a universal language that would make it possible to overcome certain contradictions, respond to certain challenges and, despite their diversity, convey a message to all the inhabitants of the world? In this lan-

guage which, ideally, would be accessible to everybody, all the world's wisdom and the wealth of its civilizations and cultures would be expressed in an immediately comprehensible form.

The creation of a language accessible to everyone would mean that people would learn to engage more readily in dialogue, and the message that this language would convey would have to be addressed to human beings in all their aspects. A message that claims to be universal—one of education's lofty ambitions—must be conveyed with all the subtle qualifications that take full account of human beings' infinite variety. This is no doubt our major difficulty.

### Lines of enquiry

Three current crises—the economic crisis, the crisis of the ideology of progress and a certain form of moral crisis—formed the backdrop to the Commission's work.

With them in mind, I tried to trace out a few lines of enquiry, taking account of cultural diversity, the specific nature of different problems and experiences, and the diversity of the political and social objectives of UNESCO's Member States, so as to gain a better

Lifelong education must be rethought and broadened. It should be a continuous shaping of the personality, of knowledge and aptitudes, but also of the critical faculty and the ability to act.



An Indian charitable organization, T.R.A.C.K.S. ("Training Resources and Care for Kids"), helps to care for orphaned and abandoned children who live on Howrah railway station in the outskirts of Calcutta. Above, morning lessons on platform 1. Right, afternoon recreation.

understanding of a number of fundamental relationships: the connections between education and culture (culture being seen as a factor in greater self-knowledge and knowledge of others); between education and citizenship and, more generally, the sense of belonging (so that our contemporaries and descendants do not feel isolated in the world of exceptionally rapid change which they see on their television screens); between education and social cohesion (which is weaker than it was fifty years ago in the countries of both North and South). And then, of course, the connection between education, training, work and employment; the connection with development; and, lastly, the essential role which education must play in the progress of research.

If the proposals that emerged from the Commission's work were to have a real impact on education policies, three transversal problems also had to be tackled. These were: the effect of modern communication media on contemporary education systems; the future of the teaching profession; the systems to be set up and the funding to be found.

### The pillars of education

The four main pillars that the Commission has presented and illustrated as the bases of education are: learning to know, learning to do, learning to be and learning to live together.

The first of these is learning to know. Bearing in mind the rapid changes brought about by scientific progress and new forms of economic and social activity, there is a need to combine a broad general education with the possibility of working in depth on a selected number of subjects. In a sense, such a general education is the passport to learning throughout life, insofar as it should teach people to enjoy learning and also lay the foundations that will enable them to carry on learning throughout their lives.

Learning to do is the second pillar. In addition to learning to practise a profession or trade, people need to develop the ability to face a variety of situations and to work in teams, a feature of educational methods that does not receive enough attention at present. These skills are more readily acquired if pupils and students have the opportunity to develop their abilities by becoming involved in work experience schemes or social work while they are still in education. Increased importance should thus be attached to all schemes in which education alternates with work.

Learning to be was the theme of the Edgar Faure Report published under UNESCO's auspices in 1972. The Report's recommendations are still extremely relevant, for in the twenty-first century everyone will need to exercise greater independence and judgment combined with a stronger sense of personal responsibility for the attainment of common goals.

Learning to live together, finally, by developing an understanding of others, of their history, their traditions and their spirituality. This would provide a basis for the creation of a new spirit which, guided by recognition of our growing interdependence and a common analysis of the risks and challenges of the future, would induce people to implement common projects or to manage the inevitable conflicts in an intelligent and peaceful way. Some might say that this is utopian; and yet it is a necessary utopia, indeed a vital one if we are to escape from the dangerous cycle sustained by cynicism and complacency.

### Learning throughout life

The concept of learning throughout life advocated in the Faure Report is one of the keys to the twenty-first century. It meets the challenge of a rapidly changing world, and it is necessary because of its advantages of flexibility, diversity and availability at different times and in different places. It also goes beyond the traditional distinction between initial schooling and continuing education.

The idea of lifelong education must be rethought and broadened. As well as adapting



to changes in working life, it should also comprise a continuous shaping of the personality, of knowledge and aptitudes, but also of the critical faculty and the ability to act.

The truth is that every aspect of working life and social life offers opportunities for both learning and doing. There is a great temptation to make too much of this, and stress the educational potential of the media, the world of work, and cultural and leisure pursuits, even to the extent of forgetting a number of fundamental truths. Although people need to use all these opportunities for learning and self-improvement, they will not be able to make good use of all their potential unless they have received a sound basic education. School should impart a desire for and pleasure in learning, the ability to learn how to learn, and intellectual curiosity. One might even imagine a society in which each individual would be in turn both teacher and learner.

The basis for a learning society is a formal system where each individual is introduced to the many different forms of knowledge. There is no substitute for the teacher-pupil relationship based on authority and dialogue. This has been said time and again by the great classical thinkers who have studied the question of education. It is the teacher's responsibility to impart to the pupil the knowledge that humankind has acquired about itself and about nature, and the essence of human creativity and inventiveness.

Education should therefore constantly be adapting to changes in society, and also pass on the attainments, foundations and benefits of human experience.

### The stages and bridges of learning: a fresh approach

By focusing on the concept of learning throughout life, the Commission did not intend to convey the idea that one could avoid reflecting on the different levels of education. The fact is that learning throughout life makes it possible to reorder the sequences and itineraries of education, ease the transition from one stage to another and recognize the value of each.

The "three Rs"—reading, writing and arithmetic—get their full due. The combination of conventional teaching and out-of-school approaches should enable children to experience the three dimensions of education—the moral and cultural, the scientific and technological, and the economic and social.

Basic education should be provided worldwide for 900 million illiterate adults, 130 million children not enrolled in school, and

**There is no substitute  
for the teacher-pupil  
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authority and  
dialogue.**

more than 100 million who drop out prematurely. This vast undertaking is a priority for technical assistance and partnership carried out through international co-operation.

One major problem area in any reform concerns the policies to be adopted for young people after primary education. One might go so far as to say that secondary schools tend to be neglected in educational thinking. They are the target of considerable criticism and provoke a considerable amount of frustration.

One source of frustration is a demand for expansion and diversification of secondary education, leading to rapid growth in enrolments and congestion in teaching programmes. This gives rise to some classic problems of mass education which developing countries cannot easily solve either financially or in terms of organization. Furthermore, there is the discouraging problem of school leavers who face a shortage of opportunities, their distress increased by a widespread all-or-nothing obsession with access to higher education. Mass unemployment in many countries has exacerbated this malaise.

The only way out of this difficult situation seems to be a very broad diversification of types of study available. The latter should include both conventional education, which focuses more on abstraction and conceptualization, and approaches that combine school and job experience in a way that brings out other abilities and inclinations. In any event, there should be bridges between these approaches so that errors in choice of direction, which are far too widespread, can be corrected.

Furthermore, the prospect of being able to go back to education or training would alter the general climate by assuring each

**F**rench school pupils compare handiwork during an art lesson.



Photo Bernard Descamps © METIS, Paris

Local community participation by means of a dialogue between the authorities and the social groups concerned is the first essential stage in broadening access to education and improving its quality.



Photo Olivier Vidal © Unesco, Paris

young person that his or her fate is not sealed between the ages of fourteen and twenty.

Higher education should be seen from the same angle.

In many countries, other types of higher education institutions exist side by side with universities. Some are highly selective, while others were set up to provide specifically targeted, quality professional and vocational training. This diversification obviously meets the needs of society and the economy, both at the national and regional levels.

Increasingly stringent selection in order to ease the pressures brought about by mass higher education in the wealthiest countries is neither politically nor socially acceptable. One of the main flaws in such an approach is that many young people are expelled from the educational process before they have been able to obtain a recognized diploma and find themselves in the desperate predicament of having neither a degree nor training appropriate for the job market.

There is a need to manage increasing university enrolment in tandem with reform of secondary education.

Universities would contribute to this process by diversifying what they offer: as scientific establishments and centres of learning leading to theoretical or applied research or teaching; as establishments offering professional qualifications, with courses and content tailored to the needs of the economy; as one of the main crossroads for learning throughout life; as leading partners in a form of international co-operation favouring exchanges of teachers and students and promoting the wider availability of first-class teaching through international professorships.

These proposals have a special significance in poor countries, where universities have a decisive role to play.

## Long-term strategies for reform

Without underestimating the obligation to manage short-term constraints or disregard the need to adapt existing systems, the Commission emphasized the need for a longer-term approach if necessary reforms are to succeed. By the same token, it stressed the fact that reforms introduced in rapid succession cancel each other out, since they do not allow the system the time needed either to absorb change or to involve all those concerned in the process.

Three main protagonists contribute to the success of educational reforms: the local community (parents, school heads and teachers), the public authorities and the international community.

Local community participation in assessing needs by means of a dialogue between the public authorities and social groups concerned is a first essential stage in broadening access to education and improving its quality. Continuing the dialogue by way of the media, community discussions, parent education and training, and on-the-job teacher training usually arouses greater awareness, develops judgment and helps build local capacities.

In any event, no reform can succeed without the co-operative and active participation of teachers. The Commission recommended that the social, cultural and material status of educators should be considered as a matter of priority, along with the tools required to deliver education of a high standard: books, modern communication media, and suitable cultural and economic support for the school.

This being so, one requirement for the improvement of education systems is responsible public policy. Policy-makers cannot assume that the market can compensate for the failures in the system or that *laissez-faire* is sufficient. The public authorities must propose clear options and, after broad consultation with all concerned, choose policies that set guidelines for the system and lay its foundations, and regulate it by making the necessary adjustments.

All the choices to be made should be predicated upon the principle of equal opportunity.

During the Commission's deliberations, I put forward a proposal that may be regarded as radical. As education throughout life gradually becomes a reality, all young persons could be allocated an education voucher at the start of their education. This would entitle them to a certain number of years of education. Their entitlement would be credited to an account at a bank which would manage a capital of time available for each individual, together with the appro-



Photo Olivier Vidal © Unesco, Paris

**Thailand's Hill Areas Education Project (HAE), which helps children and adults in 600 villages of northern Thailand, was awarded a Unesco prize for its innovative educational programme and its community-based approach in 1994. Top, an education centre in an Akha village. Above, students learn Thai at the same time as they study their own history and traditions in their mother tongue.**

priate funds. Everyone could use their capital for schooling, on the basis of their own choices. Some of the capital could be set aside to enable people to receive continuing education during their adult lives. Each person could increase his or her capital through deposits at the bank under a kind of educational savings scheme.

The Commission supported this idea, though it was aware of potential deviations that might prejudice equality of opportunity, and considered that vouchers might be allocated not at the beginning but at the end of compulsory schooling so as to enable adolescents to choose a path without jeopardizing their future choices.

As far as the international community is concerned, as agent of the success of educational reforms, the Commission framed a number of suggestions concerning: a policy of strong encouragement for the education of girls and women; the allocation of a minimum percentage of development aid (a quarter of the total) to fund education; the development of debt-for-education swaps to offset the adverse effects on state education expenditure of adjustment policies and policies for reducing internal and external deficits; the widespread introduction of the new technologies of the "information society" in all countries, to prevent the growth of yet another gap between rich countries and poor countries; enlisting the outstanding potential of non-governmental organizations.

These few suggestions should be seen in the context of partnership rather than aid. After so many failures and so much waste, experience militates in favour of partnership. Globalization makes it inescapable.

## Conclusion

The interdependence of nations provides scope for—and requires—international co-operation on a new scale and in all fields. The International Commission on Education for the Twenty-first Century is one of the ways of asserting the will to achieve this as the turn of the century draws near.

Without conducting a purely descriptive exercise or outlining a philosophy of education systems, its goal was not to construct "scenarios for the future" resulting in a set of precepts for educational policy-makers, but to provide decision-makers with facts to help them draw up educational policies and to spark off a debate that would go beyond the world of education and teachers, and involve parents, children, business leaders, trade unionists and associations engaged in giving education a more effective role. ■

## UNESCO AND UNICEF: A JOINT CAMPAIGN FOR BASIC EDUCATION

In September 1992, UNESCO and UNICEF (the United Nations Children's Fund) launched a joint "Monitoring Learning Achievement (MLA) Project", as part of follow-up activities to the World Conference on Education for All held at Jomtien (Thailand) in 1990. The Project, which focuses on three main fields—literacy, numeracy and basic life skills—seeks to provide policy-makers with analytical tools and indicators which will help them to raise the quality of basic education. It also helps countries to set up, train and support their own permanent monitoring teams.

In 1993, five "pioneer countries"—China, Jordan, Mali, Morocco and Mauritius—took part in the first phase of the project. In addition to an intensive training workshop held at UNESCO's Paris Headquarters, 86 other workshops have been organized in the pioneer countries and in Slovakia, providing training for over 7,000 persons and some 250 "core trainers". The target of 80 per cent of pupils attaining or surpassing a level of minimum learning achievement is now being met in all participant countries and in the main basic learning competencies. Analysis of the data collected through the Monitoring Project and interpretation of the findings have enabled the specific educational needs and priorities of each country to be identified.

A second group of 13 countries joined the project in 1994, and after these two years' experience, an international workshop was held at UNESCO Headquarters from 17 to 19 May 1995 on the theme *Monitoring Learning Achievement: towards capacity building*. A report on the workshop, bearing the same title, has now been published for teachers, planners and policy-makers. ■

FOR FURTHER INFORMATION, PLEASE CONTACT:  
The Monitoring Learning Achievement Project,  
Division of Basic Education,  
UNESCO, 7 Place de Fontenay, 75352 Paris 07 SP, France.  
Tel: (33 1) 45 68 09 93;  
Fax: (33 1) 40 65 94 06;  
Telex: (33 1) 204461 Paris.



**Servol** (Service Volunteered for All) is a community organization in Trinidad and Tobago that provides education for small children and development and skills centres for teenage drop-outs. Its work was selected by UNESCO and UNICEF as a showcase project in their *Education for All, Making it Work* programme. Above, students are prepared for the competitive working world.

## A WORLD EDUCATION REPORT OF 25 YEARS AGO



Photo © Jean Marc Wullschlegel, Paris

# ‘Learning to be’ in retrospect

## by Asher Deleon

Almost a quarter of a century ago, UNESCO published the findings of a world enquiry into education in a report entitled *Learning to Be*. How does this landmark study look today?

**Above, lesson in a Brazilian school north of Salvador, capital of Bahia state.**

In 1972, the International Commission on the Development of Education chaired by the former French prime minister Edgar Faure published a report entitled *Learning to Be*. The title reflected the climate of euphoria and optimism of the times, generated by economic and social achievements, the ideology of steady progress, the official process of decolonialization then being completed, the positive consequences of “peaceful coexistence”, and an enduring faith in international co-operation. It is true that student revolt and the “events” of 1968 had revealed a certain dis-

enchantment, but the Report was based on data from the previous decade. The first signs of what later came to be regarded as an “education crisis” were just beginning to appear.

### The key ideas

“Lifelong education” and “the learning society” were the Report’s two key ideas. The former was considered as the “keystone” of educational policies; the latter as a strategy aimed at committing society as a whole to education. The approach was based

on the idea of osmosis between education and society, and sought to steer clear of a number of misconceptions such as the ideas of education as a “sub-system” of society, of instruction as a tool for solving all individual and social problems, and of the compartmentalization of life into “learning time” and “time for living”.

As its title indicates, the Report focuses on learning, a process that goes beyond education and, *a fortiori*, teaching. Education and teaching are described in it as dimensions that are subordinate to the learning process. School and out-of-school activities (formal, non-formal and informal education) are treated without hierarchical distinction, and the importance of basic education for all and of adult education is taken as a premise: “learning is a process that lasts a lifetime, both in its duration and in its diversity.”

However, the Commission did not regard lifelong education as a process of permanent schooling, adult education or continuous vocational training. It was seen neither as an educational system nor an educational field, but rather as “a principle on which the overall organization of a system and hence the elaboration of each of its parts, are based”. Lifelong education is a need that is common to everyone.

Learning must be redistributed not only in time, but also in space. Thus the Faure Commission called into question the monopoly of institutionalized education. All institutions, whatever their field of competence (economic, social, cultural or informational) can be used for educational purposes and thereby help to build “a self-aware learning society”.

