

Bio News



No. 32 - OCTOBER 2002 A newspaper for the preservation of the bio-environment, a shift from an anthropocentric to a biocentric vision www.biopolitics.gr

Creating a society of joy and hope - the B.I.O. vision

Eradicating poverty, protecting bios, enforcing partnerships, supporting education, improving health and quality of life, building a civic society

To strengthen our response to environmental challenges, a unifying vision is essential. The Johannesburg Summit proved the ostensible absence of this vision and the problems that such an absence causes. To be effective in responding to environmental challenges, governments, the public sector, civil society, business, and the academic world need to unite their efforts in a global appreciation of bios. As environmental solutions are long-term goals, it is important to build public awareness with staying power. The goal is not only to change attitudes, but to also to motivate and empower people everywhere to act in defence of the environment.

Bio-education for all

Education has no higher purpose than helping us to lead fulfilling and responsible lives. In today's rapidly changing world of increasing global interdependence, it is essential for education to provide the knowledge and tools necessary for the development of conscientious environmental citizens who can be trusted to take actions to ensure a quality life for us all. Our very future depends upon our respect for bios and the choices we will make to protect this precious gift.

To promote this vision, B.I.O. launched the International University for the Bio-Environment (I.U.B.E.) in 1990. Rather than focusing on the award of degrees, the I.U.B.E. chose to free education from intra-disciplinary entrenchment by placing environmental thinking at the core of all specialties. In this endeavour satellite education that can reach every citizen on the planet is of crucial importance. We cannot allow education to remain the privilege of the few. By the time most educational programmes are implemented, they have become obsolete. Satellite education provides the opportunity for the whole world to share in the progress of knowledge, and international efforts should focus on making this education accessible everywhere.

International Court of the Environment

To improve our response to worldwide environmental harms, we must have institutional support and co-ordination to implement

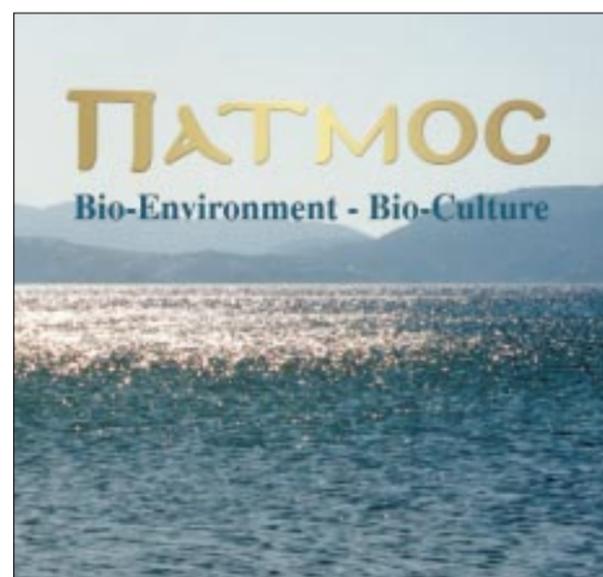
international environmental agreements and enhance national environmental policy making. Since 1998, B.I.O. has been actively involved in an international effort for the creation of an International Court of the Environment to promote environmental justice and the enforcement of international environmental legislation. The Permanent Court of Arbitration has taken this initiative under its wing, and the PCA Optional Rules for Arbitration of Disputes Relating to Natural Resources and/or the Environment were adopted at the extraordinary meeting of the Administrative Council on June 19, 2001.

World Referendum

As first proposed by B.I.O. in 1992, communication technology provides humanity with the unprecedented opportunity to dynamically voice its concern over environmental deterioration. A World Referendum for every citizen on the planet to simultaneously cast a vote for the environment, would result in a global mobilisation for the reversal of destructive trends and would guarantee a brighter future. In 1999, the B.I.O. World Referendum was successfully implemented in India and Southeast Asia. It is encouraging to note that a "global on-line poll on the environment" was launched at the Johannesburg Summit, in September 2002. This demonstrates the important influence that the B.I.O. World Referendum has had on shaping sustainable development initiatives and strategies around the world.

Bio-Culture and the Olympic spirit

Greed and short-term planning have resulted in a serious crisis in values. The diachronic ideals of the Olympic spirit can help society to exit this crisis and move into a new renaissance. The Olympiads should once again be periods of world peace and occasions for all citizens to celebrate the unifying concepts brought forth by the Olympic spirit. At the same time, the global community can be sensitised to the value of a harmonious co-existence as a vehicle for achieving a better quality of life.



New B.I.O. cd-rom

Since its inception B.I.O. has been promoting the revival of the ancient ideal of cease fire during the Olympics, a proposal adopted as a UN resolution in 1993. The hope is that the environment will act as a unifying force for peace, leading to a new social structure, where respect for the continuation of life on our planet will be at the core of every action and thought.

Bio-culture is the B.I.O. vision for peace. It aims to inspire humanity with a love for bios and with the commitment to protect this precious gift for the future. Bios, with all its intricacies and wonders, can be a source of joy and inspiration. Bio-culture is the pathway leading to the fulfilment of peace and the revelation of harmony.

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Investing in the future Biocentric priorities

Green Salary

To build a society of hope, new models in policy are essential. A Green Salary, in place of unemployment benefits, can help to elicit a positive feeling among the unemployed and, at the same time, contribute to the protection of the environment. Green Salary projects for the unemployed could include tree planting, city cleanup, recycling, resource recovery and other constructive activities. In the same context, businesses could be granted special tax deductions when providing opportunities for the unemployed to be involved in environmental projects.

Bank of Ideas

The vast dangers posed by damage to the environment need effective and prompt responses, and, in particular, quick and efficient access to information and know-how. A computerised Bank of Ideas on environmental issues can serve as a globally accessible repository of the world's wisdom, which utilises the Internet's communications facilities to promote environmental knowledge and, most importantly, to prevent the unnecessary and time-wasting duplication of ideas. People from all walks of life are encouraged to contribute to this endeavour. Historically, the views

of the public have hardly been recorded, in marked contrast to the opinions of the famous and influential. This is an opportunity to amend this imbalance, allowing us to benefit from the insights of many. It is hoped that the Bank of Ideas will serve as a model for educational institutions who can in turn help nurture this endeavour.

Health and Quality of Life

Quality of life on a global level can only improve through concerted international efforts. The challenges are numerous, and the focus should be on how to meet the demands of changing social, economic, technical, environmental, and cultural needs. Environmental decay, a frantic pace of life, alienation, and mounting health problems are posing serious threats to the developed world. At the same time, developing countries suffer from soil and air pollution, water contamination and inadequate food production. Without proper understanding of the urgent need to halt environmental deterioration, it will be impossible to counter these threats. Since modern medicine stresses prevention as superior to treatment, efforts should focus on eliminating the sources of pollution, and establishing a "healthy" and clean environment, a prerequisite for a healthy human population.



B.I.O. has a new web site
Visit us...
www.biopolitics.gr

Bio-Education in Argentina

new economics - new ethics

Fruitful co-operation to be launched between Rosario University and B.I.O.

The Dean and other members of the Faculty of Humanities and Arts at Rosario University in Argentina have requested B.I.O. to assist in curricular revisions in the departments of economics and social studies with a view to the incorporation of the views of Biopolitics in the departments' workplans and academic syllabi.

After receiving the new B.I.O. CD-Rom themed "Bio-Syllabus for European Environmental Education" (see pages 14-15), Professor Francisco Parenti, Director of the Interdisciplinary Bioethics Programme and Professor Dario Maiorana, Dean of the Faculty of Humanities and Arts at Rosario University, requested B.I.O. to assist in the development of a biocentric educational programme in Argentina, especially with regard to economics and the social sciences. It is a joy and privilege for B.I.O. to become involved in this initiative, which will contribute to the promotion of bio-education in a major region in South America. Work on the programmes and the new curricula will begin soon.

To successfully meet the demands of the new millennium, economics in the 21st century cannot repeat the mistakes of the past. Economic development at the expense of the environment is a disastrous prize, threatening life on our planet. Economic strategies must become enriched with environmental thinking and promote the environment and biodiversity as a genuine profit for humanity.

BIO Goals

INTERNATIONAL CO-OPERATION FOR THE BETTER UNDERSTANDING AND APPRECIATION OF BIOS (LIFE) AND THE BIO-ENVIRONMENT

The environment recognises no ideological or geographical boundaries, no East-West, North-South or developed-developing countries. Bios provides the unifying force for the harmonious co-existence of all forms of life, leading to a new era of bio-diplomacy.

BIO-CULTURE - BIO-ENVIRONMENT

These are two essential dimensions for building new societal values for the millennium.

PROMOTION OF BIO-EDUCATION

The International University for the Bio-Environment (I.U.B.E.) was launched to reform education worldwide by promoting biocentric curricula and satellite education.

BIO-ASSESSMENT OF TECHNOLOGY

A diachronic search for new societal values will channel technological progress in a direction that leads to a better quality of life through environmental appreciation.

INTERNATIONAL LEGISLATION ON BIOS RIGHTS

It is important to protect all forms of life by enacting rules that prevent the deterioration of the bio-environment, and ensure the fundamental right to a clean environment and to a better quality of life.

A WORLD REFERENDUM

This would allow people throughout the world to express their willingness to preserve bios on our planet.

RAISING AWARENESS OF THE RAMIFICATIONS OF THE BIOLOGICAL SCIENCES

More people would realise that progress in the biological sciences relates to their own field of interest. This acknowledgement may lead to new fields of human endeavour, such as bio-legislation, bio-medicine, bio-ethics, bio-arts, bio-linguistics, bio-economics, bio-athletics, bio-communication, bio-history, bio-education and bio-diplomacy.

ENVIRONMENTAL OLYMPICS - BIOS PRIZES

Bios Prizes should be given in every discipline and with the participation of every member of society to reward excellence in environmental protection.

CEASE-FIRE DURING THE OLYMPIC GAMES

Since the 1980's, B.I.O. has promoted the introduction of a cease-fire during the Olympic Games, a proposal which has been adopted as a Resolution by the UN General Assembly.

PROPOSED ACTION

a **bio-syllabus** and new curricula for every level of education, as well as electronic and audio-visual materials on issues related to bios and the environment

a **Green Salary** instead of benefits for the unemployed, with the commitment to contribute to the protection of the environment

environmental action groups drawing both on the enthusiasm of the young and the experience of senior citizens, to tackle local issues

a **bios-supporting economic strategy** to replace destructive policies, and promote a world-wide interdisciplinary exchange of information on the appreciation of the environment

an electronic **Bank of Ideas** to create a rich repository of information and reflections on bios.

SPONSORS 2002

European Commission
Hellenic Ministry of Foreign Affairs
International Development
Co-operation Department - Hellenic Aid

The National Bank of Greece

Kitty P. Kyriacopoulos

The Michael Marks Charitable Trust

The Hellenic Ministry of Culture

The A.G. Leventis Foundation

Alpha Bank

Action Link/Action Synergy S.A

Ioannis Vassiliou

Lonza Ltd.

George Pantelis

Hellas-on-Line

Xerox Hellas S.A.

BIO represented in 123 countries

Africa

Algeria, Benin, Botswana, Burkina Faso, Chad, Congo, Egypt, Ethiopia, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Nigeria, Senegal, Seychelles, South Africa, Sudan, Tanzania, Togo, Uganda, Zimbabwe

The Americas

Argentina, Bahamas, Barbados, Bermuda, Brazil, Canada, Chile, Colombia, Cuba, Dominican Republic, Ecuador, Guyana, Honduras, Jamaica, Mexico, Panama, Peru, USA, Uruguay, Venezuela

Asia

Armenia, Bahrain, Bangladesh, Cambodia, China and Hong Kong, Georgia, India, Indonesia, Iran, Israel, Japan, Jordan, Korea, Kuwait, Lebanon, Malaysia, Nepal, Pakistan, The Philippines, Saudi Arabia, Singapore, Sri Lanka, Syria, Thailand, United Arab Emirates, Uzbekistan

Europe

Albania, Austria, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, FYROM, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Moldova, Monaco, The Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, UK, Vatican, Yugoslavia

Oceania

Australia, New Zealand, Papua New Guinea, Samoa, Solomon Islands

Editorial

In the crucial situation facing the world today, an international effort guided by diachronic values and ideals can help nations overcome the crisis. No grievance justifies the killing of innocent people. Let us seek an end to militarism and focus on a unifying vision for the future.



A global endeavour to preserve the continuation of the chain of life on our planet - a chain that has survived for hundreds of millions of years - can lead humanity to join together in a battle against the forces which want to see us divided and unable to react. "Bios" - life - is a source of joy and inspiration. Appreciation of this precious gift can uplift the spirit of the world.

We cannot allow future generations to be burdened with our negligence. Life on our planet is threatened by a rapidly deteriorating environment. The greatest "terrorists" of the 21st century are the depletion of the ozone layer, unsafe drinking water, hunger and disease. If we see environmental preservation as a "genuine" profit for humanity, we can pursue economic development with minimum environmental impact and promote new and advanced technologies for a life-supporting society.

To strengthen our response to environmental challenges, we need imagination and innovation. Governments, the public sector, civil society and business can unite their efforts and convert these challenges into new opportunities. As environmental solutions are long-term goals, it is important to build "green" thinking with staying power. The goal is not only to change attitudes, but to also to motivate and empower people everywhere to act in defence of the environment.

In the quest for ways to overcome the current crisis in values and to achieve peace and global environmental harmony, we need to draw inspiration from the historical past. Olympic values and the ideals promoted by the Olympic spirit can help shape a new vision for humanity. The Olympic Games provide the opportunity for every citizen on the planet to make a positive contribution. Why should this opportunity be limited to athletics only? Every sector of society and every profession can benefit from the world's positively focused attention at the time of the Olympic Games and actively participate in environmental protection. In this effort, technology and the arts can join forces and raise awareness of the joy and beauty of bios.



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Protecting the world's valuable mountain resources Our global responsibility for the future

United Nations Association of Singapore Celebration for United Nations Day and International Year of Mountains 2002

Professor Seong Chee Tham, President of the United Nations Association of Singapore (UNAS) and distinguished B.I.O. Trustee, invited the B.I.O. President to contribute a greeting to the commemorative album prepared by the UNAS in celebration of United Nations Day and International Year of Mountains 2002 on October 24, 2002. Other eminent contributors included: UN Secretary General **Kofi Annan**; FAO Director General **Dr. Jacques Diouf**; World Tourism Organisation Secretary **Francesco Frangialli**; the Executive Secretary of the Economic and Social Commission for Asia and the Pacific **Kim Hak-Su**; and UNEP Under Secretary General and Executive Director **Klaus Topfer**.

In her greeting, Dr. Vlavianos-Arvanitis emphasised what a great honour and privilege it was to have been invited by Professor Tham Seong Chee to address this distinguished gathering of the United Nations Association of Singapore in commemoration of United Nations Day and the International Year of Mountains.

"This event could not have been more timely. To strengthen our response to growing environmental challenges, a unifying vision is essential. This urgent need calls on the United Nations and world leaders to work in partnership to address environmental issues and to promote working links among governments,

decision-makers, the private sector and civil society for the benefit of the environment and 'bios' - life - on our planet.

Mountains, which provide most of the world's fresh water and harbour some of the richest biodiversity, are valuable resources in danger. Climate change, pollution, excessive mining, agriculture and tourism are putting tremendous pressure on mountain



environments, leading to widespread degradation and increased risks of forest fires, soil erosion, floods and famine. The International Year of Mountains is a commendable United Nations initiative and an excellent opportunity to focus the world's attention on the protection of mountain environments and the intricate web of life that mountains sustain. By caring for our mountains, we ensure our long-term security and survival.

It is not only important to change attitudes, but also to motivate and empower people everywhere to act in defence of the envi-

ronment. Mountain forests - the 'lungs' of the body of bios - play a key role in oxygen production and in the maintenance of the atmosphere's ozone layer, both vital to our survival on the planet. The destruction of these forest ecosystems places the entire future of humanity at risk. To counter this risk, 'defence for the environment' must become an international priority. If military aircraft, instead of dropping bombs, were used to drop seeds for reforestation, then war regimes would be converted to programmes for the preservation of the environment, and the entire planet would benefit."

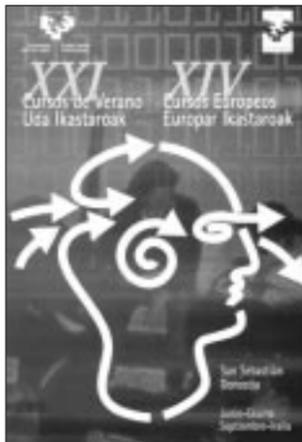
And the B.I.O. President concluded: "Since its inception in 1985, B.I.O. has promoted international co-operation in environmental protection and has sought to enrich every human endeavour with environmental dimensions. Our hope for the new millennium is to see a society based on bios supporting values where every individual will be involved in the race to save the environment. The Olympic Spirit and cease-fire during the Olympic Games, a proposal put forward by B.I.O. in 1992, can help humanity exit the present crisis in values that has resulted in serious environmental deterioration and to embrace a 'biocentric' vision of hope and peace. Mythos, culture and other time spanning ideals, together with a global effort in support of the environment, can lead humanity toward a brighter future."

