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Niels Bohr's mission for an 'open world'

I AM DIRECTOR OF THE NIELS BOHR ARCHIVE in Copenhagen, which is responsible for the publication of the Niels Bohr Collected Works, the last volume of which will be published at the end of this year. My talk here is based on research for the next to the last volume, Volume 11, which deals with Bohr's political interests and involvements.

Niels Bohr ranks with Einstein as one of the foremost physicists in the twentieth century. He is known in particular for the revolutionary quantum theory of the atom from 1913; the central role of the Institute for Theoretical Physics established for him at the University of Copenhagen in 1921; the "Copenhagen Interpretation" of quantum mechanics and, in that regard, his concept of "complementarity" first formulated at a lecture in Como, northern Italy, in 1927; the explanation of fission in 1939; and his "Open Letter" to the United Nations of 1950. The latter represents his political involvement, which is the topic of my talk today.

Unlike Einstein, Bohr started to involve himself seriously in international politics relatively late in life. Yet there are scattered statements and activities earlier in Bohr's life indicating a genuine interest and commitment. Immediately after the First World War, on 24 November 1918, he wrote to his beloved teacher and role model at Manchester University, Ernest Rutherford, with whom he had worked both before and during the war:

All here [in Copenhagen] are convinced that there can never be a war in Europe of such dimensions.

Further:

... all liberal-minded people in the world [not least in Germany] seem to have understood the unsoundness of the principles on which international politics has hitherto been carried on.

During the next fifteen years Bohr developed his new institute into a Mecca for international cooperation in science, seeking to maintain the exchange of physicists between nations. When dark clouds again began gathering over Europe, Bohr made his first visit to the Soviet Union in 1934, stating in an extensive interview with *Izvestia*: "I believe that in science there will and must exist a sense of community and co-operation that one may not be able to create in all fields," implying that co-operation in science ought to be seen as a model for international co-operation generally.

Only a few months later the Russian physicist Peter Kapitza, who by then had been a prominent member of Rutherford's group in Cambridge for thirteen years, was held back by Soviet authorities during his annual summer vacation. When Rutherford asked Bohr to sign a joint appeal for Kapitza's return from a number of prominent European scientists, Bohr responded that such an approach might offend the Russian authorities. Better, he said, with a personal appeal from a scientist respected by the Russians. Bohr followed this approach when four years later another prominent Russian physicist close to Bohr, Lev Landau, disappeared from view, writing a letter to Stalin himself.

By contrast, Bohr saw no possibility of seeking cooperation with the German government after Hitler had come to power in 1933. Instead, he actively worked to get especially the younger generation of Jewish physicists out of Germany, using his institute as a safe haven before permanent employment could be found for the refugees elsewhere. In 1938 his introductory talk at the International Anthropological and Ethnographical Science convention held in Denmark made international headlines as a criticism of Nazi race theories. A little earlier in the year, Bohr had made a much improved presentation of his complementarity standpoint at a conference in Warsaw under the auspices of the League of Nations to promote international cooperation. He also brought his close younger collaborator, Léon Rosenfeld,

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who we will hear about in the next lecture, to this conference, as well as to a trip to Krakow in connection with this event.

The visit of Bohr's younger colleague, the German physicist Werner Heisenberg to Copenhagen in September 1941, almost a year and a half after the German occupation of Denmark, has been the subject of much discussion recently on the basis of Michael Frayn's play "Copenhagen". This discussion, in turn, led to the release from the Niels Bohr Archive in February 2002 of the drafts of Bohr's unsent letters to Heisenberg on the matter written sixteen years and more after the event. At the time of Heisenberg's wartime visit, Bohr did not think that an atomic bomb could be built within the foreseeable future, or at least for as long as the war might realistically be expected to last. He had given expression to this view in lectures just before the occupation of Denmark. In early 1943, when invited through secret channels to Britain to take part in the scientific work there, he rejected the invitation on this basis.

In late September the same year, however, Bohr was compelled to escape from Denmark to Sweden together with thousands of other Danes of Jewish extraction. In Sweden, the invitation to Britain was repeated, and this time Bohr accepted.

In London Bohr was briefed about the status of the Allied atomic bomb project, and he was immediately convinced that a bomb might be ready within a matter of months. While agreeing to join the project as a member of the British contingent, he was also worried about the postwar implications of the bomb, discussing the matter in particular with Chancellor of the Exchequer and political leader of the British side of the bomb project, Sir John Anderson.

Bohr proceeded to the United States, and after spending the first weeks of 1944 in Los Alamos, where the bomb was being built, Bohr wrote a detailed letter to Anderson, both giving a status report on the work in Los Alamos and laying out his ideas with regard to the postwar implications of the atomic bomb. His main message was that

...the impending realization of the project would not only seem to necessitate, but should also, due to the urgency of confidence, facilitate, a new approach to the problem of international relationship.

Bohr advocated telling the Soviet Union about the existence of the bomb before it was used in order to avoid destroying all confidence of the war partner at the end of hostilities and to enable postwar negotiations on international control of atomic weapons. He wanted to bring his point to the very leaders of the nations developing the atomic bomb — President F.D. Roosevelt and Prime Minister Winston Churchill. Although supportive of his ideas, Sir Anderson and Lord Halifax, the British ambassador, found it inopportune to back Bohr officially. However, they did advise Bohr privately and agreed, when the opportunity arose, that Bohr talk to Roosevelt's close adviser, Felix Frankfurter, who was also a member of the U.S. Supreme Court and whom Bohr knew from before. After Frankfurter had indicated his knowledge of the atomic bomb project, Bohr told him about his ideas on how to prepare for the postwar international situation, and Frankfurter was clearly impressed. He talked to Roosevelt about the matter, and according to Frankfurter the President was equally impressed. Indeed, Frankfurter encouraged Bohr to bring Churchill the message that Roosevelt wanted to discuss the postwar situation with the British Prime Minister on this basis. As a result, Anderson and Halifax arranged a journey for Bohr to England.

