

Anything a Physicist is Interested In

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Remarks at the 75th anniversary celebration

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I begin with a story of a conversation I had with Brian Pippard, the Cavendish Professor of Physics at Cambridge, in 1976, five years after I was at the Institute. I was about to begin a sabbatical, working with Richard Eden, one of the early contributors to scattering theory, whose interests, like mine, had shifted to "energy and environment," and whose new career Pippard was enabling. Pippard said to me: "The physicists in America are different from us here. You Americans think that physics is anything that is publishable in the Physical Review. But we think physics is anything a physicist is interested in!"

Although I was at IAS for only one term, in the spring of 1971, not one but two Directors made that come about: Carl Kaysen, then the Director, and Murph Goldberger, your director quite a bit later.

I am one of many physicists in whose careers Murph intervened with life-changing results. In the summer of 1969 I was at the Stanford Linear Accelerator, half-way through an Assistant Professorship in Physics at Yale. For 12 years, dating from the summer of 1957 when I was a student at Brookhaven surrounded by particle physics, I had been living my dream of learning about the subnuclear world, with its magical symmetries. But I had become restless, and Murph had become interested in my career. Knowing I would be in Palo Alto, Murph had invited me to join what became known as the Everglades summer study, which met at Stanford throughout the month of August. He also invited John Harte, my colleague on the Yale physics junior faculty. The summer

study produced two short reports. One report, called "Institutions for the Effective Management of the Environment," had some influence on President Nixon's creation of the Council on Environmental Quality and the Environmental Protection Agency. The other report was a case study of a huge jetport planned by the Miami Port Authority for a location west of Miami at the edge of Everglades National Park. There is a direct line from that report to the decision of President Nixon to cancel the jetport a year or so later. Murph, Murray Gell-Mann, and Gordon MacDonald, all National Academy members in their thirties, ran the workshop. That was heady company, and those were heady results.

Inspired by the summer study, I went back to Yale and left traditional physics behind for a career in energy and environment. John Harte and I immediately began writing a book, called *Patient Earth*, which we envisioned as a supplementary reader on environment for introductory physics courses. Murph wrote an article in *Physics Today* a few months later urging physicists to become involved with social issues. John and I were half-way done with the book, and Murph included its table of contents.

A year later, thanks to the generosity of a Yale physics faculty fully cognizant of my career shift, I had a junior faculty fellowship. Murph and George Reynolds (who died earlier this year) and a few other Princeton faculty members were cooking up a new environmental initiative on the campus. Murph asked me to consider spending my fellowship year in Princeton, helping with the planning.

Some of you may remember that there was an eclipse of the sun in March 1970, visible in its totality from the Delmarva peninsula. Carl Kaysen and I met by chance at the bow of the ferry from Lewes to Cape May, both of us heading home. Carl had been on the faculty at Harvard when I was an undergrad. Affiliated with Kirkland House, he had escorted me to receive my diploma in a House ceremony at commencement. When we met at the bow, I learned that Goldberger had spoken to him. Goldberger and Kaysen knew that an offer to be associated with the School of Natural Sciences would be irresistible. After all, the School was where T.D. Lee and Frank Yang had done the work on parity violation that had turned me on to physics at age 19; where I would be down the

hall from Roger Dashen, Curt Callen, and Steve Adler, colleagues I greatly admired, and from Freeman Dyson who, simply, was my hero. For many years after, Carl remained a mentor and helpful critic.

It was a time when physicists thought other physicists could do anything. I often say that some of the best physicists in the world ushered me out of physics. They and I believed that they were ushering me into a career where physics would provide the way of thinking, with its emphasis on stripping problems down to their essentials and seeing deep connections, but where the problems would originate outside of physics.

When I was here, I had a second office in Jadwin on the Princeton campus, across the hall from George Reynolds. When I was in my Institute office, I was marking up the proofs of *Patient Earth*. When I was at Jadwin, I was working with George and with Hal Feiveson to plan the first projects of the Center for Environmental Studies, which formally came into existence the next fall, under George's direction. Thanks to a solar eclipse and two Institute directors, I was invited to join the Princeton faculty (in Mechanical and Aerospace Engineering, not in Physics). I have been there ever since.

What was behind all this angst and creative involvement from the physicists at that time? First of all, a kind of noblesse oblige, a belief that physicists were particularly qualified to protect the public from foolish, even dangerous projects promoted by champions of one technology or another. In this period, OTA was created to digest science for Congress, and the APS, along with several other professional societies, created fellowships for physicists to work in Congress. It was the period when the Jason group began helping the Defense Department to identify wacky budget-busting projects; Jason even stopped a few.

But beyond advocating the physicist's ability to see through nonsense, Gell-Mann, joined by Goldberger, MacDonald, Reynolds and Kaysen and Dyson, advocated that physics made physicists good at something more. Gell-Mann passionately believed that systems analysts were on the verge of capturing environmental policy, and that the norms of systems analysis would lead to excessive quantification that would sterilize

environmental discourse. There would be no place for saying that a landscape was magnificent or that a bird was beautiful. The traditions of physics, by contrast, encourage an awareness of the limits of quantification, are aligned with an appreciation of beauty and elegance, and continually affirm the humble place of human beings in the universe.

Physics provides powerful ways of looking at the world. But physics also provides wonderful traditions of mentoring, and these are not acknowledged enough. May the Institute forever encourage the pursuit of “whatever a physicist is interested in!”