

Wolf Prize
(Shared with Yakir Aharonov)

Knesset, Israel 10 May 1998)

I am a quantum mechanic. So is Yakir Aharonov. A technical term in our subject is *the entangled state*. Anyone who has a conversation with Yakir gets into an entangled state, with contradictions, digressions and interruptions all mixed up – Talmudic, I suppose. But now, here, Yakir can't interrupt me, as I declare what an honour and delight it is to share this occasion with such a quick, deep and subtle man. There is only one sadness that I'm sure he shares with me: that David Bohm, with whom he did some of his seminal research, is no longer living; if he were, he would surely be here tonight.

Although we've never collaborated directly, Yakir's life and mine have been entangled too. We both worked in Bristol, though not at the same time – in other words, we overlapped there: I'm still in Bristol, and he came and went in the 1950s, while I was at school, though I should point out that in 1959, when he was discovering the Aharonov-Bohm effect, I applied to enter Bristol University to study physics, but they turned me down without even an interview (now, they can't get rid of me).

In all honesty, I must confess to certain uneasinesses about recognition of the kind we are getting today. In fair trade, you can bake a loaf of bread and sell it. If you want to earn more money, you can't (or shouldn't) sell the same loaf again; you must bake another one, and sell that. But in science such is the concentration on particular achievements that you get rewarded again and again for the same thing, and today is the culmination of those rewards. I'm not complaining, but it is peculiar.

In the experimental sciences, it is often fairly clear who discovered what. But in the theoretical and mathematical sciences, discoveries have a more ambiguous quality. Credit for what is sometimes a complicated evolution of ideas, involving many people, tends to crystallize about particular individuals. Tonight it's Yakir and I who are benefiting from this crystallization of recognition, and we're certainly not complaining, as I said before. But one ought to get things in perspective, and so I offer (not entirely seriously) three laws. First, there is the fact that it is hard to achieve justice in the attribution of scientific ideas, and this leads to

Arnold's Law (after the famous Russian mathematician): No discovery is credited to the right person. (Of course this applies to Arnold's Law too.)

The second law says that it is not only hard but *impossible* to achieve justice, because it seems that one can always find a precursor to any thought. So we have

Berry's Law: Nothing is ever discovered for the first time. (This too is self-referential.)

Here now is the third law, which I offer not because it applies to us (nor do the others, really) but because it is deep. It is a quotation from a philosopher:

Whitehead's Law: To come close to a true theory and to realise its precise application are two very different things, as the history of science teaches us. Everything of importance has been said before by someone who did not discover it.

Now, and finally, prizes. It feels very good to have one's work recognised, and to get a prize. Part of the pleasure is the unexpectedness - almost none of us works to get prizes - doing science has its own delights, and nobody who has not experienced the thrill of discovery can truly understand it. Moreover, getting recognised and getting prizes need not be the same thing, I will illustrate with a story. It is told that in a certain mountain village in Spain there takes place, every year, a poetry competition. From near and far, contestants come to declaim their verses, hoping to win. There are three prizes:

Third prize: a silver rose.

Second prize: a gold rose.

First prize: a real rose.

Well, tonight, it seems, we have something better: a

Zeroth prize: the real rose of recognition as well as a - rather substantial – gold rose.

On behalf of Yakir as well as myself, thank you to the Wolf Foundation, for this honour and for your generosity, and for these wonderful and memorable days in Jerusalem, and thanks to you, President Weizmann, for so graciously presenting this prize on behalf of the State of Israel.