other physicists is that the overselling of the Wheeler–Feynman contribution trivialized the contributions of others who were not part of Wheeler's intellectual lineage—Steven Weinberg, for example. The physicists Halpern named in his response were former Wheeler students, collaborators with Wheeler, or collaborators with former Wheeler students.

Halpern's contention that Feynman had "numerous" graduate students is surprising. Feynman's aversion to supervising PhD students is well documented and, indeed, was articulated by Feynman himself.[2] Moreover, in 2001 I attempted to determine the number of PhD students Feynman had supervised. Personal communications with David Goodstein, Kip Thorne, and Feynman's long-term secretary, Helen Tuck, were not terribly fruitful. In the end, only five names surfaced, and not all could be verified.

Goodstein's own research suggests that in the mid to late 20th century, a professor at a major research university would, on average, supervise 15 PhD students.[3] Julian Schwinger is reported to have supervised 13; Wheeler, among the most prolific of mentors, supervised 52. At most, it seems that Feynman supervised 7.

There is more to say, but space here is limited. In sum, I stand by my review.

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Cartilage lubrication and load pressure

Sabrina Jahn and Jacob Klein, authors of "Lubrication of articular cartilage" (PHYSICS TODAY, April 2018, page 48), write that "the fluid between the surfaces reduced the friction and supported much of the load via its own pressure." That is, load on a joint pressurizes the fluid in the pores of the cartilages, providing self-pressurized hydrostatic lubrication. Loaded cartilage slowly loses pore fluid, but with each step the flexing and unloading of the joint and the bad fit of the cartilages to each other expose the surface of each to free fluid that it can resorb. I called this cycle "weeping lubrication" because cartilage weeps fluid when squeezed.

Experiments by Gerard Ateshian show that cartilage fully charged with pore fluid carries almost all its load by hydrostatic pressure.[1] In the study discussed in reference 9 of Jahn and Klein's article,[2] a woman with an instrumented prosthetic hip rose from her chair, but lit-tle of the 20 MPa loading that Jahn and Klein mention would have been carried by high-spot to high-spot solid contact.

Because of support by hydrostatic pressure, joints carry high loads without overloading the boundary lubrication that synovial fluid provides, which, experiments show, fails at more than modest solid–solid loading.[3]

I offer some advice for experimenters: When loaded cartilage eventually loses all pore pressure, the entire load trans-fers to the boundary-lubricated high spots and reveals their friction coeffi-cient. For that to happen quickly, the sample must be very thin and on a very permeable mount.

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