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Opening Session Address

SCIENCE AND SOCIETY – SOME REFLECTIONS

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It is indeed a unique occasion here, today, at the Bibliotheca Alexandrina, to revive the tradition of the Museion and of its great thinkers, Euclides, Erastosthenes, Archimedes, Hipparchos, Herophilus (already a Life Scientist!) and many others, founders of Science, the rational approach to the Universe and to its contents, among which is to be counted the human species on the planet Earth.

Hypatia, the last recorded scholar in Alexandria, the first woman in mathematics and astronomy, a neo-Platonist philosopher was murdered in 415 of our era. In her image, we scientist have the mission to further science and knowledge, to spread rationality, tolerance and understanding, so as to make the world a better place to live for all human beings.

This Library and its Academy are dedicated to the celebration of human knowledge, devoted on this present occasion to Biosciences. BioVision Alexandria 2004 pays special attention to developing regions of the world, to North-South and South-South issues. We are gathered during these days for Life Sciences, but we are here above all for **Living Science**.

SCIENCE offers most exciting **PERSPECTIVES for the future generations**. It promises a more and more complete understanding of the universe, an always greater creative power over the structure and transformations of the inanimate as well as of the living world, an increasing ability to take control over disease, aging and even over the evolution of the human species, a deeper penetration into the working of the brain, the nature of consciousness and the origin of thought.

Among all the areas of knowledge that constitute SCIENCE, biological sciences and technologies are providing entirely new perspectives to our understanding and action on the living world, for health care, food production, environmental control. They will have strong impact on social and personal relationships, family structure, law and ethical values.

The **TECHNOLOGIES OF LIFE**, resulting from the extraordinary progress made in understanding life processes and the ability to act upon them, appear to tamper with a basic mystery and to lift an interdict with the risk of unleashing uncontrollable

forces. The realizations and potentialities of genetic engineering has aroused many reservations, in some countries more than in others. But the benefits that they can bring are countless, in agriculture and food production for instance, but above all to human health. Substances extracted from natural sources may be contaminated by compounds that present risks to health. Biotechnologies may permit to circumvent the problem. Thus, synthetic vaccines may be safer that natural ones. The production of human growth hormone by genetic engineering gives a product devoid of the prion that infects the same substance of natural origin and causes the Creutzfeld-Jakob disease. Numerous other such cases can be found, a particularly actual one being that of the production of factor VIII for blood transfusion without risk of infection by HIV. Other examples would be the engineering of bananas containing vaccines or of vegetables producing contraceptives which would allow women in developing countries to control themselves their fertility. Stem cell research also opens fantastic perspectives to biology and biotechnology.

Zero risk does not exist. **RISK** appears with life. Zero risk is a dead world. The desire to systematically eliminate all risk also destroys the chances and may as well become a threat to freedom and democracy.

Our duty is to **optimize the chances and minimize the risks**.

Our descendants will continue to evolve intellectually, culturally, materially. They may with hindsight, adopt points of view quite different from ours. To stop the machine would deprive them of the possibility of further development and would prevent them from succeeding where we failed. We must offer them all the chances and transfer to them all the powers. **This** is our responsibility, we have no right to hand down judgments in their place. They may be wiser than we are.

A crucial question concerns the so-called **DEVELOPING COUNTRIES**. Will the gap that separates them from developed countries get wider and wider? A continuing and aggravating problem into the century is the unacceptable **North/South imbalance** and the resulting strains. It is the responsibility of the developed countries to offer solutions and strive for “sustainable development” for everybody on earth.

One may hope that the accumulated knowledge and the very efficient advanced technologies resulting from research in the developed countries, might provide means for the less advanced ones, to enter directly into a “high tech” era based on highly advanced technologies that are more economical and much less demanding in raw materials, resources and energy.

For instance, a country that has an unsatisfactory telephone system will not have to lay more wires but can directly go to cellular phones, and may thus even be at an advantage over countries having a developped classical phone network. Telemedicine, telesurgery are other examples; a physician in a remote area of the world will have the possibility to obtain guidance and advice from specialists of developed countries.

SCIENCE EDUCATION in our schools, colleges and universities as well as for the general public must be a major priority, so as – to train the researchers and

discoverers of tomorrow, – to lift irrational fears and rejections, – to develop the scientific spirit, the scientific attitude, in order to fight the obscure, the deceitful, the irrational.

Beyond the general progress of knowledge and the technological development, the most important impact science can and must have on society is the **spirit** that it implies, the scientific, rational approaches towards the world, life and society. This is an area in which the Bibliotheca Alexandrina can play a major role, in particular for developing countries.

Education, science and technology may collide with tradition and hurt beliefs or social structure. We must be prepared for that and take it into account so as to overcome it. The installation of a solar-powered water pump accessible to everybody in a village of a developing country may destroy a traditional structure where power was in the hands of those who controlled the water supply. Thus, science brings new freedoms but mankind has to learn to live with them.

A very actual issue concerns the situation of the scientist with respect to **ETHICS**, and more specifically **BIOETHICS**. It is my strong opinion that the scientist has first of all **general responsibility to the truth** and only then is there responsibility to the society and the world at the particular time in history. Ethics is a function of time, location and knowledge. Pursuit of knowledge and truth supersedes present considerations on what nature, life or the world are or should be, for our own vision can only be a narrow one. Ethical evaluation and rules of justice have changed and will change over time and have to adapt.

With all the caution that must be exercized and despite the risks that will be encountered, carefully pondering each step, mankind must and will continue along its path, for **we have no right to switch off the lights of the future**.

These perspectives for the future of science, for **our** future, have already been expressed in most fitting terms by this quintessence of the artist-scientist, **Leonardo da Vinci** when he wrote:

«Where nature finishes to produce its own species, man begins, using natural things, with the help of this nature, to create an infinity of species».

Prometheus has conquered the fire and we cannot give it back. We have to walk the way **FROM THE TREE OF KNOWLEDGE TO THE CONTROL OF DESTINY**.