The first matter that Bohr had to take care of in England, however, was a letter from his close colleague Kapitza, who had remained in the Soviet Union and been given facilities in Moscow to continue his physics research. The letter amounted to an invitation to the Soviet Union. Bohr and the British Secret Service agreed that it might amount to a veiled invitation to take part in a Soviet atomic bomb project. Bohr's reply, written in close cooperation with the British Secret Service, explained his presence in the England and the United States as a preparation for postwar international scientific cooperation and regretfully noted that he would be unable to accept the graceful invitation at this time.

Bohr was finally able to arrange an interview with Churchill through several influential contacts, including the Prime Minister's personal science adviser, Lord Cherwell, and the President of the Royal Society, Henry Hallett Dale, both of whom were entitled to know about the highly secret atomic bomb project. Dale, in particular, was not optimistic about the outcome of the meeting, writing to Cherwell that:

...I am especially disturbed by the thought that Bohr's mild, philosophical vagueness of expression, and his inarticulate whisper, may prevent him from making a desperately preoccupied P[rime] M[inister] understand him.

Dale was right, and the interview, which took place on 16 May 1944, was a disaster. Churchill, who was busily preparing D-Day at the time, does not even seem to have allowed Bohr to explain himself fully, instead discussing other matters with Cherwell, who was also present.

Bohr was not a man to give up easily, and when, on his return to the United States, Frankfurter encouraged him to write a memorandum to Roosevelt outlining his views, he lay all other matters aside. The eight-page memo was duly forwarded by Frankfurter and constituted the basis for an interview with the American President on 26 August 1944. In gratifying contrast to Churchill, Roosevelt expressed strong appreciation of Bohr's ideas, promising to bring them to the British Prime Minister at the upcoming meeting in Quebec. As is now well known, but as Bohr himself was only to learn some time later, the two statesmen concluded:

Enquiries should be made regarding the activities of Professor Bohr and steps taken to ensure that he is responsible for no leakage of information particularly to the Russians.

In a devastating letter to Cherwell, Churchill added:

It seems to me that Bohr ought to be confined or at any rate made to see that he is very near the edge of mortal crimes.

The suspicions of Bohr were caused by his contact with the Russian physicist Kapitza and, to a lesser extent, his conversation about the atomic bomb with Frankfurter, who was not formally cleared for the information. Although Cherwell, Anderson and others did their best to clear him of all suspicion, this was as close as Bohr would ever get to implementing his ideas.

When the bomb was dropped on Hiroshima on 6 August 1945, Bohr was back in England. Only five days later an article under his name appeared in *The Times*. It contained the essence of his views without revealing the substantial diplomatic efforts he had carried on in order to accomplish them.

After the existence of the atomic bomb had become public knowledge, Bohr was allowed to return to Denmark, together with his wife who had met him in England. On 21 October he thanked Heisenberg for his recent greeting on his 60th birthday with the following words:

I trust that we shall all see happier days and that the horrors brought over innocent people by men blinded by prejudice will be a lesson to all mankind of how easily culture can deprave if humane ideals are discarded.

I also firmly believe that the immense implications of the advance of science, by the warning of the necessity of peaceful co-operation between nations, will greatly promote harmonious international relationships.

Bohr wrote the letter in English, not in Danish as he used to, probably because Heisenberg at this time was interned in Farm Hall in England together with nine other captive German scientists.

Bohr continued his political mission throughout his life. Even after the demands of secrecy did no longer apply, he preferred the approach of contacting statesmen confidentially and one-on-one. His contact with the U.S. Secretary of State George C. Marshall in 1948 thus produced his most detailed statements of his views. Only in 1950 did he momentarily give up this approach by writing a long "Open Letter" to the United Nations, which not only stated his general views, but also told the story of his efforts during the war — and after — to reach the statesmen in confidence. Thus, the "Open Letter" can be said to merge Bohr's previously separate public and confidential approaches. Later on, Bohr returned to the confidential approach, but without much success.

Bohr's "Open Letter" coincided with the so-called "Stockholm appeal" calling for the abolishment of nuclear weapons. When he was encouraged to join the appeal, Bohr strongly objected to it, stating adamantly that any approach must start from a full exchange of information among nations — an "open world" as he called it. Thus his approach differed from other attempts by scientists and others to abolish atomic weapons not only in method (public vs. confidential), but also in content. By the same token, he decided in the end not to sign the Russell – Einstein Manifesto of 1955.

How does this story relate to the broader topics taken up at this conference? There can be no doubt that Bohr belongs to the species of “politically active scientists in the 20th century”, which is the title of this session. I look forward to discussing with you the question of how Bohr as a politician compares to other scientists presented in the session. As for the heading of the entire conference, Bohr made a genuinely *global* effort, in science and politics alike, from the vantage point of his definitely *local* cultural and political domicile in Denmark, which formed his life and to which he was closely bound for as long as he lived. To what extent his political efforts need to be understood from this perspective is also a point worth discussing.