



XU0001007

**UNESCO**

DG/98/20

Original: English

UNITED NATIONS EDUCATIONAL,  
SCIENTIFIC AND CULTURAL ORGANIZATION

Address by  
Mr Federico Mayor

Director-General  
of the United Nations Educational,  
Scientific and Cultural Organization  
(UNESCO)

at the opening session of the Niels Bohr Symposium,

UNESCO, 27 May 1998

6  
**31 - 13**

Distinguished Colleagues,  
Ladies and Gentlemen,

It is a great pleasure to welcome so many eminent participants to UNESCO House for this Symposium, organized jointly by UNESCO and the Niels Bohr Institute in Copenhagen, with the help of the Danish National Commission.

For over a decade now, we have commemorated the life and work of this outstanding scientist with the UNESCO/Niels Bohr Medal. But I suggested we hold this symposium because I felt that - as the century draws to a close - we need more than a commemoration. We need an exploration of Bohr's life and work. By throwing light on the past - on the man and on the impact of his discoveries - we may find that we see our way forward more clearly. As a new century opens, the focus will turn to new openings in science and in society at large. And some figures like Niels Bohr are of such towering stature, they cast their light far ahead of their own times.

This symposium will first explore both the science and the spirit of Niels Bohr. It will then examine the latest developments in key fields of physics. The science of quantum physics to which Bohr gave such a significant impulsion still carries his imprint and still remains a frontier area of research today. A clear example can be found in chaos theory, which is now proving invaluable in the study of a whole range of phenomena from cardiac arrhythmia to the dynamics of traffic jams. Among the tools still used today for understanding chaotic phenomena in quantum systems is the so-called periodic orbit theory based on Niels Bohr's original approximations.

We may need to look further to find an equally clear example of the continuing impact of Niels Bohr's spirit. Where, in the hyper-specialized and sharply competitive world of contemporary science, should we look for that special spirit - that unique combination of wide-ranging curiosity and social conscience? Possibly the nature of the scientific enterprise is such today that we should look for it in new, collective forms as well as at the level of the individual scientist. Possibly we can say that the spirit of Niels Bohr lives on in the efforts of ethics commissions to forge a new language of scientific responsibility. Possibly, his spirit is to be found in the thriving field of popular science, where many leading scientists have made a great effort to lead general readers down new paths into complexity.

In his own day, nobody could have been further from the common stereotype of a scientist than Niels Bohr. He led science through the most fundamental change of attitude since Galileo and Newton and at the same time he radiated spontaneous warmth and

humanity. The many physicists who went to Copenhagen later spoke of their interaction with Bohr as an experience that shaped both character and mind. By endless and passionate discussions with his brother, friends and colleagues, he groped his way forward to a closer understanding of the behaviour of natural phenomena. Bohr's creative thinking thrived on such interaction and exchange.

He also paid great attention to the impact of science on society. Earlier than many other scientists, Niels Bohr realized that atomic physics might come to play a decisive part in civilization and in the fate of mankind. The events of Bohr's time reinforced his conviction that science cannot be separated from the rest of the world. As the drama of Nazi Germany unfolded in the thirties, Bohr's initiatives helped refugee scientists escape dangerous conditions. Later, during the Second World War, Bohr became a refugee himself. On his arrival in 1943 in the United States, he engaged in a one-man campaign to persuade the leading statesmen of the Western World of the dangers that might arise from the atomic bomb. In acknowledgement of his efforts, Bohr was awarded the first Atoms for Peace prize.

After a century scarred by the use of science and technology to fuel a culture of war and confrontation, the world has at last begun to follow Niels Bohr's example. We can now see the fruits of his campaign for the use of science as a foundation of a culture of peace and co-operation. Bohr's struggle for what he called an "open world" became one of his leading preoccupations. In the later part of his life, Bohr also spent much time organizing international activities in science, most notably the CERN laboratory in Geneva. His vision of an open world and his vision of international cooperation in science here merged in a harmonious synthesis.

What he was able to do with the CERN project, the climate of the Cold War prevented him from doing at the political level. His open letter to the United Nations in 1950 rings as true today as it did then to those whose minds were not too clouded by fear and suspicion to hear his message. I would like to quote from that letter. Speaking of the atomic threat, he wrote: "*The very necessity of a concerted effort to forestall such ominous threats to civilization would offer quite unique opportunities to bridge international divergencies.*" How true that remains, when we think of the threats still facing our planet! Bohr's message went unheeded at the time. Today, we have international scientific programmes in a number of crucial areas. Progress has been made.

But we still need that effort of concerted political will which Bohr called for. How true too his following insight in the

letter: *"Any widening of the borders of our knowledge imposes an increased responsibility on individuals and nations through the possibilities it gives for shaping the conditions of human life."* Here we have a compelling message and an incontrovertible argument! Niels Bohr saw that - because knowledge forms the basis of civilization - an open world and the free exchange of knowledge are vital. How true this is today in our knowledge-dependant world! Indeed, faced with the risk of irreversible changes to our planet, we can say it is the only solution. And how relevant is Bohr's message about responsibility! I will quote from his letter one last time: *"A proper appreciation of the duties and responsibilities implied in world citizenship is in our time more necessary than ever before."* Nearly half a century after Bohr wrote those words, we have more compelling reasons than ever to take them to heart.

I hope that Bohr would have seen UNESCO's International Bioethics Committee, its World Commission on the Ethics of Science and Technology, its forthcoming World Science Conference as so many examples of responsible world citizenship. This symposium too corresponds to one of the fundamental goals of UNESCO: to promote the understanding of science on a global scale, and to relate science to other parts of human culture. This meeting will contribute to spread the message of modern science on a global scale. I am pleased to note that the symposium brings together physicists from different branches, and also physicists from many different regions of the world, including many scientists from the developing countries. The sharing of scientific knowledge is an essential part of the culture of science.

We cannot afford to lose sight of this fundamental dimension of science or it will become no more than a fragmented set of disconnected disciplines where a reductionist vision prevails. Bohr's breadth of vision and concerns must remain a model for scientists. Today we must also ensure that the sharing of scientific knowledge involves a sharing of scientific resources, of science education and of research tools. Bohr's "open world" of freely exchanged knowledge must become a reality. As I mentioned, next year UNESCO will convene a World Conference on Science in Budapest. Many of the crucial issues I have just outlined will be raised on that occasion and will, I hope, be followed up by decision-makers. I see the Niels Bohr symposium as an important inspiration for the Budapest world conference.

It is deeply satisfying for UNESCO to host an "end of the century" meeting of this kind, in honour of Niels Bohr. At UNESCO, I have to say, we have already shifted our perspective to think in terms of the new century: new starts and new openings.

In tomorrow's world, it is imperative that science makes itself more understandable and more visible to society at large. UNESCO will emphasize this point symbolically by awarding the UNESCO Niels Bohr gold medal to four outstanding physicists from various parts of the world. This award will be made not only for their important achievements in basic science, but also for their efforts to narrow the gap between science and society. The presentation of the gold medals will take place at the end of the meeting, on Friday afternoon.

In conclusion, let me just say that this symposium offers a programme of exceptional quality and perspective. It offers an opportunity to learn about developments in neighbouring fields and to engage in the kind of cross-fertilization of ideas and debate which Niels Bohr so loved.

I wish all of you a rewarding and enjoyable time in the coming three days.