The Report focused on personal development and put learners, not teachers or educational institutions, at the core of education. The important thing is not the path followed by the learner, but the outcome of the learning process. Each one of us must be free, as our judgment grows stronger and our experience becomes richer and more varied, to choose the ways best suited to our own needs, expectations and abilities.

### The education gap

Starting from these basic concepts, the Commission put forward a series of suggestions and proposals for a new organization of education systems designed to do away with antiquated

**Learning is a process that lasts a lifetime, both in its duration and in its diversity.**

or unjustified barriers and to rid traditional structures of their excessively formal nature.

I am convinced that the basic ideas of the Faure Report are still relevant in the final decade of the twentieth century and that from their standpoint the education gap—the backwardness, dysfunctions and shortcomings of education in relation to human needs—can gradually be overcome. The theory behind these general guidelines is virtually never contested nowadays. Thousands of experiments in recent decades have been carried out along these lines. At the same time, a battle still has to be waged against conservatism at national level, the inadequate commitment of international organizations, external interference in the domestic affairs of many states, and the rigidity of administrative, productive and other structures, including the teaching profession.

Only a few countries (including Canada,

**P**Primary school pupils in Tarascon (France) learn how to use a computer.



A. van der Stegen © Editing, Paris

Japan, Sweden, Norway and Argentina) have taken their cue from the Faure Report's suggestions at the national level. Most experiments, although frequently interesting and bold, carried out by local authorities, business firms, educational establishments and associations have been fragmentary and sporadic, with limited resources. Even countries that have long-established democratic and educational traditions and achievements as well as substantial financial resources hesitate to stray from the beaten track and integrate changes in the overall context.

## Utopian leanings

One criticism that could be made of *Learning to Be* is that it expected too much of education and did not take sufficient account of economic and political conditions. It also overestimated the material resources of the developing countries and the extent to which the industrialized countries were really willing to provide them with substantial aid. The by-passing of religious phenomena and their impact on education and the over-looking of the ever-widening education gap



B. Blisson © Sygma, Paris



Donna Binder © Format, London

## THE EDUCATION OF PRISONERS

BY STEPHEN DUGUID

Prison education may seem to be a contradiction in terms. Prisons are authoritarian, coercive institutions. Education, on the other hand, is generally seen as liberating, dependent on the free flow of ideas and, in the case of adults, on opportunities to put into practice ideas and skills learned in the classroom.

Despite these apparent contradictions there has grown up over the past century or more a branch of adult education known as "prison education". In developing countries the provision of education in prisons is a low national priority. Educational resources are scarce and teachers are poorly trained.

In the nations of the former "socialist bloc" prison education has been a formal partner in the reformatory mandate given to prison systems based on the premise that crime must be a deviation caused by ignorance rather than by social or cultural deprivation. Education in prisons is an important tool in the effort to have prisoners come to see the "error of their ways".

In the countries of the West the practice varies according to political choices, available funding and the state of research. In the past the dominant role for prison education was "schooling" based on literacy, secondary school and vocational education programmes. The rationale for such programmes lay in a complex series of explanations for crime, largely based on sociological foundations. More recently the rationale has begun to shift back to psychological causes for crime, and hence education programmes

are being asked to serve more specific ends such as addressing addiction, violence, anger and sexual deviation.

Prison educators are constantly called on to justify themselves, and in doing so have reached divergent though sometimes complementary positions. Many educators focus on the ameliorative effect of education on the management of the prison. Others have made a strong case for schooling in prison as a response to the educational and cultural deprivation of the imprisoned or have advocated the economic advantages of vocational training. The most optimistic assert that education should play the leading role or at least have an important place in the prison's rehabilitative and reformatory agenda.

In the past decade, prison educators around the world have emerged from their isolated and isolating institutions and discovered a common vocation amongst divergent theories and praxis. Teachers, administrators and researchers have taken part in a series of international meetings in the U.S.A., Canada, the United Kingdom, Sweden, Estonia and the Netherlands and taken the first steps towards defining some common standards for education in prison. ■

STEPHEN DUGUID,

of Canada, is associate professor of humanities at Simon Fraser University in British Columbia and a specialist in adult education. He has written many articles on education in prisons and participated in the work of UNESCO's International Commission on Education for the 21st Century.



B. Descamps © METIS, Paris

**S**tudents in Montbéliard (France) make a video film.

between individuals, and between ethnic groups, social classes and nations also reflect a lack of realism that has given rise to disappointments.

The results achieved in the different branches of education are far from satisfactory. The tiny percentage of young children enrolled in pre-school education (a percentage that is declining in several countries), the enormous numbers of children who receive no schooling at all, the figure of one billion illiterates by the end of the century, and the almost universal erosion of adult education—these are facts that make it imperative to radically revise objectives and strategic forecasts in these fields. Although the primary responsibility lies with the national and local authorities, the responsibility of the international community, and particularly that of UNESCO, should not be minimized. Indeed, it might well be asked how far and with what success UNESCO communicated the message of the Report.

### New parameters

Clearly, at the end of the 1960s it was impossible to predict the collapse of the Berlin Wall and the failure of the communist experiment,

and the Faure Commission did not have the means to study the issues connected with the problems of indoctrination, education subject to censorship, and manipulation of and by education. However, the speed with which political regimes have collapsed, the slow progress of the necessary reforms, the domestic conflicts, both political and armed, inter-ethnic and religious, and the subjective obstacles to the establishment of a market economy cannot be understood without reference to the distortions suffered by educational practices in previous decades. The International Commission on Education for the Twenty-first Century chaired by Jacques Delors may fill this gap, especially since the international climate is favourable to it. The failure of totalitarian regimes has encouraged the growing ascendancy of the philosophy of human rights, and it is increasingly clear that it is in the link between education and democracy or, better still, between education and freedom, that we should seek the guiding principle of our educational policies.

In the field of economics, the Faure Commission was able to benefit from the auspicious situation created after three decades of post-war efforts and the first two

**The Faure Report focused on personal development and put learners, not teachers or educational institutions, at the core of education.**

It is in the link between education and democracy or, better still, between education and freedom, that we should seek the guiding principle of our educational policies.

An Oxfam worker offers a Mauritanian woman and her children advice on environmental and conservation issues. Oxfam is a British non-governmental organization whose aim is to relieve poverty, distress and suffering worldwide.

decades of decolonization. The Delors Commission has had to confront a far gloomier and more disturbing economic picture: crisis affecting the South, the debt burden, the collapse of terms of trade for the main raw materials, the ever-widening gap between industrialized and developing countries (with the exception of a few Asian countries at an intermediate stage of development), unemployment, the social and economic marginalization of a section of the urban and rural populations in the industrialized countries.

Another question concerns the role of the state. Disenchantment about the principle of total, and even sometimes partial, state control over education, budget austerity and the gulf between educational supply and demand, as well as dangers arising from the “commercialization” of education, have sometimes led to questioning of the role of the state as the sole manager of education and its main source of funding. Some have suggested that it should become a mere regulator, responsible for maintaining an equitable system for distributing resources and enforcing national standards for examinations and qualifications. Others go even further. The Delors Commission was bound to take these problems into account.

The changes that have occurred in the educational sciences in the last quarter of a century are so far-reaching that they can be called revolutionary. The Faure Commission saw the new educational technologies as a prerequisite

for bringing about most of the innovations. Today, however, after the explosion of computer technology, multimedia and interactive systems, the Delors Commission has had to pay great attention to what Henri Dieuzeide, a French authority in this field, has called “a new visual order”. “The audiovisual media present, information technology organizes, telecommunications brings closer,” he notes in *Les Nouvelles Technologies, Outils d'Enseignement* (UNESCO/Nathan, Paris, 1994). “What is going to happen when any educational activity or exercise can be undertaken on a single piece of hardware containing messages that in the past were transmitted by an array of different media? . . . The result will be to force different and frequently antagonistic educational approaches to draw closer together and to work out common strategies for purposes of presentation, structuring and manipulation.”

Finally, humankind has entered a phase of historical transition marked by the conflict between human activities and environmental constraints. We must invent a new paradigm of development geared to the concept of sustainability and define the ethical rules pertaining to it. We have no choice but to build up new modes of production and consumption. Far from being masters of the universe, we must understand that we are but the guests or stewards of nature. It is through education that we must “learn to be” nature’s partner and co-pilot. ■



**ASHER DELEON**, of Yugoslavia, is a specialist in adult education and a former member of the Unesco Secretariat. He was the Executive Secretary of the International Commission on the Development of Education (1972) which produced the “Learning to Be” report.





Mo Wilson © Format, London

# Opening new doors in science education

by **François Gros**

Science teaching must be rethought from primary school to post-graduate level

**A**bove, young visitors to the Science Discovery Centre in Milford Haven (Wales, United Kingdom) peer into kaleidoscopes. The Centre is a place where people can learn about science through “hands on” experience.

In the twenty-first century, humanity will have an opportunity to achieve an ambition that has moral as well as technical implications: it will be able to attain an all-encompassing view of planet earth. Modern communication technology, modern means of transport and satellite-based observation are already bringing the various parts of the world closer together, and there are good grounds for believing that, as a result, there will be far fewer remaining pockets of political and cultural isolation.

The planet-wide view thus made possible

by scientific and technological progress nonetheless raises a problem of principle, indeed almost a philosophical problem: unless a very lofty purpose is assigned to science, unless the science we produce is more than merely utilitarian, there will be no means of surmounting a major cultural conflict that we have seen developing at the end of this century, one that is in fact much more serious than is generally realized.

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## Decompartamentalizing science

The benefits of science and technology no longer seem so obvious as they did in the last century. Before the major conflicts of our own times, science was expected to solve most of humankind’s individual and general problems. War has demonstrated that science has not succeeded in changing mentalities and

In order to overcome the disenchantment now felt towards it, science needs to be set within a far wider cultural context.

that barbarism still lurks beneath the surface of civilization. Current debates over environmental issues and bioethics also reflect a certain "culture gap" between science and society. The ecological movement has not only put science in an awkward position, it has put it on trial. In order to overcome the disenchantment now felt towards it, science needs to be set within a far wider cultural context.

One of the main dangers threatening science teaching comes from overspecialization. Although specialization is undoubtedly a necessary condition for the improved training of engineers and technicians, overspecialization is in danger of alienating science from the general public because it makes communication more difficult and raises a serious problem of social "acceptability". It is already becoming evident, for instance, that research in biology is likely to be held back more by ethical and cultural considerations than by economic ones.

Overspecialization may also lead to a lack of "culture". Scientists must learn to respect

and practise other forms of language and communication, while conversely, it would be extremely dangerous to reject science on the pretext of getting back to humanitarian values. *Science is part and parcel of culture*, and the practice of science should lead naturally on to the idea of international solidarity and tolerance.

Science teaching is at present in a rut and needs to be re-examined. This applies particularly to textbooks. Physics is taught from books on physics, and biology from works on biology, whereas science teaching should be much more cross-disciplinary. Why not refer to the underlying problems of physics when teaching molecular biology or, when teaching biology, to the ethical questions that are soon sure to come up?

The problem needs to be tackled both in general and in specific terms. Due regard must be shown both for the different cultures of different countries and for the universality of science. This is the only way to avoid fragmentation of knowledge, which is harmful in every way. Science education will

A light-hearted moment during an anatomy lesson in a French school (1989).



## SCIENCE AND THE MARKET

The market plays a paradoxical role in the spread of scientific knowledge. On the one hand, more and more databases are being created and their information-processing capacity is growing. This should facilitate the dissemination of scientific data worldwide. On the other hand, the high cost of accessing these databases is a serious drawback. The databases are highly centralized, and are in danger of becoming the exclusive property of a restricted number of major scientific or technical groups, large industrial organizations wishing to preserve their market.

Cases in which the possessors of information keep it to themselves for commercial reasons are also starting to cause problems. The ferocious competition in the pharmaceutical industry, however useful it may be in stimulating research, is open to criticism insofar as it works against the interests of countries lacking the resources to participate in it. Here, as in other fields, the right balance has not yet been achieved.

Information should be regarded as part of the common heritage of humanity, and clear rules as to its dissemination should be established.

F. G. ■



Photo © Béatrice Petit, Brussels

**A** condor from the Andes is the centre of attention during an open-air lesson at the castle of Kintzheim in Alsace (France), where visitors learn about birds of prey at first hand.

Scientists must learn to respect and practise other forms of language and communication.

also have to be integrated with other forms of education—literary, artistic, political or even economic—in order that the citizens of the twenty-first century may see science primarily as an ally in achieving what they want done for the good of their country or of civilization as a whole.

### More open, more diverse higher education

After going through a period of crisis, in Europe especially, universities can now aspire to provide both a general culture and a practical training for various occupations. It is, however, increasingly true to say that the training of scientists cannot be confined to a single location.

First of all it will probably be necessary to rethink the transition from secondary education to higher education. The former sharp break between them is becoming less abrupt. Much still remains to be done, however, because in a way school students today are more mature than their predecessors. In my opinion they are far more receptive to science, technology and discussion about social problems than is generally believed.

They first go to university to learn the basics, then to laboratories to round out what they have learned, then into industry to study the technical applications, and in some cases to museums or science parks to acquire a broader overall view of science. This form of

networking, linking the university with other professional institutions, will need to be reinforced in the future. Perhaps we should also rethink and diversify the traditional linear progression from school to university, laboratory or business.

Furthermore, universities should not all necessarily teach the same thing nor attempt to cover all the ground. Although a common core must be established, i.e. a basic scientific culture without which studies cannot be carried forward, universities nevertheless have to find their own specific roles in keeping with the aspirations of the societies (and regions) within which they operate. The evaluation of universities should, however, be carried out at international level: while cultural traditions and national goals vary from country to country, science is preeminently universal in character.

The growth of the student population in universities raises considerable problems, since it necessitates the training of adequate numbers of specialist teachers in various fields. Universities should therefore have an open-door policy and should allow scientists great freedom of movement, both within their own country and internationally. Although this means that they should set their sights high and have plentiful resources, they cannot restrict themselves to training an elite. The French “Grandes Ecoles”, for instance, provide an excellent education and produce some remarkable people, but perhaps they fail to take

#### FRANÇOIS GROS,

French biochemist, is permanent secretary of the French Academy of Sciences and a member of many scientific committees.

Among his published works are *L'Ingénierie du vivant* (“The Engineering of the Living”, 1990) and *Regard sur la biologie contemporaine* (“A Look at Modern Biology”, 1992).

We need to prepare  
the ground in  
primary and  
secondary schools.

account of the diversity of individual talents. The Grandes Ecoles, in my view to their credit, are making a real effort to open up to the wider university system and to the business world.

Thought should also be given to the possibly disproportionate importance attached to mathematics in the selection of students. Mathematics is one of the highest forms of intellectual activity and can be used to assess an individual's capacity for abstraction and rapid thinking, but it is going too far to take it as the sole criterion.

### Teaching students to be team players

If we are looking for a system that is fully appropriate to the needs of the coming century and as receptive as possible to all forms of cultures, we need to prepare the ground in primary and secondary schools. By the university level it is already too late. I believe it is essential to introduce the teaching of the history of science from the primary level on, so as to situate science within a cultural context. Science would then be gradually integrated into the teaching process in a pluralist way, with efforts being made to maintain a balance with other subjects and outlooks.

In secondary school, hands-on scientific experiments should be introduced at a very early stage. This is crucial, since such activities bring students face to face with their responsibilities, teaching them that they must

be able to work as members of a team, must have an acutely critical outlook and must realize that there is not just one, but several possible approaches to the solution of problems—in short, that life itself puts us in situations that constantly require us to solve difficult practical problems.

There have long been calls for secondary-level science to be taught in this way, but it is not easy to set up. The logistics are expensive, and teachers are not always adequately trained for this kind of work. This is one of the reasons why France has established university-level teacher education institutes (Instituts Universitaires de Formation de Maîtres), whose students have the opportunity to take training courses in laboratory work. The institutes aim to provide an interdisciplinary training course, showing how problems are linked to one another, not only across subject boundaries but also within society as a whole, while enabling trainees from different backgrounds to establish a close relationship with experimental science. It is, however, too soon to pass judgment on the effectiveness of these institutions.