Bioethics and the Environment

European Summer Courses at Basque University
San Sebastian, Spain, 3-5 September 2002

At the initiative of **Professor Marta Salona Bordas**, Member of the Faculty of Biology at Basque University, a series of summer courses on "Bioethics and the Environment" took place in San Sebastian, Spain, on 3-5 September 2002. The summer courses, co-directed by the B.I.O. President, brought together eight specialists in education and the environment in a joint effort to inspire new moral concerns in students while focusing on a better and sustainable management of our environment. The general aims of the summer courses were to:

- ▶ Introduce a new environmental approach to the current concepts of bioethics
- ▶ Revise societal practices with the aim of promoting a greater respect for the environment
- ▶ Develop environmental awareness in every profession with the goal of leading to a new system of values in society
- ▶ Integrate environmental education in vocational training programmes



The two B.I.O. lectures given during the courses were themed "Protecting the Bio-Environment - A Priority in Bioethics" and "Bio-Environment - Bio-Culture - Mobilising Technology and the Arts in Environmental Protection." Students and participants greatly appreciated the B.I.O. philosophy, and the lectures were successful in promoting the need for environmental ethics in the development of every human endeavour. The lectures also stressed the importance of close co-operation between technology and the arts in environmental protection, and emphasised that saving bios requires an all-encompassing effort with the participation of every academic discipline and every profession. **Professor Salona Bordas** expressed her interest in co-operating further with B.I.O. in the realisation of similar courses in 2003.

Other lecturers included **Professors Julen Rekondo, Jose Luis Duenas, Inaki Antiguada, Inaki Barcena, and Jose Esquinas Alcazar**, Secretary of the Commission on Genetic Resources in Food and Agriculture of the United Nations, who discussed education and moral values, bioethical dimensions in sustainable development, the environment in globalisation and sustainability, and ethical aspects in food and agriculture.

What emerged from the courses was a deeper understanding of the need for a global concept of bioethics, concerned with environmental issues and not limited to biomedical problems. Bioethics is often accused of being developed by and for developed countries, focusing on prob-

lems created by affluent lifestyles, such as obesity, abortion or euthanasia, when, in the underdeveloped world, people have trouble securing at least one meal a day, or access to safe soil and drinking water. We must react urgently. A renewed educational programme is needed in order to develop new moral values integrating the environment in our own perception as human beings on this planet so that a global concept of bios may evolve.

An education based on the development of co-operative rather than competitive values is crucial. The B.I.O. proposals for a Green Salary and for the further development of the International University for the Bio-Environment, launched by B.I.O. in 1990, were deemed especially useful. Students attending the courses were invited directly by the B.I.O. President to participate in B.I.O.'s Bank of Ideas and to embrace the Olympic Spirit.

Of particular importance and urgency are the degradation of water and forest resources and the loss of fertile soil, especially in tropical regions which harbour more than 80% of the planet's biodiversity and natural resources essential in feeding the world's population. Overfishing, industrial farming and poor agricultural practices should be seriously revised in order to ensure access to the basic needs of future generations.

At the current rates of deforestation, the last significant primary forests could be harvested within the next 50 years, causing irreversible loss of fertile soil and biodiversity. Our unbalanced relationship with the environment should be urgently and critically revised. Jose Esquinas suggested that the successful development of international agreements on "farmers rights" can improve the distribution of benefits in food production. It is estimated that more than 160,000 people move daily from rural to urban areas due to the imbalance between food production and distribution. This results in a serious increase in migratory movements, social displacement and racism that place our lives at considerable risk. When 50% of world's population survives on less than \$2US a day and 25% of the world's population on less than \$1US a day, we cannot remain the passive observers of a "market-centred ethics." Professor Barcena demanded a more active involvement of our selfish societies in the development of a new model of globalisation focusing on international co-operation and solidarity. A global concept of bioethics with the ideals of Biopolitics as our main priority is urged.

Terrorism, the Media and International Relations

University of Indianapolis,
Athens Campus, November 16, 2002

In an effort to promote better knowledge and understanding of the issues surrounding the public perception of terrorism, the Communications and International Relations Departments of the University of Indianapolis, Athens Campus, organised a conference titled "Terrorism, the Media and International Relations," at the Metropolitan Hotel in Athens, on November 16.

The war against terrorism that followed the tragic events of September 11, 2001 in the United States, has heightened world interest in issues such as the profound impact of the media on public opinion, and the interplay between the media and international relations. The media have always had a great influence on people's attitudes, and, in times of crisis, their power increases to the point where it can significantly manipulate public opinion and encourage or avoid international conflict. The goal of the conference was, therefore, to emphasise this powerful role and to: evaluate terrorism as an international relations problem; discuss media coverage of terrorist attacks and their influence on public opinion; examine media impact in situations of conflict; underscore the manipulation of information by different media outlets; explore

ways in which terrorism shapes people's perceptions and beliefs; analyse the relationship between terrorism and human rights; analyse and evaluate the post 9/11

transformation of international relations; discuss the new emerging roles of NATO, the UN and the EU within the framework of an international effort against terrorism.

The B.I.O. President was invited by **Panayotis Karafotias**, Professor of International Relations at the University of Indianapolis, to join a panel of experts at the conference and discuss terrorism as an international problem. Other panellists included: **T. Kouloumbis**, Professor of International Relations at the University of Athens; **J. Panoussis**, Professor of Criminology at the University of Athens; **S. Perrakis**, Professor of International Relations at Panteion University in Athens; and **M. Sotiropoulou**, President of the Hellenic Medical Association Against Nuclear and Biochemical Threat.



Christian Anthropology and Biotechnological Progress

Orthodox Academy of Crete, September 26-29, 2002

Current developments in biological research and knowledge offer new insight into the building blocks and the functions of life. The multifaceted applications of biotechnology provide new possibilities for modifying plant and animal life, including human life. The projected effects on the environment are crucial and will

lead to problems that could change the future of humanity.

These prospects and threats of biotechnological progress are also a challenge for Christian anthropology

and were discussed extensively at the conference on "Christian Anthropology and Biotechnological Progress," held at the Orthodox Academy of Crete, on September 26-29, 2002. The conference, which was sponsored by the Orthodox Academy of Crete, in co-operation with the European Society for the Study of Science and Theology and the University of Crete, brought together scientists and theologians from different parts of the world to address, in a relaxed and creative atmosphere, the scientific and ethical

aspects of modern biotechnology.

The B.I.O. President participated as a main speaker on the subject of "The challenges of biotechnology for the environment," emphasising the importance of environmental ethics in every human endeavour. "The directions that technical professionals in biotechnology choose

to pursue in their work lead to products that really do make a difference to many social practices and to the critical life choices of many people," she pointed out. "In this effort, con-

sideration should be given to the role the environment can play in determining the future of humanity, and decisions should be based on the interdependence among all forms of life. Human rights, the biomedical implications arising from the advancement of science, and concerns over pollution and dwindling natural resources cannot be treated in isolation. The environment as a common point of reference can provide a powerful link and lead to the comprehensive treatment of the challenges we face."

*The environment is crucial
in determining the future of humanity.
Biotechnology can make a difference to
many social practices and to the critical life
choices of many people.*

BIO Progress 2002



HONOURS AND DISTINCTIONS

- Re-nomination for the Nobel Peace Prize
- Nomination for the J. William Fulbright Award for International Understanding
- Founding Member of the Balkan Academy of Science, New Culture and Sustainable Development
- Member of the Academic Committee of the Regional Interdisciplinary Programme for Bioethics in Latin America

B.I.O. INTERNATIONAL CONFERENCES

- "Rio+10 urgent steps beyond sustainable development," roundtable discussion in view of the upcoming Earth Summit in Johannesburg, Athens Money Show
- "Profit and Values - Bio-Environment - Bio-Culture" Biopolitics at the Athens Money Show. Roundtable discussion with the participation of environmental experts and business executives
- 7th Annual Youth Bios Olympiad, St. Petersburg, Russia Programmes in bio-education
- B.I.O. participates as core partner in the EU Leonardo da Vinci "Bios & Environment Transnational Network" programme. Development of extensive educational material and networking in bio-education
- B.I.O.'s educational material translated into Romanian, Slovak, German, Italian, Portuguese and Spanish, within the framework of the EU Leonardo da Vinci "Bio-Environment and New Millennium" programme
- "Protecting the Bio-Environment: A priority in Bioethics" and "Bio-Environment-Bio-Culture: Mobilising Technology and the Arts in Environmental Protection" Biopolitics

lectures at the summer course organised at the Universidad del Pais Vasco, Bilbao, Spain

- Working group for bio-education within the framework of the European Union programme on "Prospects for Technology and Investigation"

SEMINARS/CONFERENCES/SPECIAL EVENTS

- Lecture on "Olympic values and the bio-environment" at the Greek Language Foundation conference, Athens
- Participation in the Annual General Assembly of the Pontifical Academy for Life, The Vatican
- Opening lecture, EURO-SUSTAIN conference, Rhodes
- Lecture at the Municipality of Filothei, Greece
- Keynote speech at the IVth International Conference of the Foundation for Mediterranean Co-operation, Athens
- Keynote speech, 12th Conference on "Environmental protection is a Must," Alexandria, Egypt
- Keynote speech, OECD workshop on "Innovative soil plant systems for sustainable agricultural systems," Izmir, Turkey
- Participation in the second Ministerial Conference on the Environment and Euro-Mediterranean Partnership, Hellenic Ministry of the Environment, Physical Planning and Public Works, Athens
- Speech at the "Christian Anthropology and Bio-Technological Progress" international conference, organised by the Orthodox Academy of Crete in co-operation with the European Society for the Study of Science and Theology and the Technical University of Crete
- Contribution to the commemorative programme for United Nations Day and the International Year of Mountains, United Nations Association of Singapore
- Participation as Vice-President of the International Bioethics Society in the Society's Biannual Scientific Committee meeting, Gijon, Spain
- Keynote speaker and Chair of the session on environmental ethics, World Bioethics Congress, Gijon Spain
- Chair of the session on Problems of Biosafety and Bioethics, conference on Biotechnology - State of the Art and Prospects of Development, Moscow, Russia

- Keynote speech at the conference on "Terrorism and the Role of the Media," University of Indianapolis, Athens Campus
- Keynote speech at the "Going Green Care Innovation 2002" international conference, Vienna, Austria

B.I.O. PUBLICATIONS

- "Bio-Syllabus for European Environmental Education" CD-Rom
- "Bio-Syllabus for European Environmental Education" 10 printed volumes on Architecture, Diplomacy, Economics, Energy, Ethics, Health, History, Legislation, Technology and Tourism
- "Mythos and the Bio-Environment. A Contribution to Bio-Culture" CD-Rom (in press)
- Quarterly publication of BioNews

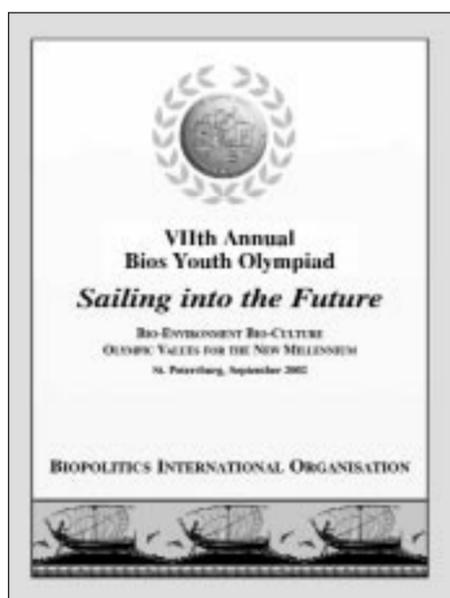
OTHER PUBLICATIONS

- "Biopolitics - Bio-Culture. International Co-operation for a Better Future." In Bioethics and Society, published by the Regional Interdisciplinary Programme for Bioethics in Latin America, Faculty of Humanities and Arts, Rosario National University, Argentina
- "The protection of life as a primary responsibility of Christian love," Proceedings of the VIIth General Assembly of the Pontifical Academy for Life, The Vatican
- "Bio-policy - a prerequisite for sustainable agriculture." Proceedings from the OECD workshop on Innovative soil plant systems for sustainable agricultural systems, Izmir, Turkey
- "Biopolitics - the bio-environment. A new vision in product development and policy" Proceedings from the Euro-Sustain 2002 conference, Greece

MEDIA COVERAGE

- International television interviews and press coverage
- Weekly B.I.O. articles in the Athenian daily "Adesmeftos"
- New B.I.O. website <http://www.biopolitics.gr>

VIIth Youth Bios Olympiad, St.Petersburg



- environmental and biopolitical issues
- ▶ The creation of networks for environmental protection and education
 - ▶ Environmental development and the furtherance of biocentric values in society
 - ▶ New approaches and methods of solving environmental problems
 - ▶ Promising environmental youth projects
 - ▶ Criteria for the bio-assessment of cultural, creative and educational activities
 - ▶ The creation of data banks on methods of environmental study and research, as well as public movements, projects and programmes to unite young people through their participation in environmental action groups
 - ▶ Bio-environmental, bio-cultural and bio-athletic values

The VIIth Annual Youth Bios Olympiad was co-organised by: the Biopolitics International Organisation; the Interregional Ecological Club of Post Graduates, Students and Schoolchildren of The Baltic-Ladoga Region; Committee on Natural Use, Environmental Protection and Ecological Safety of St. Petersburg; Youth Politics Committee of the St. Petersburg Administration; the Department of Environmental Protection of the Leningrad Region Government; the St. Petersburg State Technological University for Plant Polymers; and the St. Petersburg State Technical University.



Thanks to the committed efforts of **Professor Alexander Shishkin**, Head of the Laboratory of Ecological Standardisation at St. Petersburg State University for Plant Polymers, the VIIth Annual Youth Bios Olympiad convened with great success in St. Petersburg, on September 22-25, 2002.

The purpose of the Youth Bios Olympiad, which brings together children and young adults from Russia and other countries, is to raise awareness of the importance of co-operation among technology and the arts in the race to save the environment. Through scientific projects, oral presentations, poster sessions, theatre, dance and music competitions, the young participants develop their skills and creative thinking in relation to all aspects of the environment.

The VIIth Annual Youth Bios Olympiad had as its mission to promote:

- ▶ The ability of youth organisations to address

Ecological Protection of Planet Earth Bio-Environment and Bio Culture

International Conference, National Palace of Culture, Sofia, Bulgaria, June 5-8, 2003

B.I.O. gladly accepted an invitation by the International Research Centre, Greece, to join the co-organisers of a major international conference to convene next June in Sofia, under the auspices of the Bulgarian Ministry of the Environment and Water. Other co-organisers include: the Technical University of Sofia, Bulgaria; Democritus University of Thrace, Greece; the University of Sunderland, UK; the Technical University of Dresden, Germany; the University of Rio De Janeiro, Brazil; the National Observatory of Athens, Greece.

The conference will bring together leading scientists and decision-makers, who will exchange views on the latest developments in the environmental field. The conference will also include a Workshop on Energy Saving Heating & Cooling Technologies, as well as International Exhibition of Inventions and New Technologies on Alternative Energy and Water. The following issues will be addressed:

- ▶ *Renewable Energy, Energy Saving and Clean Technologies* (environmental design of buildings, improved construction materials, energy conservation, improved exploitation of solar energy, trends in hydropower, technologies to minimise emissions of power plants, energy saving technologies for industrial use, developments in geothermal power, biogas and wind energy)
- ▶ *Water Resources* (water resources management, quality and protection of aquatic systems, wastewater treatment technologies, new European directives on water, international water issues, protection and restoration of harbours and the coastal environment)



- ▶ *Environmental Management* (industrial environment, EMAS, urban ecology, management of solid waste, noise pollution and control technologies, environmental impact assessment and risk analysis, public environmental health, prevention of indoor air pollution)

- ▶ *Methods for Environmental Protection* (environmental informatics, use of GIS and remote sensing technology, physical and numerical modelling, monitoring systems)

- ▶ *Sustainable Development and Quality of Life* (the role of a civic society in the protection of the environment, promotion of sustainable development, promotion of changes in consumer patterns, NGOs, environmental information, environmental awareness)

- ▶ *Culture and the Environment* (environmental protection requires the contribution of culture and the arts)

If you would like to receive more information about the conference or are interested in participating as a speaker, please contact the B.I.O. offices at bio@hol.gr.

ATHENS MONEY SHOW

Profit and the bio-environment - building a vision of hope

The Environment is Profit Biopolitics at the Athens Money Show 2 November 2002

Can the dynamism and power of business and economic development be reconciled with an environmentally just and equitable society? In an attempt to shed light on this crucial question, B.I.O. held a roundtable discussion within the framework of the Athens Money Show, on Saturday, November 2, 2002, with the participation of leading representatives from the environmental policy sector and business. The following issues were addressed:

Environmental Policy and Quality of Life

The discussion was chaired by the B.I.O. President who stressed the need for a new structure in society based on models that will improve quality of life on a global level. "In view of the 2004 Olympic Games in Athens, it is essential to realise that the success of the Games will depend on our ability to protect the environment. B.I.O. has been promoting the incorporation of environmental thinking in the Olympic Games, since 1985, as well as the revival of the ancient ideal of cease-fire. Every individual should actively participate in initiatives leading to the development of a civic society," she emphasised.

The B.I.O. President also emphasised the urgent need to redefine the concept of profit.

"Profit should incorporate values such as the environment, education, health and culture, concepts that can contribute to the improvement of human welfare. With the establishment, in 1990, of the International University for the Bio-Environment,

Biopolitics aims at raising environmental awareness all over the world. The protection of the environment is a 'genuine' profit for society. We hope that a deeper understanding of this truth will result in the decline of environmental threats and will help every human endeavour to show a greater respect for the environment."

Dr. Michael Modinos, President of the Hellenic National Centre for Environment and Sustainable Development, pointed out that the Johannesburg Summit did not meet our expectations and was generally characterised a great degree of inflexibility. "We hope that the upcom-

Threats to the environment can only be relieved through a fundamental change in the economy. Health, education, culture and quality of life, are a source of profit for both business and society.

Business ventures that ignore this truth will lack long-term viability.

ing Greek EU Presidency will improve the situation. Johannesburg will provide the foundations for this effort. The development of a ten-year action plan on sustainable production and consumption is a complex issue and consists of many stages on a regional, national and international scale. The relationship between economy and the environment should become stronger emphasising a 'greener' economy. Everyone should take on the responsibility of protecting the environment. We cannot have so many free-rides. European Commission and national government subsidies have made competition between companies fierce. The protection of the environment should be a priority for society; unfortunately this is not true, especially when economic interests are at stake. The outcome of the Johannesburg Summit is complicated, and the inflexibility observed is mainly due to a lack of co-ordination within the European Union."

