A High-T_c Myth and Its Real-World Meaning

William Graham (September, page 144) states that the notion that the July 1987 Federal Conference on Commercial Applications of High Temperature Superconductors did not exclude foreign participants is a "myth." I did not attend that conference, but every report I heard projected this myth as well as stating that the US would spend $150 million for high-$T_c$ superconductors, that this is the test of US competitiveness and that we must beat the Japanese. Whatever the facts are, I wish to point out one consequence of the myth.

In November 1987 I was invited to spend two weeks in Japan to discuss high fields and technologies because the Japanese were planning a new high-field facility that was not yet funded. I could not accept the invitation because the NSF Panel on Large Magnetic Fields planned to meet during that time, and I was a member. On 26 and 27 January 1988, J. David Litster and I led an MIT Industrial Liaison Office symposium entitled High-Temperature Superconductivity: Implications for Industry. A representative from the UK, a representative from Japan and several representatives from US industry and government were invited. Graham also was invited to participate; however, his office notified us that he was unable to attend.

At this symposium, Koichi Kitazawa of the University of Tokyo, the Japanese representative, gave an overview of Japanese efforts and projected funding. He mentioned that both a high-temperature superconducting laboratory, ISTEC, and a new high-field facility at Tsukuba had been funded—the latter for about $65 million. (It turns out that funding for the high-field laboratory is $100 million, and the planned facilities follow the NSF large-field panel's recommendations for the US.) I asked Kitazawa how the Japanese managed to get funded so rapidly—in November funds were not available for the high-field facility. The answer was four words: "We thank your President!" I asked, "How so?" He reminded me of the July meeting in Washington, in which President Reagan participated and from which, Kitazawa said—stating the myth—foreign nationals were excluded. The Japanese scientists were asked how Japan should respond, and they suggested funding of a high-field laboratory and a high-temperature laboratory. Both were funded.

Whatever the intent of the July meeting arrangements, they caused considerable distress to members of the scientific community who recognized that the breakthrough was made by foreign nationals and that restrictions would be counterproductive. Certainly, the reasons for not inviting foreigners to participate were not enunciated in a clear manner, and the consequences were far reaching. For the Japanese, in this case, a myth was as good as a pile (of real money).

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Some Good ν's About γ and Landau

In the article "Reminiscences of Landau" (May 1989, page 34), I. M. Khalatnikov, director of the L. D. Landau Institute for Theoretical Physics in Moscow, wrote about Lev Landau's view of the late George Gamow. Khalatnikov recalled that after seeing Gamow some time after the latter had emigrated to the West, "Landau spoke about the 'new' Gamow with regret and even some loathing."

As close friends and colleagues of Gamow from the time of World War II until his untimely death in 1968, we found this view held by Landau to be almost unbelievable, even given Landau's penchant for very strong opinions about some scientists. We found it particularly poignant since, as anyone who has read Gamow's autobiography *My World Line* will remember, Gamow's view of Landau was almost the exact opposite, most complimentary and warm. Since we had very friendly interactions with Khalatnikov some years ago, we felt it appropriate to write to him concerning this matter.

We are deeply indebted to Khalatnikov, who kindly sent us a very interesting response clarifying the mistranslation of a Russian word that he notes actually means "disapproval"; we add that at worst it can be translated as "low regard" or "censure." We quote the relevant main body of the letter below, with his permission, because it explains and softens this difficult situation, adds to the human dimensions of his article and also contains the first announcement in the United States, to our knowledge, of the happy news of Gamow's posthumous reinstatement as a corresponding member of the USSR Academy of Sciences:

"There is no need to explain to me the strengths and merits of Gamow. All my lifetime I have always held

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Gamow in high esteem as an outstanding scientist and a bright personality. In this connection I am happy to inform you that not without my personal involvement in this problem, by the resolution of the department of general physics and astronomy of our academy, Gamow has at last been given back the title of correspondent member of the USSR Academy of Sciences, alas, posthumously. This glad news cannot, of course, make Gamow happy, but it is very important for the whole world's physical community and for his close friends that Gamow has been requited according to his deserts.

"As for Landau's strong opinion of his last encounter with Gamow, I tried my best to maximally precisely remember what had been said by Landau, moreover because this had been said in the presence of some colleagues of mine. Unfortunately, [because of] my imperfect knowledge of the English language, the wording of the English translation proved to be inappropriate. In fact, I did not know the meaning of the word 'loathing,' and the Russian phrase had the word 'неодобрение,' *i.e.*, 'disapproval.' Also, while analyzing the whole paragraph about Gamow we should bear in mind that Landau was given to generalizations, sorts of stereotypes; he from time to time changed his opinions but he needed a pretext or a reason to change his mind about something or somebody, and unfortunately, Landau did not see Gamow again. I am quite convinced that had they met again after 1938 when Landau experienced some revaluation of values, and had they spoken again, the opinion of Landau would have been different. Even in my recollections published in PHYSICS TODAY you can find a paragraph about [John] Bardeen and see how Landau changed his mind about him.

"To my regret, everything connected with Landau has already become history and there is no changing anything now. I have always thought it my duty, being a close friend of Landau, to tell people maximally truthfully what my memory keeps. And the word 'loathing' emerged in the text despite my intentions. But I would like to stress again that the opinion of Landau about Gamow does not at all belittle the scientific achievements of Gamow, nor his charm as a person."

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How the Garden State Seeds Technology

Your recent reports on New Jersey as a "pole" for the study of physics (June 1989, page 61) were welcome reading here in Trenton, and particularly at the state science and technology commission, where we've been working for some time to develop some of the strengths you cite. As your reporter correctly observed, some aspects of this physics "pole" have developed more recently than others, and in that regard your readers may be interested to know of the role played by conscious planning and development work by our state's government and its business community, working in concert.

Your news stories highlight several developments that, if not actually *caused* by state support for science and technology, are certainly strongly reinforced by it:

▷ Princeton University's materials science initiative, including its Photonics and Opto-Electronic Materials Center component, are financially supported by our state commission as a way of providing the highest-quality research base to the region's high-technology industrial community. The POEM Center is likely to receive $10 million in capital support from a bond issue approved by the state's voters last year, and annual operating support from general funds as well.

▷ Rutgers University's laudable efforts in discrete mathematics, surface modification and computational fluid dynamics are all cost-shared through the medium of various other "Advanced Technology Centers" funded generously by our state commission. In addition, the state professorships placed at Rutgers and at New Jersey Institute of Technology became a priority of Governor Thomas Kean's thanks to the attention focused on this need by our commission.

▷ The closeness of the state's industrial sector—AT&T, Bellcore, Sarnoff, Exxon and so on—to these various activities impinging on the physics community is no accident. It has been consciously and deliberately created by means of incentives for cooperation and collaboration. To take one example, the Consortium for Surface Processing referred to in your piece was not fostered by Sematech (although it holds a contract for a Sematech Center of Excellence in Plasma Etching) but by our commission, as a way of building a more powerful concentration of resources in this field. The Consortium for Surface Processing is co-incorporated by Stevens Institute