

TELLER, HEISENBERG AND THE BOMB

This is a partial account of a conversation I had with Edward Teller, relevant to Teller's opinion of Heisenberg's role in the German quest for the atom bomb. It's certainly not worth an article, but maybe it will turn up when some historian does a Google search.

An article had recently appeared in *American Scientist* about Heisenberg's mistake in calculating the critical mass of an atomic bomb. Heisenberg, as described in the article, had used the mean free path of a neutron in uranium to get an estimate of the fraction of neutrons emitted by a fission event that would trigger another fission. This was incorrect, because, as I see it, the fraction of neutrons that found a uranium nucleus much before travelling a mean free path played a more important role. Heisenberg concluded that the critical mass would be impractically large.

When the bomb was dropped on Hiroshima, Heisenberg and other participants in the German bomb project were confined to a bugged house in England called Farm Hall. Heisenberg's first reaction to the news was to exclaim that it must be a fake, because it was impossible. A week later he gave a good lecture to his fellow prisoners on how it must have been done.

The correct calculation, based on diffusion theory, was included in Robert Serber's 1943 Los Alamos Primer. I suppose it was already old news in Britain and the US.

When I asked Teller about Heisenberg's mistake and mentioned the short calculation in Serber's primer, Teller replied, **"If he hadn't made that mistake, he'd have made some other mistake. His heart wasn't in it."**

Heisenberg had been Teller's PhD adviser, so Teller's opinion of how Heisenberg's mind worked deserves considerable weight.

Up to: [McCarthy home page](#)

Send comments to mccarthy@stanford.edu. I sometimes make changes suggested in them. - [John McCarthy](#)

The number of hits on this page since 2003 September 17. □