Olympic Games and the Environment

In discussing the preparations for the 2004 Olympic Games, **George Kazantzopoulos, Director for Environment on the Athens 2004 Olympic Games Organising Committee**, emphasised that the 2004 Games are a great opportunity for the global promotion of Athens and Greece. "The Olympic Games are an event of immense athletic, cultural and economic significance. However, the effects that the presence

of so many people will have on the environment will be very serious. We have only to think about a few simple things to realise what a heavy burden the Olympic Games will pose on the environment. For example, let's consider how many meals will have

to be served during the Games or how much soap and water will be consumed."

Mr. Kazantzopoulos also pointed out that, as promoted by Biopolitics, it is important for society to acquire firm moral values before proceeding with environmental infrastructure. "When some large industrial unit pollutes the environment, or when some athletes use illegal substances in order to improve their performance, it is obvious that they are lacking in moral values. The Olympic Games is a very significant event that could influence and improve many aspects of our daily lives. The management of such large scale

events is a source of profit for the environmental technology industry. Greek environmental legislation is very strict, so we are confident that we will have an environmentally sound 2004 Olympics of global influence."

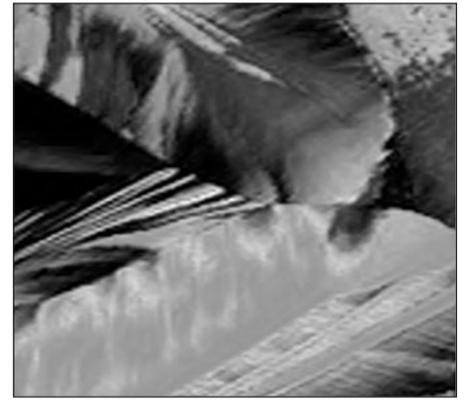
Tourism and Agriculture

Maria Valerga, Director for the Environment at Grecotel S.A., presented the environmental policy of the largest hotel chain in Greece and discussed initiatives in environmentally friendly tourism. "It is our company's belief that respecting the environment improves the quality of a tourism destination and increases profits. Society's greater environmental awareness has led our company to develop 3 main lines of action in order to incorporate environmental protection into our corporate policy. These include:

1) improvement of our environmental performance by significant water and energy savings, and waste management and waste reduction programmes 2) protection and promotion of our natural and cultural heritage, by the protection of sites of historical interest 3) environmental education, probably the most important and effective line of action."

Mrs. Valerga also mentioned that the company's environmental policy led to immediate international recognition from large tourist organisations, universities, the National Agriculture Institute and, above all, the general public. This recognition resulted in important decisions and commitments on the company's part, which is now developing an on-going information network for the protection of the environment in relation to tourism.

Costas Bougiouris, Responsible for Grecotel's Organic Farming Project, emphasised the economic significance of tourism and agriculture for Greece, as well as the fact that consumer choices are crucial in environmental protection. "Consumer choices matter. Environmentally friendly farming options provide profit both for the farmer and the consumer. Grecotel has discovered that organic farming, which is closely related with ecotourism, is profitable on a long-term scale. Profit is not only money in our pockets. Our company promotes a socially acceptable and environmentally friendly profile, through large investments in organic farming and the development of an agricultural park in Crete. The company's activities are implemented in close co-operation with local farmers, providing these farmers with a stable source of income and strong incentives for the adoption of organic



farming methods. Since 1995, seaweed and yard waste collected from the company's hotel facilities are used for the production of excellent quality compost for organic farming. Farmers have free compost available and do not need to use synthetic pesticides and fertilisers. It is, therefore, evident that profitable initiatives can be interlined with environmental protection and agricultural benefit."

Environment, Quality of Life and the Development of a Civic Society

Stavros Kaparis, Member of the Board of the Hellenic National Paraplegic Society, discussed the problems that people with disabilities face in the city. "City environments are hostile to people with disabilities, mainly due to the fact that access to most places is very difficult or almost impossible. The National Paraplegic Society appeals to the relevant authorities to seriously take these problems into account. The Society also appeals to the general public to respect the measures that have been implemented, and not block access to wheelchair ramps or handicapped parking spaces."

Quality of life issues were also addressed by **Emilia Liaska, from the Quality of Life Sector at the Greek Ombudsman's Office**. "The ombudsman has an out-of-court intervention mission, and is mainly concerned with government actions that can improve quality of life and society in a wider context. Recently, an initiative undertaken on the European Union level listed all the duties and rights of the ombudsman in relation to the protection of the environment, with the goal to achieve the harmonisation of environmental legislation in all member states. Within this framework, the Athens Network of Ombudsmen for the Protection of the Environment was created. The Network is mainly involved in violations of the European Commission's Natura 2000 Directive."

Rio + 10 - New strategy beyond sustainability - bio-environment - bio-culture

Athens Money Show May 25, 2002

Within the framework of its participation in the Athens Money Show, on May 25, 2002, B.I.O. organised a roundtable discussion themed "Rio+10 - New Strategy Beyond Sustainable Development." The aim of the discussion, which was chaired by the B.I.O. President, was to identify the world community's expectations of the upcoming Johannesburg Summit. Speakers included: **George Kremlis**, Head of Judicial and Legislative Affairs, European Commission DGXI; **Panagiotis Karafotias**, Professor of International Relations at the University of Indianapolis; **Panagiotis Siskos**, Professor of Chemistry at Athens University; and, **Panagiotis Koutsikos**, President of the Black Sea Economic Co-operation Commission (BSEC).

Mr. Kremlis expressed his views on the preparation by the EU for the Johannesburg Summit. The EU will be represented at Johannesburg at the highest level, by its President, Mr. Prodi and the Commissioners of Environmental Development, Research and Technology and Foreign Affairs. He anticipated that the EU and its member states would be subject to criticism at Johannesburg for the failure to achieve the goals of the Rio Conference. Developing countries still have serious problems in terms of water supplies, adequate sanitation and public health. Howev-

B.I.O. promotes environmental preservation as a "genuine" profit for society. The aim is to redefine the concept of profit in a way that minimises environmental threats. The protection of bios, all forms of life, must be at the centre of every human endeavour. To this end, B.I.O. participates with great interest in the activities of the Money Show in Athens, Thessaloniki and London, raising awareness among the business world of the many investment possibilities arising from environmental protection.

er, he said that Rio's goals might have been over-ambitious. The concept of sustainable development involves economic and social development within a strong environmental protection context. Thus, the discussion of international treaties was expected to play a prominent part in Johannesburg. Mr Kremlis stressed the fact that developing countries, since they have not greatly contributed to the Greenhouse effect, would seek economic support for their development, as they feel that developed countries have been utilising raw materials at an unsustainable rate.

B.I.O.'s disappointment, in relation to Johannesburg, was that balanced development would be the key issue at the conference rather than the protection of the environment. However, it must be noted that protection of the environment would play a key role within the concept of balanced development. The vision of Biopolitics is that when it comes to environmental protection, every individual must be a part of decision-making process.

Mr **Karafotias** expressed his enthusiasm about the work and vision of B.I.O., and mentioned that Dr. Vlavianos-Arvanitis has been nominated for the Nobel Peace Prize a number of times. As a former representative at the UN, he pointed out that the Organisation's goal is to serve the member states and not to take their place. At a time that the UN is facing more and more problems, the role of non-governmental organisations has become very crucial.

Mr. **Siskos** pointed out that the laws of physics and chemistry govern pollution, and that economic development is closely related to the consumption of raw materials. Environmental pollution is a by-product of economic development. Pollution reduction strategies must be adopted using clean technologies that use less energy and raw materials. The technology to adequately protect the environment presently exists; we must, however, use it properly. It is everybody's responsibility to save the environment.



Finally, Mr. **Koutsikos** spoke about the problems that Greek companies have in exporting their products. Greek exports have been reduced by 32%, and 40% of investments in the Balkans are by German concerns. At the same time, Greece has the fewest companies that have been approved by the ISO certification. Mr. Koutsikos suggested that Greece should turn more toward the Balkan and Asian markets and become a bridge between the EU and Asia. The Turkish and Asian markets are considered to have great commercial and economic prospects. As Greece is member of both the EU and BSEC, this is definitely a feasible approach.



European Bio-Environmental

Solving environmental problems involves social, economic, ethical, political and legal challenges. To respond to these challenges, education requires a radical shift away from intra-disciplinary entrenchment and into creative and thoughtful action for the development of the highest potential of each individual, for the benefit of all life on our planet.

For this purpose, B.I.O. issued a pioneering CD-Rom themed "Bio-Syllabus for European Environmental Education." This CD-Rom, developed within the framework of the International University for the Bio-Environment (I.U.B.E.), an initiative launched by B.I.O. in 1990, aims to enhance understanding and

appreciation of the environment in every human endeavour.

The production and use of energy poses some important challenges to the development of environmental policy worldwide. Among the issues of greatest interest are the increasing role of renewable energy resources, the reduction of energy consumption and greenhouse gas emissions, as well as the changes in lifestyle necessary to ensure an environmentally sound and sustainable use of energy.

One of the basic goals of B.I.O. is to sensitise experts in the field of energy who in turn will look for alternatives, thereby removing the "dependency" on non-renewable resources in order to

Prospects and concerns

Energy resources are an important element in the development of human society. The consumption of energy grows as a function of increasing world population and increasing energy demands. The 29 countries of the Organisation for Economic Co-operation and Development (OECD), which includes some of the world's largest economies, such as the USA, Japan and Germany, continue to dominate global energy use. OECD nations account for more than 58% of the world's primary energy consumption, with the USA alone accounting for 25%.

Fossil fuel resources are finite and, if we take into account the growing world energy demand, they might be close to depletion within the next 50 years, a very small time-scale in human history. Moreover, fossil fuels are found in specific geographical locations, so they are not equally distributed among nations. This is a potential cause of conflict, leading to political instability and wars.

The oil crisis of 1972 was an economic and political imbalance, which caused the price of oil to sky-rocket and resulted in serious problems for countries depending on energy sources outside their national boundaries. This crisis, however, also boosted the search for alternative sources of energy. One alternative used in the last decades is nuclear fission. Nuclear fission

supplies tremendous energy density, and its exploitation requires high technological know-how and expensive fuels. Nuclear fission also involves serious threats to the environment and risks of accidents. The by-products of nuclear

The challenge for the renewable energy sector is to increase its proportion up to 12% by 2010. This is helpful to environmental targets, because, in general, renewable energy sources are carbon dioxide neutral.

fission remain radioactive for many decades and must be stored very carefully. The storage of more and more radioactive wastes is difficult because of the danger of leakage. Also, in cases of accidents, the diffusion of radioactive elements into the atmosphere is a great danger for human health and the environment.

There is a need for a source of energy that is friendly to the environment, without the risk of accidents, and can be used on a large time-scale by humanity. An energy source with these properties is called renewable. In other words, renewable energy is any energy source that can be either replenished continuously or within a moderate timeframe, as a result of natural energy flows.

Renewable energy sources include solar energy - heat and electricity - bioenergy, wind power, hydropower, and geothermal power. However, the list can be expanded to include ocean energy - tidal forces, ocean heat and waves - and hydrogen energy, a new and very promising source of clean and renewable energy.



Advantages and handicaps

Renewable energy, in all of its forms, is very abundant and will be available for centuries on our planet. In fact, the resource base for the renewable energies - geothermal, solar, biomass and wind - is much larger than the total resource base in coal, oil, gas, and uranium (nuclear power). This is one of its big advantages over fossil fuels.

But the major disadvantage of many renewable energy sources is that the density of energy is low, as well as the power generated. This is the case for wind energy, solar energy and ocean energy.

Wind energy is also intermittent in nature, and so it is very difficult to attain a constant rate of energy supply based only on wind energy. The solution to this problem is to construct an extensive grid of engines (i.e., wind turbines, or solar collectors) to enhance productivity. However, this also increases the price of energy, which is a handicap in the competition with fossil fuels. Therefore, currently in the Netherlands, 93% of the electricity that is being used originates from coal, petroleum and natural gas powered stations. Only 3% (maximum) comes from renewable sources and 4% comes from nuclear energy.

The wind resources above the shallow waters in the seas around Europe could theoretically provide all of Europe's electricity supplies several times over.

The history of renewable energy sources is directly connected with the economic trends of the fossil fuel market. The world community becomes more interested in renewable energy sources when oil prices escalate and loses interest again once they become cheaper. This happened during the oil crisis of 1972 and with the Gulf war. At those times, research and development in renewable energy sources were strongly promoted, and funding of this research was given priority.

Also, on average, the greatest interest in renewable energy sources is shown by countries of the developed world. There are several cases where a certain well-adapted renewable energy source comprises an important factor in energy production, such as, for example wind energy in Denmark, and geothermal energy in Iceland (where historical background and natural resources also help).

For the use of renewable sources of energy to take off - wind energy, in particular - financial or fiscal incentives are needed. In the European Union, the target of 20% substitute fuels by 2020 will probably remain a dead letter, without favourable fiscal measures, regulations for their distribution by oil companies and voluntary agreements with industry.

Renewable energy sources

The majority of renewable energy sources represent a direct or indirect form of solar irradiation energy. The only exceptions are geothermal energy, which comes, probably, from the radioactive sources in the centre of the Earth, and the tidal motions produced by the action of gravity and the spinning of the Earth. This reminds us of the importance of solar energy for our world.

In most cases, we are dealing with kinetic or mechanical energy carried by a moving fluid (i.e., wind or water), or thermal energy - geothermal energy under the Earth's surface or ocean energy. This means that the technology for renewable energy is similar to the one used in fossil fuel applications, and the difficulty sometimes lies in the adaptation from one system to the other. For example, the extrac-

tion of kinetic energy from a moving fluid is done by means of a turbine composed by a rotor and blades turning around a hub. The turbine is connected to a generator which transforms the spinning energy of the turbine into electricity. Wind

energy has been the fastest growing source of electricity generation in the world in the 1990s.

Some exceptions to these techniques are the photo-voltaics effect, that is used

to convert solar irradiation directly to electric current, and the chemical reactions involved in the production of hydrogen, a new fuel with great potential. Some renewable energy sources are still in the experimental stage (wave energy, ocean thermal energy), while others, like geothermal energy from dry rocks, are extracted in specialised power plants, but are not yet commercialised.

Wind energy was the fastest growing source of electricity generation in the world in the 1990s.

Clean cars

Thus far, Japan has been the first country to successfully introduce hydrogen-power technology into the everyday environment. Japan is leading the commercial market with a small fleet of hydrogen powered delivery trucks, including a modified 4-tonne lorry named Musashi-9, which

uses liquid hydrogen to simultaneously refrigerate the groceries it hauls and fuel the combustion engine. There are no commercially available vehicles that use hydrogen as a fuel; however, automobile manufacturers have experimented with developing vehicles that use hydrogen. Research vehicles have been produced by Daimler-Benz, BMW and Mazda. Other vehicles have been built using compressed hydrogen, including two vehicles in Arizona, USA, operated by the American Hydrogen Association.

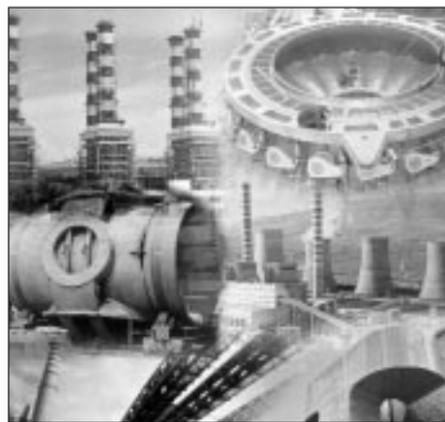
The main obstacle is the cost difference between liquid hydrogen and gasoline. Hydrogen will not be able to compete unless petroleum fuel becomes more expensive and hydrogen production becomes standardised.

significantly. Recently, the first hydrogen filling station went into operation at Munich Airport. It is fully automatic.

The fuel cell bus demonstration project in Vancouver, Canada was very successful. Three buses ran for two years in normal scheduled service. A parallel project in Chicago was also successfully completed. While the buses were more or less the same, the difference was in the filling station. In Chicago, the tanks were filled with hydrogen gas from the evaporation of the

liquid phase within half an hour. In Vancouver, there was a unit from Stuart Energy comprising an electrolyser filling the bus tanks overnight.

If the high production and storage costs of hydrogen can be overcome, it can be developed into an environmentally friendly fuel for automobiles. The fact that the automobile industry is interested in this technology and is developing prototypes is very promising.



For the new international airport in Munich, Bavaria, which opened in May 1992, it was considered promising to convert the airfield service, catering, aircraft tractors, waste removal trucks and passenger transport vehicles, such as minivans, buses, passenger cars, to hydrogen propulsion step by step, as existing vehicles were replaced. All vehicles have defined operating range requirements and are centrally refuelled. In many cases they provide a viable alternative to presently operated hybrid vehicles, while reducing emissions



Education - Clean and Renewable Energy

achieve a viable world economy. In the years to come, investments in energy, both to replace existing resources and to meet increasing energy requirements, will oblige economies to arbitrate among energy options taking into account environmental concerns. The opportunity should be seized to promote an environmentally sound energy policy on a global level.

With an entire volume dedicated to clean and renewable energy, *Bio-Syllabus for European Environmental Education* provides the guidelines and information necessary to promote the use of clean energy sources and the implementation of programmes and policy in renewable energy.



Hydrogen - the fuel of the future

Hydrogen is the most abundant element in the universe, but is rarely found in its uncombined form on Earth. It contains the highest energy to weight ratio of all fuels, released during its combustion to give water as a by-product. However, a chemical process is first needed to produce hydrogen in its molecular form before its use in energy production. That is why it is considered more as an energy storage medium, a battery. The energy needed to obtain hydrogen is stored and then given back during combustion.

