

## **Nazi Nukes: Why German Physicists Worked on Hitler's Bomb**

Much has been written about the motivations that led so many ordinary Germans to aid in the massacre of millions during the Holocaust. Nationalism, anti-Semitism, brain-washing, intense peer and authority pressure, misinformation about the atrocities—all these reasons, and far more, have been cited. The physicists of Germany who worked on their country's nuclear bomb research during World War II were not administering concentration camps or inciting riots against Jews, but their research efforts have been cast by many as just as evil, given the horrors that would certainly have been wrought by an atomic bomb-wielding Hitler. Although some enthusiastically embraced Nazi ideology, others were fully aware of the terrible consequences that would have resulted from a successful project, yet opted to continue anyway; most, too, were shocked and appalled by Americans' use of the bomb on the Japanese cities of Hiroshima and Nagasaki at the end of the war. The reasons for their decisions to stay and work towards a nuclear bomb for Nazi Germany led by Hitler are complex, but ultimately tell more about human nature than evil.

Werner Heisenberg especially bore the brunt of the post-War blame as head of the German nuclear program. After the Germans' defeat, when he traveled to American, many physicists refused to even shake his hand—"hands that had actually built the bomb wouldn't touch [his]."<sup>1</sup> The issue became more complicated once his involvement was popularized, especially in Robert Jungk's 1958 *Brighter than a Thousand Suns* and Thomas Power's more recent *Heisenberg's War*, which

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<sup>1</sup> Michael Frayn, *Copenhagen*, (New York: Anchor Books, 2000), 47.

romantically painted Heisenberg as a Hitler saboteur, heroically staying in the German project (at great risk to himself) to make sure it didn't succeed.<sup>2</sup> While there is "no evidence that Heisenberg made this claim himself in public, and it is not clear that he really took that position in his interview with Jungk... he also never repudiated it publicly,"<sup>3</sup> though he reportedly privately made statements such as "I would not want these remarks to be misunderstood as saying that I myself engaged in resistance to Hitler"—statements that were notably lacking in Jungk's book.<sup>4</sup> Michael Frayn's 1998 Tony-award winning play *Copenhagen* dramatized the now-famous meeting of Heisenberg and Bohr in 1941, sparking interest in the subject anew. Heisenberg himself, however, had "wished that the whole issue would just go away."<sup>5</sup>

This controversy, though, shall be left to other historians. But one thing is clear: Heisenberg, like most of his colleagues in the German nuclear effort, was fiercely German, and had a deep love for his country unswayed by which political party happened to be in power. As Frayn's character relates,

Germany is where I was born. Germany is where I became what I am. Germany is all the faces of my childhood, all the hands that picked me up when I fell, all the voices that encouraged me and set me on my way, all the hearts that speak to my heart. Germany is my wife. Germany is our children. I have to know what I'm deciding for them [when contemplating whether to pursue bomb development]! Is it another defeat? Another nightmare like the nightmare I grew up with?<sup>6</sup>

The nightmare of Heisenberg's childhood had been very real. Political and economic chaos followed Germany's humiliating defeat in World War I—chaos, along

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<sup>2</sup> Cathryn Carson, "Placing Frayn's Play in the Historical Tradition" (Berkeley: University of California, 2001 lecture).

<sup>3</sup> Carson, *Particle Physics and Cultural Politics: Werner Heisenberg and the shaping of a role for the physicist in postwar West Germany* (Cambridge: Harvard University, PhD dissertation, 1995), 252

<sup>4</sup> Carson, "Placing Frayn's Play."

<sup>5</sup> Carson, *Particle Physics and Cultural Politics*, 253.

