

On the 4th of June 1939, with the thunderclouds of war breaking over Europe, my grandparents placed their 12-year old daughter on a kindertransport to England. Although my mother's name was Hannelore, the papers issued by the Nazi regime changed her formal identity to Sara, lumping her together interchangeably with every other Jewish female. This definition did little to prevent her from being marked as German at the boarding school she attended in Surrey, as German rockets rained down on London in the blitz.

My grandparents moved from Breslau, now the city of Wroclaw, Poland, to Berlin, where my grandfather, Martin Bernstein, was one of the last Jewish lawyers permitted to practice his profession. They stayed because his parents were too ill to move, but in 1941, getting wind of the German invasion of the Soviet Union, finally fled unaccompanied to Moscow. From there they headed east on the trans-Siberian railroad, and sailed from Vladivostok to Shanghai, a refuge for those without identity papers, at least until the Japanese invasion of China when group identity again became a liability.

In March of 1938 my father's family left Nazi Germany via train to the port of Marseilles and sailed to Palestine. Their passports were likewise issued to "Sara's" for the female members of the family and to "Israel's" for the males. In Palestine, the running family joke was that the only patients my grandfather, Emil Rosenbaum, treated were other German-Jewish refugee doctors. They made their way to America a year later. My grandfather set up practice as a family GP in Lowell, Massachusetts; his sons headed back to war as members of the United States armed forces.

At times of transition, the past envelops you as the future beckons. Our personal histories inform powerfully the roads that we choose to tread. When I agreed to become Vice President for Research and for Argonne National Laboratory at the University of Chicago, my first foray into university-wide responsibilities, I had just audited political theorist Danielle Allen's course on "Classical Political Thought." Among the readings was Cicero's *On Duties*, his last philosophical work, where he lays out for his son Marcus the linkage of the honorable and the beneficial, the virtue of duty to society, and the primacy of civil achievement. The opportunity to contribute to the commonweal is undervalued in our academic culture, but no less resonant or powerful for it. It holds particular resonance for me growing up with parents who had fled Nazi Germany, and who neither took for granted the freedoms of the United States nor the responsibility of its citizens to seek to improve it.

Institutional trajectories also arise from particular histories. This inauguration ceremony provides an occasion for us as a community to stand outside the hurly burly of everyday life and to connect to the values that animate this glorious Institute. It is a time to ensure that Caltech's fundamental identity comes from within and that it is never imposed from without. It is an opportunity for us to distill the hard-won experience of the past so that we may create a sense of magic and wholeness for the future.

The California Institute of Technology is one of a select few institutions in the world devoted to unraveling the mysteries of the universe, to creating knowledge for the ages. Although these most basic of pursuits can seem esoteric in a torn world, in the aftermath of the nihilism and pressing immediacy of a 9/11, it informs our identity as human beings. Fermi National Laboratory Director Robert R. Wilson famously testified in the midst of the Cold War in front of the Congressional Joint Committee on Atomic Energy to answer questions about the value of building Fermilab's first accelerator ^[1]:

“SENATOR JOHN O. PASTORE (Vice Chair of the Committee). Is there anything connected in the hopes of this accelerator that in any way involves the security of the country?

DR. WILSON. No, sir; I do not believe so.

SENATOR PASTORE. Nothing at all?

DR. WILSON. Nothing at all.

SENATOR PASTORE. It has no value in that respect?

DR. WILSON. It only has to do with the respect with which we regard one another, the dignity of men, our love of culture. It has to do with those things.

It has nothing to do with the military...

SENATOR PASTORE. Is there anything here that projects us in a position of being competitive with the Russians, with regard to this race?

DR. WILSON. Only from a long-range point of view, of a developing technology. Otherwise, it has to do with: Are we good painters, good sculptors, great poets? I mean all the things that we really venerate and honor in our country and are patriotic about.

In that sense, this new knowledge has all to do with honor and country but it has nothing to do directly with defending our country except to help make it worth defending.”

Caltech researchers invented quarks, discovered quasars, started the field of molecular biology, deciphered the inner workings of the earth. We have contributed in considerable part the quintessential new knowledge that makes our society worth defending. But I would argue that Caltech’s most formidable contribution has been in introducing a novel approach to discovery, a conception of research that has permitted the Institute to found new schools of thought. This approach derives from the Institute’s origins, the vision of Caltech founders Hale, Millikan and Noyes, and it continues to provide a wealth of cultural capital. As the inheritors of this cultural capital, we must be attentive to its worth, defending our values in a sometimes indifferent and even hostile world, while at the same time seeking to hone Caltech’s distinctive identity.

In an early speech at Caltech ^[2], Robert A. Millikan observed that: “One of the chief inhibitions to human progress arises because of the extreme slowness with which the advances in knowledge become translated into action for the benefit of society as a whole. There is no step more important for the removal of that inhibition than that of providing for intimate contact between the leaders in the fields of pure and applied science.”

He then went on: “It is of equal importance, too, that those who are taking and are going to take prominent parts in the progress of pure and applied science should have the background and the comprehension which come from contact with the world’s best thought in literature and from an adequate understanding of the historical processes by which the world has reached its present stage of development.” Millikan cited the joint presence of the newly formed California Institute of Technology, the Mount Wilson Observatory, and the Huntington Library as the unique opportunity to combine different ways of elucidating and influencing the world to realize these aims.

