

Science not yet without borders

The May 2008 issue of PHYSICS TODAY contains an Opinion piece (page 51) written by Barry Sanders and titled "Science Without Borders." Sanders's belief that science should transcend politics led him to help organize the International Iran Conference on Quantum Information, which was held in 2007 in the free zone of Kish Island, Iran.

Sanders raises an important issue. It is deeply unfortunate that political intrusion into scientific conferences, such as American punitive measures against Cuban scholars, is all too common. It is also deeply unfortunate that the conference put together by Sanders perpetuated precisely the same intrusion: Israeli citizens were barred from attending.

What would have happened had Sanders's group threatened to cancel the conference over the barring of Israeli scientists? That action seems not too much to ask of a conference whose *raison d'être* is "bringing together the best science worldwide, independent of politics," thereby allowing formation of "a bond between humans from all societies." Would the Iranian government have found a way to make an exception to its exclusionary policy? We'll never know, but a rare opportunity for Israeli and Iranian intellectuals to come together and see each other's humanity may have been missed.

I do not advocate a boycott of Iranian scientists, and I have no quarrel if Sanders wishes to hold a conference in Iran. But that conference has done nothing to reduce political intrusion into scientific discourse. It simply provided an-

other venue where a particular nation's scholars, Israelis in this case, were excluded. The self-congratulatory tone of the piece, and especially its title, hardly seems merited.

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We share the vision Barry Sanders outlined in his Opinion piece "Science Without Borders." However, we were saddened by the obvious failure of the 2007 International Iran Conference on Quantum Information to live up to that vision, as attested by the barring of Israeli scientists from the conference. What disturbed us even more was that the "unfortunate" barring of Israelis did not seem to influence either the running of the conference or Sanders's upbeat report.

Did the organizers of the conference—including Sanders—try to get permission for Israeli scientists to attend? Did they protest to the Iranian government in the (obvious) case of refusal? Was the issue brought up during the conference, in the framework of the reported "lively and unconstrained" discussions?

As much as Sanders wanted to keep politics out of the conference, it did enter in the form of the Iranian government's control over who could attend and who was excluded. It reminds us of the story of the gorilla parked in the middle of a cocktail party, whom everybody is conscientiously ignoring while carrying on a spirited conversation. In fact, we imagined adding "Find the missing Israeli scientists" to the caption with the picture of conference attendees on coffee break.

According to Sanders, another International Iran Conference on Quantum Information is planned for 2009. Will Israeli scientists be allowed to attend that conference as equals with the Australians, Canadians, French, and Japanese and have the conference live up to the ideals of "science without borders"? What are the organizers doing today to make that happen in 2009, or will the political and exclusionist gorilla again sit in the middle of the party? In our opinion, Sanders should "walk his talk"

and tell his Iranian hosts that as much as he wants to help Iranian scientists and students, it will not happen a second time at the price of sacrificing scientific freedom.

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I was extremely displeased with the Opinion piece by Barry Sanders in which he described an international conference he recently organized in Iran. Taking an apparent holiday from history, Sanders proposed that "the complicated politics between Iran and the West is a compelling reason to support conferences in that country." In his view, a scientific conference "reminds us through our shared discourse that we are all human and all fundamentally the same on our journey of discovery." Sanders further notes that "the goodwill from the conference . . . will ensure Iranians are able to learn the latest and greatest that quantum information has to offer."

To hear all this, one would scarcely realize that Iran is the leading terror state in the world, with one of the worst human rights records, which includes such practices as the killing of blasphemers by stoning and the prescribed execution of infidels and homosexuals. Sanders even declines to consider whether the information Iranian scientists learned from his conference may be immediately applied to the regime's stated goal of attaining nuclear might, wiping Israel off the map, demolishing America, and hastening the apocalyptic return of the Mahdi.

Sanders's quest reminds me of an oft-repeated pattern in history: liberal intellectuals attempting to make things better by appealing to lofty callings—joint science projects, gatherings to "discuss our differences," and so forth. Unfortunately, that kind of devil's bargain has little proven track record. For instance, it is well known that one desperate course taken by some European Jews in order to survive the Holocaust

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was to actually join—or attempt to join—Nazi German institutions.

Giving aid, comfort, and scientific knowledge to countries run by barbarous regimes is not necessarily a good thing, no matter how virtuous it might make some of us feel.

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Sanders replies: These letters provide a welcome alternative viewpoint to my support for scientific conferences independent of politics. The central disagreement between me and the writers of these letters is whether a conference should be held completely independently of the host nation's politics—provided of course that safety of participants is guaranteed—or whether political matters, such as banning people based on citizenship or human rights violations, should militate against organizing such conferences.