Hydrogen can be used in any application in which fossil fuels are being used today, with the sole exception of cases in which carbon is specifically required. Hydrogen can be used as a fuel in furnaces, internal combustion engines, turbines and jet engines, even more efficiently than fossil fuels, i.e., coal, petroleum and natural gas. Automobiles, buses, trains, ships, submarines, aeroplanes and rockets can run on hydrogen. Hydrogen can also be converted directly to electricity by fuel cells, with a variety of applications in transportation and stationary power generation. Metal hydride technologies offer a variety of applications in refrigeration, air conditioning, hydrogen storage and purification. Combustion of hydrogen with oxygen results in pure steam, which has many applications in industrial processes and space heating.

Hydrogen is also an important industrial gas and raw material in numerous industries, such as computer, metallurgical, chemical, pharmaceutical, fertiliser and food industries. In the first half of this century the entire gas supply consisted of town gas, a coal gas consisting of more than 50% hydrogen. Only with the discovery of oil and natural gas reserves was hydrogen gradually forced out of the public supply system. As recently as 1992, almost 3 billion m³ of town gas (a third of that in the former East Germany) was still in use in the private household and small industry sector. This quantity represented about 10% of the natural gas consumption in this sector. The burning of hydrogen with air under appropriate conditions in combustion engines or gas turbines results in very low or negligible emissions. Trace hydrocarbon and carbon monoxide emissions, if generated at all, can only result from the combustion of motor oil in the combustion chamber of internal combustion engines.

Passive solar buildings

Building design has historically borrowed inspiration from the local environment and available building materials. More recently, humankind has designed itself out of nature, taking a path of dominance and control which led to one style of building for nearly any situation. Passive solar or climate responsive buildings use existing technologies, techniques and materials to heat, cool and light buildings. They co-ordinate traditional building elements like insulation, south-facing glass, and massive floors with the climate to achieve sustainable results. These

beautiful, comfortable and healthy living spaces can be built for no extra cost while increasing affordability through lower utility payments. They also keep investment capital in the local building industry, rather than transferring it to short term energy imports.

Today, passive solar buildings contribute to an energy independent and sustainable future. Advances in glass technology have perhaps been the single largest contributor to building efficiency since the 1970s and they play an important role in solar design.

Solar energy installations

The conversion to electricity and heat is the way in which solar energy can replace fossil fuels. The direct transformation into electricity is possible following the photoelectric effect. In this case, light photons hitting a special crystal - primarily silicon - release electrons which supply kinetic energy. After its illumination, the crystal is transformed into an electrical generator, which, linked to an electric circuit, can produce direct current electricity. Photovoltaic modules have no moving parts, are virtually maintenance-free, and have a working life of 20 to 30 years.

Solar energy installations have virtually no negative environmental impact. The major benefit is that there is no emission of greenhouse

gases, such as carbon dioxide, in the production of energy from solar systems, whether photovoltaic or thermal. Also, the presence of solar energy installations is not harmful to local ecosystems and wildlife, as these installations do not consist of any fast moving parts (i.e., wind turbines). Only in the case of large-scale applications do impacts on the local environment have to be carefully watched.

Solar energy is a clean and renewable resource, which is very popular for its environmental advantages. Small solar thermal units are widely used to heat water, mostly in the Mediterranean countries. The use of solar energy by the photovoltaic

process has been technically developed thanks to the exploration of space, where it represents almost the only way to supply space probes with electric power.

However, the solar constant of 10 kW/m² is an important limitation to the energy density. The energy supply is also dependent on the day and night cycle and on weather conditions. Thus, a power plant distributing electric energy to a network of consumers must be very large to balance these effects, and solar energy has to be combined with other energy sources or with an energy storage medium to stabilise power availability. For these reasons, solar energy contributes only by about 0.14% to the world's total energy demand. This places solar energy far behind hydropower and biomass.

For better results, the energy distribution must be based on a large number of diffuse power units (the advantage is that solar radiation is far from localised) rather than a huge central plant, and on a large consumer network.

This involves major technical skills and also a different organisation of available energy distribution networks including, to a large extent, social restructuring. Very distant future solutions could maybe include huge central solar power plants distributing solar energy collected from large solar panels in orbit!

Wind power

The evident advantage of this technology is its lack of emission of polluting gases like those emitted by the use of fossil fuels. A modern 600 kW wind turbine in an average location will annually displace 1,200 tonnes of carbon dioxide from other electricity sources, i.e. usually coal-fired power stations. However, wind turbines present problems of noise pollution, bird mortality, and interference with telecommunications. There are two potential sources of noise from a wind turbine: mechanical noise from the gearbox or generator, and aerodynamic noise from the rotor blades. Technical improvements in blade construction have reduced the noise.

Large, modern wind turbines have become very quiet. At distances above 200 metres, the swishing sound of rotor blades is usually masked completely by wind noise in the leaves of trees or shrubs.

Europe's largest wind park in Carno, Wales, produces the equivalent of the electricity consumption of 20,000 homes. In Europe, more than 6,600 megawatts of wind power were on-line as of January 1999, covering the average domestic electricity consumption of seven million people. Worldwide, 10,000 MW have been installed. This is equivalent to the amount of nuclear power installed worldwide by 1968.

As recorded in Denmark between 1980 and 1995, technological advances in aerodynamics, structural dynamics and micro-meteorology have contributed to a 5% annual increase in the energy yield per square metre wind turbine rotor area. New technology is continuously being introduced in new wind turbines. The weight of Danish wind turbines has halved in 5 years, the sound level has halved in 3 years, and the annual energy output per turbine has increased 100-fold in 15 years. The megawatt-market took off in 1998, however, 600 and 750 kW machines continue to be the "working horses" of the industry at present. Megawatt-sized machines are ideal for offshore applications, and for areas where space for siting is scarce, so that a megawatt machine will exploit the local wind resources better.

Opinion polls in Denmark, Germany, Holland and the UK, show that more than 70% of the population is in favour of using more wind energy in the electricity supply. People who live near wind turbines are on average even more favourable towards wind energy, with a score of more than 80% in favour of wind energy.

Lessons from History

- According to legend, Archimedes used a parabolic collector to set the Roman fleet on fire during the battle of Syracuse.

✎

- In 1767, the Swiss scientist Horace de Saussure was credited with building the world's first solar collector, later used by Sir John Herschel to cook food during his South Africa expedition in the 1830s.

✎

- One of the fathers of solar energy was inventor Clarence Kemp, who, in 1891, patented the first commercial solar water heater in Baltimore, USA. In 1895, two Pasadena, California executives bought the rights to Kemp's solar system, and, with the help of high gas and coal prices, fitted 30% of the homes in Pasadena with solar water heating systems by 1897.

✎

- In 1905, Albert Einstein in a publication in the journal *Annalen der Physik* explained the photoelectric phenomenon properties, considering that light is composed of distinct energy particles called photons and won the Nobel Prize in 1921 for this success.

✎

- Solar technology advanced to roughly its present design in 1908 when William J. Bailey of the Carnegie Steel Company, invented a collector with an insulated box and copper coils.

✎

- The rationing of copper during the Second World War sent the solar water heating market into a sharp decline.

✎

- During the 1970s, in response to the OPEC oil embargo, a number of incentives were established to promote solar energy.

✎

- The Gulf war of 1990 sparked interest in non-fossil fuel energy alternatives. International markets for solar energy take off in the mid 1990s.

✎

- By the mid 1990s, tax credits and incentives had mostly disappeared, but today's industry represents the few strong survivors and, in the USA, more than 1.2 million buildings have solar water heating systems, and there are 250,000 solar heated swimming pools.

Greek mythology is alive today! It can be found in the mountains and rivers of rural Greece, its islands, and other lands where Greeks once lived. Heracles, Apollo, Zeus, Hera, Hermes, Dionysus and the others are all here, plotting, betraying, fighting, celebrating, consorting. One has only to know where to look.

The myths are an intricate and vast collection of inter-woven stories whose origins pre-date written records. They relate to all aspects of human life and experience, blending the divine with the mortal, man with nature, heaven with earth. The myths convey beliefs, superstition, ritual, social ideas, philosophy and ethical values. They speak of the origin of the universe and of man, of the deluge, of epic battles among the gods, and of men who knowingly and unknowingly interact with the gods. Nature comes alive. Rivers were begotten by gods, had names, and bore families.

BIO has re-visited this rich treasury of Greek lore and has assembled a new CD which organizes the myths according to the mountains and rivers whose names can be traced to mythology or where events recounted in the myths were said to have occurred. Myths were told and re-told by word of mouth, and many variations of the same

story exist, often localized for the benefit of the inhabitants of a given area. The CD reflects this multiplicity and includes links to other versions of a story or to related events.

In its concept of Bio-tourism, BIO has promoted the idea that the traveler should come into intimate contact with the culture and environment of an area in a way that is constructive. Mythology is an important element of Greek culture, and it is hoped that this CD will enrich the experience of both visitors to the country and armchair travelers. What follows is a sampling of the many tales found in the CD.

INACHUS RIVER

The name Inachus is believed to have a Cretan origin. Several rivers were named Inachus including a river in Argolis commonly known today as the Panitsa. Its origin is on Mount Lycium and its mouth in the Argolic Gulf. A rapid torrent during winter, it dries up during the summer months. Inachus, who gave his name to the river, has been described as the founder of the royal house of Argos, and members of his line are called Inachids.

Like most of the rivers, Inachus was the son of the gods, Oceanus and Tethys. After the great flood of Deucalion, he brought the Argians from the mountains to the sea, and made the area habitable by collecting the waters of the river into one channel. He married the nymph Melia ("ash-tree"), who gave birth to the first man, Phoroneus, according to the belief in Argos. Inachus' son Phoroneus



had many children and his children had more children; thus the number of people on the earth multiplied. With the permission of Zeus, Phoroneus became the first mortal king on earth. Up to that time, Zeus had been the king of both gods and mortals.

Io and Zeus

A daughter of Inachus who was named Io was so beautiful that Zeus wanted her. When the

king of the gods went to see his beloved Io in Argos, he took Hermes with him to serve as a distraction. While Hermes kept the king and his people occupied, Zeus consorted with Io. Ploutus contributed to making the scene pleasant by causing the waters of the Inachus to overflow and irrigate the Argolic plain, thus yielding richer produce. But the jealous Hera responded by bringing a drought to Argos. She metamorphosed Io into a cow and placed a guard next to her who would play his flute and watch her at all times. Zeus, in turn, sent Hermes to kill the guard and liberate her.

In another version of the myth, Io as a young girl repeatedly saw Zeus in her sleep telling her to go and meet him. When she told her father about the dream, he sent an emissary to Dodona to consult the oracle. The oracle directed that he should send his daughter away; otherwise Zeus would burn his country. Inachus complied. At that moment Io was metamorphosed into a cow and

Argos, a shepherd, guarded her. When the shepherd was killed, Io was stung by a fly that made her run about manically until she reached the river Nile, where she bore her child. Just before she reached the area, she heard the oaks of Dodona tell her that she was Zeus' honored wife.

According to another myth, when the god of the sea, Poseidon, competed against Hera to see who would be the ruler of Argos, Inachus and two other rivers were selected as judges of the contest. But Inachus was partial and favored Hera. For that reason, Poseidon caused Inachus and the other river-judges to dry up in the summer. After this incident, the worship of Hera was introduced into the city, and Inachus was the first who made sacrifices in honor of the deity.

NOMIA MOUNTAIN

Nomia, the name of an Arcadian nymph, is also the name of a mountain range along the border between the provinces of Arcadia, Elis, and Messenia, south of Mount Lycaeon and north of the plain of Messenia. Its highest summit is 1,388m, and today the range is known as

Tetrazio. In antiquity, the town of Lycosura in Arcadia was near the mountain. A surname of Apollo, Lycius, can be traced here. Nomioi was the general name of the gods who protected cattle, and included Pan, who learned to play the pipes here, Hermes Nomaius, Apollo Lycius and Lycoctonos.

Apollo and Coronis

Once, when Apollo was in Lakereia, a city in southeastern Thessaly, the beautiful Coronis, daughter of the king Phlegyas, was strolling alone by the lake, and as she leaned to cool her feet in the water, Apollo saw her and instantly fell in love with her. The god took Coronis in his arms and made love to her. Returning to the palace, Coronis was too ashamed to mention what had happened to her parents. She had been engaged to Ishys, son of the king of Arcadia, and she went ahead with her marriage plans. As the time of the wedding drew near, a crow saw the preparations and promptly flew to Delphi to tell Apol-

lo that his beloved was soon going to marry someone else. Apollo cursed the eager crow, which up to then was white in colour, and caused it to turn to black just as it had blackened his heart. He then killed the bridegroom with his arrows and had his sister Artemis to kill Coronis and her companions.

However, not wanting his unborn child to die, just as Coronis' body was placed on the funeral pyre, Apollo grabbed the babe from her womb and entrusted it to the wise centaur Cheiron to raise. The child was given the name of Asclepius and was raised in Cheiron's cave from whom he learned how to cure every illness. His reputation as a healer soon became well known throughout the country, and people from all over the land came to him to be cured.

Asclepius the healer

One of Asclepius' patients was Hippolytus, son of Theseus and the Amazon Queen Antiope. His father's later wife, Phaedra, fell in love with Hippolytus and tried to seduce him, but he rebuffed her. Phaedra, fearful of the consequences and also wanting to take revenge, claimed to Theseus that his son had tried to rape her. Theseus cursed his son and called on the god Poseidon to kill him. Poseidon sent a raging bull from the sea to terrify Hippolytus' horses. Hippolytus was tossed from his chariot and dragged, then torn apart by his horses. The name Hippolytus means, "torn apart by horses". In her grief, Phaedra hanged herself. Asclepius applied his skills and brought Hippolytus back to life, but Zeus became furious because he believed that Asclepius had crossed the line that separated the gods from mere mortals. He thus hurled one of his thunderbolts at Asclepius and killed him.

Apollo was very saddened by the death of his son Asclepius and sought revenge. Since he could not fight against his father Zeus, he instead killed the three Cyclopes who produced Zeus' thunderbolts. In order to punish him for the triple murder, Zeus thought of banishing him to the Tartarus, but Apollo's mother Leto interceded and won a lighter punishment. Apollo was condemned to serve Admetus, the king of Pherae, as his shepherd for one year. Thereupon came the name Lycius.

MOUNT OLYMPUS

Mount Olympus, the tallest mountain in Greece at 2,973m, was the home of the Olympian gods. Its south side forms the boundary with Thessaly, a region located in the central part of the country. Heaven was seen as a metaphor for the summit of the mountain, which was perpetually covered with snow.

The titan Cronus, along with Rhea, fathered the Olympian gods, chief of whom was Zeus. Fearful of a prophecy that they would one day overthrow him, Cronus swallowed his children when they were infants. The youngest sibling, Zeus, was saved by his mother and caused his brothers and sisters to be disgorged. Together with them, he began a war

against Cronus and the ruling Titans. Known as the Titanomachia, or battle of the Titans, this war was waged in Thessaly for ten years. The Titans occupied Mount Othrys and the sons of Cronus occupied Mount Olympus. Eventually, the Titans were overcome and hurled below to Tartarus. The victorious Olympian gods remained atop Mount Olympus.

Later, the gods of Mount Olympus were threatened by Otus and Ephialtes, the two giant sons of Poseidon by Iphimedeia, renowned for their extraordinary strength and fearlessness. At a young age, the giants attempted to scale heaven by piling Mount Pelion on the top of Mount Ossa and both on the lower slopes of Mount Olympus in order to reach the abode of the gods. They would have accomplished this feat had they been allowed to grow to manhood, but Apollo destroyed them "before their beards began to grow."

According to Homer, the gods lived in palaces on the summit of Mount Olympus and spend their days in solemn assembly in the palace of Zeus, while the younger gods danced and the Muses played the lyre and sang. Their abode was hidden from the view of mortals by a wall of clouds, the gates of which were guarded by the Horae, the divinities of the weather and ministers of Zeus. Over time, the real seat of the gods became less material and was gradually transferred from the summit

of Mount Olympus to heaven itself.

The Olympian gods

In addition to Zeus, the great Olympian gods were Poseidon, his brother; Hera, his sister and wife; Demeter, his sister; Ares, Hephaestus, and Hestia, his children by Hera; Apollo and Artemis, his children by Leto; Hermes, his son by Maia; Athena, his daughter by Metis; and Aphrodite, his daughter by Dione. Olympus was a surname not only of Zeus but also of all the gods who lived on Olympus, as distinct from the gods of the underworld. Although Poseidon generally dwelt in the sea, he also appeared on Olympus when the gods were an assembly.

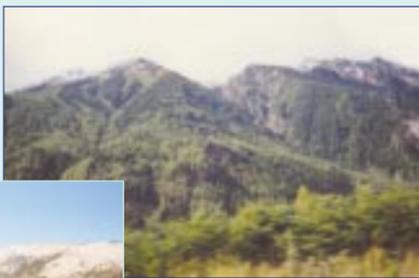
Demeter, Persephone and Hades

Once, Persephone disappeared, and her mother Demeter, goddess of agriculture, learned that the king of the underworld, Hades, had abducted her with the consent of Zeus. Furious, Demeter left Olympus and went to dwell upon the earth among the mortals. She produced a great famine by not allowing the crops to grow. Zeus, fearful lest the race of mortals should die out, sent Iris, the messenger goddess, to persuade Demeter to

return to Olympus. But Demeter would not return. In desperation, he sent all the gods of Olympus to implore her with entreaties and presents, but she vowed neither to return to Olympus nor to restore the fertility of the earth until she had seen her daughter again. Eventually, Persephone was allowed to leave the underworld but only for part of the year. Hades had given Persephone the seeds of a pomegranate; her acceptance symbolized the consummation of their relationship, and henceforth, Persephone was regarded as the spouse of Hades. Rhea finally persuaded Demeter to return to Olympus and to restore fertility to the earth.

