Hydrogen Storage in Nanotubes

In their recent letter (28 Jan., p. 593), Michael J. Heben and Anne C. Dillon point out that we, along with another group of authors, had misinterpreted their research with hydrogen storage in carbon single-wall nanotubes. In our report, "High H_2 uptake by alkali-doped carbon nanotubes under ambient pressure and moderate temperatures" (P. Chen, W. Wu, J. Lin, K. L. Tan, 2 July 1999, p. 91), we referred to the work of A. C. Dillon *et al.* (*1*) as being performed at a temperature of 133 kelvin and a pressure of 300 torr. Although they noted that the rate of hydrogen desorption peaked between 275 and 300 kelvin, we emphasized that the adsorption started at 133 kelvin and 300 torr, because from our experience with multiwalled carbon nanotubes, we had found that such nanotubes adsorb only a small amount of H_2 at ambient or high temperatures [our work is reported in (*2*)]. Recently, we performed low-temperature, low-pressure experiments on multiwalled carbon nanotubes and found that there was only very little H_2 staying in the sample at ambient or high temperatures in spite of the fact that adsorption was observed at subambient temperatures. This shows that some hydrogen was stabilized between 275 and 300 kelvin by Dillon *et al.*'s single-wall carbon nanotubes. We apologize for our misemphasizing the low-temperature and low-pressure conditions of Dillon *et al.*'s experiments, which may have led to a misunderstanding of their results as referred to in our report.

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References
1. A. C. Dillon *et al.*, *Nature* **386**, 377 (1997).
2. X. Wu, P. Chen, J. Lin, K. L Tan, *Int. J. Hydrogen Energy* **25**, 261 (2000).

Science Under the Nazis

Regarding Manfred D. Laubichler's Essay on Science and Society "Frankenstein in the land of *Dichter* and *Denker*" (*Science*'s Compass, 3 Dec., p. 1859), I must disagree with his analysis of history. That German sciences are now prospering is uncontestable. Where I disagree is the paragraph in which he speaks of past science and says the following: "The Nazi years changed all that. Large numbers of scientists and students were killed or forced to emigrate, retreated into 'pure science,' or were compromised by the odd mixture of reaction and modernism that characterized the Nazi attitude toward science. After World War II, the intellectual foundations of the New Federal Republic were laid by philosophers and social scientists, in particular by the so-called Frankfurt School, which stressed the critical evaluation of the past as a sine qua non for the intellectual life. In the context of this discourse, human genetics and any other forms of 'biologism' were considered particularly dangerous."

It is painfully important to understand that the scientific community in Nazi Germany both thrived under the Reich and morally failed. As described in Ute Deichmann's book *Biologists Under Hitler* (*1*), when the Nazis took power, they infused huge amounts of money into all types of science. Much of this science had a slant toward justifying the Nazi view of human development, and whether it was physics, chemistry or biology, psychology or behaviorism, the science had to demonstrate a strong Aryan streak. Grants were written by scientists seeking these funds, after a time of economic depression and scientific scarcity in Germany, and they were writen to accommodate Nazi dicta. Many will recall the debates involving Konrad Lorenz. It is this moral failure that led to the ostracism

of the German scientific community after World War II to the point that, immediately after the war, the great physicist Lise Meitner castigated the German scientific community for their moral failings in science. It was not surprising that great engineers and scientists like Wernher Von Braun were able to carry out huge science and engineering programs at Peenemunde that, had the Nazis succeeded, would have led to a disastrous course for the world.

And Laubichler is correct; many scientists and students were killed—however, they were most typically non-Aryan, Jewish, gay, or communist and not embraced into the Nazi bosom. Many physicians flocked to the Nazi party, and the SS (the Schutzstaffel) in particular, for when Jewish people were removed from their positions because of the Nuremberg Race Laws, new economic opportunities were available to German physicians. This was no different in the sciences.

Therefore, the social democratic systems of Germany after the war did follow a pattern of scientific community exclusion because many scientists were broadly complicit in Nazi programs, and there was concern for their involvement both in Germany and in the rest of the world scientific community.

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References

1. U. Deichmann, *Biologists Under Hitler*, T. Dunlap, Transl. (Harvard Univ. Press, Cambridge, MA, 1996).

Response

Steinberg raises important issues that I could only touch on in my essay. As he points out, a good number of sciences and scientists thrived under the Nazis; many profited from the expulsion and murder of Jewish colleagues, or tailored their research to comply with the party line, a fact I also alluded to in my essay. But Steinberg's sweeping implication of the whole scientific community that stayed in Germany under the Nazis lacks the historical details needed to understand the role of individual scientists in Nazi Germany. Many more studies, such as Deichmann's book that Steinberg mentions or the present research project of the Max Planck Society investigating the role of its predecessor, the Kaiser Wilhelm Gesellschaft, during the Nazi years, are needed before we will have a more complete picture. In the meantime, Steinberg's comment that "the scientific community in Nazi Germany both thrived under the Reich and morally failed," while true for many cases, represents a kind of historical absolutism that keeps us from seeing the individual choices (between "good" and "evil") that scientists made in Nazi Germany and can keep us from learning from history.

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CORRECTIONS AND CLARIFICATIONS

News Focus: "Fermat's last theorem's first cousin" by Dana Mackenzie (4 Feb., p. 792). The credit for the image of Robert Langland's letter was incorrectly listed as "R. Langlands." The image was obtained from the Web site http://sunsite.ubc.ca/DigitalMathArchive/Langlands, managed by Bill Casselman at the University of British Columbia.

"Pathways of Discovery" timeline: (14 Jan., p. 230). The statement about Edwin Hubble for the 1929 entry was incorrect. Hubble limited his discovery to the relation of redshift and brightness of spiral nebulae; the argument that the universe is expanding came from others. And in the entry for 1610, the word "Siderus" in the book title should have read "Sidereus."

Random Samples: "Warming up wind chill" (14 Jan., p. 221). The wind velocity should have been listed in units of km/h, not kph.

Report: "Modulation of brain reward circuitry by leptin" by S. Fulton *et al.* (7 Jan., p. 125). The graph in Fig. 2A was from a different condition than the remaining panels. Whereas panels B, C, and D showed the effect of leptin during food restriction, panel A depicted the results obtained in the free-feeding condition (see the supplementary figure available at http://www.sciencemag.org/feature/data/1044048.shl). The appropriate panel A for our report is shown below.

News of the Week: "Shadow and shine offer glimpses of otherworldly Jupiters" by Mark Sincell (3 Dec., p. 1822). The description of Jupiter's density in the second paragraph as "one-third the density of water" is incorrect. It should have read "one-third greater than the density of water."