The acquisition of knowledge in the twenty-first century will probably be a halfway house between computerized messages of the highest level of abstraction at one end of the spectrum and highly specialized, sophisticated technologies at the other: scientists will therefore have to be able to move freely between these two extremes. ■



A physics class at the  
University of Mindanao  
(Philippines).

Nancy Durrell McKenna © Panos Pictures, London



John Lauros © Rapho, Paris

# Sharing knowledge

by Pierre Léna

**A**bove, the European Southern Observatory (ESO) at La Silla (Chile) is situated 2,400 metres above sea level in the Atacama Desert, where the skies can be studied 300 days a year because of the extreme clarity of the air.

**PIERRE LÉNA**, of France, teaches at the University of Paris VII. His most recent published work is *Méthodes physiques de l'observation* ("Physical Methods of Observation", 1995).

**A**t a time when there is a worldwide trend for knowledge to become the preserve of the most highly developed countries, one of the major problems facing the university system is that of sharing the information accumulated by the major scientific research centres.

The critical point for the transfer of knowledge comes when students from the developing countries who have obtained their doctorates in the industrialized countries return home to put their knowledge to use. They find that there are few satisfactory job opportunities and in many cases are isolated in their research. Even students from the International Centre for Theoretical Physics established

by Professor Abdus Salam in Trieste (Italy) find themselves in a similar situation. The problem is that there is at present no real concerted policy which would allow scientific centres to come into being outside the industrialized countries.

Chile is an especially interesting case in this respect. It has some of the best sites in the world for astronomy, and the United States, Europe and Japan are all interested in them. For the country's own scientific development to benefit from this natural asset, now being exploited by others, it would be fairly logical to envisage a kind of "levy" on telescopes installed by foreign countries, i.e. by making them available for part of the time to

Chilean scientists. Negotiations on these lines are being carried out with Europe and have already been concluded with the United States.

But opportunities for access to technical equipment, however powerful the equipment may be, are not in themselves a guarantee of sustainable scientific development. Building a scientific community is a long process that, even when conditions are favourable, does not always produce immediate results. A reasonable aim for Chile would be to set up an International Centre for the Sciences of the Universe, possibly to be shared by the whole of Latin America, playing a similar role to that played for physics in Europe by the Trieste Centre. ■

## SCIENCE MADE SIMPLE

BY JAYANT V. NARLIKAR

The challenge of popularizing science and helping people to appreciate science as part of their culture can be approached on four levels.

At primary school the first thing to do is encourage curiosity about nature. Children generally start with this curiosity, but educational systems often stifle it. Next they must be taught the concept of a pattern in natural phenomena, and then be gradually introduced to the mathematical or quantitative aspects of nature. The teacher should then show how nature follows certain laws and that therefore predictions can be made about it. If these aspects are incorporated into primary education, children will begin to appreciate the sciences as an important part of their education.

The main goal of secondary education should be to emphasize the experimental verification of scientific laws. Children should be made aware of the historical development of science through the interplay of theory with experiment. The history of science should be taught in a way that shows how scientists actually learn—by making mistakes and correcting them.

The aims of higher education should be to provide students with access to source material that will supplement classroom teaching and work with textbooks, and to make sure they have opportunities to discuss, ask questions, argue and interact with their teachers. Students should be made aware of the frontiers of research and should see research being done around them. They should do projects to find out what interests them and to add to the content of science. Students often do not discover what they really like until it is too late.

One of the chief purposes of science popularization for the general public is to help people learn to live comfortably with science and technology. The limitations as well as the powers of science should be appreciated. Scientists often get carried away and give the impression that science is a panacea. This provokes a backlash from those who say: How can you offer answers to everything when you know that science is incomplete? The solution is to share the failures as well as the triumphs. These things can be conveyed in books, lectures and films made for the general public. ■

**JAYANT V. NARLIKAR** is an Indian astrophysicist who is presently director of the Inter-University Centre for Astronomy and Astrophysics in Pune (India). His published works include *The Lighter Side of Gravity* (1982) and *The Primeval Universe* (1988).



Students at the Inter-University Centre for Astronomy and Astrophysics in Pune (India) learn how to use a telescope.

# The hands-on approach

## by Goéry Delacôte

San Francisco's Exploratorium is giving a wide public an informal initiation to science

Although education in the United States has not traditionally been regarded as a matter for the Federal Government, in recent years the latter has set about transforming the education system on a national scale by setting minimum standards and common objectives for all schools, thus creating a general frame of reference.

There are three essential aspects to these standards and objectives: they lay down what young Americans should have learned by the end of a certain number of years of schooling; they describe relevant and effective methods to be used for the teaching, in three- or four-year instalments, of the various subjects; and they set forth methods of evaluation adapted to these new criteria. They also list the conditions to be met for putting this new frame of reference into effect.

### A flexible, open system

These measures bear certain resemblances to those relating to the establishment of school curricula in France in the late nineteenth century by Jules Ferry, except for the fact that they allow local institutions wide freedom of choice as to the methods and resources used to attain the objectives.

In the case of mathematics, the standards, drawn up with the help of all the parties involved in the changes—chiefly high-school and college teachers, but also businessmen, parent-teacher associations and politicians—have already been promulgated. This process, a thoroughgoing piece of social and political



Photo © Exploratorium, San Francisco

**G**oéry Delacôte (right), director of the San Francisco Exploratorium (USA), bowls a wheel across a moving circular platform to show a visitor a simple solution to a complex mechanical problem.

alchemy, was carried out with the co-operation of all those competent in the subject, thus avoiding the mistakes made thirty years ago when modern maths were introduced. Similar standards are now being prepared for science teaching and will soon be brought into force for all subjects.

This idea of a “wide-mesh” education system creates favourable conditions for a genuine debate among the various people and institutions actively involved in the system. It also makes it possible to take specific local conditions into account and to optimize the management of each community’s resources. The greater the scope for initiative, and hence autonomy, at the local level, the more necessary it becomes to lay down a general framework that is flexible enough to let such initiatives be put into effect.

In the next century we shall very likely all have to come to terms with the definition of objectives on a national, or even international, scale and, on the other hand, the need for initiatives at the local level.

### The educational role of museums

There is, however, a risk that such initiatives will come to nothing unless schools themselves undergo a transformation at the same time. The substantial rise in the numbers of schoolchildren brought about by population growth will bring the whole education system to a standstill unless it is reorganized.

The experience of my own institution, the San Francisco Exploratorium, may be of some interest in this respect. An experimental

The main aim of the San Francisco Exploratorium is to put across the idea of continuing education as something quite natural.

centre, founded in 1969, its purpose is to bring basic scientific knowledge to a wide audience, parents and teachers as well as students. It is open to all comers and provides learning aids, access to on-line services (Internet, for example), teachers and guides, all with the aim of putting users in the frame of mind to go on asking more questions and allowing constantly changing new learning techniques and methods to be tried out.

These techniques, worked out jointly by the teachers and engineers with the help of the learners themselves, aim to stimulate debate on science, its social applications and the ethical problems it raises, and also on the processes (metacognition) at work in science.

The Exploratorium is also a meeting-place for prospective teachers, where they can acquire a foretaste of their future job. The initial training it provides, though by definition insufficient for a proper vocational qualification, aims mainly to put across the idea of continuing education as something quite natural. In science, this initial training consists chiefly of familiarizing trainees with the experimental approach and with how to give lessons, but it also teaches them how to learn by instilling in them a capacity to stand back and examine their own methods objectively.

At a more general level, the educational role of scientific centres open to the public—museums of science and natural history, botanical gardens, zoos and so on—is being

**C**hildren run their hands over a meteorite at the Smithsonian Institution, the natural history museum in Washington, D.C. (USA).



Photo © Charles Lénars, Paris

reconsidered in the United States. These centres are in the process of changing, from being mere adjuncts to formal education to becoming experimental logistical bases for the transformation of the whole educational system. Excellent as the universities are as regards research and academic knowledge, experience has shown that they are often ill suited to providing trainee teachers with the sort of skills an appropriate professional training requires, whereas the scientific centres possess, as compared with the universities, a remarkable degree of freedom in terms of their timetables, programmes and organization and the use they make of their premises and of available technologies.

### A move towards school autonomy

As well as to the part that scientific centres could play in education in general, consideration needs to be given to the future of schools themselves.

The fact that schools do not at present enjoy real autonomy in the management of their resources reduces their power of initiative and hampers the adaptation of the education system as a whole to the changes made necessary by its own expansion. Schools operate on the basis of directives given to them rather than agreed objectives that would leave them free to allocate resources in such a way as to produce results best suited to local conditions. This makes it particularly difficult to create a learning environment that would enable any substantial improvement in pupils' performance to be obtained and would be conducive to equal opportunity while taking account of local factors.

A move towards autonomy for schools has started in the United States as a result of pressures from parents, learned societies and industry, but schools have still received no indications as to the most suitable types of organization and management required. Guidance from outside experts is therefore essential for the gradual implementation of the changes foreseen. This alone will enable serious mistakes to be avoided. ■

The San Francisco Exploratorium is on-line via Internet: <http://www.exploratorium.edu>

#### GOÉRY DELACÔTE

is a French physicist who was a co-founder of La Villette Museum of Sciences in Paris (France) and is presently Director General of the San Francisco Exploratorium. His most recent published work is *Savoir apprendre: les nouvelles méthodes* (1996).

The school must adapt to a world where it no longer has a monopoly on the transmission of knowledge



# Schools at the crossroads

by Robert Bisailon

Schools often seem to be standing still while the rest of the world moves on. However, a number of social changes now look set to challenge educational systems and the functions of education.

Schools are at a crossroads. On the one hand, the state seems unwilling to go on financing and directing education; on the other, schools and local authorities would like to have more of a say in these matters themselves.

In these circumstances, the role of schools and their place in society become less straightforward than they were. In competition with other institutions such as the family



One of the aims of education is to provide young people with the means of changing the society in which they live.



Heidur Neioerny © Pamos Pictures, London

**S**tudents in the periodicals library at the University of Dar Es Salaam (United Republic of Tanzania).

and the workplace, which are themselves in the throes of change, schools no longer have a monopoly on the dissemination of knowledge. New information and communication technologies are putting teachers to the test and making them re-examine their approach to education.

The ways by which young people acquire knowledge have changed. Acquisition by absorption, a process encouraged by the media, is taking over from the traditional process in which the family and the school acted as the intermediaries. But the media appeal to young people's curiosity and emotional responses in a random fashion, and schools find it very hard to put knowledge acquired from the media into some sort of order so that schoolchildren can benefit from it.

The concept of skills has also taken on a broader meaning. As well as transmitting knowledge and know-how to their pupils, teachers must train them to find information for themselves and to make use of it. Pupils' skills are now defined in terms of their self-reliance and their ability to adapt to different types of training and jobs.

In a society where there is more and more cultural intermingling and where there are

fewer and fewer fixed points of reference, teachers are expected to show children how to form their own values.

Lastly, the phenomenon of students "working their way through college" is a typical feature of life in North America, where the school population is drawn from mixed, multiethnic backgrounds. All these factors have a strong influence on thinking about what is required of schools and about ways of achieving integration.

## Education and politics

The situation raises a number of socio-political questions, such as how to reconcile elitism with democracy without widening social cleavages or how to expound a universal culture respectful of national identities without encouraging racism and intolerance.

In this context, how should the roles of the state, the school and the individual be defined? A definition of a "common public culture", encompassing a set of non-negotiable values that are necessary to social cohesion, is perhaps called for. This set of values could serve as a common core for the education of all groups, minority or majority, sedentary or nomadic, without infringing the basic rights of any of

**ROBERT BISAILLON**, of Canada, has been President of Quebec's *Conseil Supérieur de l'Éducation* ("Education Board of Governors") since 1989.

them. These consensual values could justifiably be invoked to challenge the authority of schools designed to emphasize religious or ethnic differences. Again, instead of introducing new subjects into syllabuses, would it not be better to reorganize existing syllabuses transversally to encourage knowledge and understanding of other languages and cultures? Education could in this way become truly a factor working for peace.

On a matter more directly related to the social and economic context, the kind of general knowledge that opens pupils' minds to the world around them needs to be combined with vocational qualifications enabling them to find a place in economic life. Since one of the aims of education is to provide young people with the means of changing the society in which they live, they should first understand how it works and how it can be improved.

In all these respects teachers have a leading role to play, which is why one of the most basic changes to the system concerns the teaching profession. More emphasis in pre-service training should be attached to teachers' individual and collective responsibility, i.e. the development of professionalism should be the guiding principle. Next, in view of the length of teachers' careers, pre-service training, practical experience and in-service training should form a continuum. Success depends on responsible commitment, by each according to his or her role and competence, on the part of all those who determine educational policies, who are in charge of schools and whose daily business is education. ■

**A** UNICEF-supported puppet show performed at a primary school in Bujumbura (Burundi). The play seeks to encourage reconciliation and tolerance.



Howard J. Davies © Panos Pictures, London

## THE PROSPECTS FOR TEACHERS

BY BILL RATTEREE

The training of what may well be more than 50 million teachers worldwide by the year 2000 and payment for their services—representing from 50 to 80 per cent of current public educational expenditure in almost all countries—constitute an enormous investment.

For this investment to be fully realized, the training, recruitment and career prospects of teachers must be interlocked in such a way as to favour a dynamic and creative schooling environment. Recruitment criteria will need to favour aptitude and motivation to teach, not just the acquisition of credentials. Career structures will need to provide instructional rather than administrative paths for highly skilled teachers. There must be equality of opportunity and treatment between men and women.

As far as salaries and other material benefits are concerned, the evidence suggests that with a few exceptions in high-income countries, teachers' salaries have not maintained comparability with professions requiring similar qualifications. The consequences include: a decline in the quality of individuals recruited into teaching, the loss of qualified and experienced teachers who are attracted to other jobs, and general lack of interest in sustaining creative performance. The impact is most dramatic in low-income countries subject to economic and fiscal restrictions, where multiple job-holding, teacher absenteeism and recourse to private teaching schemes are becoming the rule.

It is thus indispensable to ensure salaries comparable to rates of equivalent professionals and to formulate strategies to establish material incentives broad enough to motivate all teachers. The alternative is that schooling in many countries will inexorably decline, as basic skills are not taught or taught poorly, student dropout levels among low-income families will increase and the education system will fail to carry out its basic mission. ■



Jacky Chapman © Format, London

**BILL RATTEREE**, of the United States, is a member of the secretariat of the International Labour Organisation (ILO) in Geneva.

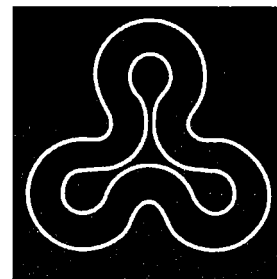
**A** practical science lesson in a Wandsworth school, south London (United Kingdom).

# Distance education in the high-tech era

**Menahem Yaari**, President of the Open University of Israel, talks to Jasmina Šopova



© Open University of Israel, Tel Aviv



Established in 1974, the Open University of Israel is one of the world's few nationwide distance education universities. It has a study centre in Jerusalem and almost 90 more scattered throughout the country. In addition to an impressive programme of Jewish and Middle Eastern studies, the university offers nearly 400 courses (in Hebrew) in such diversified fields as the social sciences, the life and natural sciences, mathematics, computer science, music, humanities and art.

## ■ How does distance education fit into current educational practice?

**Menahem Yaari:** Several kinds of institutions in the world practise it, notably a large number of traditional universities that are gradually opening departments of this kind. They are, you might say, "mixed" institutions. There are also institutions like the National Technological University (NTU) in the United States that operate uniquely as distance education entities but by using the traditional course material of other leading universities. They act as an agent, as it were. There are also about twenty universities like ours that develop their own course material and broadcast it via satellite, thereby using the most up-to-date communication technology.

## ■ What is special about the Israeli version?

**The control room of the Open University of Israel's satellite studio.**

**M. Y.:** We have based our system extensively on the one developed in Britain twenty-five years ago. But we've taken it even further. The British Open University is mostly concerned with the social sciences, while Israel's covers a broader range of subjects, particularly the sciences. Its teaching is much more diversified.