Hephaestus, Aphrodite and Ares

Hephaestus, the god of fire and metal-smiths, was married to Aphrodite, but this was not a happy union. Aphrodite and Hephaestus had no



Mountains of Greece

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children, and Aphrodite secretly loved Ares, the god of warriors. Whenever Hephaestus was away, they would meet in his house. But Helios, the sun god who sees everything, alerted Hephaestus, who by trickery trapped the two lovers in



bed and exposed them to the mockery of the other gods. When Hermes and Apollo saw how Hephaestus had trapped Aphrodite and Ares in the act of love and displayed them for all the immortals to see, Apollo asked Hermes how he would feel if he were ever in such an embarrassing position. The lighthearted Hermes replied that he would suffer thrice the bindings if only he could share the bed of Aphrodite!

Apollo and Hermes

Apollo was the god of prophecy, musical and artistic inspiration, archery and healing. Although one of the great gods of Mount Olympus, Apollo is often described as being dependent on his father Zeus as the source of the all his powers.

Hermes, the son of Zeus and Maia, acted as herald of the gods and a deity of wealth, trade and travelers. He was the most cunning of all the gods. Before he was even a day old, Hermes escaped his cradle and traveled to Pieria, where he saw the renowned herds of Apollo. He decided to steal them and take them back to his native Arcadia. He divided the stolen animals into twelve parts for the twelve great



gods of Mount Olympus and had them walk backwards in order to cover their tracks. When Apollo discovered the theft, he promptly confronted Hermes. Maia was perplexed at Apollo's accusation of her infant son, but Apollo brought Hermes to Zeus, who ruled that he return the stolen cattle to their rightful owner. Hermes began to play on a lyre he had crafted out of a tortoise shell, and Apollo was so charmed by the music that he allowed Hermes to keep the animals. Hermes, in turn, gave Apollo the lyre, and the two brothers immediately became great friends. This theft won Hermes recognition as a god.

Dionysus, the god of wine and song, was a late arrival on Mount Olympus. After establishing his divinity throughout the world, he led his mother, Semele, out of the underworld Hades, named her Thyone ("raging queen"), and ascended with her to Mount Olympus.

The lesser dieties

Pan, a son of Hermes, was the god of goatherds and shepherds and was born with horns, hooves, a tail and a furry body. The appearance of her newborn son caused his mother, the Nymph Driope, to run away in fear. Hermes carried Pan up to Mount Olympus, where all the gods were delight-



ed with him, especially Dionysus. Pan lived in Arcadia, dwelt in grottos, wandered on the mountains and in the valleys, and amused himself with the chase or in leading the dances of the Nymphs. He was fond of music and invented the syrinx,

or shepherd's pipe, which he played in a masterly manner.

Hermes is said to have carried the newborn Heracles to Mount Olympus and placed him at Hera's breast while she was asleep. Hera pushed him aside in fury upon waking up, and the spilt milk created the Milky Way. Hera continued to persecute Heracles for many years thereafter. Eventually, Heracles sacrificed himself, became immortal, and ascended to Mount Olympus. There, he married again, this time to Hebe, daughter of Zeus and Hera. Hebe had the honor of being appointed as the gods' cupbearer, pouring and bringing them wine. Hebe was worshipped as a goddess of pardons or forgiveness; freed prisoners would hang their chains in the sacred grove of her sanctuary at Phlius.

The Muses

The nine Muses were daughters of Zeus and Mnemosyne, the Titan goddess of memory, and each had mastered a particular art: Calliope, epic poetry; Clio, history; Euterpe, lyric poetry; Melpomene, tragedy; Terpsichore, choral song and dance; Erato, love poetry; Polyhymnia, sacred poetry; Thalia, comedy; Urania, astronomy. The Muses acquired their skills from their leader, Apollo. Goddesses of singing, art, and science, the Muses seemed to come and go on Mount Olympus as they pleased. They were often found there entertaining the gods while Apollo strung his lyre. They also liked to haunt Helicon Mountain. Humans often implored the Muses to grant them good signing voices.

Asteria, sister of Leto and another beloved of Zeus, was an inhabitant of Mount Olympus. In order to escape Zeus' persistent advances, she first metamorphosed into a quail and then threw herself into the sea. Later, she turned into the island of Asteria ("starry sky"), or Ortygia, an island that later became known as Delos.

Ate, a daughter of Eris, goddess of discord, was an ancient divinity who led both gods and men to rash and incon-s i d e r a t e actions, causing much suffering. At the birth of Heracles, she induced Zeus to take an oath by which Hera was enabled to give Eurystheus

the power that had been destined for Heracles. When Zeus realised that Ate was responsible for this thoughtless act, he hurled her from Mount Olympus and banished her forever from the abode of the gods.

Pegasus

Fathered by Poseidon, Pegasus, the famous winged horse, was born when the hero Perseus slew the Gorgon Medusa and cut off her head. Pegasus originally rose up to the seat of the immortals and lived in the palace of Zeus, for whom he carried thunder and lightning. However, later writers describe him as the horse of Eos, sister of the sun god Helios and the personification of the dawn (Aurora) and

Bellerophon

Bellerophon was one of the heroes that had two fathers, one mortal and one divine. Some considered him the son of Glaucus, others the son of

Poseidon and Eurynome, the daughter of Nisus ("brightness" or "emigrant"). From Poseidon, Bellerophon had received Pegasus, the winged horse that sprang from the neck of Medusa when she



was decapitated by Perseus. Bellerophon had many adventures riding Pegasus, but by being presumptuous, he brought about his own demise. He proposed to ride up through the sky to join the gods on the top of Mount Olympus. Zeus was not amused and sent a stinging fly to cause Pegasus to rear and throw Bellerophon off. Others say that Zeus unseated Bellerophon with a thunderbolt, causing him to fall back to earth.

Orpheus

According to the great Athenian dramatist, Euripides, Orpheus, a son of Apollo and the Muse Calliope, was endowed with a supernatural talent for the art of music. He initiated the Bacchanalian rituals in honour of Dionysus (Bacchus), the god of wine, in the forests of Mount Olympus. After his violent death at the hands of the maddened Maenads, the female devotees of Dionysus, Orpheus' remains were collected by the Muses and buried at the foot of Mount Olympus.

ALPHEIUS RIVER

The Alpheius is the longest river of the Peloponnese, flowing for 111 km, with many tributaries. It flows through Megalopoli and continues in a north-western direction, providing a natural border between the provinces Arcadia and Elis. It joins the river Ladon further on, then the river Eurymanthus, and flows by ancient Olympia, reaching the Kiparissiakos Gulf 6km south of Pyrgos. The name Alpheius is considered by some scholars to be pre-Hellenic and of Semitic extraction. Today the river is commonly called Roufias, a name possibly of Slavonic origin.

Alpheius and Arethusa

Alpheius was worshipped as a river god in all the places that the river flowed through, but more so in Arcadia, Messenia and especially in Elis. In areas where the river was important for people's livelihood, Alpheius would assume even a greater importance than one of the twelve gods. Alpheius' father was either Helios or Oceanus, and his mother was Tethys. Alpheius was a handsome young man and a hunter, who roamed the forests of Arcadia. There he fell in love with Arethusa ("the waterer") who was one of the company of Artemis, the goddess of the hunt. Artemis and her maidens were committed virgins, and so she refused to marry him. To escape his advances, Artemis metamorphosed her into a spring and through underground channels, she reached Ortygia, a small island near Syracuse where she sprang up again. Alpheius, however, was madly in love with her, so he became a river and after crossing the sea, finally reached her. Both the names Alpheius and Arethusa are related etymologically to the Greek verb meaning to water. Phoenician merchants once named a spring they found among the willows, Alphaea, the spring of the willows.

Tyro, was the daughter of Salmeoneus ("beloved

of the goddess Salma"), the ruler of Thessaly. She fell in love with Enipeus, a tributary of the Alpheius and spent her days by the riverbank. Enipeus, although flattered, did not encourage her feelings. Once the god of the sea, Poseidon ("he who gives to drink from a wooded fountain"), saw Tyro, and taken by her, he assumed the appearance of Enipeus and asked her to meet him at the point where the Enipeus joins the Alpheius. When she went there, Poseidon put her into a deep sleep and subsequently raped her. When she awoke, she realised what had happened and was astonished by the deceit. But Poseidon laughed and said that if she kept the matter a secret, her reward would be that she would bear twin boys from a father who was far superior to a river god. Tyro kept the secret, but due to a cruel step-mother, Sidero, ("iron woman"), she had to abandon her children. The twins were found by a horse and were raised by the horse's owner. One of them was given the name Pelias ("black and blue"), and later became the king of Iolcus; the other was named Neleus ("ruthless") and became king of Pylos. When they grew up, the two brothers set out to find their mother, Tyro. When they had found her, they avenged their mother's suffering at the hands of Sidero, by pursuing Sidero to the temple of Hera, where Pelias stabbed her to death.

Oenomaus ("impetuous with wine"), king of Pisa in Elis, was married to the Pleiad Sterope, by whom he became the father of Hippodameia ("horse tamer"). He vowed not to surrender his daughter to any suitor unless the suitor could defeat him in a chariot race. Oenomaus would invariably win each contest and would then kill the suitor. However, Pelops ("muddly face") used deceit to win the race and thereupon threw Oenomaus into the river Cladeus.

Origin of the Olympic Games

Pelops was the son of Tantalus ("lurching" or "most wretched"), the mythological king of Asia Minor, who was favoured by the gods. Pelops was said to have lived during the dawn of pre-historic times and gave his name to the Peloponnese. According to Pausanias and others, the Olympic Games were established in memory of Pelops. The banks of the Alpheius were the burial place of Pelops. Another legend has Heracles as founder of the Olympic Games. After defeating Augheias in battle and killing him, Heracles is said to have gone to the banks of the Alpheius River and established the Olympic Games, in the memory of his victory, having first

built six altars, one for each pair of Olympian gods. In those days, women were forbidden from attending the Olympic Games. Those who disobeyed the rules and attended the Olympic Games, or who simply crossed the Alpheius during the days that it was forbidden, were thrown off Mount Typaeon, a steep mountain lying between Skilountas and the Alpheius.

Sheep and oxen were raised by the banks of the Alpheius, and this is why the river was some-



times connected to the labour of Hercules in which he cleans the stables of Augheias. Hercules changed the direction of the waters and cleared the area from the manure which had been accumulating there for 30 years. The myth is symbolic since the river has changed its course frequently over time. Even today, traces of the old river bed can be seen.

(Photos: N. Arvanitakis)

Universal Commitment for the Dignity of the Human Being

II World Conference on Bioethics Gijon, Spain, October 4, 2002



Full text of the Universal Commitment for the Dignity of the Human Being:

Observing that:

Human dignity, as an attribute or value which is unique to human beings and from which other values and fundamental rights follow, is recognised or is alluded to in international documents such as:

- ▶ the Universal Declaration on Human Rights (UN, 10.12.1948)
- ▶ the Convention for the Protection of Human Rights and Fundamental Freedoms (4.11.1950)
- ▶ the Social Charter of Europe (18.10.1961)
- ▶ the International Agreement on Civil and Political Rights (16.12.1966)
- ▶ the International Agreement on Economic, Social and Cultural Rights (16.12.1966)
- ▶ the Convention on Children's Rights (20.11.1989)
- ▶ the Declarations, Treaties and Protocols of the UN with regard to Women (1967, 1974, 1977, 1993, 1999)
- ▶ the Convention of Asturias on the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine (Council of Europe, 4.4.1997)
- ▶ the Declarations, Agreements or Protocols that followed the Summits of Rio (June 1992), Kyoto (December 1997), Montreal (January 2000) and Johannesburg (September 2002)

or any other such documents whose principles have been embodied, in general, by the constitutions and the legal and juridical ordaining of democratic nations, as well as in

- ▶ the Universal Declaration on the Human Genome and Human Rights (UNESCO, 11.11.1997)
- ▶ the Bioethics Declaration of Gijon (First World Conference on Bioethics, SIBI, 24.6.00)
- ▶ the Bioethics Declaration of Caracas (First Iberoamerican Conference on Bioethics (9.2. 2001)

The Second World Conference on Bioethics convened with great success in Gijon, Spain, from September 30 to October 4, 2002. The Conference was organised by the International Bioethics Society (SIBI), with the leadership of Professor Marcelo Palacios, President of SIBI's Scientific Committee. This distinguished event was placed under the auspices of the President of the Government of the Principality of Asturias, Vicente Alvarez Areces, and the President of the Autonomous Parliament of the Principality of Asturias, Maria Jesus Alvarez.

As a Member of SIBI's Scientific Committee, the B.I.O. President participated

Full dignity of the human being is a fundamental right for each and every individual which must be respected and protected.

In spite of this fact, in far too many places in the world such norms or principles are still restricted or even deliberately violated because neither the dignity of the human being nor the rights that follow from it are recognised in their full extent.

Millions of people are suffering from hunger, lack of drinking water and proper housing facilities, from diseases (AIDS being the most dramatic example), from indigence due to poverty and scarcity of essential goods or needs - all of them evils that could be easily and readily overcome - conditions that are turning individuals into fully dependent beings or are leading them to extermination and death while the affluent society - the smallest share of the world's population - are enjoying wealth and abundance and even squander global natural resources.

Nature, biodiversity and the environment are undergoing an increasingly alarming decline with the progressive reduction of green areas, the extermination of animal species, the accumulation of waste and garbage in continental and maritime areas, the degradation of soil and waters because of global pollution levels, regardless of the fact that these are habitats, resources and spiritual resorts which are essential to human beings.

Violence, be it physical, moral, technical or social, is irrational behaviour which is anti-cultural and contrary to the dignity of human beings.

Wars and armed conflicts, terrorism, political or religious prosecution, forced emigration, aggression to cultural diversity and most particularly that of indigenous peoples, racism, xenophobia, social exclusion, exploitation and abuse of women and children, the abandonment of the elderly, the egotistic economic interests and the abuse of scientific and technological superiority, make evident the many violent and daily acts that affect all layers and domains of human life; acts that are increasing in number and intensity, often carried out with total impunity.

as a lecturer in the plenary session on "Food in the World." She discussed the ethical considerations of environmental deterioration and poorly distributed food resources, as well as our moral responsibility to protect biodiversity with a view to sustainable agriculture that can feed the world and guarantee the continuity of bios.

*The Congress culminated in a **Universal Commitment for the Dignity of the Human Being** a document which will be announced to governments, parliaments and international institutions around the world, so as to request consideration and implementation of the issues addressed.*

Full dignity of the human being is a fundamental right for each and every individual which must be respected and protected.

Affirming that individual and collective dignity is fiction if we:

- ▶ Fail to prevent that millions of disfavoured people go on suffering from famine, chronic malnutrition and lack of drinking water.
- ▶ Consent to the suffering of millions because of poverty-related diseases and scarcity of food and drinking water or because they live below the standards for a healthy living and have no access to essential health care services.
- ▶ Fail to promote the notion that everyone is entitled to access to education, fairly distributed labour and information on issues of their concern.
- ▶ Fail to avoid discrimination of persons and peoples, woman and child abuse, abandonment of the elderly and aggression to cultural groups, their identities and their vital surroundings.
- ▶ Tolerate, or in any way foster, racism, xenophobia, ideological, religious, political, cultural prosecution, or forced emigration.
- ▶ Fail to halt environmental degradation, the decline of nature and the arbitrary extinction of species (biodiversity).
- ▶ Fail to humanise science and technology so that they serve the general interest of humanity, and most particularly the interest of the most disfavoured.
- ▶ Continue to resort to weapons or terror to resolve our differences instead of building bridges of tolerance and constructive communication.

Believing that:

- ▶ Only with respect and the effective exercising of individual and collective human dignity everywhere on the planet can peaceful living, social justice, democracy, pluralism, equity, freedom, security, privacy, brotherhood, cultural diversity and the conservation of nature, can be achieved and can be finally established as natural rights we human beings are to enjoy and pass onto coming generations.
- ▶ There is an impending need to have every country sign and ratify, as soon as possible, the Treaty on Phylogenetic Resources with regard to food and agriculture, as well as to promote the fair distribution of benefits.

We express our firm commitment to:

- ▶ Promote and implement behaviours that make human dignity a universally exercised asset for a peaceful living, the responsible exercise of freedom, liberties and autonomy; an asset that is to be a legacy for generations to come.
- ▶ Progress with determination towards a new world order, promoting participation, responsibility, cooperation, equity and solidarity, so as to put an end to human miseries such as social injustice, hunger and poverty, economic mishaps, unemployment, cultural, ideological or religious oppression, illiteracy, social exclusion, armed conflicts and wars.
- ▶ Defend the right of every human being to adequate food and healthcare through the promotion of any means that will secure that right and by facilitating equity in the access to the benefits from scientific and technological achievements concerning nutrition and health care.
- ▶ Protect the environment, nature and biodiversity and focus on the prompt restoration of the damage so far inflicted upon these assets.
- ▶ Undertake the measures and implement the attitudes - be they individual, collective, social or political - that are required to put an end to violence in its different expressions and to establish effective respect for the dignity of human beings as an emerging new culture we cannot renounce.
- ▶ Urge governments to readily implement, with no excuse whatsoever, the measures and actions that are required to make the present Commitment effective.

THE BIO-ASSESSMENT OF TECHNOLOGY - A PATHWAY FOR BIOSAFETY AND NEW ETHICS

Biotechnology - State of the Art and Prospects of Development Moscow, Russia, October 14-18, 2002

A major international congress, themed "Biotechnology - State of the Art and Prospects of Development," took place in Moscow, Russia, on October 14-18, 2002. The congress was held under the auspices of the Russian Academy of Sciences, the Ministry of Industry, Science and Technology, the Ministry of Agriculture, the Ministry of Education, the Ministry of Health, the Russian Academy of Medical Sciences, the Government of Moscow, and Mendeleyev University of Chemical Technology of Russia.

