

American Journal of Physics.

Producing a high-quality, peer-reviewed archival journal such as *AJP* involves significant costs, including those for a reliable online platform that has made *AJP* and other member-society journals available to a much wider audience than did the former print-only subscriptions. AJP has also made major investments to digitize and make available electronically journal issues that were published in print long before the industry made the transition to digital. Those real costs are recovered, by and large, through institutional subscriptions paid by libraries and research institutions. The cost of producing one typical article is between \$1500 and \$3000. Considering the average journal subscriber base, a \$20 price for a non-subscriber to download an article is not out of line.

AJP's online platform, Scitation, already provides free access to full abstracts, index terms, and search capabilities for more than a million articles. Our journal prices are significantly lower than those for similar journals produced by commercial publishers, and we invest the modest return in outreach services such as lay-language translations of important research results, subsidized programs for students, and subsidized student and member-society subscriptions for *PHYSICS TODAY*.

H. Frederick Dylla

*American Institute of Physics
College Park, Maryland*

Fundamentalism and a full stomach

Kudos to Pervez Hoodbhoy for a great introspective article on the lack of scientific progress in the Islamic world (*PHYSICS TODAY*, August 2007, page 49). I largely agree with his general hypothesis that the disease in the Islamic world is from us and within us, but missing from his analysis is a macrolevel, socio-historical, scientific analysis of the lack of scientific progress in the Islamic world. Societal pursuit of science and the arts is a manifestation of "full-stomach syndrome": Only after basic survival needs are met and excess capital is accumulated can a person, a community, a society afford to indulge in such nonessential luxuries as scientific exploration. Often the excess accumulation of capital that allows indulgence in science and the arts is obtained at the expense of a terrestrial neighbor. It thus

becomes a societal manifestation of the second law of thermodynamics—order and progress in one region can only be had by inducing bare subsistence and despair in another. Such has been the case in every episode of human civilization, and the advancement of scientific progress in the West is no exception to this rule.

For the non-Western world to contribute scientifically, it must first break free of Western military, economic, and political domination and achieve true independence to begin to accumulate capital and transform its society. In East Asia, the process began 40 years ago, with China being the latest example; it is beginning to bloom, too, in Central and South America and was stirring in the Islamic world until, as Hoodbhoy says, the West acted to reverse the forces of secularism and change. That reversal puts the Islamic world's transformation 50 years behind the curve, and there is limited hope in the foreseeable future for progressive forces like Hoodbhoy himself.

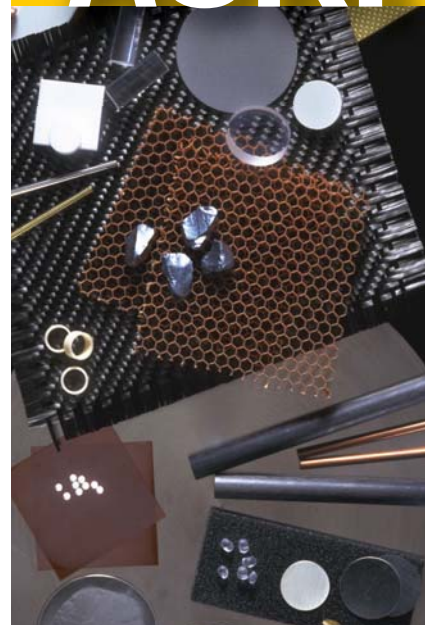
Mohammad Babar
(malangay@gmail.com)
Farmington, Missouri

The excellent and thought-provoking article by Pervez Hoodbhoy is disturbing for its description of the influence of rigid fundamentalist religion not only on Islamic science but on science in any society, even in the US. It is the very nature of science to intellectually question its own icons and, at times, other authorities in its host culture. Moreover, science places valid, observable facts above current explanations. Ignoring the facts of science because of the general public's state of mind (or belief) cannot portend anything but the depreciation of observable facts in the public debate.

I have long maintained that a political candidate's religion was an improper subject for debate. Hoodbhoy's observations make this less clear; certainly, a candidate's propensity to accept or reject new ideas is important to his or her performance in the office sought. Certainly, a candidate's fundamental view of knowledge will affect the allocation of funds needed to further intellectual endeavors. How can a science-based society continue to succeed if the very basis of its past successes is even subliminally rejected by the political leadership?

The current trends of ignoring the protocols of science, having nonsense pose as science, distorting the nature of science via semantic ploys, and using political organizations as science

CAN'T FIND WHAT YOU NEED? ASK!



The Goodfellow Online Catalog
goodfellow.com

is just the beginning of what
we offer to make your job easier.

**For custom items, special
finishes, or special sizes and
quantities, contact us at**

info@goodfellow.com
or

1-800-821-2870

Goodfellow
Metals • Alloys • Ceramics • Polymers

© 2007 Goodfellow Corporation

"authorities" are all detrimental to science. If science is to remain vibrant and productive, its practitioners must be more proactive in explaining science in a way the public can understand, relate to, and support. This effort must be made at every possible occasion by scientists and media personnel alike, all who value the product of science—knowledge.