<sup>6</sup> Frayn, *Copenhagen*, 42.

with its resulting social discontent, that Hitler did not hesitate to exploit in his rise to power.<sup>7</sup> Ironically, it also set the stage for the rich growth of quantum mechanical theory in Germany, notably during the period of 1924-29,<sup>8</sup> as people there sought "an irrational world order"<sup>9</sup> and hit upon a beautiful interpretation of the universe that also, wonderfully, seemed to be right. "Oh, those years! Those amazing years!"<sup>10</sup> cries Frayn's Heisenberg nostalgically, remembering the thriving physics community. Physicists of this golden era had experienced "Europe in all its glory again. A new Enlightenment, with Germany back in her rightful place at the heart of it."<sup>11</sup> Eager to maintain and expand this comforting contrast to the ruin of their postwar state, physicists "often reacted by asserting that science and scholarship were all that Germany had left as a world power, an attitude which accelerated and deepened the politicization of physics," already intensified by the ever-increasing reliance on government for funding once endowments plummeted with the economy.<sup>12</sup>

For Heisenberg and other German physicists, then, it was especially unbearable to see the disintegration of their country's field. The "Party clique... filled more and more professorial chairs with totally incompetent candidates," who promoted themselves as "Aryan physicists." In the early 1930s, the Nazis began a campaign, championed enthusiastically by Nobel laureates Johannes Stark and Philipp Lenard, to remove the "Jewish contamination" of quantum mechanics and relativity,<sup>13</sup>

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<sup>7</sup> Tatyana Gordeeva, "Hitler and the Rise of National Socialism" from *German Culture* (WWW: [http://www.germanculture.com.ua/library/history/bl\\_hitler\\_rise\\_of\\_nazi.htm](http://www.germanculture.com.ua/library/history/bl_hitler_rise_of_nazi.htm), 2003) and Mark Walker, *Nazi Science: Myth, Truth, and the German Atomic Bomb* (New York: Plenum, 1995), 185.

<sup>8</sup> Frayn, *Copenhagen*, 60.

<sup>9</sup> Paul Forman, "Weimar culture, causality, and quantum theory, 1918-1927: Adaptation by German physicists and mathematicians to a hostile intellectual environment," in *Darwin to Einstein: Historical Studies on Science and Belief*, ed. Colin Chant and John Fauvel (New York: Longman, 1980), 274.

<sup>10</sup> Frayn, *Copenhagen*, 60.

<sup>11</sup> Frayn, *Copenhagen*, 61.

<sup>12</sup> Walker, *Nazi Science*, 184

<sup>13</sup> Wolfgang Finkelburg, "The Fight Against Party Politics," in *Physics and National Socialism: An Anthology of Primary Sources*, edited by Klaus and Ann Hentschel (Boston: Mirkhauser, 1946

which had been birthed by the likes of Einstein, Bohr, and others. (Ironically, the government had almost forced German Jews into theoretical physics by restricting their funding for experimental equipment—what *real* physicists used until theory became an acceptable alternative to experiment in the early 1900s.) Anyone who lectured on these "inferior" subjects were considered "bad Germans" and risked career advancement.<sup>14</sup> Heisenberg, formulator of the uncertainty principle and one of the founding fathers of quantum mechanics, refused to cease teaching relativity and faced attacks by pro-Nazi scientists, who called him a "white Jew,"<sup>15</sup> which contrasts intriguingly with his later role as head of the German nuclear effort.

Many scientists and intellectuals, Jews and non-Jews, left Germany—if they could—to get away from the increasing influence of the Nazi party, but others opted to stay. The decision of the physicists who remained (even if, like Heisenberg, they were offered positions in other countries like America<sup>16</sup>) was often later explained by them as an effort to save German physics from utter decimation, even if they acknowledged the wrong-doings of the Nazi government. "I said to myself, this is a German affair," recalled Walther Gerlach, who in 1922 demonstrated the quantization of space, "and we must see that German physics are preserved... I went to my downfall with open eyes, but I thought I would try and save German physics and German physicists, and in that I succeeded."<sup>17</sup>

The immense government control of physics research by government continued into the war, and while it may have convinced some scientists to stay in the

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[1998]), 339-345.

<sup>14</sup> Finkelburg, "The Fight Against Party Politics," 340.

<sup>15</sup> Finkelburg, "The Fight Against Party Politics," 340.

<sup>16</sup> Warren Strobel, "Absense of A-Bomb: Were the Nazis Duped—Or Simply Dumb?," from *U.S. News: Mysteries of History* (WWW: <http://www.usnews.com/usnews/doubleissue/mysteries/nazi.htm>, 2000).