For each subject—there are at present about 400—we set our own course material and ask the most qualified experts Israel has to offer to develop the course. This ensures a very high standard. We can boast of the fact that our courses are used as working documents by a large number of students and professors in other Israeli universities.

From its inception the University used the most modern educational tools avail-

able—video, cable television and computers—but we took a revolutionary step in 1994 when we introduced multimedia and interactive studies by satellite.

## ■ How does a course by satellite work?

**M. Y.:** Unlike other courses, courses by satellite take place live. The professor is in a studio at our broadcasting centre in Tel Aviv. A satellite dish connects him to some sixty receiving centres scattered throughout the country. The studios in the Tel Aviv centre are equipped with a video camera, facilities making it possible to present transparencies and slides directly on the video, a colour scanner, a personal computer for graphic presentation of information and a console enabling the teacher to communicate directly with the students. The teacher also has at his disposal all the relevant information about his students:

how many there are, their names and their academic background. The classrooms are equipped with a large screen, personal computers and telephones so that students can dialogue with their teacher.

■ **All this must demand high-level organization. . .**

**M. Y.:** Yes. As well as the experts we ask to develop our courses, the Open University of Israel employs its own faculty (teaching assistants, lecturers and professors), like any other university. But instead of giving courses, the professors provide course follow-up by supervising their content. They also have to make sure that assessments, final examinations and teaching materials are up to an acceptable standard.

We are also on the cutting edge of self-evaluation. We are perfectly aware of each course's contents and each student's results. All these data enable us to assess the quality of our teaching. We have direct access to courses, and if something goes wrong, we know about it at once and can rectify it from one day to the next.

■ **Does this kind of organization make the system complicated and costly?**

**M. Y.:** Just the opposite. The experts who develop our courses work for other institutions. We pay only fees, which considerably reduces our overheads without diminishing the quality of our teaching.

The Open University of Israel now pays for itself. For the first fifteen years of

## Conquering time and space

One message that UNESCO is trying to get across is that education does not necessarily mean going to school. Continuing education and distance education are the two key concepts for broadening the scope of traditional education.

Continuing education means giving those who have "outgrown" school-going age a chance to improve their skills or to retrain according to their needs or job-market demands. It also encourages the social reintegration of marginalized young people, like those, for example, who have been demobilized after a war. UNESCO has established a training programme of this kind in local languages for young Haitians,

its existence it was sponsored by the Rothschild Foundation, which was its initiator. But for the past few years enrolment and the sale of our own books (some 450,000 per year) provide for 75 per cent of our budget, with the rest coming from the state. By way of comparison, government financial support for other institutions is about 75 per cent. It's true, however, that they are more heavily engaged in research than we are.

Moreover, we don't need a campus.

**The Open University's satellite programme broadcasting studio.**



Palestinians, Rwandans and Mozambicans, and several scientific, technical and professional training projects for women in sub-Saharan Africa are also on the drawing board.

Distance should be no obstacle to education. China, India and Brazil, which rank among the world's nine most populated and least literate countries, are planning to overcome the problems of distance by using satellites to televise educational programmes. Studies have shown that although this kind of teaching is initially very costly, it may be more economical in the long run than traditional schooling. UNESCO is doing all it can to promote effective partnership between governments, non-governmental organizations and business so that these countries can benefit from quality programmes and broadcasting technology.

Our study centres are mostly located in the country's primary or secondary schools, which we are able to use when they are not occupied at specific times of the day. In this way distance education becomes one of the least costly educational systems that exist.

■ **What are the other advantages of distance education?**

**M. Y.:** Apart from the fact that it enables working people or students living far from university towns to continue their studies near home, it offers the possibility of teaching beyond the borders of any given country. In this regard distance education can become a basic tool for building peace, especially in the Middle East where borders have begun to open up. But opening borders isn't enough. For people to cross them, education is essential. And when I talk about crossing borders I'm not referring only to the physical sense; I mean exchanging ideas and establishing a real dialogue. It is clear by now that with the advance in technology that enables us to reach the remotest villages distance education is the best way to establish this dialogue. It is even likely that this form of teaching will gradually replace the more traditional form, which is for the moment at least still dominant just about everywhere in the world. ■



Betty Press © Panos Pictures, London

**P**upils of a Bamako (Mali) school take their desks home for the holidays.

# Africa: a fresh start

by **Fay Chung**

The quest for a blend of African traditions with the universal values that will shape the next century

More than any other continent, Africa needs to rethink its education systems. All too often, the systems of education inherited from colonialism have been preserved in Africa more or less intact, generally on the grounds of “maintaining standards”. What this actually means is that a very small elite enjoys exactly the same kind of education as it would have in Europe, while the vast majority are deprived of any form of modern education whatever.

The failure of these educated elites to transform their countries from feudal social structures and traditional subsistence agriculture is in marked contrast with the success of the East Asian elites who have managed to

make their economies more efficient than the Western economies that they began by imitating. Why have African elites failed whereas their counterparts in East Asia have succeeded so spectacularly? What role has education played in this?

## The Japanese model

East Asia has been strongly influenced by the Japanese model. In the nineteenth century, the Japanese realized that it was essential for their survival as a nation to appropriate Western mathematics, science and technology, whilst eschewing Western culture and social values. Compulsory primary education for all existed in Japan by 1870. The goal

**FAY CHUNG**, of Zimbabwe, has served as her country's Minister of State for National Affairs, Job Creation and Co-operatives, and as Minister of Education. She is now with UNICEF (the United Nations Children's Fund) in New York.



Betty Press © Panos Pictures, London

**G**raduation day at the University of Nairobi (Kenya).

of secondary education for all was subsequently achieved, and after the Second World War access to post-secondary education became available for the majority. But while they sought to imitate, and later to surpass, Western science and technology, the Japanese insisted on the primacy of their own language, literature, culture and religion.

Africa has not made such a conscious choice. The introduction of Western education into Africa by Christian missionaries meant that the educated elite was more steeped in Christian theology, history, literature and culture than in science and technology. This strong bias towards the humanities still exists today.

Probably the most visible symptom of this Western orientation was the rejection of African languages in the education system. Even now African languages are not taught in most French- or Portuguese-speaking countries, and even some English-speaking countries have denigrated the use of African languages as “divisive” and “tribalistic”. To the African Christian convert African culture was synonymous with superstition and

backwardness and was generally rejected as “uncivilized”. In other words, the educated African adopted the European conception of traditional African culture.

### Redefining the purpose of education

Very few African countries have attained primary education for all, despite the fact that many have been independent for some thirty years. At the secondary level, the record is even worse. Many African countries only provide secondary education for 4 or 5 per cent of the appropriate age group. In most African countries, less than one per cent of the relevant age group goes on to any form of post-secondary education, compared to between 25 and 75 per cent in the industrialized countries. Those who do are unlikely to specialize in science or technology.

It is within this context that we need to re-examine the connection between education and economic development on the one hand, and education and cultural values on the other. “Development” must be defined more clearly. At present Africa’s development strategy appears to be based almost exclusively on structural adjustment, although this is clearly a far too narrow and economist conceptualization of development, which does not take into account such extremely important factors as a country’s level of human-

**B**elow, a primary school class in Eritrea’s Asmara region.

**B**elow left, students at the University of Lusaka (Zambia) familiarize themselves with the computer.



Photo © Patrick Lages, Paris



Ron Gilling © Panos Pictures, London



Photo © Claude Sauvageot, Paris

**P**upils from several Niger villages gather for a morning P.E. session before getting down to their classwork.

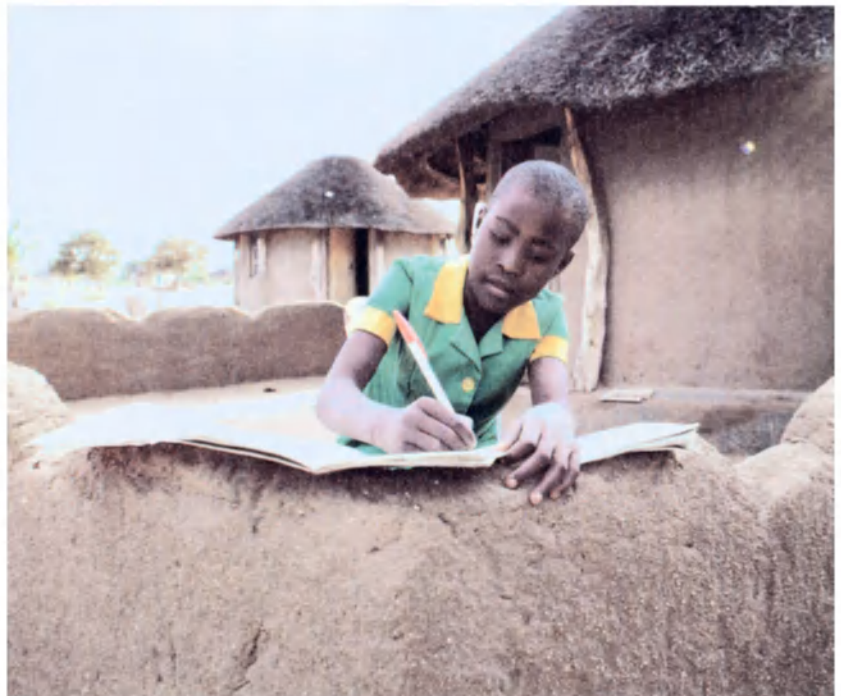
resource development or its level of economic diversification and industrialization.

Education also needs to be redefined. The systems and structures of the past should not be retained uncritically. Education must serve a purpose, and Africa needs to decide what that purpose is. While it has a critical role to play in economic development, it has an equally important role in creating and defining the values that will make Africa politically and culturally united, coherent and forward-looking. Only when the purpose of education has been clearly defined can Africa decide what type of education is suitable for its development.

In deciding on that purpose the global village and the global market must be kept in mind. It is no longer possible for Africa to perpetuate its colonial and feudal heritages by continuing with the educational systems and structures of the past whilst ignoring the transformation of the rest of the world into technologically advanced industrialized economies. On the other hand, Africa is the least polluted and least environmentally damaged continent. As the latest entrant into the modernization process, it may be able to avoid the terrible environmental and human damage caused by that process. ■

**Only when the purpose of education has been clearly defined can Africa decide what type of education is suitable for its development.**

**H**omework (Botswana).



Bruce Paton © Panos Pictures, London

# The children of Confucius

by Zhou Nanzhao



Oliver Vidal © Unesco, Paris

## Education has played a central role in Asian tradition ever since the time of Confucius

**Above, on the way to school.**

In Asia learning has been cherished ever since the time of Confucius, who believed that human beings are perfectible and can be led along the right path through education. He emphasized the power of education to improve society and to teach citizenship, and for centuries education was the foundation of the political, social, economic and cultural life of Asian peoples.

Attention has often been drawn to this profound appreciation of the value of education. Working Asian mothers, bending low in the rice fields, have always hoped that education would enable their children to escape from poverty. Stories and images from many coun-

tries record Asian women's aspirations for their children, ranging from the well-known figure of the Japanese mother who regards educating her offspring as her prime duty, to the Chinese mother who for years travelled long distances to evening classes and taught her disabled son with the notes she took, and Korean mothers who would sell their cows to pay for their children's schooling. The writings of Mahatma Gandhi and the great Indian poet Rabindranath Tagore offer further testimony of the value attached to education by Asians.

Not surprisingly, therefore, Asian parents and teachers have high expectations of the young, and studies have shown that these expectations go hand in hand with high curriculum standards, long hours spent on learning, strict training in intellectual skills, a high degree of parent-children interaction at home, close teacher-pupil relations at school and high educational achievement, especially in such intellectually demanding courses as

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**ZHOU NANZHAO,**  
a Chinese educator, is Vice-  
President and professor at the  
China National Institute for  
Educational Studies in Beijing.



mathematics. Since there is no substantial difference in the intelligence quotient of most children and no children are ineducable, it is clear that this cultural factor helps to account for the relatively high scholastic achievements of many Asian students.

## Learning to be team players

Traditionally, collectivism has taken precedence over individualism in Asian cultures. Confucianism emphasized the development of the individual as a member of the family and of society at large, and learning the rules of social relationships was considered an essential step towards becoming a mature and responsible person. For centuries Chinese intellectuals upheld the moral ideal of “bearing the worries of the world *before* anyone else and enjoying the pleasures of life *after* all others”. This group-oriented attitude, classically displayed in the “team spirit” of the Japanese, has been conducive both to economic productivity and social cohesion. It partly explains why many Asians tend to dislike the concept of competition among individuals yet display a high degree of competitiveness in a collective setting.

Another cultural tradition that has shaped the Asian approach to education is an emphasis on the spiritual rather than the material dimension of development. Traditional Chinese culture, for example, was essentially based on ethics, stressing the moral cultivation of the personality. Today it

is still widely recognized in Asia that education cannot be value-free, and in many countries the building of both “spiritual” and “material” civilizations is the twin goal of national development.

The idea of a meritocracy based on performance in state examinations rather than on inherited wealth has long been accepted in Asia. Whereas the theoretical goal of Confucian education was the cultivation of the person in the ethical sense, in practice it tended to be more concerned with the preparation and selection of a ruling elite. For Confucius, education was a powerful instrument which this elite could use to govern the state. By education the ruler should “learn to care for the people” while the ruled “learned to be obedient”. Care from above and obedience from below were supposed to lead to a stable social order. The authority of the parent at home and that of the teacher at school went a long way to explain the discipline of most Asian students.

Extended to the political and economic sphere, the authority of the state favoured a co-operative, harmonious relationship between

The idea of meritocracy has long been accepted in Asia.

**S**aptagram is a women's organization in Bangladesh whose work has been cited by the joint UNESCO-UNICEF programme *Education for All: Making it Work* as a model for women's education in developing countries. Right, a Saptagram course in Faridpur.



Oliver Vidal © Unesco, Paris

Some features of traditional cultures partly explain why an industrial economy was so slow to take off in many Asian countries.

business and government and facilitated the implementation of government policy. Authoritarian modern government has been said to be one of the factors accounting for the economic miracles of East Asian countries.

But if this is so, why have economies with cultural traditions that are supposedly so conducive to development only recently embarked on rapid growth? Some scholars have seen Confucianism as a conservative, anti-modernizing force. This might be an exaggeration, but it is safe to say that, apart from more fundamental economic and political factors that have hampered development, some features of traditional cultures partly explain why an industrial economy was so slow to take off in many Asian countries. These features include:

- ▶ *the “politicization” of educational-cultural values and lack of governmental commitment to economic modernization.* Educational institutions were used as mere instruments in political strife and as an appendage to the government apparatus;
- ▶ *neglect of individuality.* The collective interest was grossly over-emphasized and the individual was reduced to the status of an instrument;
- ▶ *focus on interpersonal relationships rather than on the conquest of nature.* Over a long



A computer class in a Tokyo high school (Japan).

Brenda Prince © Format, London

period this resulted in the underdevelopment of science, engineering and applied technologies; ▶ *over-emphasis on classics-oriented examinations.* Meritocracy based on success in examinations could be a motivating force for learning and career achievement irrespective of class, but over-emphasis on examinations in the Confucian classics suppressed the creativity of many brilliant young minds.

▶ *contempt for pragmatism, utilitarianism and business.* Confucian idealism neglected science and technology. It separated brain from hand and scholarship from craftsmanship. The educated elite were entitled to rule simply by virtue of their “superior morality”, without having to acquire practical knowledge or skills. Matters of utilitarian value were despised, and business was regarded as an occupation of low social status. It is partly due to these cultural attitudes that vocational and technical education are neglected even today in many developing Asian countries.

▶ *gender bias.* For centuries women were relegated to household drudgery and played a negligible role in society. This explains why girls received much less schooling than boys and also helps to account for the persistently high ratio of girls in the numbers of school dropouts in Asia (two-thirds during 1985-1992). Low educational levels among Asian women have resulted in high infant mortality, high population growth in rural areas, worse conditions for children’s nutrition and health and a stagnant economy.

