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'Culling the Herd' of FSU Physicists

Having lived in the Soviet Union for more than a year, gotten married there, worked at scientific institutes in several of the republics and made an additional 14 visits there since 1977, I would like to offer some modest observations on the proposals to fund physics in the former Soviet Union.

The Soviet (now Russian) Academy of Sciences and its institutes are a model of how not to do physics. First, a truly enormous number of physicists are educated, based on quotas established with the input of the academy. The number of these scientists has no rational basis in terms of the technology of the country and greatly exceeds the number produced in the US and Japan combined. (It is akin to having a million physicists in Albania or the Cayman Islands.) To worsen the situation, most of these physicists are theoreticians, whose skills, while often considerable, have little if any immediate application to short-term economic or societal (for example, environmental) problems. Finally, to make the situation truly impossible, these physicists are isolated in research institutes where they have no direct access to universities and students or to industry and engineers. If a system were ever designed to minimize the usefulness of physicists to society, this is it!

The short-term solution to the FSU's physicist problem is to close the academy institutes (almost without exception) and to reassign the better physicists to work of more immediate use in newly created positions in universities and industry. Funding the continued existence of literally thousands of academy "think tanks" only exacerbates the situation. In the US and Japan most physicists earn their livings teaching students who are not physics majors or doing rather applied problems in industry; why should Russian physicists be more privileged than we are?

Also, there are other countries of the world, such as India, that have a fine tradition of mathematics and physics. Why are we not clamoring to support Indian physicists?

The long-term solution to the problem is that the FSU must drastically reduce the production of physicists to match the number of jobs in its new society. When wartime and postwar

Russia was extremely impoverished, it produced Lev Landau, both Lifshitz brothers, Aleksandr Prokhorov and a collection of other luminaries. It is not apparent that the grotesque overproduction from 1960 to 1990 has produced Russian physicists of the same quality. Perhaps "culling the herd" would be quite healthy for Russian science.

Russian physicists for years have led a privileged existence envied by all other citizens. (There was great complaint at the Institute of Spectroscopy in Troitsk when the new office building was completed, because afterward the theoreticians were actually required to come to work five days a week; previously they came in only on the day of the weekly seminar.) Of course the life of an academician is still amazing by Western standards, with private restaurants, private resort hotels, private hospitals and so on. Those days are almost over. Russian physicists will actually have to work like other Russian citizens. It is a kind of modest revolution. And very few Russian nonscientists are shedding any tears about it.

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8/92

Reconciling COBE Data with Relativity

There is one aspect of your news story on the recent COBE data (June 1992, page 17) that I find disturbing. The article states that the dipole anisotropy in the cosmic microwave background radiation is due to "the motion of Earth relative to a 'comoving observer'—one who rides along with the general expansion of the universe." This velocity of the Earth can actually be measured, the story says, and is found to be 370 km/sec.

We were all taught in undergraduate physics that the basis of both the special theory of relativity and the general theory of relativity is the "relativity principle," the fact that all reference frames are equivalent and that there is no experiment that can determine a preferred reference frame. What your news story seems to say is that at every point in space-time there is a preferred reference frame, namely that of the "comoving observer," and that one's velocity with regard to this preferred reference frame can be determined by simply measuring the anisotropy in the cosmic background radiation. Thus it would seem that measurement of this dipole anisotropy is in effect a modern-day Michelson-Morley experi-

ment, but this time with a positive result, and that the cosmic background radiation acts in effect like the stationary ether that Albert A. Michelson and Edward W. Morley failed to find. Thus it would also seem that while the special and general theories of relativity may be correct, the relativity principle, on which these theories are presumably based, is not. I would be grateful to any experts in cosmology or general relativity who could comment on this point.

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SSC: Too Much to Pay for Too Little Promise

How can the world's largest debtor nation, running a \$400 billion annual deficit, with millions out of work and a collapsing industrial base, afford the Superconducting Super Collider, an \$8.5 billion toy for high-energy physicists? The answer, of course, is that it can't, but an allegiance of "scientists," politicians and manufacturing companies seems to be in a position to push this project through Congress.

We have seen it before. What have recent NASA projects given us? The Hubble Space Telescope, built for the price of 50 to 100 world-class Earth-bound telescopes, needs about a billion more dollars. The space shuttle? How about the Galileo probe? Its antenna failure threatens to drain the resources of the entire deep-space network! Can big science point with pride to results from fusion research? After 30 years and Lord knows how many billions of dollars, there is no hint of commercial fusion prospects.

The products of scientific research that we use in our daily lives are the result of industrial research and small-scale university research, not big science. Our world has been immeasurably changed by the transistor, integrated circuit and laser, and now we await the fallout from high-temperature superconductivity. Is there a message here?

Are the "scientists" who mailed the letters to Congress supporting the SSC (see PHYSICS TODAY, August 1992, page 59) so out of touch with reality that they don't realize that the country is in a recession and we need to invest that money in a way that can benefit the country?

It's time that scientific research is targeted to benefit the people of the country, not to sate the intellectual curiosity of a few "scientists," the political ambitions of a few politi-

cians, and the financial goals of a few corporations.

LON HOCKER

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Saga of the Surplused Research Professor

A. C. Hall's letter (February 1992, page 9) about "surplused" industrial physicists, of which I am one, prompted me to write.