<sup>17</sup> Frayn, *Copenhagen*, 79, 87.

hopes of saving what they could from the system, it also created great obstacles to the very research results the state tried to extract, especially that of the bomb. As Heisenberg noted,

[T]he whole structure of the relationship between the scientist and the state in Germany was such that although we were not 100% anxious to do it [work on nuclear research], on the other hand we were so little trusted by the state that even if we had wanted to do it it would not have been easy to get through.<sup>18</sup>

"The official people were only interested in immediate results," agreed his colleague Kurt Diebner. "They didn't want to work on a long-term policy as America did,"<sup>19</sup> and didn't invest nearly the same level of resources into the project. Erich Bagge, another physicist, was glad of this, however: "If the Germans had spent 10 milliard marks on it and it had not succeeded, all physicists would have had their heads cut off."<sup>20</sup> Still, the reasons for this lack of resources is still not completely clear, though as Albert Speer, the Nazi Minister of Armaments, said after the war, "I do hope Heisenberg is not now claiming that they tried, for reasons of principle, to sabotage the project by asking for such minimal support!"<sup>21</sup>

Towards the end of the war, when Germany had clearly lost, the Allies launched "Operation Epsilon," which rounded up the top German nuclear scientists and brought to an English country-house called Farm Hall.<sup>22</sup> As Frayn's Heisenberg recalls,

We've been rounded up by the British—the whole team, everyone who worked on atomic research—and we've been spirited away. To Farm Hall... our families in Germany are starving, and there we are sitting down each evening to an

<sup>18</sup> Frayn, *Copenhagen*, 77.

<sup>19</sup> Charles Frank, *Farm Hall Transcripts* (Berkeley: University Press, 1993 [1945]), 78.

<sup>20</sup> Frank, *Farm Hall Transcripts*, 86.

<sup>21</sup> Frayn, *Copenhagen*, 108.

<sup>22</sup> Bookmark Physics, "Operation Epsilon: The Farm Hall Transcripts" (WWW: <http://bookmarkphysics.iop.org/bookpge.htm?book=616h>, 1993)

excellent formal dinner with our charming host, the British officer in charge of us.... No one knows we're there—no one in England, no one in Germany, not even our families.<sup>23</sup>

Farm Hall was more than just a comfortable prison, however. Not only did it keep the German physicists isolated until after the bomb was dropped and the Allies could decide what they wanted to do with them (ultimately, all were released uncharged), but it allowed for recording of everything they said. The British intelligence were careful to hide the surveillance equipment well, and the "guests," they were called by the Farm Hall transcripts<sup>24</sup> (which were declassified only recently, after decades of pressure from historians<sup>25</sup>), were apparently unaware that they were being recorded. A week into their six-month stay, one scientist wondered out loud whether the house might perhaps be bugged, and Heisenberg had merely laughed: "Microphones? Oh no, they're not as cute as all that. I don't think they know the real Gestapo methods; they're a bit old-fashioned in that respect."<sup>26</sup>



*Farm Hall*

By the time the bombs were dropped on Hiroshima and Nagasaki, however, it's quite possible that the guests were well aware of hidden surveillance. In the transcripts, one scientist, upon opening an out-of-the-way cabinet, unthinkingly wondered out loud why there were wires inside; and the scientists often invited each other for walks outside when they wished to discuss privately, perhaps because there was less chance of microphones.<sup>27</sup> It is thus difficult to tell whether they truly believed

<sup>23</sup> Frayn, *Copenhagen*, 45-46.

<sup>24</sup> Frank, *Farm Hall Transcripts*.

<sup>25</sup> Bookmark Physics, "Operation Epsilon."

<sup>26</sup> Rigby, Nick. "Hitler's Scientists and the Atomic Bomb" from *BBC News World Edition* (WWW: [http://news.bbc.co.uk/2/hi/uk\\_news/england/cambridgeshire/3127222.stm](http://news.bbc.co.uk/2/hi/uk_news/england/cambridgeshire/3127222.stm), 2003)

<sup>27</sup> Kaiser, David. 8.225 lecture.

all their words about their intentions towards Germany's bomb program or were just carefully establishing themselves as good anti-Nazis for the listening British.