Schoolchildren in Thailand bow to their teachers when leaving at the end of the school day.



Chris Stowers © Panos Pictures, London

## Education for a global ethics

Asian nations today, while determined to preserve their cultural identity and traditions, are becoming increasingly aware of the need for interdependence. In response to increasing

In the coming century humankind may find that elements of the wisdom of Confucianism are as relevant as they were long ago.

globalization their educational systems have begun to advocate the teaching of a core of universal values. These values include: awareness of human rights combined with a sense of social responsibilities; social justice and democratic participation in decision-making and government; understanding and tolerance of cultural differences and pluralism; caring and co-operation; a spirit of enterprise, creativity; sensitivity to equality of the sexes, open-mindedness to change and a sense of obligation to environmental protection and sustainable development.

Most of these values are rooted in time-honoured cultural traditions. The “spirit of caring” is embedded in Confucian “benevolence” and Buddhist “mercy”. Sensitivity to environmental protection was expressed in ancient China by the Taoists’ concern about the destructive consequences of technology on natural resources. Altruism has been respected as the highest human value in Asia for hundreds



Photo © Claude Sauvageot, Paris

**A** village school in the Shanghai (China) region. The girl's red scarf indicates that she is a model pupil.

of years. In the coming century humankind may find that elements of the wisdom of Confucianism are as relevant as they were long ago. One way of fostering universal values for future centuries, therefore, is to educate the young with great books of the past.

Another approach that should be fostered is educational bridge-building between East and West. Culturally East and West are compatible and complementary. The Confucian scholar-official selected according to merit rather than hereditary privilege is close to the ancient Greek idea of “government by the best”. If East and West can learn from each other and integrate each other’s cultural strengths—individual initiative with team spirit, competitiveness with co-operativeness, technological skills with moral qualities—then universal values and a global ethic will gradually develop. This renewal of cultures is a great contribution that education can make to humanity. ■



Ian Murray © Unesco, Paris

**A**bove, a health training course for village women of Tilonia in India's Rajasthan state as part of the Barefoot College Programme, a community education project for the development of needy rural areas.

**R**ight, a village school in Chan State (Myanmar).



T. Neelour © Ash, Paris

This dossier provides a brief glimpse of UNESCO's activities in education, which are at the heart of its mission to construct "the defences of peace in the minds of men". These activities have two fundamental aims. The first is to make the right to education a reality for everyone on earth. The second is to help UNESCO's Member States construct and renovate their education systems to meet the challenges of the 21st century.

## WORLDWIDE ACTION FOR EDUCATION

UNESCO's work is underpinned by three separate institutes: IBE and IIEP deal with comparative education and educational planning respectively. Lifelong education, literacy and adult education are covered by UIE.

### THE INTERNATIONAL BUREAU OF EDUCATION (IBE)

P.O. Box 199, 1211 Geneva 20, Switzerland  
Tel. (41 22) 798 14 55  
Fax (41 22) 798 14 86  
Internet: <http://www.unicc.org/ibe>

The International Bureau of Education is a study and information centre in comparative education. Founded as a private organization in Geneva in 1925, the IBE became the first inter-governmental organization in the field of education in 1929. In 1969, the IBE changed its status and became an integral part of UNESCO, while retaining broad intellectual autonomy.

The IBE prepares and organizes the International Conference on Education (ICE), which is convened every two years in Geneva by the Director-General of UNESCO. Each session of the Conference deals with a specific theme and leads to the adoption of an international recommendation on that theme addressed to Ministers of Education worldwide. The forty-fifth session of the Conference will be held in 1996 on the theme "Strengthening the role of teachers in a changing world".

The Bureau houses a documentation centre, which contains more than 100,000 books, documents, periodicals and microfiches. There is a large collection of national reports on educational developments and innovations.

The IBE organizes training activities in the form of a scholars-in-residence programme, workshops and brief courses on the techniques of librarianship.

It also publishes education studies and reference works, such as the *International Yearbook of Education* and the *UNESCO: IBE Education Thesaurus*, as well as newsletters and periodicals. UNESCO's quarterly *Prospects* is the IBE's main international review of comparative education.

### THE UNESCO INSTITUTE FOR EDUCATION (UIE)

Feldbrunnenstrasse 58, 20148 Hamburg, Germany  
Tel. (49 40) 448 04 10  
Fax (49 40) 410 77 23  
Telex 2 164 146 UIE D  
E-mail: [uie@unesco.org](mailto:uie@unesco.org)

The UNESCO Institute for Education was established in 1951 in Hamburg, Germany. It focuses on adult and non-formal education within the framework of lifelong learning, and specifically on adult literacy and continuing education. UIE's activities include research, training and documentation dissemination on a worldwide scale.

Decisions on programme activities and the budget are made by the UIE Governing Board and UNESCO's General Conference. The Institute's financial resources are provided by UNESCO, the German government, the authorities of the Hanseatic City of Hamburg and other funding sources.

Currently, the Institute's main tasks include:

- collecting and analysing information on research in the field of adult education. Particular attention is given to educational opportunities for migrants, minorities and other underprivileged communities, to women and literacy;
- conducting co-operative research projects related to non-formal basic education for adults and out-of-school youth, including projects on the development of alternative learning approaches for the latter, the use of mother tongues and national languages in literacy and post-literacy work in industrialized countries;
- strengthening information exchanges and the extension of networks in the field of adult and continuing education.

The Institute houses a documentation centre and a library specializing in literacy and continuing education, containing over 50,000 publications and documents.

UIE publications include the *International Review of Education*, handbooks and reference works, studies on literacy in industrialized countries, reports and a newsletter.

### THE INTERNATIONAL INSTITUTE FOR EDUCATIONAL PLANNING (IIEP)

7-9, rue Eugène-Delacroix, 75116 Paris, France  
Tel. (33 1) 45 03 77 00  
Fax (33 1) 40 72 83 66  
Telex: 640032  
Cable: EDUPLAN, Paris  
Internet: [Information@iiep.unesco.org](mailto:Information@iiep.unesco.org)

The IIEP, which was established in 1963, is a centre for advanced training and research in the field of educational planning and administration. It contributes to the development of education throughout the world, by expanding knowledge and training professionals. It acts as a focus for the exchange of ideas and concepts in educational planning and administration.

It is financed mainly by a UNESCO grant-in-aid, voluntary contributions from UNESCO Member States and contract resources.

Training is the cornerstone of IIEP's operations. The number of participants in its nine-month Annual Training Programme has passed the 1,000 mark, while over 3,100 people have attended the intensive courses and workshops

which IIEP organizes in a number of countries and sub-regions.

IIEP's research and study programmes are relevant to UNESCO's main priorities on basic education for all and human resource development, and lead to the production of training materials and modules.

Topics covered in the 1990-1995 period included improvement of the quality of education; access to education for disadvantaged groups and ways of reducing inequalities; management of the transition from school to work; planning science education for secondary schools; new trends in technical and vocational education; institutional management of higher education as well as educational financing, management and administration.

IIEP disseminates new technical concepts in educational planning through a large-scale programme of publications and documentation. Some 700 titles have been published so far.

The IIEP Documentation Centre has a stock of some 37,000 books and documents, and subscribes to around 500 periodicals dealing with educational planning and related subjects.

### TO FIND OUT MORE

publications (books and periodicals) may be consulted at or ordered from its Paris headquarters.

The UNESCO Catalogue of documents and publications can also be accessed on the World Wide Web of Internet: <http://www.unesco.org>

For further information, please contact:  
UNESCO Publications Promotion and Sales  
Division

7, Place de Fontenoy  
75352 Paris 07 SP, France  
Tel. (33-1) 45 68 49 73 or 74 and 45 68 46 25  
Fax (33-1) 42 73 30 07

For information about UNESCO educational documents and newsletters:  
UNESCO

Documentation and Information Service  
Education Sector  
7, Place de Fontenoy  
75352 Paris 07 SP, France  
Fax (33-1) 45 67 45 83

## REGIONAL ACTION

Two regional centres play an important role in the field of post-secondary education: CRESALC for Latin America and the Caribbean and CEPES for Europe.

### CRESALC

Apartado postal 68394, Caracas 1062-A, Venezuela  
Tel. (58-2) 283 1333, 284 5075 or 284 2175  
Fax (58-2) 283 1411  
E-mail: uhriv@unesco.org

Established in 1978 in Caracas (Venezuela), CRESALC promotes regional co-operation in higher education and assists UNESCO Member States in Latin America and the Caribbean in their efforts to develop and improve national systems of higher education.

It also promotes the mobility of academic personnel, serving as the secretariat for the application of the Regional Convention on the Recognition of Studies, Diplomas and Degrees in Higher Education.

CRESALC is closely involved in the implementation of UNITWIN (see this page). A UNESCO Chair in Human Rights has been established in co-operation with the national Council of Universities in Venezuela. It publishes a bi-annual journal, *Revista Educación Superior y Sociedad*, and a quarterly bulletin, *Boletín CRESALC*.

### CEPES

Str. Stirbei Voda, 39, Bucarest, R-70732 Romania  
Tel. (40-1) 615 99 56 or 613 08 39  
Fax (40-1) 312 3567  
E-mail: cepes@cepes.ro

The European Centre for Higher Education (CEPES) was established in Bucharest (Romania) in 1972. It serves as a hub for the collection and exchange of information and experience, a forum and a centre for the promotion of research and development in UNESCO's European region (which includes Israel, Turkey and North America).

It is also a focal point for several specialized networks connected with such issues as higher education research, staff development and women's studies.

CEPES houses a library and documentation centre which contains some 27,000 documents. Its capacity for co-operation has been enhanced by the setting up of the UNICOM electronic network.

CEPES publications include a quarterly, *Higher Education in Europe* (in English, French and Russian).

## EDUCATION FOR PEACE

### The Associated Schools Project (ASP)

Since it was launched in 1953 the ASP network has sought to strengthen the commitment of children and young people to international understanding and peace.

Participating schools are invited to organize programmes relating to education pilot projects on one of four main themes: the study of world problems and the role of the United Nations system in solving them; human rights; other peoples and their cultures; the environment.

Associated Schools act as a springboard for the inclusion of UNESCO's ideals and concerns in school curricula.

As of February 1996 more than 3,638 educational institutions on all age levels in 129 countries belong to the network, with numbers increasing every month.

For further information, please contact: Associated Schools Project, UNESCO, 7, Place de Fontenoy, 75352 Paris 07 SP, France  
Tel. (33-1) 45 68 10 00  
Fax (33-1) 40 65 94 05

## THE REGIONAL PROGRAMMES

### Expanding and reforming primary education and promoting adult education

The building blocks of UNESCO's global action in favour of literacy and education for all are its regional projects and programmes for literacy: the Major Project in the field of Education in Latin America and the Caribbean; the Regional Programme for the Eradication of Illiteracy in Africa; the Asian and Pacific Programme of Education for All; and the Regional Programme for the Universalization and Renewal of Primary Education and the Eradication of Illiteracy in the Arab States by the year 2000.

In addition, an information-exchange network based at the UIE facilitates co-operation between industrialized countries faced with problems of "functional illiteracy", i.e. an inability to read and write sufficiently well to cope with the challenges of life in complex modern societies.

The regional literacy programmes are based on two fundamental principles: technical co-operation between developing countries and the need to combat illiteracy through a global approach combining the universalization and renewal of primary education with stepped-up literacy work among out-of-school youth and adults.

All programmes give special attention to the education of women and girls and to literacy follow-up activities designed to encourage the reading habit.

Progress towards regional goals evidently depends upon the success of national efforts, but in many countries these efforts are faltering because of the economic crisis which has severely restricted the development of education.

Fortunately, there is a growing realization that education is the key to development, and the commitment of the international community has increased since the World Conference on Education for All held in Jomtien (Thailand) in 1990.

### SOME USEFUL ADDRESSES:

#### Regional Office for Education in Africa (BREDA)

12, avenue Roume, B. P. 3311, Dakar, Senegal  
Tel. (221) 23 50 82 or 23 84 41  
Fax (221) 23 83 93  
Telex: 51410 UNESCO SG, 21735 UNESCO SG

#### Regional Office for Education in the Arab States (UNEDBAS)

Al-Shmaisani, P.O. Box 2270, Wadi Saqra, Amman, Jordan  
Tel. (962-6) 60 65 59, Fax (962-6) 81 18 49  
Telex: 24304

#### Regional Office for Education in Latin America and the Caribbean (OREALC)

Calle Enrique Delpiano 2058 (Plaza Pedro Valdivia), Casilla 3187, Santiago de Chile, Chile  
Tel. (56 2) 204 90 32  
Fax (56-2) 209 18 75  
Telex: 340258 UNESCO CK

#### Principal Regional Office in Asia and the Pacific (PROAP)

Prakanong, P.O. Box 967, Bangkok 10110, Thailand  
Tel. (66-2) 391 05 77 or 391 07 03  
Fax (66-2) 391 08 66  
Telex: 20591 TH

## A SPEARHEAD FOR HIGHER EDUCATION

### The UNITWIN/Unesco Chairs Programme

The key objective of this programme launched in 1991 is to develop a spirit of solidarity based on twinning, networking and other linking arrangements among universities throughout the world. More specifically, it is designed to make full use of North-South and East-West co-operation in order to set in motion a process leading to strong and durable links between higher education and scientific institutions worldwide, especially along the South-South axis.

UNITWIN helps to establish sub-regional, regional and inter-regional networks of higher education and research institutions (there are 46 inter-university networks). The UNESCO Chairs (215 in over 80 countries) are intended to provide postgraduate students from the developing countries with enhanced opportunities for advanced training and research at centres of excellence in key disciplines related to sustainable development.

Partnerships have been established with other United Nations agencies, in particular with the United Nations University (UNU), inter-governmental organizations, development aid agencies, foundations, industry and non-governmental organizations in the higher education and scientific fields.

For further information, please contact: Director of the Division of Higher Education UNESCO, 7, Place de Fontenoy 75352 Paris 07 SP, France

## UNESCO/UNICEF

### Education for all: making it work

At the World Conference on Education for All (Jomtien, Thailand, 1990) 155 countries pledged to provide basic education for all children and adults.

The search for innovation and fresh ideas has led UNESCO and UNICEF to launch a joint project: "Education for All: Making it Work". The project identifies the latest innovations in school systems and practice in Africa, Asia, Latin America and the Arab states by a continuous on-the-ground search using networks and partners in education ministries, teachers' associations, the research community and local educational authorities.

The project provides wide access to these new ideas in education and shows how they work, through booklets, videos, databases, thematic portfolios and workshops.

#### For further information, please contact:

UNESCO  
Education for All: Making it Work  
Basic Education Division  
7, Place de Fontenoy  
75352 Paris 07 SP, France  
Tel. (33-1) 45 68 23 64 or 21 26  
Fax (33-1) 40 65 94 06

#### UNICEF

Education Cluster Programme Division  
3, United Nations Plaza  
New York, NY 10017, United States  
Tel. (1-212) 702-7284  
Fax (1-212) 702-7149



UNESCO/Gil Jacques, Montréal

## 1996: INTERNATIONAL YEAR FOR THE ERADICATION OF POVERTY

**F**or there to be peace, there must be knowledge and acknowledgment of others. Peace means lasting respect for differences; peace means never threatening that most important possession of all: life itself.

At the dawn of the third millennium, I call on each and every one of us to make a public announcement in the schools, in the worlds of sport and the arts, in the media and within government administrations: human life must no longer be threatened. The act of killing has no justification and above all no religious vindication—religions are founded on love and generosity—nor can there be any cultural, nationalistic or ideological justification. If we really wish to leave a peaceful world to our children, we must with the greatest firmness forbid all threats to human life.

### Dialogue and tolerance

This is the one essential condition whereby a culture of war—of force, constraint, oppression, inequality—can be transformed into a culture of peace. A culture of peace requires: dialogue, tolerance and awareness of the infinite diversity of humanity. The ethical values embodied in UNESCO's Constitution: justice, freedom, particularly freedom of speech, "the free flow of ideas by word and image"—equality, solidarity—"the intellectual and moral solidarity of mankind"—only through these

values can humanity enjoy peace, peace lived every day—which means happiness.

