

was reasonably safe. You will recall that we did not know much about safety in those days. We did not know how dangerous it was, and we were playing pretty safe. We put the village five or six miles away from the plant, as you will see, when you get up there. I think that today we would not worry so much about that danger. As we have gone along, our experience has made us very confident. Many things we feared did not materialize and precautionary procedures have developed very rapidly, and today we feel there is not as much danger as we anticipated.

The remoteness of the site, of course, brought the costs up very much. It was a virgin site. Artisans, masons, carpenters and labourers did not care to leave the big cities. We could not present it to them as a patriotic effort because we could not tell them what it was. We had to meet the Toronto rates which brought the costs up above normal costs, although I do not think, in retrospect, the costs would look very high today. In any event, it was quite a frantic effort from then on. We selected the site in August 1944. The actual construction started immediately, and we had one pile operating within a year. That was a small pile, but it was the first pile operated outside of the United States. It was put into operation in September, 1945.

Shortly after the end of the war, the Atomic Energy Control Board was set up. So everything I have mentioned, up to the present time, is pre-atomic energy control board.

Do you think there might be some questions at this point?

By Mr. Coldwell:

Q. You have spoken of the years 1942, 1943, and 1944. What was going on in the United States at that time? Were they ahead of us?—A. Oh yes. It is rather difficult properly to appraise that period. The most significant things, from 1940 or 1942, were the judgements that were forming in the minds of the first class scientists, such as Fermi and Chadwick. These people were considering all aspects of nuclear theory and making calculations to answer the questions as to the feasibility of reactors and bombs. The group in England certainly was a very important group.

As time went on more work was done in the United States than in U.K. That is just as one would expect, considering their facilities. The Columbia group was a very active one and so was the Chicago group, and the group at the Bureau of Standards. Until that first pile reacted in Chicago, the order of magnitude of expenditures in the United States was not great. Probably it ran from \$50 million to \$100 million.

Q. And there then followed close co-operation between the three countries?—A. There followed close co-operation between the three countries. As a matter of fact, there were scores of papers published in 1940 and 1941; so when it is said that all countries have always had the scientific theory, it is substantially true. Some of you may have read popular articles. In an article in *Colliers*, July 4th 1940 there is an interesting story.

By Mr. Green:

Q. The Germans did not make the progress that had been expected?—A. No. That was a most extraordinary thing. Scientists would say that it was because of the way the dictatorship countries handled science. If the German scientists had been operating under the pre-1914 regime they would probably have made more progress. Apparently Hitler took many of his first class scientists away from the laboratories. The Germans certainly had the basic knowledge but they never made a successful reactor.

Q. They must have known the results from Chicago?—A. No, the curtain was down by then. They knew of the early Columbia work and they knew of the work done by Bohr in Denmark. There must have been fifty or sixty