"We never worked on the bomb," insisted Gerlach the night of Hiroshima.<sup>28</sup> "We must admit that we didn't want to succeed," said Weizsacker, pointedly adding that it would have been "a much greater tragedy for the world if Germany had had the uranium bomb."<sup>29</sup> Heisenberg declared that

I would say that I was absolutely convinced of the possibility of our making an uranium engine but I never thought that we would make a bomb and at the bottom of my heart I was really glad that it was to be an engine and not a bomb. I must admit that.<sup>30</sup>

though later statements cast doubt on the truth of this proclamation. Otto Hahn's statement was especially strong: "I must honestly say that I would have sabotaged the war if I had been in a position to do so."<sup>31</sup>

While the physicists had good reason to align themselves with the winning side, they were still caught in an uncomfortable situation, for there was still their yet-beloved German Fatherland to think of, regardless of whether they had held moral scruples about the Nazi regime. Heisenberg, like the others,

wanted to distance himself from the Nazis, but he didn't want to suggest that he had been a traitor. He was reluctant to claim to his fellow-Germans that he had deliberately lost them the war, but he was no less reluctant to suggest he had failed them simply out of incompetence.<sup>32</sup>

Not only did they still want to preserve what was left of German physics (not much, by then), but, as Gerlach worried out loud at Farm Hall,

When we get back to Germany we will have a dreadful time. We will be looked upon as the ones who have

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<sup>28</sup> Frank, *Farm Hall Transcripts*, 80.

<sup>29</sup> Frank, *Farm Hall Transcripts*, 78.

<sup>30</sup> Frank, *Farm Hall Transcripts*, 78.

<sup>31</sup> Frank, *Farm Hall Transcripts*, 82.

<sup>32</sup> Frayn, *Copenhagen*, 98

sabotaged everything. We won't remain alive long there. You can be certain that there are many people in Germany who say that it is our fault.<sup>33</sup>

An alternative existed to returning to Germany, however. "It seems to me that the sensible thing for us to do is to try and work in collaboration with the Anglo-Saxons," reasoned Heisenberg. "We can do that now with a better conscience because one sees that they will probably dominate Europe."<sup>34</sup> Weizsacker agreed: "Our strength is now the fact that we are 'un-Nazi.'"<sup>35</sup> There were further worries, though: as Germany proved itself behind America by failing to build the bomb, perhaps the Germany physicists' professional value, so damaged by their Nazi connections, was in question—after all, American physics seemed to be succeeding quite well without them. "At the moment we are no longer dangerous," noted Weizsacker, "we are also no longer interesting"<sup>36</sup>—although this could also be seen as an advantage, given their prisoner status.

While the discussion of their intentions regarding a German atomic bomb is somewhat suspect, the physicists' shock at the American bombing of Hiroshima was clearly real; they were "completely staggered by the news,"<sup>37</sup> as the Farm Hill transcripts reported. Heisenberg seemed especially disconcerted by the announcement, and in the scientists' ensuing discussion, he was one of the participants most preoccupied with speculation on technical details, even as others turned the talk towards the moral implications of the attack.<sup>38</sup> Especially at first, he was extremely skeptical that it was actually a nuclear bomb:

All I can suggest is that some dilettante in America who

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<sup>33</sup> Frank, *Farm Hall Transcripts*, 79-80.

<sup>34</sup> Frank, *Farm Hall Transcripts*, 88.

<sup>35</sup> Frank, *Farm Hall Transcripts*, 89.

<sup>36</sup> Frank, *Farm Hall Transcripts*, 89.

<sup>37</sup> Frank, *Farm Hall Transcripts*, 70.

