

## CAN SCIENCE SAVE THE WORLD?

First of all, let me thank BA for inviting me once again at BioVision, which I took part in - since the first edition, in 2002.

Special thanks to my old friend, Ismail Serageldin.

I hope you would share my congratulations for his terrific effort - he and his "dream team" - for making possible this wonderful enterprise.

And I would start my presentation with a quote from the impressive Librarian's opening address, last Monday. During the "hi-speed flight" over the S&T landscape, over needs and perspectives in this changing world, he said something each of us has well in mind, but he recalled with an uncommon strength: "For the tomorrow's world, we must provide knowledge producers, not only technology consumers".

How to do that?

As you probably know, I have developed a (long - unfortunately) career in communications and I had the opportunity to deal with the enormous change occurred in the last 25-30 years. From no-mobile phones to convergent devices; from PCs running basic operating systems, to web 2.0 and enhanced

multimedia tools in our mini-laptops. In the health domain, gene therapy was something beyond any imagination, so far... or Nanorobots, or everything we are discussing in these days.

Speed of changing, however, has been incomparably faster than our capability to bring science and technology to the public and make our society aware on decisions to take and choices to make.

So, in my opinion, the best effort to be done in the coming future is bridging the gap among those who will become the tomorrow's scientists and innovators, and the speed of learning, compared to the progress in S&T.

Rethinking S&T for the 21<sup>st</sup> Century should mean, to me, introduce a new cultural perspective for the benefit of youth in the view of an innovative and sustainable model for development and growth.

In this attempt, communication will play a pivotal role and, in some extent, basic science has to be meant as the cultural "trait-d'union" among generations and approaches.

In other words, it should be the substrate underlying and feeding today's young generation as future's ones.

So:

Can Science Save the World?

How to make it possible?

Let me begin with an apology. It is true that science is usually an input into economic activity that generates further prosperity, thereby increasing the quality of life.

However, science can also be an output that is pleasurable to indulge in, but which absorbs economic resources - rather than adding to them: like art, poetry, philosophy and so forth... which also contribute to the quality of life and the richness of culture.

This is probably what we need now, more than ever:

Overpopulation may not be much of a problem today in Europe and North America, but it, and its consequences: hunger, disease and poverty, are ever more serious problems elsewhere in the world.

So, we are given a simple choice: spread as much culture as possible in the view of a sustainable development and population growth.

Or we shall offer our descendents meaner, poorer, sadder and shorter lives.

Twentieth century life in the developed world is incomparably different from what it was like in the 19<sup>th</sup> century.

What led to these changes?

Surely, all the world's kings, presidents, and politicians played a role, but a minor one. So did all the world's architects, writers, and artists.

Most of the changes in our way of life resulted from advances in science, technology, and medicine. The history of civilization is closely linked to the history of science, much more closely than many scientifically illiterate historians may realize.

In a like manner, the 21st Century will be very different from the past century.

One thing, however, is clear: the relation between pure or fundamental science, on the one hand, and applied or practical science, on the other, has changed rapidly.

Medicine, despite its many triumphs, is not yet an exact science. Many new drugs, new devices and new procedures are devised every year. New therapies are added to the physician's tool-box. Nevertheless, it is still more an art than a science. But today, the human genome is to be widely mapped and many medical "miracles" will become possible, soon, if scientist will learn how to deal with the immense amount of information contained in our genes.

Many dire diseases will become preventable or reversible.

Today, physicists, chemists, computer scientists, ethical philosophers, and biologists are working together to explore the most fundamental processes of life. Thanks to their very basic research, medicine is fast becoming a precise and quantitative science.

Many of the fundamental questions of physical science have been answered, at least in principle.

Those that still vex physicists have to do with things that are far too small or too far away to affect the everyday world. Finding out the rules was an essential first step, but there is a lot more to basic science than that.

Why?

Because, even knowing all the relevant rules, answering such a simple question as: "why water is transparent and expands when it freezes" is devilishly difficult - let alone answering such tough questions as "what the weather will be tomorrow?" or "how a child learns to walk and talk?".

There's more basic science to do today than ever before, and many unexpected wonders of nature are hidden in the complexity of things and not yet revealed to us. The so-called end of science is a mirage: science is truly the endless frontier.

An appropriate point to mention is the changing relationship between academia and industry.

As the distinction between basic and applied science blurs, it's downright silly to keep these enterprises entirely separate from one another.

University researchers should be encouraged to exploit their discoveries, just as industrial labs should pursue undirected basic research.

These traditions exist in the United States and in a few other countries, but not everywhere. We should anticipate and foster many even closer links between academia and industry in this century.

Ours is a technological society. Most of us can simply use such things as cars, computers, and cellular phones. But some of us must understand how they work, and others must address the problems that beset us, many of which were caused by the new technologies.

The functioning of modern society depends on our well-trained engineers and applied scientists. Who are they and who will teach them? Things have gotten much too complicated for on-the-job training.

Tomorrow's teachers and scientists are today's inquisitive children. Children often ask the same sorts of questions that basic scientists do:

"How did the world begin?"

"What makes stars shine?"

“How do rabbits make more rabbits?”

If only they could be encouraged to continue to ask these questions when they grow up... I'm suggesting what's called a bait and switch operation: get the kids interested in quarks and quasars so they learn some physics and maths, and maybe they will grow up to be scientists and invent a better battery or a new therapy.

Here is one more virtue of basic science. Science is one of a very few examples of successful international cooperation. This is not something new: science has rarely recognized national or cultural boundaries. For example, five men taught us our place in the universe: Copernicus (a Pole), Tycho Brahe (a Dane), Kepler (a German), Galileo (an Italian), and Newton (an Englishman).

Science continues as a multinational and multicultural enterprise, but today's scientists are no longer exclusively white, European, Christian men.

I shall conclude my talk with one last argument for the importance of pure science, even when it is so pure that it offers no hope of immediate practical application.

No one said it better than Primo Levi: an applied chemist, a holocaust survivor, and a very moving author.

Please forgive me for offering an English translation of his Italian prose:

“What is the use of all this research? A world, in which only useful things are studied, would be sadder, poorer, and perhaps even more violent than the one fate has allotted us...

The future is uncertain even in the most prosperous countries, and the quality of life deteriorates; and yet I believe that what is being discovered about the infinitely large and the infinitely small is sufficient to absolve this end of the century and the millenium.

What a very few are acquiring in knowledge of the physical world will perhaps cause this period not to be judged as a pure return to barbarism.”

Thank you for your attention.