CUI MALO?: LESSONS FROM HISTORICAL CRITIQUES OF BIG SCIENCE

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Second ECFA Workshop on
e^+e^- Higgs/EW/Top Factories

12 October 2023
Paestum, Italy

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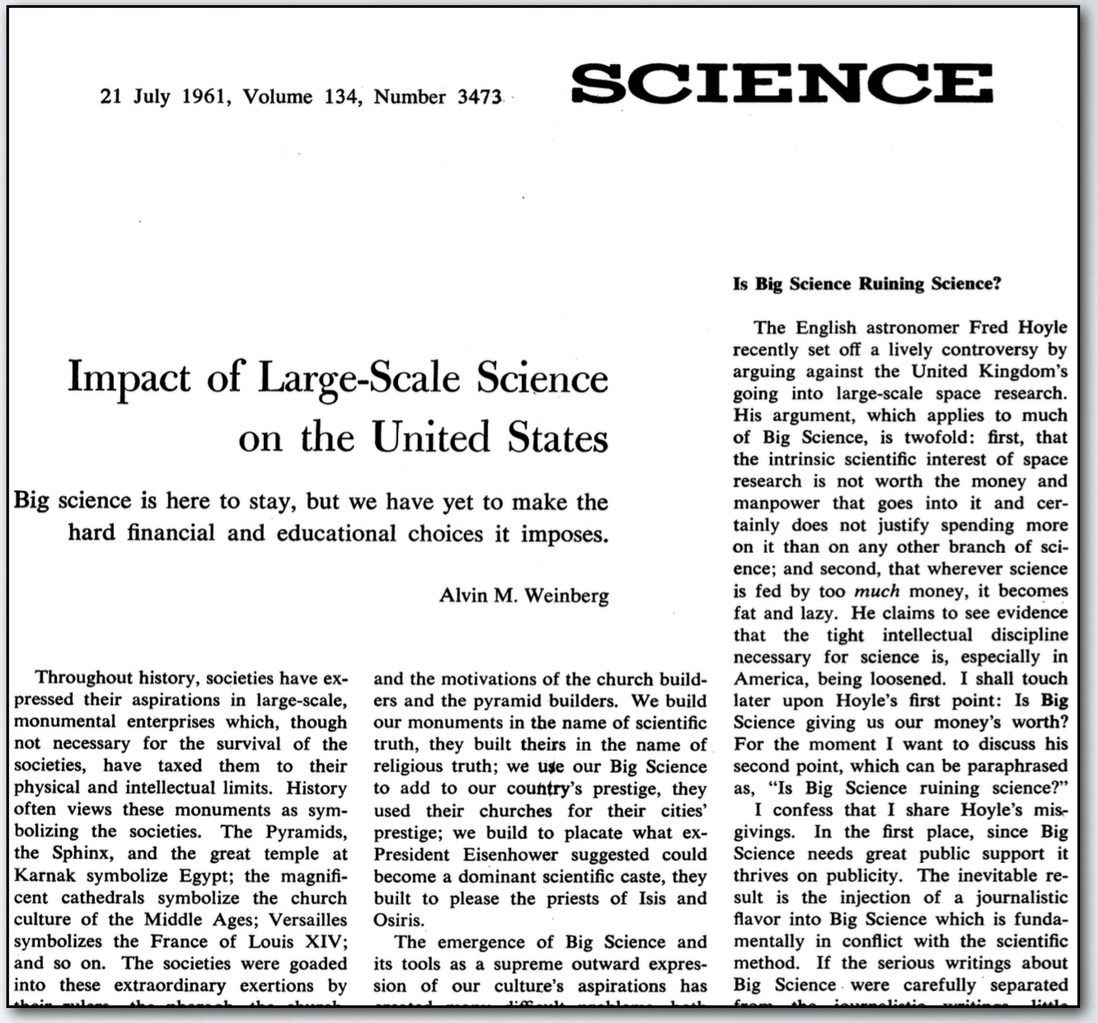
I. INTRODUCTION



21 July 1961, Volume 134, Number 3473 SCIENCE

Impact of Large-Scale Science on the United States

Big science is here to stay, but we have yet to make the hard financial and educational choices it imposes.