<sup>38</sup> Frank, *Farm Hall Transcripts*.

knows very little about it has bluffed them in saying 'If you drop this it has the equivalent of 20,000 tons of high explosives' and in reality doesn't work at all... I don't believe a word of the whole thing.<sup>39</sup>

Some others also expressed doubts, though not as emphatically as Heisenberg. Hahn said he thought it would take another two decades for such a bomb to be built,<sup>40</sup> and his confidence was clearly shaken by the possibility of being so very wrong. He tried to lighten the ego bruising by the age-old trick of putting down others: "If the Americans have a uranium bomb, then you're all second-raters. Poor old Heisenberg." Though Heisenberg ignored him, choosing not to rise to the pointed barb, he kept at his pestering: "At any rate Heisenberg you're just second-raters and you may as well pack up."<sup>41</sup> Even in addition to his own misconceptions, there was a larger issue at stake. The glory of German physics had just been neatly blown aside by the Americans' staggering successes—if making and using a weapon of mass destruction counts as a success, of course.

Even though Hitler's atrocities were yet resonating, the humanitarian catastrophe of the bomb's use greatly affected the physicists. Hahn, who won a Nobel in his work on fission (a concept integral to the construction of a nuclear bomb), was especially upset, despite his tendency to provoke others. As Major Rittner, the British officer in charge, described, Hahn was

completely shattered by the news and said that he felt personally responsible for the deaths of the hundreds of thousands of people, as it was his original discovery which had made the bomb possible. He told me that he had originally contemplated suicide when he realised the terrible potentialities of his discovery and he felt that now these had been realised and he was to blame. With the help of considerable alcoholic stimulant he was calmed down

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<sup>39</sup> Frank, *Farm Hall Transcripts*, 71.

<sup>40</sup> Frank, *Farm Hall Transcripts*, 72.

<sup>41</sup> Frank, *Farm Hall Transcripts*, 71.

and we went down to dinner where he announced the news to the assembled guests.<sup>42</sup>

While some of the physicists did not quite have Hahn's reaction (such as Gerlach, the "old Nazi co-ordinator [who] also want[ed] to die, because his hands [were] so shamefully clean,"<sup>43</sup> most were repulsed that the Americans had use the bomb on an entire city of civilians. This can be interpreted either with irony, given the horrific actions of *their* country over the recent years, or with understanding of guilt, as the temptation to take the moral high ground—we didn't drop a nuclear bomb on a Japanese city, now did we?—must have been irresistible. "I think it's dreadful of the Americans to have done it," declared C.F. von Weizsacker. "I think it is madness on their part."<sup>44</sup> Karl Wirtz, relieved, said, "I'm glad we didn't have it."<sup>45</sup> And as Frayn's characters relate,

HEISENBERG: On the evening of Hiroshima Oppenheimer said it was his one regret. That they hadn't produced the bomb in time to use on Germany.

BOHR: He tormented himself afterwards.

HEISENBERG: Afterwards, yes. At least we tormented ourselves a little beforehand. Did a single one of them stop to think, even for one brief moment, about what they were doing?

...

BOHR: My dear, good Heisenberg, we [the Allies] weren't supplying the bomb to Hitler!

HEISENBERG: You weren't dropping it on Hitler, either. You weren't dropping it on anyone who was in reach. On old men and women in the street, on mothers and their children. And if you'd produced it in time they would have been my fellow-countrymen. My wife. My children. That was the intention."<sup>46</sup>

For Heisenberg and his colleagues of the German nuclear effort—such great men, such eminent physicists—so forever tainted by the stains of Nazi ties, is a

<sup>42</sup> Frank, *Farm Hall Transcripts*, 70.

<sup>43</sup> Frayn, *Copenhagen*, 46.

<sup>44</sup> Frank, *Farm Hall Transcripts*, 72.

<sup>45</sup> Frank, *Farm Hall Transcripts*, 72.

<sup>46</sup> Frayn, *Copenhagen*, 43.

shame indeed. But as Gerlach notes, "If Germany had had a weapon which would have won the war, then Germany would have been in the right and others in the wrong."<sup>47</sup> The Americans of the Manhattan Project were, and are, celebrated. History is written by the victor, and while it is certainly better off for a non-Nazi victor, the personal motivations of Germany's wartime physicists may have led them to not realize this as clearly.

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<sup>47</sup> Frank, *Farm Hall Transcripts*, 87.

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*Farm Hall photograph on page 5 from BBC source.*