Letter to the editor in response to "Background and Professional Qualifications of High-School Physics Teachers" [Phys. Teach. 38, 98 (Feb. 2000)].

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We enjoyed "Background and Professional Qualifications of High School Physics Teachers" by Neuschatz and McFarling [Phys. Teach. 38, 98 (Feb. 2000)]. They have provided valuable data to help us examine the quality of physics instruction in our high schools. However, we were disappointed that they failed to address the quality of the physics courses taken as well as the quantity. According to statistics gathered by the authors, 18% of all physics teachers had completed two or less physics courses, while another 31% had completed between three and five courses. Realistically, in terms of understanding the preparation these provide for teaching high school physics, the reader has to wonder if these courses were part of a comprehensive sequence, and whether they were algebra or calculus based. While workshops that carry academic credit can be extremely valuable, they do not, in general, replace regular academic course work in physics in terms of preparatory background for high school teaching.

Neuschatz and McFarling demonstrate in Figure 3 that 20% of teachers without a major or minor have completed six to nine physics courses, while 10% of this same group has completed 10 or more classes. If these individuals were able to complete this many courses without receiving a minor in physics, what kinds of courses were they taking? Most comprehensive public universities offer multiple general education courses in physics at the freshman level, none of which really provide the proper background to teach a yearlong introductory course. While it is often true that teachers of biology and chemistry are asked to teach physics, their background usually consists of a year or less of algebra based physics which, in many instances, may be less comprehensive than the class they are teaching.

Additionally, Neuschatz and McFarling, who provide the readers with no evidence of a background in physics, question the appropriateness of elementary education majors taking a conceptualized, mathematically non-rigorous physics course while it is not uncommon for prospective automotive mechanics to be required to take algebra-based physics. However, a conceptual physics course is of much more use to an elementary teacher because it emphasizes the physics of everyday objects and situations. While such a course "assumes only a minimal familiarity with basic algebra", the elementary teacher spends the vast majority of their time presenting the basic concepts, not the mathematics of the science they teach.
mathematical problem solving side of physics will only rarely be presented to the most advanced of their students, such as in an eighth grade honors course.

We applaud the efforts of Neuschatz and McFarling to gather hard data concerning the preparation of our high school physics teachers; it is long overdue. State boards of education and local school boards could more effectively evaluate their programs by performing similar evaluations in their respective areas.

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