Alvin M. Weinberg

Throughout history, societies have expressed their aspirations in large-scale, monumental enterprises which, though not necessary for the survival of the societies, have taxed them to their physical and intellectual limits. History often views these monuments as symbolizing the societies. The Pyramids, the Sphinx, and the great temple at Karnak symbolize Egypt; the magnificent cathedrals symbolize the church culture of the Middle Ages; Versailles symbolizes the France of Louis XIV; and so on. The societies were goaded into these extraordinary exertions by

and the motivations of the church builders and the pyramid builders. We build our monuments in the name of scientific truth, they built theirs in the name of religious truth; we use our Big Science to add to our country's prestige, they used their churches for their cities' prestige; we build to placate what ex-President Eisenhower suggested could become a dominant scientific caste, they built to please the priests of Isis and Osiris.

The emergence of Big Science and its tools as a supreme outward expression of our culture's aspirations has

Is Big Science Ruining Science?

The English astronomer Fred Hoyle recently set off a lively controversy by arguing against the United Kingdom's going into large-scale space research. His argument, which applies to much of Big Science, is twofold: first, that the intrinsic scientific interest of space research is not worth the money and manpower that goes into it and certainly does not justify spending more on it than on any other branch of science; and second, that wherever science is fed by too *much* money, it becomes fat and lazy. He claims to see evidence that the tight intellectual discipline necessary for science is, especially in America, being loosened. I shall touch later upon Hoyle's first point: Is Big Science giving us our money's worth? For the moment I want to discuss his second point, which can be paraphrased as, "Is Big Science ruining science?"

I confess that I share Hoyle's misgivings. In the first place, since Big Science needs great public support it thrives on publicity. The inevitable result is the injection of a journalistic flavor into Big Science which is fundamentally in conflict with the scientific method. If the serious writings about Big Science were carefully separated

II. RESOURCE DISTRIBUTION

Alvin Weinberg

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‘In making our choices we should remember the experiences of other civilizations. Those cultures which have devoted too much of their talent to monuments which had nothing to do with the real issues of human well-being have usually fallen upon bad days.’