The goal of the congress, which also featured a special exhibit on the latest biotechnology methods, was to bring together leading professors, scientists and experts to present their experience and answer questions related to biotechnological development. The congress also aimed at

promoting new government regulations regarding biosafety and biotechnology, as well as raising important bioethical issues.

As mentioned by the Vice President of the Russian Academy of Sciences, **Professor N.A. Plate**, "...during the period of reforms carried out in Russia at the present moment, the further development of modern biotechnology acquires special importance, both economic and scientific. The use of living organisms and the biotechnological potential of economic activity are an advantage that can help to solve such problems as shortage of foodstuffs, depletion of natural energy sources, problems of biosafety, plant growth control, and the diagnosis and cure of dangerous diseases."



The following topics were discussed:

- ▶ Biotechnology and medicine, the production of new drugs, vaccines, proteins and immunomodulators
- ▶ Biotechnology in agriculture and food production, genetically modified organisms
- ▶ Biocatalysis and organic synthesis, genetic engineering technologies, nanobiotechnology and biosensors
- ▶ Biogeotechnology, wastewater treatment, oil recovery
- ▶ Biotechnology in industry, processes and equipment of microbiological industries, sterile and non-sterile fermentation, industrial use of microorganisms, biocatalysis in industry

- ▶ Biotechnology and the environment, biomonitoring, conversion of organic wastes, treatment of wastewater and processing of industrial and agricultural wastes
- ▶ Biosafety and bioethics, legislation and regulation in biotechnology, new directions in education

The B.I.O. President was invited by the congress Co-Chairman and Rector of Mendeleyev University of Chemical Technology of Russia, **Professor Pavel Sarkisov**, to chair the Plenary Session on "Biosafety and Bioethics," along with **Professor A.A. Kokoshin**, Deputy Chief of the Committee for Industry, Construction and High Technology of the State Duma of the Russian Federation, and **Professor G.A. Yagodin**, Rector of Moscow International University.

Organic Agriculture - Regulations



Organic farming is an environmentally friendly alternative to conventional farming. It uses locally available resources and replaces external inputs. Unfortunately, it is still practised on a small scale basis compared to conventional agriculture. However, the trend towards organically grown foods is increasing across the globe, and it is estimated that more and more farmers will convert their farmland to organic, therefore increasing rural employment and protecting the environment.

Organic agriculture defined

Organic agriculture is farming that is based on ecological principles - hence the terms biological or ecological farming which are also used to describe this production method. The goal of organic agriculture is to create a sustainable agriculture system. It favours renewable resources and recycling, returning to the soil nutrients found in waste products. Where livestock is concerned, meat and poultry production is regulated with particular concern for animal welfare and by using natural foodstuffs.

Organic farming respects the environment's own systems for controlling pests and disease in raising crops and livestock. It also begins to consider potential environmental and social impacts by eliminating the use of synthetic inputs, such as pesticides, herbicides, chemical fertilisers, growth hormones, antibiotics or gene manipulation. These are replaced with site-specific management practices that maintain and increase long-term soil fertility and encourage biodiversity on the farm and in the wider area.

Inspection and certification

The expanding demand for certified organic agriculture products requires a procedure that responds to traders, retailers and consumers' needs in terms of quantity, regularity and quality of supply. Suppliers must be able to illustrate that their products follow internationally agreed upon organic standards. The establishment of stable certification and inspection systems entails advanced legal and technical knowledge and organisational skills. Certification means having the farm and the farmer's methods inspected by an organic certifying group to ensure that

they comply with standards and guidelines on organic farming. In fact, according to the EC and Codex guidelines, the use of terms inferring that organic production methods have been used are restricted to products derived from operators under the supervision of a certification body or authority and are subject to a regular inspection system meeting minimum requirements. Inspection covers all stages in the production process, includ-

Inspection and certification systems are used to verify the labelling of, and claims for, organically produced foods. Inspection covers all stages in the production process, including storage and packing.

ing storage, processing and packing. Farm inspections are carried out at least once a year and spot checks are also undertaken.

Each certifying group has a code of standards which is available to interested people. Different certifiers use different inspection methods and criteria, but the results are similar.

These organic and certification systems are themselves designated by and subject to regulation authorities whose responsibility it is to approve and supervise the schemes impartially and effectively and

make sure they meet all relevant national and international requirements.

Sanctions for infringements of any of the rules include instant removal of the right to claim organic status for the product concerned with stricter penalties imposed for more serious breaches. Comprehensive and exact record keeping is demanded, including, for livestock farmers, complete records of their livestock management systems.

Developing countries

The FAO Committee on Agriculture has recognised that demand for organic products has created new export opportunities for the developing world. According to the 22nd FAO Regional Conference For Europe on organic farming and food quality "export of organic products from developing countries into EU-member states requires that the country of origin appears in a list drawn up by the Commission. On request, a third country can be included in this list if it demonstrates that the organic food is produced according to rules that are equivalent to the rules of organic production laid down in EC legislation and that is subject to inspection measures that are equivalent to those stipulated for products originating in the EU. Such regulations ensure that consumers in EU countries are assured organic products of acceptable quality regardless of the country of origin."

It is feared that some developed countries may not want to accept products from develop-



ing countries, for they may not trust the organic certification of these products. Decision makers in the public and private sector in developing countries often lack the necessary information to make decisions regarding the development of organic production. It is therefore essential that on a local level developing countries should invest on improving inspection and certification of organic produce.

Organic farming and species biodiversity

Experts estimate that species are disappearing at the rate of 20 to 75 a day. In the next 25 years, we can expect 1.5 million species to become extinct. Conversion to organic farming is considered the first step towards a modern type of agriculture that does not only produce crops but also protects species diversity. Long term research projects have gathered solid evidence that organic systems are beneficial to biodiversity. These benefits have been recognised by organisations concerned with the conservation of individual species or habitats, which are increasingly turning to organic management regimes on farmed areas. Where farms and commercial

forests are managed along organic guidelines a philosophy of cycles is adopted. Diverse combinations of plants and animals optimise nutrient and energy cycling for agricultural production.

For the compilation of this document information was used from the European Commission website on Agriculture, from the Twenty Second FAO Regional Conference for Europe on Food Safety and Food Quality as Affected by Organic Farming, from Organic Agriculture World-wide 2002 by Yussefi M. and Willer H. published by Biofach and from the High-Level Pan-European Conference on Agriculture and Biodiversity.

Labelling

Organic is a labelling term that indicates products that have been produced in accordance with organic standards throughout production, handling, processing and marketing stages, and certified by a duly constituted certification body or authority. The organic label is therefore a pro-

cess claim rather than a product claim.

Organic standards will not exempt producers and processors from compliance with general regulatory requirements, such as the Codex General Standard for the Labelling of Pre-packaged Foods.

The EC organic logo

In March 2000 the European Commission introduced a logo bearing the words "Farming - EC Control System" [Regulation (EEC) No 2092/91] to be used on a voluntary basis by producers whose systems and products have been found on inspection to satisfy EU regulations.

Consumers buying products bearing this logo can be confident that:

- ▶ at least 95% of the product's ingredients have been organically produced

- ▶ the product complies with the rule of the official inspection scheme
- ▶ the product has come directly from the producer or preparer in a sealed package
- ▶ the product bears the name of the producer, the preparer or vendor and the name or code of the inspection body

(Source: EUROPA - Agriculture - Organic Farming - http://europa.eu.int/comm/agriculture/qual/organic/index_en.htm)

Organic agriculture world-wide 2002

Organic food is a growing business with good long-term prospects. Despite the heightened attention that organic agriculture has attracted during the last decade, it still only accounts for a small proportion of overall agricultural land. In 1999 BIOFACH / Oekowelt GmbH commissioned Stiftung Oekologie & Landbau (SOEL, Foundation Ecology & Agriculture) to compile statistical data and general information on organic agriculture world-wide. IFOAM, the International Federation of Organic Agriculture Movements collaborated in this project. In February 2002, the texts were revised and the statistical material was up-dated.

According to this report the total organically managed area is more than 17 million hectares world-wide. Australia holds the highest percentage, with 7.7 million hectares, followed by Argentina (2.8 million hectares) and Italy (more than 1 million hectares).

In the European Union (EU), its twelve accession countries (Bulgaria, Estonia, Latvia, Lithuania, Malta, Poland, Romania, Slovenia, Slovakia, Czech Republic, Hungary, Cyprus), the EFTA countries (Iceland, Liechtenstein, Norway, Switzerland) and Bosnia-Herzegovina, Croatia and Yugoslavia 4.3 million hectares are under organic management, which coincide to almost 2% of the total

agricultural land in Europe. In North America growth rates have been overwhelming, SOL estimates that 1.3 million hectares are presently organically managed there and future prospects look very bright.

On the other hand in Asia, organic farming has not yet received a lot of attention. For most countries no precise figures are available, but it may be presumed that no country has yet reached 1% of its total agricultural production. The total organic land area in Asia is now almost 10000 hectares. In many Latin American countries the organic land area reaches almost 0.5 %, and starting from a low level, growth rates are remarkable.

For Africa not a large amount of data is available, but at the IFOAM trade conference in October 1999,

it was illustrated that organic farming is expanding at a sufficient rate. An important factor for growth in Africa is the demand for organic products in the developed countries. Another motivation is the maintenance and building of soil fertility on land threatened by degradation and erosion.

(Source: Yussefi M. and Willer H. - Organic Agriculture Worldwide 2002 - Statistics and future prospects - Biofach 2002)



Regulation of organic food

In order to regulate food, it is necessary that objective parameters are established according to which regulatory decisions can be made. Hence the need for food quality and safety standards, guidelines and recommendations.

The first regulation on organic farming (Regulation EEC No 2092/91) was drawn up in 1991 and, since its implementation in 1992, many farms across the EU have converted to organic production methods. Where farmers wish to claim official recognition of their organic status, the conversion period is a minimum of two years before sowing annual crops and three years in the case of peren-

nials. In 1999, the Codex Alimentarius Commission (CAC) adopted guidelines for the production, processing, labelling and marketing of organically produced foods, omitting however, provisions for livestock and livestock products.

These regulations set out the principles of organic production at farm, preparation, storage, transport, labelling and marketing stages. Finally, in 2001 The

Codex Alimentarius Commission was revised, in order to include the sections concerning livestock and livestock products and bee-keeping and bee-products.

Today's consumers are increasingly calling for access to information on how their food is being produced and are looking for reassurance that due care with regard to safety and quality has been exercised at each step in the process.

Agriculture and the environment - a difficult partnership

Agriculture and the environment have always had an intimate if uneasy relationship. Agricultural production has perennially been subject to the vagaries of the weather and to events such as droughts, floods and wildfires. The expression "feast or famine" aptly describes the risks and rewards that are inherent in the farming profession. Yet, agriculture is not only impacted by environmental forces but is itself a major agent of environmental change. Agricultural activity worldwide is estimated to be responsible for 9% of total greenhouse gas emissions. Farming contributes to pollution of the air and water. The widespread use of chemical fertilizers and pesticides, and the destruction of habitat areas have adversely affected the world's biodiversity and changed its ecology.



The development of agriculture

For the most of human history, mankind relied on hunting, fishing and gathering of naturally grown fruits and vegetables for its food supply. Only in the last 10,000 years has humanity begun to produce its own food through the planting of crops and domestication of animals. These developments were followed by the emergence of towns. For defensive and commercial purposes, people chose to live in close proximity to one another. The development of agriculture, along with the development of transportation networks, set the stage for the growth and urbanisation of the world's population. Sometime around 1960, the world's agriculture collectively produced enough food calories to adequately feed the entire population

of the world, assuming that these calories were equitably distributed.

From that point, a surplus of up to 20% in food supply has been produced. However, the food is produced in places far removed from the areas where hungry populations live. Moreover, the poor cannot afford to buy these surplus foods. Therefore, great imbalances exist at national, regional and local levels between the need for food and its availability.

Each day, about 800 million people in the developing world, or 18% of the population, do not have enough to eat. Malnutrition plays a role in the deaths of 6 million children in these countries annually.

Food is produced in places far removed from the areas where hungry people live.

Moreover, the poor cannot afford to buy these surplus foods.

A growing population

The world's population is expected to increase from approximately 6 billion people today to 9 billion by the year 2050. Most of the growth is occurring in the developing world, where the urban population increased from about 300 million in 1950 to 1.7 billion today. In Latin America, the population of cities such as Mexico City, Bogota, Sao Paulo and Managua tripled or quadrupled from 1950 to 1980. The fastest growing continent today is Africa. Nairobi, Dar es Salaam, Kinshasa and Lagos have grown by seven-fold. At the same time, we are seeing a more urban population. By 2005, half of the world's population will be living in cities. Developed countries will have more elderly populations due to a reduction in their birth rates, while developing areas will see younger populations, which typically migrate to



cities or other countries in search of a better life. These demographic trends will mean that the developed world will have more elderly, fewer workers and increased health care needs; developing countries will have more mouths to feed and a shrinking supply of labour for agriculture.

The Green Revolution

Agriculture has made great strides in increasing production and yield in recent years through the so-called Green Revolution, i.e. use of fertilisers and pesticides, increased use of irrigation, and improved crop varieties. Over the last thirty years, the per capita increase in production of the world's three major cereal crops has been as follows: corn, up 37%; rice, up 20%; and wheat, up 15%. These gains have been accompanied by decreases in price, to the benefit of the world's consumers, especially the poor. In the past 25 years, global food prices declined by 40%, in real terms.

The greatest productivity gains have occurred in North America, Australia and Europe, which normally produce more than is required by their populations and are the source of food aid.



Southeast Asia has successfully increased its food production by using multiple, short-duration crops each year and irrigation. In China, food production must increase by 60% by the

Over the last thirty years, per capita production of the world's three major cereal crops has increased: corn, up 37%; rice, up 20%; and wheat, up 15%.

year 2030 just to keep up with the growth of the population. In Africa, agricultural production has been stagnant due to inadequate rainfall, the encroachment of deserts and an abundance of pests. In Latin America, agriculture is plagued by improper use of pesticides, clearing of forests, and faulty irrigation practices leading to salinization of ground water.

The development of biotechnology holds the promise of greater yields through development of pest resistant species, more diversity, cheaper production and reduced environmental impacts. However, many consumers in the developing world distrust genetically modified foods. Some nations have refused to accept imports of these foods, fearing their affect on consumers. Concerns also exist over the accidental transfer of modified genes to other species, resulting, for example, in insecticide-resistant insects or herbicide-resistant weeds.

Agriculture and the environment

Agricultural production flows from the interaction of man's labour with the land and water. Each component is facing major problems in the coming years. The need to feed future populations will require the conversion of additional lands to agricultural use. However, the availability of good quality land for agricultural development is rapidly diminishing. In countries such as India, China, Indonesia and Egypt, all available agricultural land is already in production. In order to address problems of poverty and joblessness, some governments in Latin America and Asia support the clearing of land for subsistence farming. Most of the new farmland comes from the destruction of tropical forests

through burning. This process releases gases that are associated with global warming - carbon dioxide (CO₂), carbon monoxide (CO), nitrous oxide (N₂O), methane (CH₄) - into the atmosphere. The loss of forestland directly impacts biological diversity and the viability of ecosystems. Cultivating these lands, whose soils are generally poor, will require the application of chemical fertilisers and pesticides, which will impact the quality of water and threaten the health of farm workers, particularly when the farmers have not been trained in the proper use of these chemicals. Even in the absence of nitrogen fertilisers, tilling of soils permits oxidation of organic materials, producing carbon dioxide.

Land and agriculture

Approximately 11% of the world's land is currently used for growing crops, and another 25% is used as grazing land. From 1964 to 1984, the amount of cropland increased by only 9%, while the world's population increased by 45%. The total amount of land in agricultural use increased from 4.5 billion hectares in 1966 to nearly 5 billion in 1996. The need to feed future populations, however, will require that additional lands be converted to agricultural use. Agricultural land expansion is mainly possible in the tropical forests of Latin America, Africa, and parts of Asia. How-

ever, it would occur at the expense of other biological resources such as forests and wildlife habitats. In Latin America and Southeast Asia, extensive conversion of woodlands to agricultural uses is raising concerns about environmental degradation and loss of biodiversity. In both the developed and the developing, urban growth is putting pressure on existing agricultural lands. To avoid future food shortages, ways must be found both to protect present agricultural lands and to place new lands into agricultural production in a manner that does not harm the world's ecosystems.

Soils and water

Agricultural production depends upon the maintenance of soil quality. Studies have shown that the quality of agricultural soils in the world is declining. Nearly 40% of the world's agricultural land is seriously degraded as a result of

Nearly 40% of the world's agricultural land is seriously degraded as a result of soil erosion or nutrient depletion.

soil erosion or nutrient depletion. Protecting agricultural soils needs the attention of national governments and international aid agencies to prevent soil degradation from endangering the world's food production.

The United Nations has reported that unless changes are made in how water is managed, the world's water situation will worsen considerably in the next 30 years. Today, 31 countries,

accounting for less than 8% of the world's population, face chronic shortages of fresh water supplies. By the year 2025, 48 countries are expected to face water shortages, affecting 35% of the world's population. Portions of Africa and south Asia are particularly vulnerable to water scarcity. Agriculture is the largest user of water, currently accounting for about 70% of water use worldwide, with the balance going to industrial and domestic users. The United Nations projects an increase in agricultural water use for irrigation of crops of from 50 to 100% by the year 2025. In many areas, however, irrigation water is not efficiently applied, and 60% or more of the water never reaches the crop. Methods that minimize water use such as drip irrigation need to be more widely deployed. In many areas, surface and ground water supplies are shrinking, damaging aquatic ecosystems and the water supply itself. Toxic substances, salts and other pollutants accumulate in water systems, rendering them unfit for use.

