

of that paper. Alpher took the reference with equanimity.

Besides his great intellectual achievements, Ralph Alpher was a gentleman of unflinching kindness and a keen sense of justice.

Reference

1. J. D'Agnese, *Discover*, July 1999, p. 60.

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TV could use real-world physics

I agree with James Jackson's letter (*PHYSICS TODAY*, November 2007, page 14), "Advocating Real-World Physics Classes." I will take the discussion further and include physics TV programs, such as some shown on NOVA and the Science Channel, that are even less relevant than physics classes.

Those TV shows emphasize irrelevant, unobservable, impractical, and inaccessible subjects such as mysterious dark matter, dark energy, black holes, parallel universes, and string theory—all subjects that have no relevance to the daily lives of ordinary people. Most of the programs turn people away from physics rather than draw them in.

It would be far more beneficial if the preponderance of the physics TV programs described phenomena people readily observe, and described them in a manner that viewers can actually understand. Such treatment would help establish physics as a useful, practical, interesting, and worthy subject.

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Crystal quest

The item "US Condensed-Matter Community Grapples with Availability of Crystalline Samples" (*PHYSICS TODAY*, August 2007, page 26) mentions the role of the tenure practices of US physics departments in reducing the supply of crystalline samples. Arguments based on tenure are not likely to elicit a good response among the people making funding decisions. Agency heads and members of Congress do not have tenure and generally have far less job stability than the average person.

The scaled-back condensed-matter efforts of large electronics companies were also cited as reducing the supply.

Those cutbacks are probably mostly due to increased emphasis on systems and software. However, part of the crystal-growing capability of larger electronics firms has been spun off into smaller companies; thus much of the source of supply remains. Small companies do not have tenure, or retirement either. In most cases a small company appreciates the opportunity to publish; it strengthens the collaboration between crystal growing and physics efforts, since it is beneficial to both. Small companies have strong incentive to associate with good physics groups in need of crystals; published papers help improve a company's reputation in general and help in winning government contracts. Also, a small company usually wants no part in university or research-institution politics.

One possible way to increase funding for crystal growing is to seek the cooperation of state governments. Since crystal growing may eventually lead to manufacturing jobs, states may have a strong interest in cooperating on funding. Many materials, such as those that are superconducting or thermoelectric, will probably be used in non-single-crystalline form, but even in those cases, there is a great deal of commonality in materials synthesis technology. I testified before our state senate in support of such a program a few years ago, and I became aware of the attitudes of states, both in this country and abroad. States favor technology-based industry because it leads to more rapid economic growth. State funding of technology may often increase when federal funding is tight, such as in recessionary periods, because technology development is linked to job creation. The program about which I testified has prospered since that time.

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Mixing science and theology

I cannot understand how *PHYSICS TODAY* could have published Robert Griffiths' review (*PHYSICS TODAY*, February 2008, page 65) of *Quantum Physics and Theology: An Unexpected Kinship* by John Polkinghorne. Science education in the US is still under attack by those who feel that their interpretation of the Bible is an equally valid source of knowledge as the scientific work of generations of biologists. Therefore, it is a disgrace for any physics journal to

publish a review that equates the methods of theology with those of science and to give credence to a book that argues the same point.

The methods of science and theology are not similar, nor is their validity. Who has ever designed an aircraft that flew on the basis of theological principles? Who has ever turned on a light that was powered on the basis of theological principles? Who has ever cured a child of a raging bacterial infection on the basis of theological principles? Or is *PHYSICS TODAY* next going to publish descriptions of miracles?

Theology and faith can guide believers' actions or provide emotional comfort, but they can never, as science can, be a method for deciding what is real or true. Although in a few fields, like cosmology and particle physics, some scientists have abandoned the scientific method for speculations not grounded in or testable by observation, the truth of that method continues to be validated every day by the efficacy of the technologies that are based on it.

In contrast, the tenets of theology are entirely grounded in the conflicting authorities of the sacred texts and priest-hoods of the world's many different religions. Disputes as to which religion is true can never be resolved—although there continue to be attempts to do so by force. To argue, as Polkinghorne and Griffiths do, that there is no real difference between science and theology is to help pave the shortest route to a new Dark Age.

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Griffiths replies: The preceding letter is an illustration of what I referred to in my review as "misguided scientific fundamentalism." I can think of no better refutation of its dogmatic caricature of the relationship of science and theology than that provided by reading John Polkinghorne's book, which I therefore recommend to anyone interested in investigating the topic with an open mind.

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Correction

June 2008, page 11—In the penultimate paragraph of William Unruh's letter, the final sentence should read, "It was 60 years before Kepler, in positing his elliptical orbits, restored and improved on the equants."