Dialogue and tolerance are not to be equated merely with docility and acceptance of the opinions of others. On the contrary, dialogue and tolerance mean choosing a new way of life, a new way of reaching agreement—with no bloodshed, no loss of life, no violence, none of war's perversity. Dialogue and tolerance mean pursuing with both determination and compassion the non-violent settlement of conflicts.

### Peace and development

There can be no lasting peace without sustainable development, without endogenous development, through the uprooting of frustration, poverty and exclusion. Only by conferring on each person the possibility of deciding for him or herself—and thus being in charge of his or her own destiny—can we hope to reduce population growth, reduce migration, improve the quality of life in rural settings, understand—and help those who govern to understand—that peace and the environment are the concerns of each and every one of us.

Sustainable development has one essential key word: sharing. We should share all resources—starting with knowledge. At both international and domestic levels, land, finance, knowledge and know-how are the preserve of

a very small minority. This inequality constitutes a threat to world stability and security. Such inequality is incompatible with the need for a lasting democracy—democracy being the third side to the interactive, interdependent triangle: peace, development, democracy.

### Education for democracy

Only education can ensure a true democracy, one where all citizens participate: "I participate, therefore I exist"! I am "counted" in surveys, polls and elections. But I must also "count". If I am not taken into account, democracy is only a name, a façade, an autocracy or a disguised plutocracy. Lasting democracy is the only political system where human rights are respected. To this end, decisive steps must be taken to strengthen the legal and judicial system and provide the rule of law with the rigour and speed it needs. Human resources must be increased for the fight against violence and for making public freedom a synonym for security. The United Nations system and particularly its peace-building and conflict-prevention capacities must be strengthened in order to confront transnational problems—whether economic, political or cultural (drug and arms trafficking, money laundering, terrorism, etc.).

### 'Disarming' history

Peace, development and democracy can be achieved through education, but only if education is for everyone, by everyone and with everyone. This is neither a question of donations nor of selling a prototype; education is an everyday, personal achievement. Through education, society as a whole—civil, military and religious—can be taught to eradicate violence, to prevent potential conflict and to build peace.

Teachers cannot instil in schools the oppo-

site of a child's experience in the outside world. Principles and values, the links between all differences and all cultures, can only be learned through example. How can peaceful behaviour be learned if schoolbooks tell only of war and violence? How can we move from the concept of might being right to that of right being might without "disarming" history and showing the tremendous contributions of philosophers, scientists, inventors and artists?

The United Nations—and therefore all nations—has designated 1996 the Year for the Eradication of Poverty. We are primarily thinking, of course, of the least-developed countries. But we must not forget the poor, the far too numerous excluded people in the most-developed countries. The misery of the shantytowns, the street children, the exploitation of young people—all are reasons for our collective shame. But those of us who are well off and think of marginalization as being beyond society and therefore beyond our concern, should open our eyes and take notice. The whole of society, including the armed forces—who will become peace-builders—must work together for our common future. Whether we are aware of it or not, the world is one world. Parliamentarians, elected representatives of the people, must ensure that budget priorities fit in with the terms of a moral world contract. Such a contract must be long-term and take account of future generations with the vision that "we, the peoples" must have in order for our children to be spared "the scourge of war".

I invite all states, parliaments, mayors, local governments, teachers, journalists, intellectuals, sports associations and youth groups to work together so that 1996 may give fresh impetus to the historic transition from a culture of war to a culture of peace. ■

# TALAMANCA- LA AMISTAD



J. And. J. Bassi © Incafo, Madrid

Bestriding Costa Rica and Panama, the Talamanca-La Amistad Cordillera is a patchwork of natural parks and reserves covering more than 800,000 hectares. It was registered on UNESCO's World Heritage List in 1990

According to an ancient legend of the Bribri and Cabecar Indians, the huge platform formed by the Cordillera de Talamanca, whose peaks between Costa Rica and Panama rise to an altitude of almost 4,000 metres above sea level, was the site where the god Sibú decided to set up house and sow the maize seeds that would give birth to humankind.

According to this legend, the creation took place at the source of the Lari River in Surayum, where Sibú organized great festivities, handing out lavish quantities of cacao to each person who had helped him. When they were over, he brought forward young Iriria, the Earth, so that she could cover the rock with her fertile bridal train, and the world began to turn green. Then Sibú fell asleep after asking the *cuyeo* bird to sing for him that night.

Science, on the other hand, tells us that this imposing mountain range rose up some 30 million years ago. The enormous pressure exerted by tectonic and volcanic movements caused uplifts during the Pliocene epoch which eventually filled in the oceanic basin then separating North America from South America, and which took on their present shape about 7 million years ago.

So it was that a narrow strip of land (its width between the Pacific and Atlantic Oceans is barely more than 150 km) came into existence and formed a veritable bridge between two biologically different continents. The abundance and variety of its endemic species can be put down to this genetic convergence of flora and fauna from two distinct regions.

Others factors include the region's geographical position and its topographical and climatic diversity. The proximity

#### FRILÁN ESCOBAR GONZÁLEZ

is a Cuban journalist who has twice won the National Critics' Award of Cuba, for his books *Martí a flor de labios* ("Martí, On the Tip of the Tongue", 1993) and *La vieja que vuela* ("The Old Woman with Wings", 1994).



# a natural bond between two countries

by Froilán Escobar González

of the Atlantic and the Pacific tempers the fierce tropical heat. But variations in altitude—from sea level to the 3,820-metre-high Mount Chirripo, the cordillera's highest point—mean that the climate displays wide temperature differences (from a maximum of 25° C to a minimum of -9° C).

## A FOREST IN THE CLOUDS

Because of these climatic features and the richness of its soil, the region offers a wide palette of different landscapes and biotopes.

The very humid forest found at tropical level has a varied, complex and heterogeneous flora, which includes tall bushy trees covered with epiphytic plants such as liana, which can grow as thick as a human torso. Its fauna is equally varied, and comprises snakes, deer, felines, vampire and other bats, capuchin and howler monkeys, tree frogs, sloths and anteaters. There is also a huge variety of birds and butterflies

whose colours enliven an impenetrable environment more luxuriant even than the jungles imagined by Wifredo Lam or Douanier Rousseau.

## A LILLIPUTIAN LANDSCAPE

Above 3,000 metres, the forest gives way to a damp and inhospitable zone known as the *páramo*. The reddish, dwarfish vegetation, no more than two metres in height, found on this shrubby steppe consists mainly of bamboo, grasses, ferns and myrtle whose branches have twisted under the effect of wind, frost, drizzle and the abrupt temperature changes characteristic of this subalpine biotope, which is not found elsewhere in the region.

This is the point where the range of many plant species of Andean origin comes to an end. The fauna includes two species of bird, lizards, one species of salamander, insects and spiders which adapt their activity to temperature variations during the day and fall

into a state of lethargy at night to slow down their metabolism. Certain species of rodent as well as rabbit are also found in this area. They are hunted by forest felines such as the jaguar (*Panthera onca*), the ocelot (*Felis pardalis*), the tiger cat (*Felis tigrina*) and the jaguarundi (*Felis eyra*).

## VALLEYS OF DESOLATE BEAUTY

The Talamanca-La Amistad reserve is the only site in Central America where the Quaternary glaciations left an indelible mark. The visitor venturing up to the summits of the mountain range can observe almost intact glacial formations—deep U-shaped valleys, moraines, lakes, cirques—which testify to the existence of great glaciers during the Pleistocene epoch some 25,000 years ago.

The many valleys fashioned by the glaciers have a desolate beauty. They include the Savannah of the Lions, named after the mountain lions (*Felis concolor*) that live there; the Valley of the Rabbits, a vast expanse of sand surrounded by rocky peaks and inhabited by rabbits; the mysterious Valley of the Ridges, where the soil's high iron content causes magnetic disturbances which disorientate compass needles; and the Valley of the Moraines and the Valley of the Lakes, which are dotted with some 30 crystalline lakes. It is here that you may catch a glimpse of Baird's tapir (*Tapirus bairdii*) as it swims in one of these often ice-covered lakes, or as it races along—it is a powerful 200-kg animal two metres long—in an attempt to escape its main enemy, the jaguar, one of six big cats found in Talamanca, but now almost extinct.

## A BIRD WORSHIPPED BY THE AZTECS

The sighting of a quetzal, a bird of legendary beauty, as it takes off, leaving a golden-green streak in the air, is a particularly rare privilege, since the virgin forest above 1,200 metres where it lives is steadily being destroyed.

The bird gets its name from the Aztecs, who called it *quetzaltototl* and worshipped it. They used its feathers to decorate the god Quetzalcoatl, who was represented as a feathered serpent.

Opposite page, glacier-sculpted countryside in Chirripó National Park.

A waterfall in the Hitoy-Cerere biological reserve, a nature reserve in the Talamanca-La Amistad Cordillera.



J. M. Barrs © Incafo, Madrid



1

Stéphane Bonneau © Bios, Paris



2

Seitre © Bios, Paris



3

Seitre © Bios, Paris



4

Jean-Philippe Vain © Jacana, Paris



6

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8

T. McHughy/PHR © Jacana, Paris

Two subspecies of the bird are found in the area between Mexico and Panama, but only one (*Pharomachrus mocinno costarricensis*) inhabits this steep cordillera. The female lays two eggs in a nest in the hole of a tree, and takes it in turns with the male to brood. When quetzals breed, which is twice a year, the male damages its magnificent plumage by flying in and out of the nest, and after the young birds have left the nest it moults and grows its feathers again.

1. A small, brightly coloured tree frog belonging to the dendrobate genus. Its skin secretes a virulent poison.
2. A quetzal, a bird with brilliant plumage and (in the male) long tail feathers.
3. The giant anteater is nearly two metres long.
4. Baird's tapir, a species indigenous to Central America.
5. The ocelot, an animal long hunted for its fur.
6. A typical plant of the *páramo*, high-altitude grasslands.
7. The vampire bat attacks domestic animals at night and sucks their blood.
8. The double-crested harpy eagle preys largely on monkeys and sloths.
9. A puma, cougar or mountain lion, the largest of the cats found in the Americas.



5

Jean-Philippe Vain © Jacana, Paris



7

Jany Sauvanet © Bios, Paris



9

T. Davis/PHR © Jacana, Paris

Another interesting sight is the flight of hummingbirds, tiny creatures capable of flying in any direction (including backwards) or remaining in stationary flight as they gather nectar from flowers. Their wings beat sixty times a second and their heart up to 1,440 times a minute. One of the most picturesque of these birds is the fire-breasted hummingbird (*Panterpe insignis*), which is endemic to the high areas in this region. It is 11 cm long and weighs 5.7 g.

A very different sight is the majestic flight of the harpy eagle (*Harpia harpyja*), which is in danger of becoming extinct because of the excessive use of pesticides and uncontrolled deforestation.

But these are only a few of the 600 bird species that have been identified in the Talamanca cordillera (as many as all those found in North America).

### SIBÚ'S CHILDREN

In addition to its natural wonders, the region contains a great many archaeological remains. Over 200 sites have been discovered (tombs, stone columns, petroglyphs) which cover more than 12,000 years of history, from the preceramic period to the tribal societies encountered by Europeans in the sixteenth century. Study of them will reveal more information about the pre-Columbian cultures of the region and the links between Meso-American and South American cultures.

The indigenous peoples of Panama, the Guaymí and Teribe, like those of Costa Rica, the Bribri and Cabecar, are descended from tribes which peopled the valleys of Central America's mountain ranges at the time of the Spanish conquest. Despite being in contact with "civilization" for almost five centuries, they have managed to preserve their language, beliefs and lifestyle. They have a thorough and detailed knowledge of natural resources and have succeeded in exploiting them through farming (maize, haricot beans, bananas, rice), an activity which they pursue in conjunction with hunting and fishing without endangering the region's ecological balance.

These indigenous communities, which number about 10,000 people, currently live in reserves. They not only suffer from high mortality, malnutrition and illiteracy, they are also threatened by the considerable pressure put on the ecosystem by the activities of farmers and ranchers, who are moving closer and closer to their territories. ■



1 Contrast © Gamma, Paris



2 F. Mayer © Magnum, Paris



3 Springer Liaison © Gamma, Paris



4 F. Mayer © Magnum, Paris

# C H E R N O B Y L T O D A Y

by France Bequette

1. Chernobyl in 1990.

2. Abandoned houses in a village some twenty kilometres from Chernobyl.

3. Dolls left behind in the hasty evacuation of Chernobyl.

4. The no. 4 reactor, which exploded in 1986, is now encased in a protective concrete sarcophagus.

In the aftermath of the explosion of reactor no. 4 at the Chernobyl (Ukraine) nuclear power plant on 26 April 1986, more than 4 million people living in Belarus, Ukraine and Russia were exposed to radiation. "The Chernobyl disaster is now recognized as having been the greatest technological catastrophe in human history," writes Belarusian geneticist V. K. Savchenko in his recently published study *The Ecology of the Chernobyl Catastrophe* (see bibliography at end of article).

More than 1.7 million persons are estimated to have been exposed to higher than normal levels of radiation; 850,000 of them still live in the contaminated areas, and 280,000 should be relocated but have nowhere to go. For ten days on end burning graphite in the reactor spewed radioactive gas and aerosol

particles into the atmosphere. Nearly 50 million curies<sup>1</sup> in all, or 77 kilograms of various radioactive substances (the most lethal being iodine-131, caesium-134 and -137, strontium-90 and plutonium-239), were cast over extensive distances (from 300 to 400 kilometres), while lighter air-borne particles drifted to countries as far away as the United States, India and Kuwait.

## 'HALF-LIFE' WORSE THAN 'NO-LIFE'

The full impact of the ecological disaster can be measured by studying the half-life<sup>2</sup> of iodine-131 (8 days), caesium-134 (8 days), strontium-90 (28 days), caesium-137 (30 days) and plutonium-239 (24,100 years!). The half-life of a substance has to be multiplied by an average of 10 or 15 to under-

stand how long it will take for radioactive substances to disappear entirely from the environment.

Despite its short half-life, iodine-131 is the most harmful element for the moment. The human organism needs iodine, but unfortunately it does not distinguish between the stable element and the radioactive one. Merely inhaled or lodged in the food chain, it settles in the thyroid gland where it can cause cancer. Children and babies are especially vulnerable.

Because of their high solubility, caesium-137 and strontium-90 are the principal culprits in contaminating soil and plants, which they enter via the root-system. Concentrated in the food chain, they settle in the muscles (caesium-137) and on bone surfaces (strontium-90). Strontium-90 replaces calcium in the bone marrow, thereby opening

FRANCE BEQUETTE is a Franco-American journalist specializing in environmental questions.



Measuring radiation levels 100 metres from the reactor (1991).

V. Iliava © Magnum, Paris



Detecting radiation in a Chernobyl house (1991).

V. Iliava © Magnum, Paris

the door to blood diseases such as anaemia and leukemia.

Plutonium is, however, the most dangerous element by far (the intake of a single microgram is lethal to human beings). The heaviest of the elements released by Chernobyl, it is not easily absorbed by plants and is radioactive only over a short distance. Its fallout was minimal and affected the immediate vicinity of the power station, an area thereby condemned to several tens of thousands of years of dangerous sterility.

#### SURVIVING IN THE CONTAMINATED AREAS

The disaster's ecological effects—apart from the harm done to human life—are still largely unknown. Grassy plains and fields and flat, bare ground are the kinds of terrain that are most seriously contaminated. Some 144,000 hectares of agricultural land and 492,000 hectares of forest have been withdrawn from normal use over a long period. Radionuclides concentrated in the sediment at the bottom of standing water (lakes, swamps, reservoirs and the like), are absorbed by animal and plant life. In the forest radioactivity concentrates in tree bark, moss, lichen and mushrooms and in leaves and pine needles, which contaminate the soil when they fall to the ground. In some areas it is forbidden to gather firewood. When burned, the wood contaminates ovens, and its ash used as fertilizer contaminates soil and crops.

A lot of pastureland is unusable. Forage from the wet plains, which is extremely contaminated, can only be used as a last resort. Dairy products must not be consumed before

being specially processed. Around Chernobyl milk is used as an indicator of the contamination level; when milk is acceptable for consumption, other products from the same farm can also be consumed.

