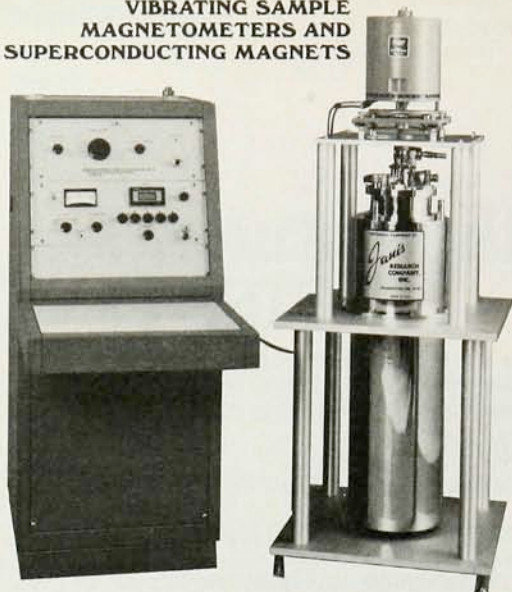


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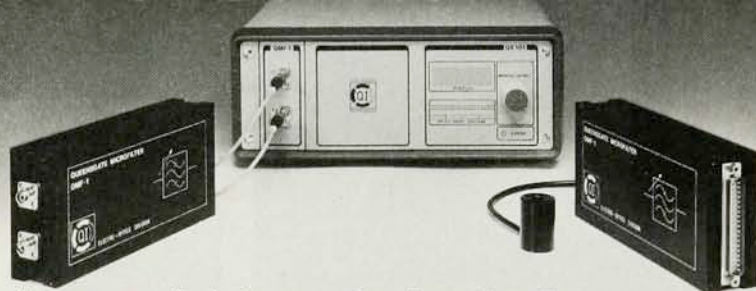
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HENRY H. BARSCHELL

2/89 University of Wisconsin, Madison

Bubble Chamber Photomission

In our article "Pions to Quarks: Particle Physics in the 1950s" (November, page 56), through an oversight, we failed to mention that the photographs on page 61 of Donald Glaser's notebooks were taken from Peter Galison's contribution, chapter 14, to the book *Pions to Quarks*, which we edited (Cambridge U. P., New York, to appear in 1989), and from Galison's more extensive treatment, "Bubble Chambers and the Experimental Workplace," in *Observation, Experiment and Hypothesis in Modern Physical Science* (P. Achinstein, O. Hanaway, eds., MIT-Bradford P., Cambridge, Mass., 1985).

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12/88

Gibbs and Mandelbrot at Yale

In his Opinion piece (January, page 71) Benoit Mandelbrot offers a non-Gibbsian approach to the definition of temperature and its fluctuation. He notes that "for small systems the statisticians grant that a fog of uncertainty is simply unavoidable." This limitation creates difficulties for chemistry and all of semiconductor physics, because these sciences and others often deal with single particles in thermal and diffusive contact with an appropriate reservoir. That is why the Gibbs approach is so widely followed.

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*Source: *The American Heritage Dictionary*, 2nd ed. (Boston: Houghton Mifflin Company, 1982), p. 1134.

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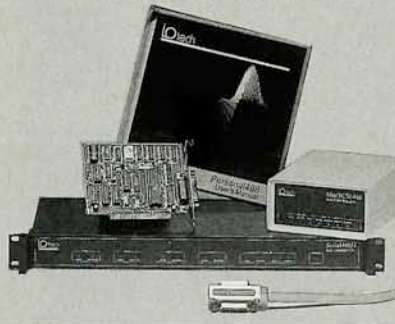
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extraordinary power of the Gibbs viewpoint became apparent only after quantum theory was formulated. The canonical example is the Fermi-Dirac distribution, which can be derived from first principles in a few equations, without fog. I give the references below¹ not because they are particularly original, but for the convenience of readers who remember, for example, the incredibly complex apparatus of the Darwin-Fowler method and wish to compare it with an exposition of the Gibbs method applied to the Fermi-Dirac problem.

Reference

1. C. Kittel, *Introduction to Solid State Physics*, 6th edition, Wiley, New York (1986), pp. 616-618. C. Kittel, H. Kroemer, *Thermal Physics*, 2nd edition, Freeman, New York (1980), pp. 1-4.

CHARLES KITTEL

1/89 University of California, Berkeley

MANDELBROT REPLIES: I have no love for Darwin-Fowler, and no quarrel with Gibbs—even when I'm at IBM.

BENOIT B. MANDELBROT

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1/89 Yorktown Heights, New York

Should SSC Have Overseers Overseas?

Just a decade ago, the US General Accounting Office invited this lone low-energy physicist to take part in a roundtable discussion on the future of high-energy accelerators. The tenor of the discussions was cordial enough until the subject came up of future machines of very large size, and the methods by which they would be managed and funded.

It seemed obvious that eventually the problem that would be faced would be the same one that faced our European colleagues in the 1950s and forced them to combine forces in CERN—namely the impracticality of a one-nation effort. This eventuality was not very congenial to the views of my colleagues, and when I pressed for the idea of international management and funding in the future, there was a decided chill around the table, and I found myself a minority of one. There were abundant expressions of approval for the idea of international cooperation, but none at all for international control. It was not difficult to infer that I was stepping on the very sensitive toes of people around the table who were directors of very large facilities and who did not relish the prospect that their successors might be answerable to an international board of directors.

As I have followed the debate on the SSC, and have questioned some of its key advocates on the question of joint international control of the SSC in the framework, perhaps, of a CERN-Pacific, I have detected the very same chill I felt in the GAO offices ten years ago. Despite the loftiness of the goals that invariably find expression in the SSC debate, some largely unspoken ambitions for personal power seem to be driving the project toward unilateral funding by American taxpayers and unilateral control by an American director. If there are good reasons for such unilateralism, now is the time for them to come out.

LAWRENCE CRANBERG

11/88

Austin, Texas

Builders of Weapons vs Builders of Minds

The alarming news story "Five Years After 'A Nation at Risk' US Schools Still Seek Better Grades" (June 1988, page 50) acknowledges the central problem: "The need for better teachers is inescapable." On page 72 of the same issue (from the report on AIP's 1986 employment survey) is the statement "[Physics] bachelors working for defense contractors had a median monthly salary of \$2315, while those teaching earned \$1350."

Any society that attaches nearly twice as much value to weapons as to the minds of its children deserves to have a problem (and I include Canada in this).

ROY L. BISHOP

Acadia University

6/88

Wolfville, Nova Scotia, Canada

Asia's Academic Achievers

In the news story "Five Years After 'A Nation at Risk' US Schools Still Seek Better Grades" (June 1988, page 50), the graphs comparing US students with their counterparts in other countries are somewhat misleading. The European countries, for example, not to mention the Asian countries, have educational systems and philosophies different from ours. The comparisons with Hong Kong form-6 or form-7 students are especially misleading and unjustifiable. It defies my imagination to explain how Hong Kong students take a quantum leap from last place in 9th-grade science to first place in 12th-grade physics in three short years.

Form-6 and form-7 physics students in Hong Kong, as a rule, take calculus, calculus-based general physics