The challenges ahead

To sum up, agricultural lands are being threatened on all sides by erosion, desertification and urbanisation. Water supplies are subject to competing demands from growing populations and the threat of contamination. The use of chemicals for fertiliser and control of pests is being challenged by public concerns about health and environmental quality. The production of genetically modified crops offers the promise of increased production at lower costs, but it remains controversial. Hunger, environmental degradation and water supply are inter-related global problems. The world community needs to find ways to feed its people without causing irreparable damage to the natural environment. Global, regional and national agricultural management will require improved policy coordination and better tools, including improved data collection

methods and analytical capability. The United Nations is leading the way through the programs of the World Health Organization, Food and Agriculture Organization, World Food Program and other agencies. The European Union has adopted a Common Agricultural Policy (CAP) which seeks to ensure a fair standard of living for all those who are engaged in agriculture, to increase production in order to provide an adequate supply of food for the population, and to encourage the modernisation of agriculture. The benefits of this policy are the transfer of productivity gains to the rest of the economy and the release of manpower that is needed in other sectors within an environmentally friendly framework. A regional approach to agricultural policy may be relevant to areas such as Africa, a continent in the midst of a food crisis.

Soils - vital but neglected



Although soils are as vital to human life as the air and water, they do not generally receive a corresponding amount of attention. Soils provide the basis for the production of about 90% of all human food, feed for livestock, fibre and fuel. Today, soil degradation has become a major worldwide problem. Historically, many civilisations have failed as a result of the unwise management of their soil resources. Maintaining soil quality and using the world's land resources to feed its growing population without damaging essential ecosystems and biodiversity are major challenges for today's policy-makers. A united strategy is needed to achieve sustainability in valuable soil resources.

Soil quality

The quality of the soil reflects the health of an ecosystem. Soil quality refers to the capacity of soil to support plant growth and to act as a living reservoir that regulates the flows of water, nutrients, and energy through the ecosystem. It is determined by a number of factors, including texture, structure, water-holding capacity, porosity, organic matter content, depth, and others.

Soils can be degraded by erosion, compaction, low organic matter, loss of soil structure, poor internal drainage, salinisation, or acidity. Soil quality must be understood for two important reasons. First, our use and management of land must be matched with the soil's capability. Second, a basic understanding about soil quality is necessary before we can recognize ongoing trends. If the quality of the soil is stable or improving, it is a good indicator that the ecosystem is sustainable. If soil quality is deteriorating, the larger ecosystem will almost certainly also decline.

Recent trends in soil quality are disturbing. According to a study by the International Food Policy Research Institute, nearly 40% of the world's agricultural land has been seriously degraded as a result of soil erosion or nutrient depletion. This degradation has significantly impacted the agricultural productivity of about 16% of the world's agricultural lands. Ironically, the degradation has been especially pronounced in the developing world, precisely the areas in which increased food production is most critically needed. In many parts of the developing world, the ability of the soils to continue producing food using current agricultural methods appears to be seriously threatened. In Central America, almost 75% of the cropland is seriously degraded. In the Philippines, about one quarter of all cropland has been degraded by improper use of pesticides and fertiliser.

The situation in Europe

Europe is facing a severe problem of soil degradation due to soil sealing, soil erosion, slope stability problems, contamination and acidification. According to the United Nations Environment Program and the European Environment Agency, soil problems in parts of eastern and southern Europe are so severe that the soils are losing their ability to support human and natural communities. Desertification is even occurring in some areas. An underlying cause has been economic development. Covering of the soil by urban development is a major concern. In Germany, for example, the average loss of land in 1997 was 120 hectares per day. Urbanisation is also a problem in the Mediterranean countries, where the development of tourism is rapidly consuming coastal lands. Wind and water erosion are serious problems in south-

ern Europe due to harsh climate, steep slopes, a thin vegetative cover, and poor agricultural practices such as overgrazing. Soil contamination is concentrated around existing and former industrial and military sites.

A European policy on soil is urgently needed as a basis for legislation and systems for monitoring and managing soil resources.

The soil resource does not enjoy the same level of policy protection that is given to air and water resources. A European policy on soil is urgently needed to provide the basis for legislation and systems for monitoring and managing soil resources. Good data on soil quality is hard to come by. Most soil data is collected locally for specific purposes and is not generally suitable for regional policy development. Improved regional soils data collection is needed to better understand the trends in soil quality and to assist in the formulation of sound policies for its protection.

Erosion

Soil erosion is a natural process that occurs virtually everywhere. Small particles of the soil are detached by the water or the wind and are deposited elsewhere. When erosion occurs at an accelerated rate, it becomes a matter of concern, particularly to agriculture. If the top layer of soil, known as the humus or topsoil, is eroded away, the soil loses its productivity. Soil erosion on agricultural lands is determined by the rainfall intensity, the tendency of the soil to erode, the presence of slopes and vegetation, and the use of conservation measures by the farmer. Erosion from rainfall is greatest from high-intensity storms of short duration, although longer lasting rainstorms can also cause the removal of a significant amount of topsoil. Wind erosion is influenced by similar factors to those controlling water erosion. Wind speed and duration have a direct effect on the extent of wind erosion. Windbreaks such as trees and shrubs can serve to curtail wind erosion, while ground cover in the form of vegetation or crop residue also restrains erosion. Wind erosion not only depletes the productivity of soils, but it can also damage crops.

Impact on water quality

Erosion not only causes loss of valuable topsoil; it also pollutes the water, clouding the water and choking aquatic life. It destroys fish spawning grounds and degrades recreational water quality. Excess pesticides and fertilisers can be transported along with the eroded soils, contaminating downstream water supplies. In addition, silt from erosion accumulates in channels, reducing their capacity and increasing the threat of flooding. Water pollution from agriculture is perhaps the most difficult type to control because it occurs over a wide area, varies according to climate and soil characteristics, and the agricultural practices of the individual farmer: the choice of crops, the extent of application of fertilisers and pesticides, and land management practices.



Controlling soil erosion

Once the factors influencing soil erosion in a particular area have been analyzed, suitable conservation measures can be applied to minimize the erosion and protect the soils. The range of soil erosion control measures available includes tilling and cropping practices, retention of grassed areas and crop residue, and windbreaks. In hilly areas, contour tillage involves plowing across the face of the hill rather than up and down the slope. While practices are beneficial in controlling soil erosion, they may also have higher costs or cause the reduction of productive lands.

Soil erosion control measures include tilling and cropping practices, retention of grassed areas and crop residue, and windbreaks.

Developed nations have governmental agencies that assist farmers in devising effective erosion control plans. However, this is not generally the case in the developing world. An example of an organization dedicated to promoting more sustainable usage of soil is the African Conservation Tillage Network (ACT), a non-governmental organization which seeks to disseminate information and sponsor pilot projects on conservation practices for small-scale farming throughout Africa. Such programs are desperately needed in Africa and should be expanded.

Soil contamination

Soil contamination is another type of soil degradation. It can result from agricultural activity, industrial activity, mining, disposal of solid wastes, or military activities. High levels of contamination can render land completely unfit for agricultural use. For many years, industrial enterprises disposed of hazardous materials on the land or in the water without regard to their long-term effects on the environment. Many industrialised countries are now trying to deal with the legacy of this activity. In the European Union, 300,000 sites have been identified as definitely or potentially contaminated. As many as 1.5 million sites may be contaminated, the bulk of which have not been identified due to a paucity of data.

A major source of agricultural soil contamination is the misapplication of inorganic nitrogen, phosphorus, or potassium-based fertilisers by farmers. Another source is pesticides, which have come into extensive use over the last 50 years to control a wide range of pests on farm crops. They tend to bind tightly to the soil, most

often in the surface layer, are persistent in the environment and may be present in the soil long after they have been applied. Residues of a number of pesticides can be found in soils at levels that may



pose a human health risk. A number of dangerous pesticides have been banned in many parts of the world, yet others have been developed to take their place.

Heavy metals, salts, and petroleum products can also contaminate soils. Water from rainfall can wash contamination from an area containing hazardous substances, such as fertilisers and pesticides, and deposit them in the soil it flows over. Many of the contaminants that pollute the air and water find their way into the soil. These include emissions from motor vehicles, such as lead, and chemicals from manufacturing plants. Rain and snow can deposit airborne particles or gases on the soil. Acid rain is the deposition on the soil of acids resulting from the generation of electricity, industrial activity, or the operation of motor vehicles. In the atmosphere, the emissions become converted to nitric acid and sulfuric acid.

Treating contaminated soils

Contaminated soils can be treated, although this is often a capital-intensive process. Once a contaminated site is identified, a careful analysis and plan of action should be prepared to determine the best treatment approach.

Treatment may entail excavation and removal of the contaminated soils; flushing the contaminants out of the soil with water, chemical solvents, or air; destroying contaminants by incineration; encouraging natural organisms in the soil to break them down; or adding material to the soil to prevent the contaminants from spreading. After the treatment has been applied, the soils should be monitored for a period of time to determine the effectiveness of the treatment.

Due to the large number of contaminated

sites in the industrialised countries, a number of low-cost, cleanup technologies are being developed.

Biomining, or phytoremediation, is an innovative soil cleanup technology based on the ability of plants to take up and concentrate contaminants in their tissues. It is especially effective with petroleum-based contaminants. Biomining offers the advantages of being done directly on the affected site, with lower costs, while retaining the functionality of the soil ecosystem. Bioventing involves the drilling of one or more wells on the contaminated site, and injecting oxygen into the well to sustain the microorganisms in the soil and enhance the biodegradation of the contaminants.

Due to the large number of contaminated sites in the industrialised countries, a number of low-cost, cleanup technologies are being developed.



Bio-Syllabus for European

Praise for B.I.O.'s new CD-Rom from around the world

For many years, my research colleagues and I have been studying some of the problems of life sciences; this is why this CD-Rom will be of great benefit to us. I will do my best to acquaint a broad circle of scientists, legislators and decision-makers who can influence governmental regulations of environmental policy with the issued CD-Rom sent to me.

Professor N.A. Borisevich, Institute of Molecular and Atomic Physics, National Academy of Belarus

Thank you for the two copies of the CD-Rom issued by your organisation. I would like to inform you that the second copy of the CD-Rom has been forwarded to the Brazilian Ministry of Environment, as requested. **Pery Machado, First Secretary, Embassy of Brazil**

Thank you very much for the CD-Rom you were so kind as to send me. The combination of the very attractive teaching modules in an interdisciplinary perspective is a very worthy contribution to the great effort to further life on the planet. **Professor Juan de Dios Vial Correa, Pontifical Catholic University of Chile**

I consider the CD-Rom very interesting and a great effort to promote the conservation of our biodiversity and the environment. I congratulate you for this work and inform you that I have sent this information to the Ministry of Science and Technology in Havana. **Ambassador Jorge Quesada, Cuba**

The Faculty of Humanities at Charles University in Prague, and especially the Department of Social and Cultural Ecology, thank you for the CD-Rom on Environmental Education. We are sure it will be very helpful and will constitute a big aid for all students. **Dr. Ivan Rynda, Head of the Department of Social and Cultural Ecology, Faculty of Humanities, Charles University, Czech Republic**

Thank you for sending me the CD-Rom comprising the teaching modules on Ethics and Culture. This will be a reference. **Professor Alain Pompidou, Honorary Member of the European Parliament, Member of the French Academy of Technologies and the French Economic and Social Council, France**

Today I received your wonderful CD-Rom. Congratulations for all the work you have put into this tremendously helpful work. I thank you so much for your excellent contribution which is so essential for my future work. **Professor Alfred Rest, University of Cologne, Germany**

Thank you for the CD-Rom you have sent to our Department. I found the material really pioneering work and an interesting and useful educational tool. I will review it widely among the students at the School of Environmental Engineering and Chemical Technology. **Professor Akos Redey, Head of the Department of Environmental Engineering and Chemical Technology, University of Veszprem, Hungary**

I was very pleased with your CD-Rom, which I found interesting and useful for my work. I hope there will be a further edition of this CD-Rom. **Dr. Laszlo Kapolyi, President, System International Foundation, Hungary**

I just received the Bio-Syllabus CD-Rom. I very much appreciate your kindness to send it to me. In the near future I will show it to our Director at the Institute of Environmental Studies for consideration. **Dr. Csaba Forgacs, Deputy Head, Department of Agroecconomics and Rural Development, Budapest University of Economic Sciences and Public Administration, Hungary**

I feel very proud that B.I.O. has produced such a wonderful CD-Rom. It is just the material which I need very much to disseminate in Jakarta regarding Biopolitics. I take this opportunity to express my congratulations for what you have done for mankind and I wish you all the best and success. **Ambassador Irawan Abidin, President Director, PT Multiguna Bhakti, Indonesia**

I would like to thank you for the CD-Rom you have sent to me and, at the same time, congratulate you for this great piece of work. It is a very useful tool in education, making everyone aware of environmental ethics around the world. I will surely forward the second copy of the CD-Rom to the Ministry of Environment of the Republic of Indonesia. **Ambassador F.X. Lopes da Cruz, Indonesia**

The Bio-Syllabus CD-Rom is marvellous and precious. My very best wishes. **Professor Giovanni Conso, President Emeritus, Constitutional Court, Italy**

I wish to thank you very much for sending me the Bio-Syllabus CD-Rom, which is a testimony of your commitment in the field of Biopolitics. Congratulations for this endeavour. **Professor Eleonora Barbieri Masini, Faculty of Social Sciences, Gregorian University, Rome, Italy**

Thank you very much for having sent the Embassy the CD-Rom Bio-Syllabus for European Environmental Education. According to your request, we have already forwarded to the Italian Ministry of Environment the second copy of the CD-Rom. I take this opportunity to convey to you, together with my appreciation for your work, my best regards. **Ambassador Agostino Mathis, Italy**

Thank you for the Bio-Syllabus CD-Rom. It is beautiful work. It completely illustrates your B.I.O. philosophy. This CD is quite inspiring for us. **Professor Saku Machino, Sophia University, Tokyo, Japan**

Please accept my sincerest appreciation for the B.I.O. CD-Rom. This CD-Rom is a very useful educational tool for the students of our university. We will use it in the class of bioethics and environmental ethics. The content of the CD-Rom is in excellent taste and reflects your philosophy. **Professor Kiyoshi Aoki, Life Science Institute, Sophia University, Tokyo, Japan**

While thanking you for providing the CD-Rom, which we found to be most interesting, the Embassy wishes to inform you that it has forwarded one copy to the Ministry of Home Affairs and the Environment in Malta and kept another copy at the Embassy. Seeing that this CD-Rom would also be of interest to the students at the Mediterranean Academy of Diplomatic Studies at the University of Malta, it would be appreciated if you could kindly send the Embassy another copy for the Academy. **Ambassador Fiona J. Formosa, Malta**

I browsed through the B.I.O. CD-Rom and I wish to congratulate you on your excellent work. There is a wealth of information on all fields of the environment and life on our planet. And all this information is presented in a very interesting and readable way. We need a lot of time to get to know in detail all publications on the CD, and it will be very interesting and useful for us. We have set up a new master's course in field of environmental protection titled "Technology of Environmental Protection." The matters discussed in your CD-Rom will be very useful for our students. The information in the B.I.O. CD-Rom will be very interesting and necessary for the work of my colleagues in the environmental technology and management laboratory. We are going to place the B.I.O. CD-Rom at the disposal of the library at the Technical University. We would be pleased to work with you in the future in the field of environmental protection and sustainable development. **Professor Luben Tzankov, Head, Environmental Technology and Management Laboratory, Technical University Sofia, Bulgaria**

I could learn a lot from the vision promoted by the B.I.O. CD-Rom, so I like it very much. **Professor Li Kangmin, Asian Pacific Regional Research and Training Centre for Integrated Fish Farming, Wuxi, China**

Thank you for the wonderful CD-Rom. It is really very useful as an overview of all topics in Biopolitics and environmental issues. **Professor Jaroslav Stoklasa, Member of the Academy of Sciences, Czech Republic**

Let me express our gratitude for your highly fruitful CD-Rom dealing with ten teaching topics. We express our sincere thanks and admire your efforts in the field of environmental policy on our planet. Such an environmental encyclopaedia needs a lot of work, but you are highly qualified for such fruitful works. We are all highly grateful for this gift. Dear colleague, please do your best and continue these activities in addition to the responsibilities of B.I.O. Your work is a highlight in the



efforts to conserve bios on our planet.