Millikan’s synthetic view of scholarship was unusual for its time and remains so almost 100 years later. The effective combination of the pure and the applied to advance knowledge and benefit society requires a number of elements, many of which characterize the Caltech of today:

1. An absolute commitment to excellence. Every appointment—student, faculty and staff—matters. Intrinsic to this strategy is the need for diversity: diversity of thought, diversity of

background, diversity of experience. We must cast the net as broadly as possible to recruit and retain the most inventive and original scholars.

2. **Ambition.** At every scale, from creating the smallest implantable medical devices to leading the effort to develop the world's largest telescope to sending planetary probes hurtling out of the heliosphere. We are at a time in the history of science and technology where competition for federal funds drives the system to conservatism, but the genius of Caltech is its fearlessness to try new ideas, its willingness to absorb risk and even fail if the potential is transforming discovery.
3. **Focus.** As the constraints become more pronounced, we will be challenged even more profoundly to define areas where the Institute can be a world leader and where it cannot. We will have to forge partnerships – with sovereign countries to build the Thirty Meter Telescope, with medical centers to translate our research into clinical applications – while protecting our capacity to set the intellectual agenda.
4. **Intimacy and intensity.** This is a visceral feature of Caltech, built on an organizational structure with few disciplinary barriers and the cultural expectation of shared knowledge.
5. **Perspective.** The arts help us to function as life thrusts us into situations where we have to conceive problems outside of the structures that define them. It provides us with an elasticity of thought and familiarity of experience not fully our own, while challenging us to define the essence of what we believe. Copernicus, the late 15th-early 16th century mathematician and astronomer who placed the sun rather than the earth at the center of the solar system, thereby changing forever human beings' conception of their place in the universe, spoke five languages, held a doctorate in canon law, practiced as a physician, and was a classics scholar, economist, translator, governor, and diplomat! He turned to classical Greek and Latin authors as he struggled with his doubts about the accepted astronomical wisdom.

There is no doubt that each of these elements – Excellence, Ambition, Focus, Intimacy, and Perspective – is by itself difficult to achieve, and perhaps even more challenging to maintain in changing times, but taken together they yield intellectual magic. The former president of

the University of Chicago and Attorney General of the United States, Edward H. Levi, spoke to this enchanted state in a 1967 talk entitled *The University and the Modern Condition*: “I recall the late Leo Szilard, puckish great scientist, describing the uncertain quality which made for a great laboratory. He could tell, he said, all the danger signals that indicated when things were not going well. But he could not say what made for a good or great laboratory. He only knew, he said, there was a sense of wholeness when this occurred. It was, he said in the most matter of fact way, a kind of magic.”^[3]

For the California Institute of Technology, this sense of wholeness reflects a comfort with our fundamental identity. It comes from within and is grounded in our knowledge of where we have come from. It is stable against the pressures of conformity, it defies the ease of settling for second best, and it resists the push to intellectual conservatism. At the same time, there is nothing comfortable about it. Montaigne mused that “We can be knowledgeable with other men’s knowledge, but we can’t be wise with other men’s wisdom.”^[4] The process of actively engaging with extant knowledge, of challenging and refining one’s own ideas through rigorous argument with predecessors and contemporaries, can be difficult and exhausting. But there is no other route to wisdom, no shortcuts to reimagining our place in the universe.

The philosopher Yogi Berra ordered a pizza. He was asked what kind of pizza he wanted. “Cheese,” he replied.

“Would you like it cut into four pieces or eight?”

“Four,” he said. “I couldn’t possibly eat eight.”

It is the same intellectual pie, but we are called to cut it up in original and valuable ways. We are called to create magic.

The privilege of being president, even in the brief time that I have held this role, has been to meet colleagues from across Caltech, to learn of their interests and to be exposed to their modes of inquiry, to see the astonishing range of individual styles that still touch on the shared values of the Institute. It is a heady intellectual experience and one that holds the promise of new friendships. It is also a rare opportunity to help shape an institution whose collective impact on the world – through its trustees, its faculty, its students, its staff, and its alumni – is extraordinary in both its depth and duration.

Two weeks ago a number of us stood near the 13,800 foot summit of Mauna Kea in Hawaii at the groundbreaking for the Thirty Meter Telescope. Five hundred years after the Copernican revolution, we are marshaling deep scientific insight and ingenious technological accomplishment to search for the signatures of life on planets orbiting distant suns. If life is found elsewhere in the universe, our understanding of the place of human beings in the natural world will undergo another revolution. It is pure and applied science. It is poetry. It is Caltech.

References:

- [1] R.R. Wilson's Congressional Testimony, April 17, 1969. Fermilab History and Archives Project, www.history.fnal.gov/testimony.html
- [2] Robert A. Millikan, *The Autobiography of Robert A. Millikan* (Arno Press, New York, 1980), p. 231.
- [3] Edward H. Levi, "The University and the Modern Condition," in *Point of View: Talks on Education* (University of Chicago Press, Chicago, 1969), p. 19.
- [4] Essays of Michel de Montaigne, Chapter XXIV-Of Pedantry (1877).