II. RESOURCE DISTRIBUTION

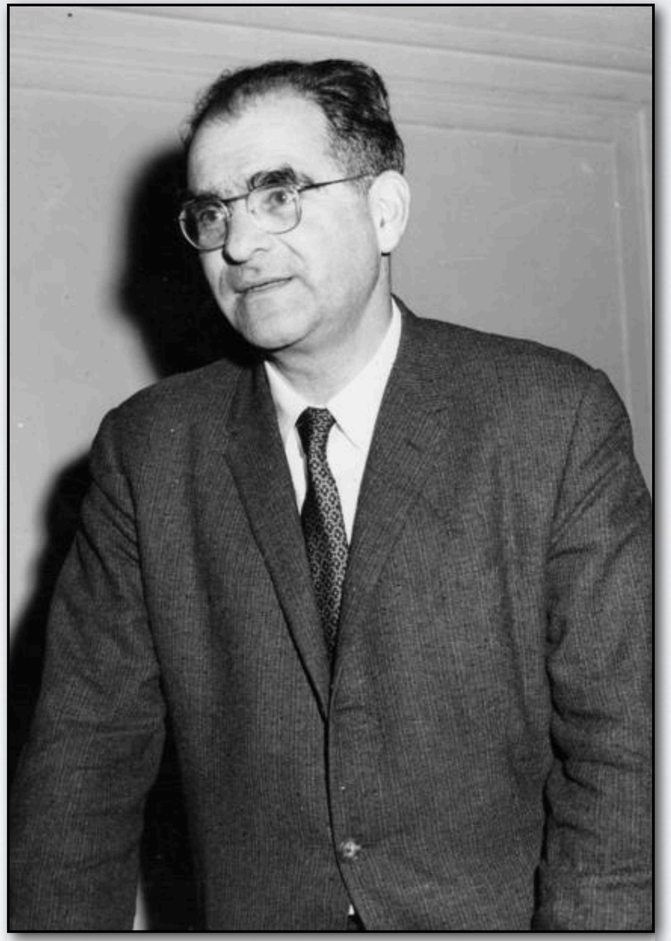
Alvin Weinberg

Robert Wilson

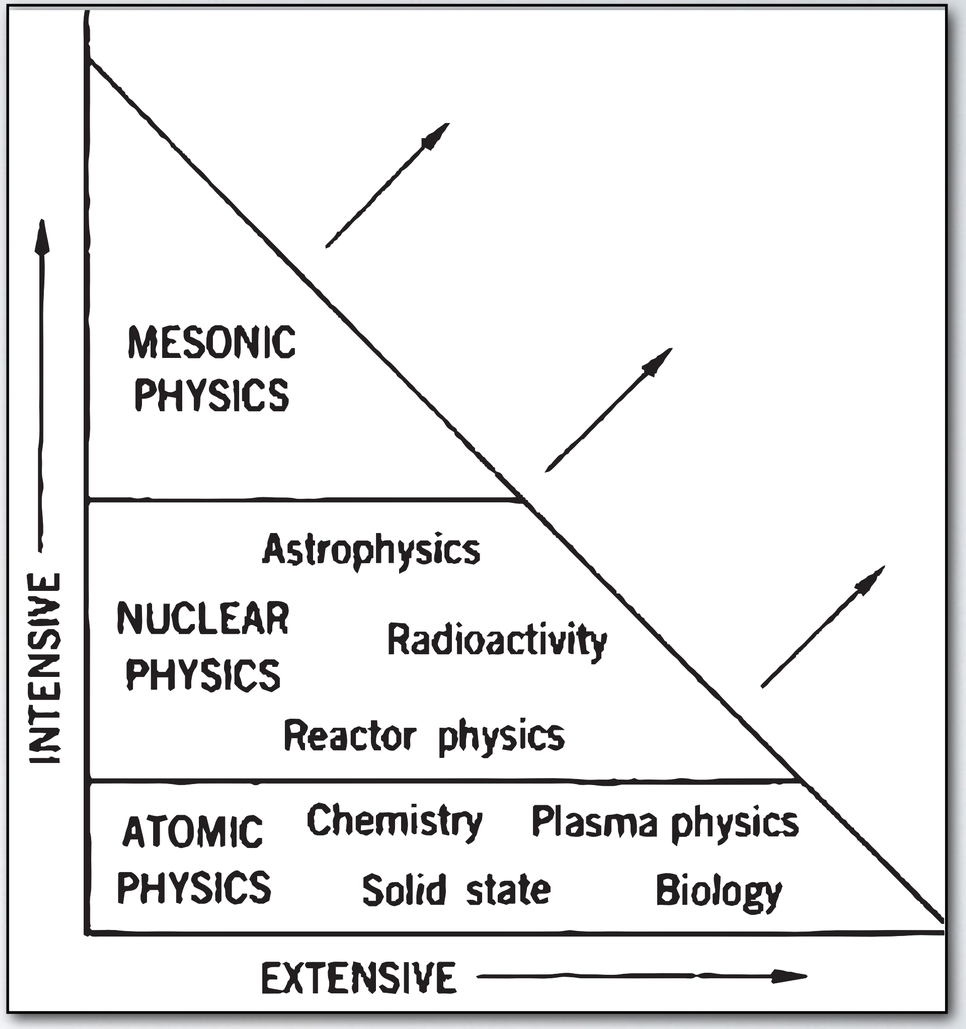
John O. Pastore

III. REDUCTIONISM

Philip W. Anderson



Victor Weisskopf

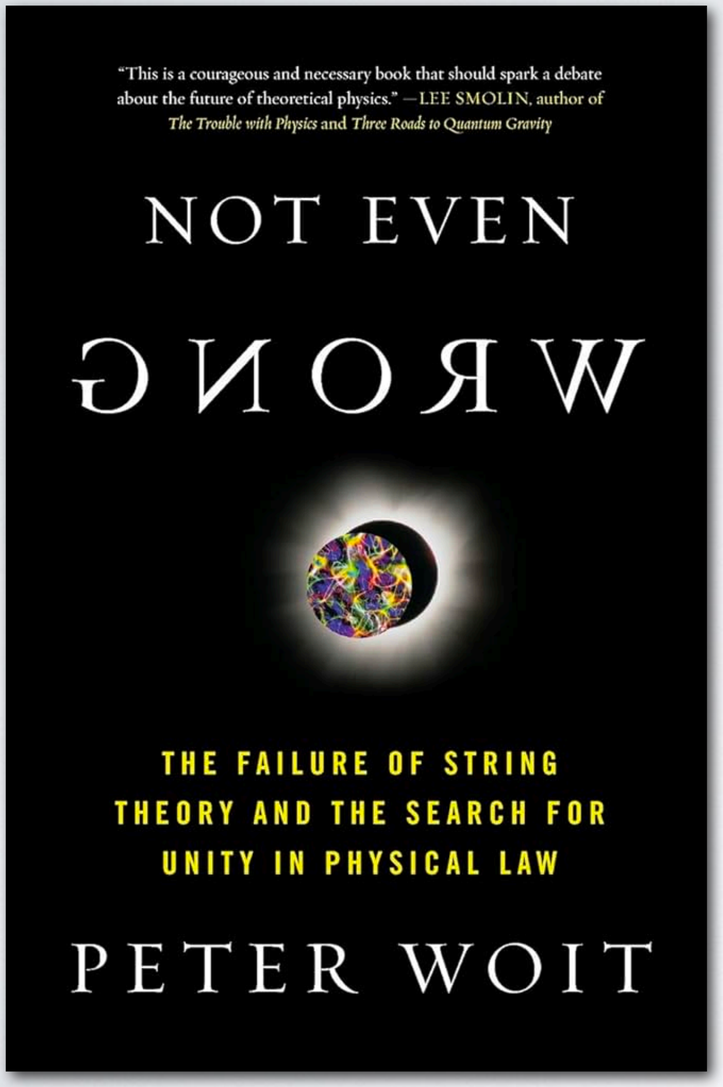


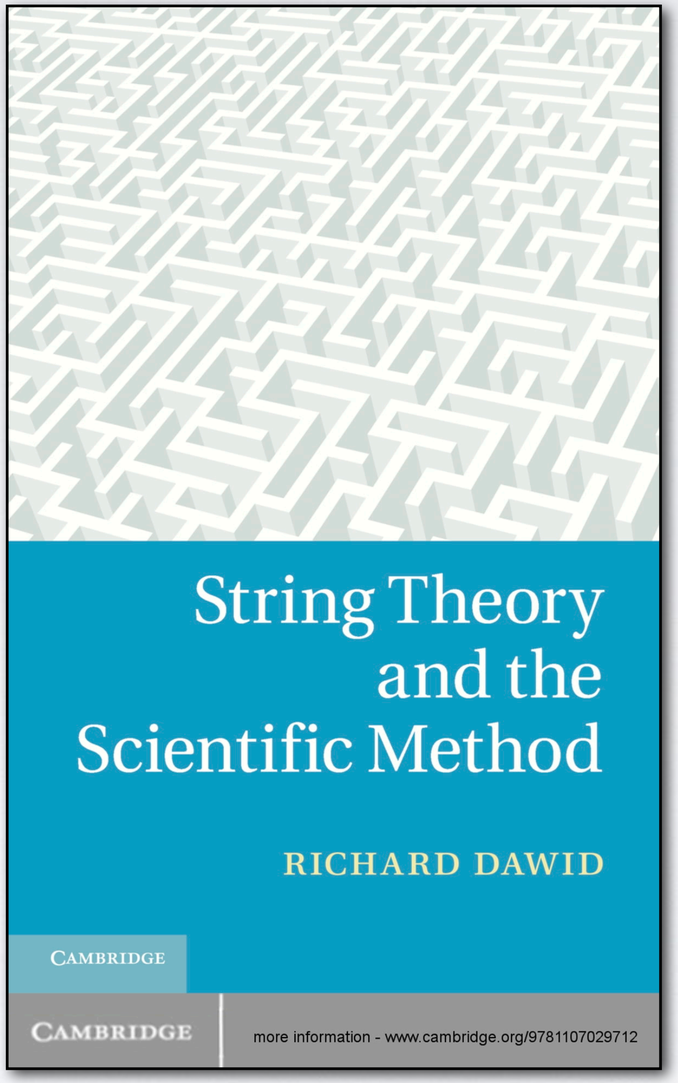
III. REDUCTIONISM

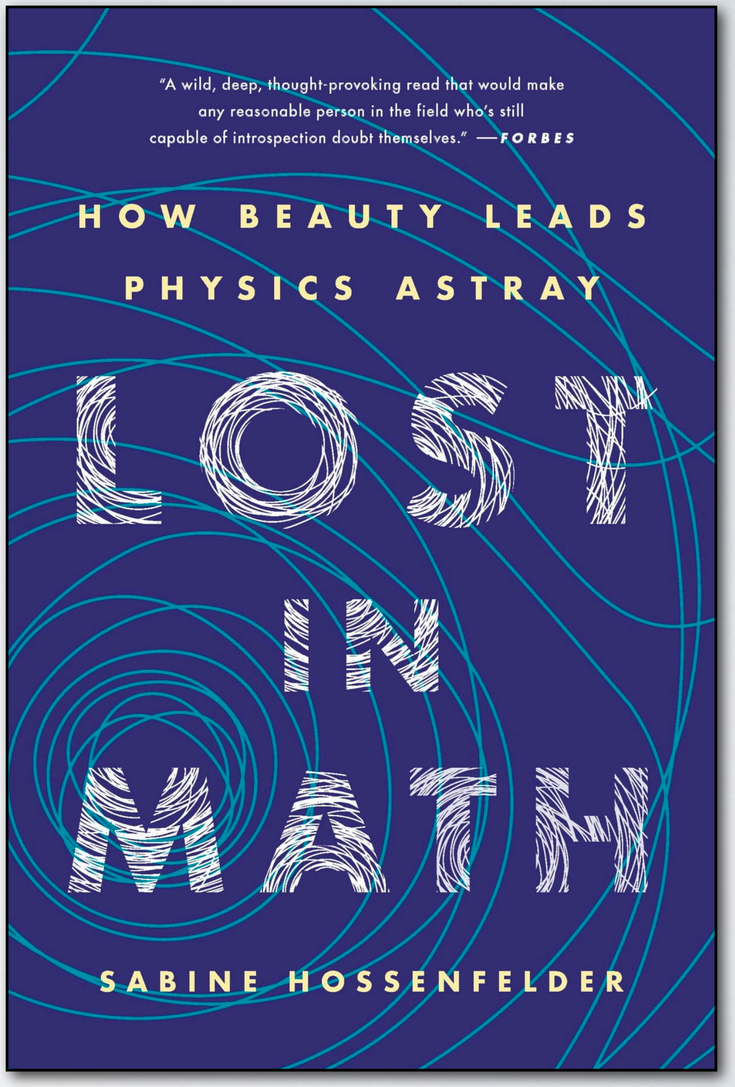
Philip W. Anderson

"['More Is Different'] was unquestionably the result of a buildup of resentment and discontent on my part and among the condensed matter physicists I normally spoke with. 1967 was a temporary maximum of arrogance among the particle physics establishment."

IV. THEORY & EXPERIMENT







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'When physicists started building colliders in the 1940s, they did not have a complete inventory of elementary particles, and they knew it. New measurements brought up new puzzles, and they built bigger colliders until, in 2012, the picture was complete. The Standard Model still has some loose ends, but experimentally testing those would require energies at least ten billion times higher than what even the FCC could test. The scientific case for a next larger collider is therefore presently slim.'

V. CONCLUSIONS

Source: *Hendersonville Times-News*, 2 July 1993

THANKS!

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