In response to the thousand and one questions asked by the stricken populations, Belarus has produced a 55-page booklet entitled *Radiation: How to Survive in the Radiation Contaminated Areas*. Potatoes and grain crops are the food crops least prone to contamination. Among fruit and berries red and black currants are more liable to contamination than apples and pears. The booklet strongly urges people who grow their own produce to use mineral (phosphorus and potassium) and organic (manure, guano and humus) fertilizers in their gardens and orchards because these seem to prevent the plants from absorbing radionuclides.

The booklet gives a lot of down-to-earth advice on the best methods for washing, cooking and preserving food. Salting and marinating meat, for example, is one of the best ways to rid it of caesium-137, which stays in the brine. Generally speaking, poultry and cattle may be consumed if they have been penned in and fed only uncontaminated (imported) food for a month or a month and a half before being slaughtered. Meat and animal by-products must undergo a radiological test. A network of labs and monitoring centres has been developed for this purpose.

It is strongly recommended to keep houses dust-free, to leave working clothes outdoors, to wash often with soap, not to wash clothes in rainwater, to wear face-masks for

certain activities, to drink plenty of diuretic and laxative infusions and eat food rich in protein, vitamins and mineral salts in order to strengthen the body's defences. It takes several months for the human body to eliminate caesium.

#### MENTAL HARDSHIP

Obedying this advice is unfortunately not possible for the 400,000 displaced persons who are now penniless and jobless in a region they do not know. They are tortured by the fear that they are harbouring some terrible disease caused by radiation. Is their pessimism justified? Are they right to fear the worst?

#### **UNESCO'S CHERNOBYL PROGRAMME**

UNESCO has an ongoing programme to aid the countries affected by the Chernobyl disaster by means of operations to remedy its consequences and to promote economic and social development in the areas concerned.

Twenty-nine UNESCO Member States are taking part in the programme, which has some 150 full-time employees working in Russia, Belarus and Ukraine. The programme's financial resources currently amount to more than \$9 million.

In consultation with Russia, Belarus and Ukraine, UNESCO has proposed more than 70 projects in its fields of competence (education, science, culture, communication and social science), some thirty of which are underway or have already been completed.

Nine community development centres for social and psychological rehabilitation have been set up in the worst-hit communities. Since they were opened in 1993, they have received nearly 160,000 visitors, the vast majority of whom have been children (90,000) and young adults (almost 40,000).

Teaching materials on the themes of energy, the environment and development incorporate lessons learned from the Chernobyl disaster and highlight alternative energy sources.

FOR FURTHER INFORMATION, PLEASE CONTACT:

The UNESCO-Chernobyl Programme  
UNESCO, 7, Place de Fontenoy  
75352 Paris 07 SP, France  
Tel: (33) 45 68 12 31  
Fax: (33) 40 56 90 69

To help Chernobyl victims cope with psychological and social disorders triggered by the disaster, since 1991 UNESCO has opened nine community centres for children and adults in the resettlement areas near the stricken region. A World Health Organization (WHO) Conference on the health consequences of Chernobyl, held in November 1995, noted that the increase in psychological problems has been accompanied by a marked rise in thyroid cancer in children under-fifteen in Belarus, (a thirty-fold rise since 1986), and in Ukraine, where the numbers of such cases have increased at least ten-fold.

Scientists believe that the rates of leukemia and other blood ailments, as well as breast cancer, bladder cancer and kidney diseases could also increase over the next few years. Studies carried out in Japan ten years after the atomic bombing of Hiroshima and Nagasaki showed a sharp rise in the incidence of these diseases. Although preliminary reports on the state of health of the workers (some 600,000 "liquidators") brought to Chernobyl in the first weeks after the accident show no increase in death-rates, they do reveal a big jump in the incidence of common ailments, a high rate of neuropsychological disorders and premature aging.

#### GLACIERS: NATURE'S ARCHIVES OF NUCLEAR ACTIVITY

The psycho-social effects experienced by the affected populations were singled out for priority at the WHO conference. "In particular," noted Dr. Hiroshi Nakajima, Director-General of WHO, "these have included anxiety over the possible ill effects of radiation on their health in the long term. Originally, much fear and mistrust had occurred because of the lack of information immediately after the accident, which caused many psychosomatic disorders". Headaches, chest pains, intestinal disorders, sleep disturbance, loss of concentration, and alcohol abuse are commonplace. Similar psycho-social effects can be observed in the wake of

earthquakes, fires, floods and other natural and man-made disasters.

According to psychologist Lubow Horich, co-ordinator of the nine rehabilitation centres, "People . . . continue to be suspicious of most information available". Fact-gathering in the nuclear field is hard; tempers flare quickly; fact and fiction intertwine. Some people believe, for example, that radioactive contamination is contagious; others believe that red wine and vodka neutralize radiation!

Chernobyl is the eighth nuclear accident of which glaciologists have found undeniable traces in glaciers. Glaciers have also recorded all the atmospheric nuclear tests carried out by the major powers between 1954 and 1963. Snow and ice imprison all radioactive elements carried by air currents. Moreover, it is impossible to confuse natural and artificial radionuclides. Radioactive fallout acts as a reference level for glaciologists, enabling the different layers of snow to be accurately dated. This means that it is futile to try to hide or minimize the facts: nuclear safety goes far beyond mere national boundaries.

1. Curie (Ci): a classical unit of radioactivity equal to 37 billion becquerels; 1 becquerel (Bq) is a unit of radioactivity equal to the disintegration of one radionuclide per second.
2. Half-life: the time required for a decrease by half in the activity of a radioactive body.

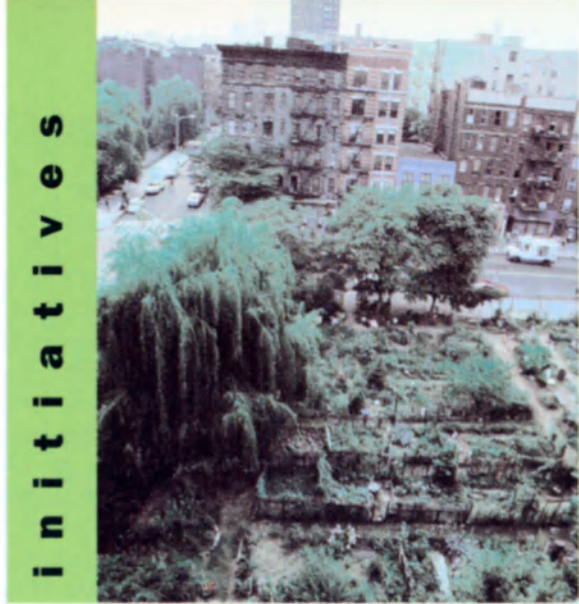
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I. V. Rolevitch and A. I. Stavrov,  
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*Chernobyl: 9 ans après*, a press kit prepared by France's Institute of Nuclear Protection and Security (IPSN), April 1995.



initiatives

Photo Liaison © Gamma, Paris

Gardens in New York City.

## Farms in the city

In virtually every city in the world, wedges of land are used for vegetable gardens. New York City, for example, has more than 1,000 community gardens, and Berlin some 80,000. In the developing world, urban farming is a source of income for about 100 million people, and a food source for nearly half a billion.

The most comprehensive global research on urban food production to date has been conducted by the United Nations Development Programme (UNDP) with assistance from The Urban Agriculture Network (TUAN), which is based in Washington D.C. TUAN has documented urban farming practices in more than 20 countries in Asia, Africa and Latin America and has discovered that between 25 and 75 per cent of urban families worldwide are engaged in food production at least part of the time. Farmers in 18 of China's largest cities meet 85 per cent of the urban demand for vegetables and more than half the demand for meat. In the United States farms in metropolitan areas account for more than a third of all crop and livestock sales. In Java, urban home gardens supply an estimated 18 per cent of the calories and 14 per cent of the protein consumed in the island's cities. Some 20 per cent of the food needs of Buenos Aires are met by urban gardens. It is generally estimated that these products are from 30 to 60 per cent richer in micro-nutrients than those found in supermarket stock.

Community gardens are also the ideal place for recycling sewage and solid waste. But air pollution is a problem: food grown along roadsides can be contaminated by lead from exhaust emissions. When the air is polluted, it is better to grow tomatoes and fruit rather than lettuce. It would appear, nonetheless, that lettuce concentrates less lead if it grows in soil with a high content of rubbish-based compost.

In the poor neighbourhood of Jerusalén, in the southern suburb of Bogota, a local non-governmental organization (Las Gaviotas) uses hydroponic techniques, i.e. growing is done either in a 15-centimetre-deep mixture of rice husks and coal chips or entirely in water. With support from the United Nations Development Programme (UNDP) over 100 people learned to grow high-quality vegetables on rooftops and in other unused spaces. The crops provide families with additional income and fresh vegetables. Even the local school has its own rooftop vegetable patch, where students and neighbourhood inhabitants take courses in hydroponic agriculture. ■

- *Urban Agriculture: Food, Jobs and Sustainable Cities*, UNDP, 1995
- The Urban Agriculture Network, c/o UNDP, 1 United Nations Plaza, New York, NY, 10017 USA.



Photo © Annie Walter

### VANUATU, THE LAND OF FRUIT TREES

There are some 40 species of fruit and nut trees in Melanesia's Vanuatu Islands. Some are endemic, while others were introduced by the first migrants more than 2,000 years ago. It is now hard to distinguish endemic from imported species. Yet a very rare variety of the sapotaceae (*Burckella*) family, mentioned for the first time in 1892, has never been seen elsewhere. The copious amounts of fruit and nuts harvested from the wild and cultivated trees are an important and much-appreciated addition to the local diet. According to France's Institute of Scientific Research for Development through Co-operation (ORSTOM), arboriculture may have been invented in Melanesia, an important region for the diversification of fruit-tree species.

### LAND DEGRADATION

Degradation of the world's agricultural land is increasing, reports the Food and Agriculture Organization of the United Nations (FAO). Some 305 million hectares have already been destroyed by human activity, and in the next 20 years another 140 million hectares (an area equivalent to almost half the surface of Western Europe) will lose much of their value as farmland. Degradation is most widespread in Africa, Asia and Latin America. The situation is particularly serious in Africa, where only a quarter of cropland was used in 1990, because farmers lack the means to replace lost soil-enrichening substances with fertilizers. Soil is a rare and non-renewable resource, and a mere 11 per cent of the earth's land surface can be used unrestrictedly for farming.

### NEW FROM UNESCO

In collaboration with the United Nations Development Programme (UNDP), UNESCO's International Environmental Education Programme has recently published three modules for students and

teachers: *Freshwater Resources, Biological Diversity and Global Change*. So far they are available in English only. For further information, please contact: Unit for Environmental Education, EPD UNESCO, 7, Place de Fontenoy, 75352 Paris 07 SP, France. Fax: (33-1) 44 49 01 12.

### COLOURFUL RICE

The colours of plants, a phenomenon linked to their genetic diversity, is determined by the wave-length of the sun's rays that they absorb during photosynthesis. In the last ten years a Chinese agronomist from Zhejiang, Li Minzheng, has developed some 120 varieties of coloured rice, ranging from black and green to red, yellow and purple. Flowers are a striking example of the coloration process, but it also applies to plants such as cotton, of which, oddly enough, only the white variety is cultivated. The production of coloured cotton would reduce dependence on chemical pigments, a major source of water pollution.

### ANCIENT CAVE-DWELLERS

American and Romanian researchers have discovered 33 hitherto unknown animal species in the pitch darkness that has reigned for 5.5 million years at the bottom of the Movile cave on the shores of the Black Sea. The finds include spiders, a centipede, terrestrial isopods, a leech and an unusual little insect called a water scorpion. Biologist Thomas Kane surmises that these creatures lived in a tropical climate and that they fled to the cave during a big climatic upheaval. Deprived of sun, thus of photosynthesis, like the animals living at the bottom of the sea, these small sightless organisms derive their energy from the oxidation of hydrogen sulphide dissolved in the water. According to the team's microbiologist, Brian Kinkle, no other cave in the world contains so many interdependent species. Moreover the similarity of conditions enables researchers to carry out experiments that would be impossible or too costly in the ocean depths.

### FOR THE LOVE OF PEAT

Peat bogs are the result of a long process that began with the retreat of the glaciers some 12,000 years ago. They form in temperate humid climates by an accumulation and partial decomposition of vegetable remains under conditions of poor drainage. Immersion excludes air and prevents complete decay. The peat layer may be several metres thick in places. When drained, shallow peat bogs can become very fertile soil, and thick layers of peat provide fuel. But to destroy peat bogs is to plunder a heritage that has taken thousands of years to form and is valuable because it sustains unique



Pat Wild © Japana, Paris

plant- and animal-life and is our main source of information on the flora and climatic conditions of the Quaternary era. Bogs in Denmark and Germany have even delivered up 700 excellently preserved bodies of our Bronze- and Iron-Age ancestors.

### LONG LIVE THE COELACANTH

When requested by the Fondation Nicolas Hulot in France and Germany's Max Planck Institute, biologists Hans Fricke and Raphael Plante travelled in November 1995 to the Comoro Islands in the Indian Ocean to assess the status of the last surviving coelacanths (*Latimeria chalumnae*). A living fossil that was thought to have disappeared at the end of the Cretaceous period, this deep-sea fish was discovered alive and well in 1938. Today only some 150 are left. A number of international organizations have joined forces to try to prevent the extinction of this fish that cannot be kept in captivity.

### KEEPING TABS ON TUNA

Researchers at France's Institute of Scientific Research for Development through Co-operation (ORSTOM) are following the movements of tuna fish via tiny emitters fitted with temperature and depth sensors attached to the fishes' backs. They have discovered that the tuna, a migratory fish, has a strong sense of direction, but do not yet know how the fish can find its way so accurately in an environment which seems to be so lacking in "landmarks". When computerized, data on the tuna's movements could not only lead fishermen to fish-abundant waters but also regulate access to them so as to prevent over-fishing. Another bad-news/good-news story for fish.



P. Cayré © ORSTOM, Paris

# G L O B A L V I E W

## 186 COUNTRIES RATIFY CHILDREN'S RIGHTS CONVENTION

The International Convention on the Rights of the Child, which was unanimously adopted by the United Nations General Assembly in 1989, has been ratified by 187 countries, an unprecedented figure in the history of human-rights-related treaties. Only five UN Member States have not yet ratified it.

The Convention is the first international treaty to combine civil and political rights with economic, social and cultural rights. Signatory countries agree to halt child slavery, protect children from sexual abuse and give them the possibility of speaking out and being heard. The Convention contains 54 articles covering rights to education, nutrition, primary health care and leisure time. Many countries have changed their domestic law to bring it into line with this international legal document.



## CHILDREN AND AIDS

Fifteen million human beings are now HIV-positive. One and a half million of them are children. For babies the risk of Aids is linked to the presence of the HIV virus in the mother. An adult can remain HIV-positive for more than ten years, but the length of time before the disease reaches its final stage is considerably less in a small organism that has not had time to develop its system of defence.

Third World children are the worst affected: 80 per cent of infected children die before the age of five, but half of them do not reach age 2. The figures

are much less dramatic in the industrialized countries, where HIV-positive pregnant women receive follow-up medical care.

The prospects for developing a vaccine are still remote. For the moment the struggle against Aids depends largely on educating for responsible sexual behaviour. Most countries that have taken action via sex education through school programmes and the media (pop music, theatre, radio and television), have made some headway. Where active promotion of condom use has been accompanied by an effective campaign against sexually transmitted diseases, the incidence of HIV has dropped by about 50 per cent.



## PEACE PACKS PARADE

Half of the world's 23 million refugees are children. To help them, the World Association of Girl Guides and Girl Scouts (WAGGGS) has launched a "Create Peace Worldwide" initiative which has attracted enthusiastic support from girls in many countries. Kuwaiti girls made a thousand "peace packs" for the children of prisoners of war and other Kuwaitis missing since the Gulf War and 5,000 more for Sahraoui refugee children in Algeria, to whom Girl Guides in Bahrain also sent packs. Tajikistan received more than a thousand packs from the Icelandic Association, and refugees in Kenya received the same number from the Mauritius Girl Guides Association. Australia has already finished its Peace Pack Project and with the help of the United Nations High Commissioner for Refugees (UNHCR) has sent 13,392 packages to Africa. The

Peace Pack Project is still underway in the United States and picking up momentum.