Alfred A. Brooks Jr
(brooks50@comcast.net)
Oak Ridge, Tennessee

Insider notes on the International Geophysical Year

Fae Korsmo's article (PHYSICS TODAY, July 2007, page 38) on the genesis of the International Geophysical Year does a good job of covering the international scientific relationships that gave birth to the idea. But there were two other achievements without which the IGY would not have attracted the favorable public support or the congressional appropriations, both of which were essential to the fame and success of the IGY and would lead to the Antarctic Treaty. I learned about them through long-ago personal conversations with Walter Sullivan and Joseph Kaplan, who were instrumental in IGY preparations.

Fae does reference Walter's fine book on the IGY. But how did he go from being the *New York Times* political correspondent in Austria to becoming the paper's—and maybe the country's—best science writer, with a deep commitment to the IGY? He had no background in science beyond a keen interest in how violins are made. Walter told me that when he asked the *Times* to bring him home so his kids could go to US schools, his employer said, "No. You are too important to us where you are." Then one day he saw a notice that the newspaper was looking for a science writer to cover the story of the IGY. None of the other writers on staff seemed interested in going to the ice. But Walter saw his best chance to get his family back home, so he volunteered to go to Antarctica and try being a science writer. He stayed with the story, broadened his great skills into all areas of science, and brought Antarctic science and the IGY to the front page of the *New York Times*.

But what about the money to support US scientists in their Antarctic work? The National Academy of Sciences' IGY history reminds us of Joe's role (not mentioned in the PHYSICS

TODAY piece): "American participation in the IGY was charged to a US National Committee (USNC) appointed in March 1953 by the NAS. Joseph Kaplan, Professor of Physics at UCLA, was appointed Chairman of the USNC."¹ When NSF went to Congress to get the needed appropriation, it faced considerable skepticism. The duty fell on Joe to invite the key congressman to lunch. Joe told me that no amount of passionate argument about the merits of Antarctic science was persuasive. Finally, he decided he had to find a subject his lunch partner was interested in. The congressman's favorite subject turned out to be college football. Joe jumped at the opportunity. "Did you know that I am chairman of the UCLA faculty committee on athletics?" he asked. After a half hour of college football stories, the congressman said, "Joe, you sound like a regular fellow. What is this project you need money for?" His support for the IGY appropriation turned the tide, and the IGY was off and running.

Reference

1. National Academies webpage, "The International Geophysical Year," <http://www7.nationalacademies.org/archives/igyhistory.html>.

Lewis M. Branscomb
(lbranscomb@branscomb.org)
University of California at San Diego
La Jolla

Wigner and the 'gift' of mathematics

I recently read Frank Wilczek's Reference Frame in the May 2007 issue of PHYSICS TODAY (page 8), in which he discusses his reaction to Eugene Wigner's claim that the success of mathematics in the natural sciences is miraculous. Wilczek's discussion seems to assume Wigner's claim is that mathematics has worked miracles in bringing about the development of the natural science disciplines. I, however, have taken that statement to express wonder that every nook and cranny of human thought seems to find some branch of mathematics just waiting to describe it or ready to be developed to describe it. That is, there seems to be a mathematical description available for everything. Even Darwin's theory can be described mathematically, and often is.

James D. Barter
(james.barter@ngc.com)
Northrop Grumman Space Technology
Redondo Beach, California

Wilczek replies: Interested readers deserve the pleasure of reading Wigner's classic essay for themselves. Here's how he began it: "The miracle of the appropriateness of the language of mathematics for the formulation of the laws of physics is a wonderful gift which we neither understand nor deserve." I don't think I misrepresented him.

Frank Wilczek
Massachusetts Institute of Technology
Cambridge

Clarification on chaos and complexity

In his review of my book *Chaos and Complexity in Astrophysics* (PHYSICS TODAY, September 2007, page 71), Mario Livio correctly points out that "chaos theory actually has had a limited impact on most areas of astrophysical research." That was indeed the main reason for my writing the book.

Many astrophysical systems are genuinely very complicated, as Livio says, but nowhere in the book did I "pretend that those systems are governed by a simple, underlying mechanism described by a limited set of nonlinear equations." Likewise, I did not complain about "astrophysicists resorting too quickly to . . . computer simulations." I merely wished to stress that numerical simulations *alone* cannot be the key to physical understanding and that modern approaches of nonlinear dynamics and pattern theory may be very useful, at least as complementary tools, in the pursuit of that understanding.

It seems to me that atmospheric and oceanic geophysicists—and even research engineers in various fields—have been rather successful in using such combined approaches, even though the systems they have been dealing with are also very complicated.

I think these points should be made, to set the record straight.

I decided not to include any detailed discussion of convection theory in the book, save the Lorentz and Moore-Spiegel models that were among the early paradigms of deterministic chaos. Turbulence in general and convection in particular are vast and complex subjects, and many books have been devoted to their various aspects. I apologize again, as I did in the book, for not including many important contributions and thus disappointing some readers.

Oded Regev
(regev@physics.technion.ac.il)
Haifa, Israel