

LETTERS

Physics First, Because the Atom Unlocks Science

Leon Lederman is engaged in a valiant campaign to renovate the teaching of physics in high school (PHYSICS TODAY, September 2001, page 11). At the center of his campaign is a modification of the order in which the different sciences are taught in the high-school curriculum: Instead of physics last, teach physics first.

The Europeans have cut this Gordian knot by teaching all sciences simultaneously. In France, for example, in the years that correspond to US middle school and high school, the schedule is approximately as follows: Math is taken four hours per week for all seven years; physics (with some chemistry), four hours per week the last six years; biology and natural sciences, three hours per week all seven years; and information science and technology, one hour per week for the first four years. Although student options are limited, the last three years will differ somewhat depending on whether the student chooses a more literary or scientific path.

Rather than start new pilot projects in the US that parallel the French schedule but will take at least 10 years to evaluate, one could perhaps obtain a more immediate evaluation by comparing US and European results in the 20- to 30-year-old groups. That is finally where differences will count, rather than in test results at the end of the school year.

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LEDERMAN REPLIES: The European system is better than our alphabetical system of biology, chemistry, and physics, but it is also mired in history and in the difficulty of

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change. The point was made by Richard Feynman, who pounded on the idea that the atom is key to 20th-century science. The learning of science involves exposure of students to phenomena, followed by explanation. Since 1930, the explanation of the periodic table or the ideal gas laws or the combination of elements to make compounds follows most beautifully from the properties of atoms. One doesn't need Schrödinger's equation to get a feeling for how atomic structure creates the rows in the periodic table, or the chemical activity of the columns, or the potential energy "well" that enables two atoms to make a molecule.

So the atom is the key to explaining much of chemistry. Study of physics concepts and methodology requires a full year, culminating in atomic structure. Imaging and simulation software can help to provide the overjoyed chemistry teacher with students who are comfortable with the physics of atoms.

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Teller 'Exiled' Himself for Science

In his review of Edward Teller's memoirs (PHYSICS TODAY, November 2001, page 55), Hans Bethe says that Teller left Hungary in 1926 to seek an education in Germany. Later in the review, he says that Teller was forced to leave Hungary (in 1926), then Germany (in 1933). This information creates the unfortunate impression that Teller left Hungary for the same reasons he left Germany when the Nazis came to power. He was not forced to leave Hungary; there was no anti-Semitism in Hungary at that time. Jewish Hungarians were doing quite well and were represented in outstanding numbers among top financiers and industrialists, professionals and artists. Nothing proves this point better than the synagogue in Budapest; built in the

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