Upon reaching the age of 60, after some 30 years in industry I was surplus— that is, offered the choice of either getting the mashroom treatment or getting out of the way. I got out of the way and proceeded to become appointed as a "research professor," first in the department of chemistry and then also in the department of physics, at a major university. That was exactly ten years ago. I have no salary, no official duties and no professional prospects. Obviously I have been surplus once again. I have earned the title of Surplused Research Professor.

What does an SRP do? Out of habit, most of the time he writes proposals, just like his 40-years-junior fellow faculty members do. Otherwise not very much. Now and then his monitor asks the SRP, "Listen, when are you going to quit; there are better proposals than yours; please. . . ." Yet the SRP has managed to be funded for the past ten years, has produced a few PhDs and has provided subsistence to several postdocs.

The SRP is not entirely crazy. When he writes a proposal he includes a figure for his support. He must be very careful, though, because on more than one occasion he was told by referees that grants are not for the support of senior faculty, beyond the summer months. The SRP therefore does not dare put more than two months' worth of an imaginary salary—which he doesn't get. Never mind that he works nearly full-time. If he gets the funds, the university collects the standard overhead, and everybody(?) is happy.

The SRP has no idea how many peers he has. Is he pretty much alone in this world, or is there a large community of SRPs?

In the precious little spare time between proposal writing the SRP does his research—not in physics, because that is done on the fly, but on more important subjects. Lately he has had some breakthroughs. He has found that:

▷ Being an SRP is fun. Feeling sorry for oneself is also fun, is normal and is recommended.

▷ The university is in a morally ambiguous position, taking advantage of a hobbyist. The SRP should either be surplus once again or have some modest measure of support from the institution, as long as he measures up to expectations. It is more a matter of principle than of amount.

▷ An SRP is bound to develop some antisocial streaks and phobias. The SRP is conditioned to conclude, sooner rather than later, that salaried, "normal" faculty members should not derive any financial benefit from grants. Such "normal" faculty members are who they are because it better be a part of their vocation to do research. Grants should enable them to do things, buy equipment, write papers, woo graduate students and inflate their egos, but not increase their take-home pay.

This SRP is proud of his findings. He has discovered the key to the spread of happiness and the recycling of a natural resource at practically no cost. Moreover, if his third finding is implemented it will radically reduce the number of mediocre proposals and increase his score.

ALEX LEMPICKI

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3/92

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Politics, Pendulums and the Meter's Making

It isn't clear from John W. Dooley's letter on the origins of the meter (October 1991, page 150) if he is aware that Thomas Jefferson, at George Washington's request, developed a mensuration system using a pendulum as a length standard.

Alexander Hamilton had given the young United States a decimalized currency, and in April 1790 President Washington (who had been a surveyor in civilian life) asked his Secretary of State, Jefferson, to devise decimalized weights and measures. Jefferson proposed a pendulum arm that would take 1 second to swing. Anyone who would count 86 400 swings from solar zenith to solar zenith had an accuracy better than one part in a million. Jefferson proposed 10 new inches to a new foot, and 10 000 new feet to a new mile.

The story is told in Dumas Malone's *Jefferson and the Rights of Man* (Little, Brown, 1951), and of course the report of the Secretary of State is a public document anyone can obtain.

TED UZZLE

10/91

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John W. Dooley's letter asking why $g = \pi^2$ (or, less provocatively, why the

period of a 1-meter pendulum is 2 seconds) rang a bell. At the 1989 annual meeting of the American Association for the Advancement of Science, I heard John L. Heilbron, a historian of science, deliver a plenary lecture on "The Politics of the Meter Stick." I had not realized that he would be speaking of the time during and after the French Revolution. He showed that the French decision to define the meter in terms of the meridian that ran through Paris was motivated mainly by political, ideological and patriotic considerations that had nothing to do with weights and measures; a simple definition in terms of a pendulum was rejected in favor of several expensive surveying expeditions.

Policymakers who think that the Superconducting Super Collider or the Human Genome Project is "crucial" would do well to have heard Heilbron's talk.

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DOOLEY REPLIES: I appreciate the responses to my letter. John Wessner of Towson State University sent me a copy of an article¹ that gives the text of John L. Heilbron's AAAS lecture.

The French committees had a number of arbitrary options for deriving a useful length standard from measurements of the Earth. For example, had they chosen the pole-to-pole (instead of pole-to-equator) distance, the standard would have been nearly equal to the old French standard, the toise. Why did they not do this? Perhaps they decided that their standard had a better chance of acceptance if it came close to the length of a "seconds pendulum," the standard that not only Thomas Jefferson² but others including Robert Hooke³ and Christian Huygens⁴ had proposed earlier.

References

1. J. L. Heilbron, *Am. J. Phys.* **57**, 989 (1989).
2. S. A. Bedini, *Thomas Jefferson, Statesman of Science*, Macmillan, New York (1990). (Thanks to Robert J. Whitaker, Southwest Missouri State University.)
3. J. F. W. Herschel, *A Preliminary Discourse on the Study of Natural Philosophy*, Carey and Lea, Philadelphia (1831). (Thanks to Kermit R. Mercer, University of Rochester.)
4. J. R. Smith, *From Plane to Spheroid*, Landmark Enterprises, Rancho Cordova, Calif. (1986). (Thanks to J. Donald Fernie, University of Toronto.)

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