I support the goal of the universal right of all scientists, regardless of citizenship, to participate in open scientific meetings, and equally support the goal of universal respect for human rights. The question before us then is whether it is better to hold conferences, even under compromised conditions, or not to hold them, with the hope that the lack of engagement will drive change.

In our complex world, we need the yin and the yang of political and cultural engagement. Sanctions and boycotts have a place, but scientists in every country have a need for contact with others with whom to share ideas, to collaborate, and to learn and teach.

In the sports, music, and science worlds, we are seeing exchanges that somewhat transcend politics. This year the Summer Olympics were held in China, and the New York Philharmonic played a concert in North Korea. In 2007 the 38th International Physics Olympiad was held in Iran. These events are important in bringing together athletes, musicians, and scientists, but also in catalyzing change in our global society.

The letter writers have in common the view that holding these conferences is tantamount to appeasement. If they think that threatening to cancel a conference or holding it once and refusing to do so again is an effective tool for creating a better world for science, they may do so, either on their own or with some allies. Personally I regard threats and cancellations as counterproductive. Perhaps the letter writers see a way forward that I do not see.

As I write this letter (1 October 2008), I am returning from the First Interna-

tional Iran Summer School on Quantum Information, which I co-organized and which featured top international speakers. Sixty-eight students chose to participate, including several international students; unfortunately Israelis were forbidden. In our imperfect world, the students were grateful for the opportunity to learn, and the speakers for the opportunity to share knowledge. Despite the compromises, the school was a positive event that built scientific discourse independent of politics but constrained by reality.

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Physics: A calling or assembly line

I find my physics education useful nearly every day in my job for a large semiconductor chip manufacturer, and I am still glad that I struggled through a PhD from the University of California, Berkeley, about a decade ago. However, I agree with Anita Mehta (PHYSICS TODAY, June 2008, page 50) when she suggests that the physics research enterprise must overcome challenges if it is to remain relevant.

Around the beginning of the 20th century, one of Max Planck's professors famously declared that there was nothing significant left to be discovered in physics. Einstein's relativity and quantum mechanics followed; physics became paramount when the atom bomb helped end World War II and largely maintained the global peace for decades afterwards.

Times have changed. The Soviet Union is gone. The challenges with global climate change are also mostly political and economic. The microelectronics revolution has transformed the world, but with personal computers, cell phones, and the internet being everywhere, it is easy to take the underlying physics for granted. Do most people care, for instance, that the storage of songs and videos in iPods depends on the precise control of electrons' quantum tunneling through an insulating barrier?

Nearly all the practical successes of physics in the recent past are the consequences of physical understanding developed more than half a century ago. Meanwhile, nuclear fusion remains unavailable for power generation; high-temperature superconductivity is inadequately understood; and

no mass-market application of carbon nanotubes has yet been found.

So what is new, and why should the taxpaying layperson care? Any new research proposal raises two pertinent questions: Is it likely to reveal anything fundamentally new about how nature works? If only confirming established physical theories, is the work going to be of any practical consequence in the near term?

Physics, like everything else, has to compete in the marketplace of ideas. Further inquiry in physics may remain relevant only if it continues to be widely perceived as a useful art or otherwise generates concepts that excite the imagination of young people.

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In Anita Mehta's collection of inconvenient truths, she chronicles the evolution of the physicist from a craftsman doing research for "pleasure rather than work" to a "physics professional" working for the research corporation that is the modern university. Having earned a bachelor's in physics and a doctorate in psychology, I feel compelled and ever-so-slightly qualified to conclude that, if anything, Mehta has done us a disservice by being far too polite.

Mehta uses artful prose to address issues that already make many people uncomfortable. Her insights ring true. As she notes, the broad promise of early theoretical advances made by Renaissance men gave way to specialization in which the skills needed to solve problems became more important than the original thinking needed to recognize them. Mehta writes that too few people are allowed "the postdoctoral researcher's birthright—the luxury of dreaming." But she passes over a concurrent and inseparable phenomenon: the decline in the status of graduate students and postdocs from colleagues doing independent research to glorified laboratory assistants.

Specialization, Mehta writes, has brought coexisting but contradictory interpretations of nature, often achieved through computer simulations rather than experiments; that specialization has led to "the growing estrangement of subfields within physics." Mehta courteously skirts the root cause of what she calls the "assembly-line mindset" and of all the other problems she notes: the advent of international competitiveness as the core motivation for science. In that realm, nations accumulate knowledge to gain economic and military advantage