Professor Ahmed Hamad, President's Advisor for Environmental Affairs, Assiut University, Egypt

Congratulation for your successful CD-Rom. **Lence Kurcivca, Ministry of Environment and Physical Planning, FYROM**

Thank you for sending me the CD-Rom "Bio-Syllabus for European Environmental Education" by the Biopolitics International Organisation (B.I.O.), with teaching modules in a number of important topics. I am sharing it with a number of interested colleagues in FAO. Let me take the opportunity to express, once more, my admiration for your dedication and commitment towards a more equitable world for present and future generations. I thoroughly agree with you on the importance of an "all-encompassing bio-education." **Jose T. Esquinas-Alcazar, Secretary, Commission on Genetic Resources for Food and Agriculture, Food and Agriculture Organisation of the United Nations**

His Serene Highness Prince Albert thanks you for keeping him informed of your activities and for sending him the CD-Rom on "bio-education" that you have just issued and which is a good way to give a sense of responsibility towards our environment to every citizen. With His Highness' best wishes for all your efforts to preserve the bio-environment. **Mireille Viale, Secretary to HSH Prince Albert of Monaco**

Thank you very much for the Bio-Syllabus CD. Congratulations for the excellent piece of work. It will take the work of B.I.O. many more steps forward. **Professor Tham Seong Chee, President, United Nations Association of Singapore**

We would like to thank you very much for the Bio-Syllabus CD-Rom and for BioNews. These are very valuable materials for us. **Terezia Davidova, Slovak Environmental Agency, Bratislava**

Thank you very much for the CD-Rom on ten teaching modules. Congratulations!! Excellent work done. Useful and very progressive. **Dr. Julius Oszlanyi, Institute of Landscape Ecology, Slovak Academy of Sciences**

We are very glad to confirm receipt of your CD-Rom with teaching modules on important environmental issues. Thank you very much for both the CD and all your efforts in the area. We hope that they will be accepted with understanding by many people - primarily by those who are the most competent and can help us to "awaken," feel responsible and seek an ethical and environmentally friendly society. **Dr. Dagmar Kudelova, Institute of Forest Ecology, Slovak Academy of Sciences**

I found the B.I.O. CD-Rom excellent and very useful. **Professor Marta Salona Bordas, Department of Zoology, Basque University, Spain**

Thank you for sending the CD-Rom "Bio-Syllabus for European Environmental Education" that you have edited. I find it very interesting and useful. **Professor Carlos Maria Romeo Casabona, BBVA Foundation, Spain**

Thank you very much for the CD-Rom "Bio-Syllabus for European Environmental Education" that you have sent me. **Professor Santiago Grisolia, Valencia Foundation for Advanced Studies, Spain**

We would like to thank you very much for your serious efforts related to one of the most important matters facing our globe,

Environmental Education



which is the environment. It is our great pleasure to establish a fruitful co-operation with your organisation in the field of the environment. Again, we thank you for your efforts and for the precious CD-Rom. **Dr. Mohamad Rukieh, Head of the Administrative Board, Director General, General Organisation of Remote Sensing (GORS), Syria**

Thank you for the CD-Rom you sent me. I note with appreciation the efforts your organisation has put into issues of the environment. We will do our best to ensure that Johannesburg becomes a success. **Dr. Kezimbra Miyingo, Minister of State for the Environment, Uganda**

I received the CD. Very impressive!!!! I like it!! **Professor Don Huisinh, The Centre for Clean Products and Clean Technologies at the University of Tennessee, USA**

Thank you once more for your B.I.O. publications and the CD-Rom. It was very interesting and useful for our country. **Dr. Khalilulla Sherimbetov, Chairman, State Committee for Nature Protection of the Republic of Uzbekistan**

I studied the B.I.O. publications, the Russian books, the CD-Rom and other materials with great interest and became convinced, once again, of the necessity of opening a Biopolitics branch in Uzbekistan. **Professor Yusuf Shadimetov, President, ECOSAN International Fund of Ecology and Health, Uzbekistan**

It was a great pleasure to receive the content-rich disk with the plans and suggestions embracing all branches of man's activities on earth. I salute you for your immense investment in time and energy, to push ahead the ideas concerning our responsibilities towards nature and ourselves. I am only sorry that such excellent ideas and activities are overshadowed by acts of terrorism and wars. One wonders why humans are often so inhuman to the environment and their fellow men. Let's hope that things will soon change and that the ideas propagated by B.I.O. will receive their honourable place on the world agenda. With best wishes for success, because your success will also be ours. **Professor Lev Fishelson, Department of Zoology, Tel Aviv University, Israel**

I have just received your Bio-Syllabus CD. I very much appreciate your sending me this CD, and after I have had time to have a look at it, I will send more comments. With sincerest thanks and with best wishes. **Dr. Stefan Rokem, Department of Molecular Genetics & Biotechnology, The Hebrew University of Jerusalem, Israel**

The CD-ROM touches on many important topics, especially those of economics, ethics, health and technology. While the teaching modules emphasise an interdisciplinary approach, what seems to be lacking is a core teaching around which all these issues are concerned. Above all, the desire to move away from a more fully human development model in favor of a "bio-centric" approach is bound to create serious ethical difficulties. A re-consideration of the anthropological basis will certainly serve as a stronger foundation for your work in biopolitics. **Bishop Giampaolo Crepaldi, Secretary, Pontifical Council for Justice and Peace, The Vatican**

On behalf of the Moscow School of Social and Economic Sciences I would like to express our gratitude for the CD-Rom you have sent us. We use these materials within our Masters and retraining programmes on Social Work and Cultural Management. We highly appreciate the B.I.O. aims, objectives and activities. **Dr. Boris Shapiro, Dean of Social Work and Social Administration, The Moscow School of Social and Economic Sciences, Russia**

We would like to invite you to visit our Faculty and discuss, with the group of researchers in our Faculty who have used your CD-Rom, the suitable development of the Biopolitics programme in our region. **Professor Francisco Parenti, Director, Interdisciplinary Bioethics Programme, and Professor Dario Maiorana, Dean, Faculty of Humanities and Arts, National Rosario University, Argentina**

I have received your CD-Rom and have studied it carefully. I think it is an excellent product and will recommend it further to friends and colleagues who are interested in environmental and bioethical issues. **Shakeel Bhatti, Senior Programme Officer, Genetic Resources, Biotechnology and Associated Traditional Knowledge Section, Global Intellectual Property Issues Division, World Intellectual Property Organisation (WIPO), Switzerland**

New Publication 10 volumes on Biopolitics

The International University for the Bio-Environment

The International University for the Bio-Environment (I.U.B.E.) was founded by B.I.O. in 1990, to inspire needed reforms in education and to promote the environment at the core of every academic discipline. The I.U.B.E. is committed to working directly and in partnership with educators and decision-makers around the world to address important social, economic and environmental challenges. The I.U.B.E. also promotes projects to raise the standards of education and training, and initiatives to benefit the environment.

As environmental problems seem to intensify, we need to increase our efforts to understand and identify the crisis in values that has led to the severe deterioration of bios. A model, global bio-education could provide not only new educational methods and techniques, but also an expanded scope in every static idea and value for the benefit of all forms of life on our planet. We cannot take any more risks, as local problems rapidly cross national boundaries. The I.U.B.E. encourages co-operation in all areas of human endeavour in order to promote a unified vision directly related to bios and the environment.

The environment is life. Every plant that is destroyed, every animal that becomes extinct, every micro-organism dying from pollution, breaks the chain of the continuity of life. The environment can contribute to the development of a new perspective in society, one which places the responsibility to protect bios in the hands of every one of us.

New edition - 10 volumes on Biopolitics

Within the framework of the activities of the I.U.B.E., B.I.O. issued a pioneering educational CD-Rom titled "Bio-Syllabus for European Environmental Education" comprising ten electronic volumes on environmental subjects. The CD-Rom met with great success in 123 countries around the world (see comments on opposite page), and the material and information presented are about to be released in print as ten new volumes in one hard-bound edition.

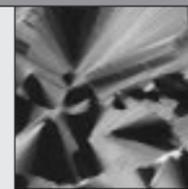
The purpose of "Bio-Syllabus for European Environmental Education" is to function as a modular teaching implement, aimed at people of various backgrounds and interests and serving as a complete open and distance learning tool designed to enhance understanding and appreciation of environmental issues in every human endeavour. The reader is encouraged to develop an awareness of current concepts, as well as the ability to critically evaluate progress in the environmental field. Environmental dimensions in the following topics are addressed: **Architecture, Diplomacy, Economics, Energy, Ethics, Health, History, Legislation, Technology and Tourism**. The goal of "Bio-Syllabus for European Environmental Education" is to:

- ▶ inspire decision-makers to place the environment at the core of all strategies and policies
- ▶ encourage universities and other educational institutions to adopt interdisciplinary curricula and to promote environmental thinking in all academic disciplines
- ▶ assist diplomats in influencing government policy concerning international co-operation in environmental protection
- ▶ motivate the development of environmentally compatible economic strategies, as well as indexes to measure the environment as the true wealth of humanity
- ▶ stimulate the implementation of existing environmental legislation on a global level
- ▶ raise awareness of the urgency of creating an International Court of the Environment to promote environmental justice
- ▶ encourage every individual to embrace environmental ethics and to join environmentally committed legislators, scholars, educators and business leaders in influencing governmental regulation of environmental issues around the world

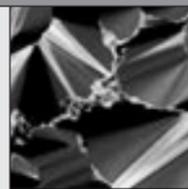
B.I.O. cross reference library

The B.I.O. cross-reference library is a vital part of this work. Since its inception in 1985, B.I.O. has brought together leaders from diverse fields to present environmental concepts as they apply to their own area of expertise. This vastly rich material has been subdivided into topics and is now available as a comprehensive electronic reference library on the environment. The library can be accessed at <http://www.biopolitics.gr> and is also available on CD-Rom.

Bio-Architecture



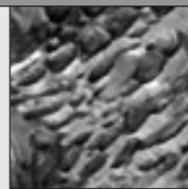
Bio-Legislation



Bio-Diplomacy



Bio-Economics



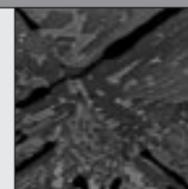
Bio-Energy



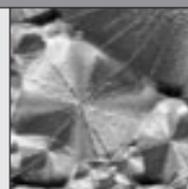
Bio-Technology



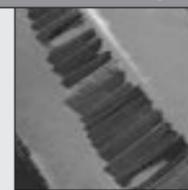
Bio-Ethics



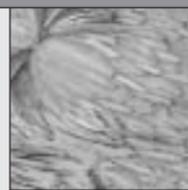
Bio-Tourism



Bio-History



Bio-Health



Meeting the challenge of bio-education

The International University for the Bio-Environment raises awareness of the need to incorporate an appreciation of bios on all levels of education and assimilate the progress of the biological sciences in fields such as theology, philosophy, diplomacy, economics, law, media, business.

Technology may be viewed as the revelation of the truth and a pathway leading to a better future. The decisive role of education raises our concern on the assessment of needs and choices, as well as priorities leading to the formulation of educational strategies. Social needs are becoming pressing, and the mass media expand our awareness of existing threats to bios.

Professionals of the future making decisions about the world need to be aware of the environment in all aspects of their work. Raising awareness of environmental issues is important, but it is equally important to become involved in practical education and training activities.

Many international programmes on bio-education are now in the process of being implemented. Specialists involved in such programmes can contribute to the development of new policies for environmental education. The propagation of knowledge through telecommunications, the press, radio, television, satellites, assists in overcoming underdevelopment and thus contributes to quantitative and qualitative educational development throughout the world. A revision of academic curricula with a view to a global appreciation of bios would provide a perspective of hope and harmony for the millennium.

The environment is a source of joy and inspiration for the future. Bios - life - is the most precious possession on our planet. The more we understand this most unique gift the more successful we will be in fulfilling the needs of the community, the country, and the world.

Environmental strategies cannot be effective unless every human endeavour is involved. Environmental protection is an all encompassing effort, comprising, short- and long-range priorities to ensure the continuation of the chain of life on our planet and to guarantee the rights of future generations.



Our **new** web site
www.biopolitics.gr

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B.I.O. PUBLICATIONS PROCEEDINGS

- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - VOLUME I, A. Vlavianos-Arvanitis, Ed. First BIO International Conference, May 1987 (English, 400 pp.) 1988
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - VOLUME II, A. Vlavianos-Arvanitis, Ed. Second BIO International Conference, Oct. 1988 (English, 543pp.)1989
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - VOLUME III, A. Vlavianos-Arvanitis, Ed. Fourth BIO International Conference, Jan. 1991 (English, 683 pp.)1991
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - VOLUME IV, A. Vlavianos-Arvanitis, R. Keles, Eds. Fifth BIO International Conference, Istanbul, May 1992 (English, 303 pp.) 1993
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - VOLUME V, A. Vlavianos-Arvanitis, Ed. Sixth BIO International Conference - International Sakharov Festival, Athens, July 1994 (English, 671 pp.) 1996
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - VOLUME VI, A. Vlavianos-Arvanitis, J. Morovic, Eds. Seventh BIO International Conference, Bratislava, June 1997 (English, 527 pp.) 1998
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - VOLUME VII, A. Vlavianos-Arvanitis, L. Kapolyi, Eds. Eighth BIO International Conference, Budapest, September 1998 (English, 271 pp.) 1999
- ▶ BIOPOLITICS - BIO-CULTURE - BIOS OLYMPIAD, A. Vlavianos-Arvanitis, Ed. BIO International Conference, Ancient Olympia, August 1999 (Greek, 299 pp.) 2001
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - VOLUME VIII, A. Vlavianos-Arvanitis, Ed. BIO International Conferences, 2000-2001 (English, 335 pp.) 2001

BUSINESS

- ▶ BUSINESS STRATEGY FOR THE BIO-ENVIRONMENT I (Greek), A. Vlavianos-Arvanitis, Editor. First Conference on Business Strategy for the Bio-Environment, Athens, Nov. 1992, 132 pp., 1994
- ▶ BUSINESS STRATEGY FOR THE BIO-ENVIRONMENT II (Greek), A. Vlavianos-Arvanitis, Editor. Second Conference on Business Strategy for the Bio-Environment, Athens, Dec. 1993, 180 pp., 1994
- ▶ BUSINESS STRATEGY FOR THE BIO-ENVIRONMENT III (Greek), A. Vlavianos-Arvanitis, Editor. International Conference on Profit and the Bio-Environment, Athens Chamber of Commerce and Industry, Oct. 1995, 271 pp., 1996
- ▶ BUSINESS STRATEGY FOR THE BIO-ENVIRONMENT I (English), A. Vlavianos-Arvanitis, Editor. Proceedings from the Second Symposium on Business Strategy for the Bio-Environment, Athens, Dec. 1993, 168 pp., 1995
- ▶ BUSINESS STRATEGY FOR THE BIO-ENVIRONMENT II (English), A. Vlavianos-Arvanitis, Editor. Proceedings from a Corporate Symposium, Harvard Club of New York City, Feb. 1995, 105 pp., 1996
- ▶ BUSINESS STRATEGY FOR THE BIO-ENVIRONMENT III (English), A. Vlavianos-Arvanitis, Editor. International Conference on Profit and the Bio-Environment, Athens Chamber of Commerce and Industry, Oct. 1995, 239 pp., 1996

DIPLOMACY

- ▶ BIOS IN THE NEXT MILLENNIUM, A. Vlavianos-Arvanitis, Editor. Proceedings from a Francophone Symposium, October 1987
- ▶ BIOS IN THE NEXT MILLENNIUM, Lecture by the Right Honourable Lord Ennals sponsored by the British Council and BIO, May 1988
- ▶ BIOPOLITICS - PROTECTING THE BIO-ENVIRONMENT, Lecture by His Excellency The Ambassador of Israel, Mr. Moshe Gilboa, at the Third BIO International Conference, June 1989
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT, Presentation at the General Assembly of the Academy of Athens by Academician Professor C. Bonis (Greek), March 1990
- ▶ THE BIO-ENVIRONMENT AND INTERNATIONAL CO-OPERATION, A. Vlavianos-Arvanitis, Editor. A Hellenic-Turkish Symposium, Athens City Hall, May 1990 (English, 79 pp.) 1990
- ▶ BIO-DIPLOMACY AND INTERNATIONAL CO-OPERATION, A. Vlavianos-Arvanitis, Editor. Proceedings from a Hellenic-Russian Symposium, Athens, December 1991 (English 74 pp.) 1993
- ▶ POPULATION GROWTH, FOOD SECURITY AND EQUITY, A. Vlavianos-Arvanitis, Editor. Proceedings from a Hellenic-Indian Symposium, Athens, April 1993 (English, 47 pp.) 1993
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT - BIO-CULTURE IN THE NEXT MILLENNIUM, A. Vlavianos-Arvanitis, Editor. Proceedings from a Hellenic-Czech Cultural Symposium, Athens Chamber of Commerce and Industry, April 3, 1995 (English, 104 pp.) 1995
- ▶ BIOPOLITICS - BIO-CULTURE, A. Vlavianos-Arvanitis, Editor. Hellenic-Ukrainian Symposium, Ministry of Foreign Affairs, Athens, October 20, 1998 (Greek, available electronically)

TEXTBOOKS

- ▶ BIOPOLITICS - DIMENSIONS OF BIOLOGY A. Vlavianos-Arvanitis (Greek, English, French) 1985
- ▶ BIOPOLITICS - METHODS OF IMPLEMENTATION A. Vlavianos-Arvanitis (Greek, English) 1985
- ▶ BIOPOLITICS - BIO-SYLLABUS OUTLINE A. Vlavianos-Arvanitis (Greek, English) 1989, 1990
- ▶ BIOPOLITICS - THE BIOS THEORY A. Vlavianos-Arvanitis (Greek, English) 1990, 1991
- ▶ THE INTERNATIONAL UNIVERSITY FOR THE BIO-ENVIRONMENT A. Vlavianos-Arvanitis (English 1991, Greek 1991-1992)
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT: BIO-SYLLABUS A. Vlavianos-Arvanitis and A. Oleskin (English 1992, Russian 1993)
- ▶ BIOPOLITICS - THE BIO-ENVIRONMENT- BIO-CULTURE A. Vlavianos-Arvanitis (Greek, 192 pp.) 1994
- ▶ BIOPOLITIQUE - LE BIOENVIRONNEMENT A. Vlavianos-Arvanitis (French, 48 pp.) 1998
- ▶ BIOPOLITICA - EL BIO-AMBIENTE A. Vlavianos-Arvanitis (Spanish, 48 pp.) 1998
- ▶ BIOPOLITICS - BIOS OLYMPIAD A. Vlavianos-Arvanitis (Greek, 111 pp.) 2000
- ▶ BIO-SYLLABUS FOR EUROPEAN ENVIRONMENTAL EDUCATION (in press)

PERIODICALS

- ▶ BIONEWS Newspaper, English and Greek (1987, 1994 - 2002)

CD-ROMS

- ▶ BIOPOLITICS – THE BIO-ENVIRONMENT (English) 1999
- ▶ BIO-SYLLABUS FOR EUROPEAN ENVIRONMENTAL EDUCATION (English) 2002

VIDEOS

- ▶ ENVIRONMENTAL OLYMPICS – BIOS PRIZES, St. Petersburg, Russia, September 1999 (English, Greek) 1999
- ▶ ENVIRONMENTAL OLYMPICS – BIOS PRIZE, The Kogi, Santa Marta, Colombia, October 1999 (English, Greek) 1999