

What, Another Nobel Prize in Chemistry to a Nonchemist?

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(Photo: Michael Grace-
Martin)

The 2011 Nobel Prize in Chemistry was awarded to a materials scientist, Dan Shechtman, for the discovery of quasicrystals. The usual rumblings followed—why not include Paul Steinhardt, how about Roger Penrose? And, among chemists, a different tune, with an angry, resigned note to it, “Once again, not a real chemist ...”

I want to address this attitude in this Editorial. First a few words about the Nobel Prizes.

The last decade has been especially unkind to “pure” chemists

What real purpose does the Nobel Prize serve? Of course it aspires to recognize the greatest achievements of humanity. No, not systematically across the richly tilled fields of human creativity, but in selected areas, those reflecting Alfred Nobel’s interests. The sciences are not covered in any representative way. But beyond that recognition, and accepting the mystique that has grown around it, what is the significance of the Nobel Prize? Does it affect our professional opinion of what is good chemistry? Hardly—we knew the quality of Ryoji Noyori’s work decades before the Nobel Committee got to recognizing him. Does it make people (other than the mothers of the recipi-

ents) happy? The Oscars are coming, the Olympics soon after; you’ll see how happy those who do not win will be. Given the way human beings are, prizes on balance may generate more pain than happiness. For that which is truly good, which indeed deserves to be praised, exceeds by an order of magnitude (if not two) that which is singled out.

And how are the prizes perceived? What the press exacerbates—the cult of being first and best, be it in the Olympics or the Oscars—cannot be blamed just on the media. It is what human beings desire. Why? To see what we cannot reach, to make our desire tangible. Seen in its most positive way—and there are many ways to look askance at our obsession with the subject—in our contemplation of prizes and contests, in watching others receive them, we are reaching out for material and spiritual betterment in ourselves. The essential role of prizes may be a focusing of our own aspirations, especially those of our young people. I will return to this. But let’s talk about chemistry and not chemistry in the awards.

The Nobel Prize in Chemistry has been awarded 103 times to 161 people in the 110 years of its existence. In the last 30 years (my cutoff date is arbitrary) the chemistry prize was given 10 times for a discovery that is reasonably classified as biochemistry or molecular biology, once to a materials scientist. And a great physicist, Walter Kohn, shared in another Nobel Prize in Chemistry (with John A. Pople).

True, the last decade has been especially unkind to “pure” chemists, as only four of ten Nobel awards could be classified

as rewarding work comfortably ensconced in chemistry departments around the world. And five of the last ten awards have had a definite biological tinge to them.

I know that I speak from a privileged position, but I would urge my fellow chemists not to be upset. What looks like a lack of sensitivity on the part of the Nobel Committee in Chemistry of the Royal Swedish Academy of Sciences (that’s the responsible gang) to the center of our field, I view as a call to our profession to embrace the far and influential reach of chemistry.

Ubiquitin and the ribosome, fluorescent proteins and ion channels are as fundamentally chemical as metal surfaces, enantioselective catalysts, olefin metathesis, or, just to name some fields squarely in our profession that should be (or should have been) recognized, laser chemistry, metal–metal multiple bonding, bioinorganic chemistry, oral contraception, and green or sustainable chemistry.

The Nobel Committee has in its wisdom decided that biochemistry and molecular biology are chemistry. A significant part of our community has (in my opinion unwisely) disagreed with this. I would place the blame elsewhere—for reasons buried in history and personalities, about a hundred years ago we allowed the biological to get away from chemistry, so to speak. That was a mistake, with molecular biology and the chemical turn in biology around

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the corner (well, 50 years after we lost biochemistry). Perhaps the situation is being repaired, in part, as evidenced by the renaming of some departments in the US as one or another variant of chemistry and chemical biology.

It will take some decades still for the Nobel Committee in Physics to recognize chemists. Though I would claim Müller and Bednorz as our own, even as I cringe at my own characterization of good scientists as one or the other. But the awards for cuprate superconductors and graphene do move in our direction, so to speak.

Disciplines are human constructions—the conservative, compartmentalizing affliction of academia. The world is one, and our best minds and hands have moved with facility across disciplinary lines, using tools of chemistry to chart emerging territory in biology. And vice versa. The star materials of the condensed matter physicist had to be synthesized by chemical techniques; the Fourier transformation and the mass spectrometer brought us new chemistry.

Iwould come to peace with the decisions of the Nobel Committee in Chemistry. I'm not saying that they are all wise, that they do not make mistakes of omission or even commission. But their existentially difficult decisions do not call into question the value or identity of our field.

Let me return to the intrinsic value of the Nobel Prizes. By recognizing excellence, the Nobel Prize evokes aspiration. Especially for young people. After

The Nobel Prizes are a conduit for the aspirations of young people

I received mine, a friend reminded me—I had conveniently forgotten—that once, sitting in Rienzi's, a Greenwich Village Café, playing a truth game at age 17, when asked what I desired most in life, I said that I wished to win a Nobel Prize. Ten years later, having done good work, I would not have said it. For then I was wiser, and knew that oh-so-many do good things, yet only few can be rewarded. Pick a year, and I could tell you of twenty people with whom the community would be as happy as with the one to three chosen.

Aspirations need to be awakened. How many were so stirred among young Japanese chemists, when my friend the late Kenichi Fukui became the first Japanese chemist to receive a Nobel Prize? Before then, some of them might have actually believed some of our silly prejudices of Japanese not being original. Ahmed Zewail's Nobel Prize for femtosecond chemistry has served to begin to remove from millions of bright young scientists in the Islamic world the unnecessary burden of an inferiority complex. As if they couldn't do what ibn Rushd and ibn Sina did 850–1000 years ago!

The Nobel Prizes are a conduit for the aspirations of young people. The aspirations may be naïve (as mine were at 17),

but they are *good*. Listen to the young people in a science space, say the New York Hall of Science—they press buttons, scream, learn or do not learn, as they try things out. They see science as fun. They broach the joy of understanding. When they wend their way to the Nobel Exhibit that was there when I wrote this, they see hints of the good science that led some of the best scientists to Stockholm. And they also see these scientists rewarded—they see the grand party that the Nobel Foundation has learned to throw with more than a century of experience. They see men (and women!) with a smile they would wish to emulate. “Oh, how I would like to be there!”, the young people think. “You must work hard, but you can be there,” Röntgen answers them, quietly. Selma Lagerlöf's shoes, in that same exhibit, make me cry, say “You can remain human, even if you fly with Nils.”

Dreams, yes. But they are dreams within the realistic grasp of a young person, the child of a Korean grocer come to New York City. And even if you did not stand there on the stage at the Konserthuset in Stockholm with Dan, this dream will get you much, much further than that other seductive pull, of copying LeBron's slam dunk, or Maria Carey's song.

It is the Nobel Foundation, and not Sony, that has invented the Dream Machine: a way to turn the celebration of what human hands and minds can do into an incentive for young people to do more than what they ever dreamed they could do.