For further information, please contact: World Association of Girl Guides and Girl Scouts, World Bureau, Olave Centre, 12c Lyndhurst Road, London NW3 5PQ, United Kingdom. Tel. (44-171) 791-1181; Fax (44-171) 431-3764.



## A PRIZE FOR PROMOTING CHILDREN'S LITERATURE

As well as awarding the "Nobel Prize" for authors and illustrators of young people's books—the biennial Hans Christian Andersen Award—the International Board on Books for Young People (IBBY) presents the annual IBBY-Asahi reading promotion award to an institution or group that has made a lasting contribution to the development of a book-promotion programme for children and young adults. The 1996 prize has gone to *The Little Library* from Johannesburg (South Africa) for its multicultural publications.

Founded in Zurich (Switzerland) in 1953, IBBY promotes international understanding through children's books. It will hold its 25th Congress in Groningen (Netherlands) from 12 to 16 August 1996. The main theme of the Congress will be "Telling the Tale", and discussions will centre on the ways in which a story is told: orally, through images and the written word, including the latest computerized techniques.

For further information, please contact: IBBY, Nonnenweg 12, Postfach, CH-4003 Basel, Switzerland. Tel. (41-61) 272 29 17; Fax (41-61) 272 27 57.

For the Groningen Congress: Rindert Kromhout, Bloemstraat 90 huis, 1016 LC Amsterdam, Netherlands. Tel./Fax (31-20) 620 54 83.



## S.O.S. CHILDREN

A mere \$13 dollars is all it takes to protect a child from the six most deadly diseases (diphtheria, measles, whooping cough, poliomyelitis, tetanus and tuberculosis). It costs \$150 to equip a well that provides a family with drinking water. To provide a primary school with a year's supplies costs \$957. Amazingly small sums can help to solve most of the health, nutrition and educational problems faced by the world's children.

Measles alone kills a million children each year. In the developing countries one child out of three goes hungry. Almost 10 per cent of the world's children die before turning five. The toll of wars and conflicts adds to this grim litany: one and a half million children killed in the last decade, four million maimed and twelve million left homeless.

Yet the world has the technological and financial resources to palliate much of this suffering, if not eradicate it entirely. Many developing countries have succeeded in reducing the malnutrition rate to 10 per cent of the child population: 17 countries have taken nationwide steps to eliminate vitamin A deficiency, which leads to blindness; 20 countries iodize more than 75 per cent of their salt. Since the United Nations World Summit for Children held in New York in September 1990, 158 countries have officially committed themselves to attaining the goals set on that occasion for the year 2000.



Isabelle Leymarie talks to

# JOCELYNE BÉROARD

## KASSAV'

singer with the *zouk* group

### ■ How did you get into music?

**Jocelyne Béroard:** My parents loved music and had pretty eclectic tastes, like many people in the West Indies. My brothers and I listened to everything: opera, jazz, bossa nova, Myriam Makeba, Edith Piaf. . . . My mother played tangos and beguines on the piano. We listened to her religiously. But I particularly liked the songs with words. I studied classical piano for seven years, but I was lazy; I would have liked to know how to play without having to work at it. My brothers studied the piano too, then one of them started in on the drums and another on the guitar. One of them composed and played beguines and jazz on the piano, and once in a while I would sing with him for the fun of it.

### ■ How did you get started?

**J. B.:** The first time I sang in public was quite spontaneous, at the year-end festivities at my high school. I sang a song I liked the tune of; in creole it was called *Maman, la grèv baré moin* ("Mom, the strike blocked my way"). It was a kind of protest song. Strikes weren't very popular at the time in Martinique. I didn't realize it then, but my mother and teachers were very upset. Later I settled in Paris, and one of my brothers introduced me to the music scene. I worked with several groups before joining Kassav'.

### ■ What kind of music did people listen to in the Antilles—the French-speaking West Indies—when you were a teenager?

**J. B.:** *Mini-jazz* or the *compas*, styles that came from Haiti and were imitated by all the local groups; *tumbele* too, a

Zaire beat imported by the African band Rico Jazz. Other groups played calypso. There was even a group that did Otis Redding slows, imitating his voice with an awful American accent! And of course older rhythms like the tango, the mazurka or the creole waltz. But this kind of music is no longer played at young people's *zouks* (dances) nowadays.

### ■ Where does the *zouk* come from?

**J. B.:** In the Antilles you first had the traditional styles of African origin, born at the time of slavery—the *belair* and other drum rhythms, as well as music played by slaves to imitate their masters, like the quadrille. . . .

### ■ What about city music like the Saint-Pierre beguine?

**J. B.:** Far be it from me to put down the beguine—I love it—but that's not all you hear nowadays. While other Caribbean and Latin American countries were honing their own styles, music in the Antilles stagnated, simply copying salsa, calypso, jazz, the Dominican beat and other foreign rhythms. Then Pierre-Edouard Décimus, Georges Décimus and Jacob Desvarieux, the core of the Kassav' group, started thinking about the weaknesses of Antillean music. The inspiration was there, but the recordings were poorly produced, poorly balanced and technically defective. What's more, most of the musicians were self-taught, and talented though they were, they needed time to acquire certain skills. The Antilles still suffer from a lack of top-flight music schools and conservatories. So Pierre-Edouard decided to form a really professional group with a typically Antillean style that corre-

sponded to our temperament, and to concentrate particularly on making recordings and performing on stage.

### ■ With its innovative arrangements based on traditional rhythms, *zouk* has managed to unify Guadeloupe and Martinique, musically speaking. . . .

**J. B.:** Yes, maybe because Kassav' was created in Paris, where the Décimus brothers and Jacob Desvarieux, who all come from Guadeloupe, were living at the time. They wanted to play with the best Antillean session musicians and so they joined forces with musicians from Martinique. Kassav' came out of that encounter. Some Martiniquans ask me occasionally why I use words from Guadeloupian creole, but that's part of my personal contribution to the group.

### ■ Does the use of creole make it more difficult for this music to get an international hearing?

**J. B.:** No. A lot of people—including me—don't understand everything Michael Jackson sings. But that doesn't stop him from being a hit in non-English-speaking countries. Our music is strong enough in itself to reach audiences of different nationalities. You just have to know how to listen.

### ■ In which countries, apart from those of the Caribbean, is Kassav' most successful?

**J. B.:** In Africa. Throughout the French and Portuguese-speaking regions of Africa. Angolan music, for example, is close to the music of the Antilles, and at one time the music of the Cape Verde Islands was influenced by *zouk*. Some Cape Verde *mornas* are reminiscent of





A leading Caribbean music group, Kassav' invented zouk (from mazouk or mazurka, a creole word meaning a village dance), a musical genre that now has fans in many parts of the world. The group recently made a recording entitled *Difé*, featuring Stevie Wonder and Ray Barretto as guest artistes. Left, Jocelyne Béoard and the other members of the Kassav' group.

Photo © Columbia, Paris

slow beguines. But even in New York, where we played at the Africa Fest, or in Japan and Russia, the audience gets swept up in the joie de vivre of our music. In New York we had the Haitians jumping for joy.

■ **Are the different islands in the Caribbean receptive to one another?**

**J. B.:** If you listen closely, all their music is similar. All you have to do is slow down some rhythms and you recognize others. Jamaican *ragga* isn't very far from *zouk*; nor is bossa nova. I don't think it is possible to invent a new rhythm these days. It's become a matter of combining rhythms and making arrangements.

■ **Are the words very important for your fans?**

**J. B.:** Yes, because people who like a song, like to sing it. When we perform in the Antilles, the audience sings along with us. The same thing happens in Africa; the people don't speak creole, but they learn the words phonetically. That's why it's important not to write just any old thing.

■ **How does the group get its ideas?**

**J. B.:** Everyone brings along their own compositions. Sometimes they are greeted enthusiastically, sometimes they're criti-

cized pretty severely. We work as a group, though, even when we're doing arrangements. Everyone makes a contribution, and we talk it all through.

■ **Whereas calypso and other forms of Caribbean music have long reflected the rivalry between the sexes, your lyrics are more conciliatory. Do women in the Antilles today express their sensuality more freely than before?**

**J. B.:** Certainly. Even just a short time ago it was rare in traditional songs for women to present themselves as "matadors". All they did was cry over lost love. A woman who sang late at night at dances and hung out until all hours with musicians was looked down on. In the West Indies there are still men who don't think much of women. But if I tease men in my songs and try to make them understand certain problems, it's because I want to promote a better understanding between men and women. I always try to bring hope and not to dwell on the negative side of life, even in the greatest distress. Even in a small way, it's better to contribute to happiness and peace in the world, heartbreaking though it is to see how violence is spreading everywhere. Through music we can say what other people do not always dare to express—

but we have no right to fan the flames of hatred.

■ **Do you agree with certain Antillean musicians who say that *zouk* today is too commercial?**

**J. B.:** Antillean music is in an awkward position. Many "fake" groups—consisting of a single person playing and composing on a computer—have recently appeared on the scene, and the public has heard a lot of mediocre stuff. When we began, Kassav' disks flooded the market. The craze for our disks and *zouk* in general was incredible. When people saw that the formula was successful, everybody jumped on the bandwagon. Today the public is spoiled for choice, but Kassav' still leads the field for this kind of music. The flame dies down if we go a long time without recording, but it comes back to life as soon as we bring out a quality disc. A lot of instrumentalists and singers admit that they wait for a Kassav' recording to come out and bring them inspiration. ■

1. *Difé*, CD Columbia 480697 2.

ISABELLE LEYMARIE, a Franco-American musicologist, has recently published *Du tango au reggae, Musiques noires d'Amérique latine et des Caraïbes* ("From the Tango to Reggae: Black Music from Latin America and the Caribbean", Flammarion, Paris, 1996).

## The rarest, most precious vital force

by Marie Curie

This text by Marie Curie (1867-1934), who shared the Nobel Prize for Physics in 1903 and was sole winner of the 1911 Nobel Prize for Chemistry, is the preamble to a memorandum on international scholarships for the advancement of science which she presented in Geneva in 1926 as a member of the Committee on Intellectual Co-operation of the League of Nations.

I shall devote but few words to an affirmation of faith in the importance of science for mankind. If at times this importance has been questioned and if the words "the failure of science" have been pronounced in moments of bitter discouragement, it is because man's endeavours to achieve his highest aspirations are never perfect, like all that is human, and because these endeavours have too often been diverted from their path by forces of ego-centric nationalism and social regression.

Yet it is through the constant effort to expand science that man has risen to his present pre-eminent place on our planet and that he is also winning increasing power over nature and a larger measure of well-being. We should join with those who, like Rodin, pay homage to the devoted efforts of scholars and thinkers and with those who, like Pasteur, "believe indomitably that science and peace will triumph over ignorance and war".

If, to judge from the experience of the recent world conflict, the aspirations of the elites in different lands often appear less exalted than those of the great mass of less well educated persons, it is because of the perils inherent in all forms of intellectual and political power when these are not controlled and channeled toward the high ideals which alone justify their use. No enterprise can therefore have greater importance than those which seek to promote international ties between the dynamic thinkers in all countries and especially between the young in whose hands lies the future of mankind.

I am sure that no one will deny that even in the most democratic of countries existing social systems offer a considerable advantage to the wealthy and that the roads to higher education, open so freely to children of families with ample means, are still difficult of access to children of families with limited resources.

As a result every nation each year loses a large part of the rarest, most precious vital force. While waiting for reforms in education to resolve this problem once and for all, the democratic response in various countries has hitherto consisted of a partial remedy, the creation of national educational scholarships, thus enabling higher education to retrieve some of the young people of whom it would otherwise be deprived.

These national efforts, highly commendable though still far from adequate, are not our concern here, but I would like to point out that the same problem exists with regard to post-university studies for the young people who have managed to surmount all the obstacles encountered up to that point.

At this post-university stage of their lives, young students who contemplate careers in science are brought face to face with pressing demands. In most cases the family has done its utmost to help the young man or woman to come this far and, unable to make further sacrifices, it now asks them to become self supporting. And even in well-to-do families the wish to take up very advanced studies may encounter a lack of understanding, such studies being considered as an extravagance or a mere whim.

Yet what in fact are the best interests of society in this matter? Should it not give every encouragement to those called to a scientific vocation? Is it really so well-endowed that it can afford to reject the vocations it is offered?

I believe, on the basis of personal experience, that the sum total of the aptitudes called for by a true scientific vocation is an infinitely frail and precious thing, a rare treasure that it is both absurd and criminal to throw away, a gift to which great care must be devoted so that it may grow and fructify.

What, in reality, are some of the qualities required of the person who aspires to success in the field of independent scientific research? The intellectual qualities are an intelligence capable of learning and understanding; a sure judgment capable of appraising the significance of theoretical and experimental demonstrations, an imagination capable of creative effort. Equally important are the moral faculties: perseverance, zeal and above all the unselfish dedication that guides the novice along a path which, in most cases, will never lead him to material rewards comparable to those offered by careers in industry or business.

Thus to foster and safeguard the scientific vocation is a sacred duty for each society which has the interests of its future at heart. It is gratifying to see that public opinion is becoming increasingly conscious of this duty. ■

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UNESCO Publishing, 266 pages, Paris, 1996, 150 French Francs

This report is the result of a three-year process of consultation and analysis carried out by a distinguished panel of specialists chaired by Jacques Delors, former President of the European Commission.

It is a thought-provoking book that proposes ideas that go far beyond mere educational reform. It examines the place and functions of education in relation to individual achievement and social development in a changing world.

The report closes with a strong plea for more resources to be devoted to education, both nationally and internationally, and for strengthening international co-operation in education, with UNESCO as a key player.

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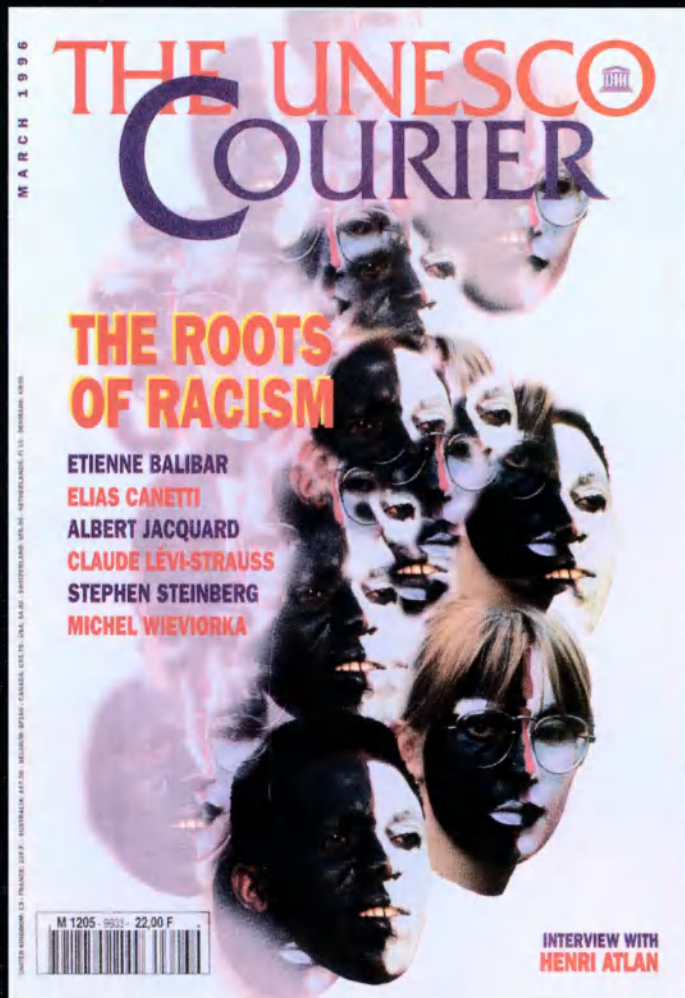
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