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Remarks at a Gala Dinner  
by John Palanyi Nov. 3, 1994

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Thursday Evening, November 3, 1994.

*The Baders,  
Best regards,  
John.*

**REMARKS AT A GALA DINNER, NOVEMBER 3, 1994,**

*Four Seasons Hotel, Toronto*

**JOHN POLANYI**

It is really Mrs. Jackman, principal donor of the new Chair in Chemistry, who brings us together today. Mary Jackman died on July 11<sup>th</sup> of this year, aged ninety. She was a modern woman, but wouldn't have objected to being called a lady, which she certainly was.

Her ideal was Virginia Woolf, who wrote that gentle but devastating feminist tract: 'A Room of One's Own'. Mary Jackman was given a copy by her mother in 1928, the year the book came out.

There is a passage in it, that I am sure Mary knew, that sheds light on the astonishing fact that the Chair that is being inaugurated today is not called the 'Mary Rowell Jackman Chair'.

"Women have served all these centuries", Virginia Woolf explained, "as looking glasses possessing the magic and delicious power of reflecting the figure of man at twice its natural size... How is he to go on giving judgement, civilising natives, making laws, writing books, dressing up and speechifying at banquets, unless he can see himself at breakfast and dinner at least twice the size he really is?"

I give very special thanks to a member of today's organising committee who has for years hefted around that looking glass; my wife Sue. "Take [the glass] away", Virginia Woolf continued, "and a man may die, like the drug fiend deprived of his cocaine".

It is science that is central to today's event. And science has been almost as persistently misunderstood as has the female sex. The emancipation of science remains a dream.

How nice if in the recent Canadian review of science policy there had been one paper entitled, 'A Laboratory of One's Own'. For, unless our scientists are able to shelter a part of their science from the tumult of the day, they will no longer hear nature's voice, and will lose their way.

If science is to be better understood, scientists will have to find their voice. You may have read last month that in a test designed to determine whether computers can think, a panel of judges interrogated seven computers and seven computer scientists, hidden from view in the next room. Happily, not one of the computers persuaded the judges that it was human. But quite unintentionally five of the computer scientists misled the judges into thinking that they were computers.

No wonder that, with so little help, Virginia Woolf in 'A Room of One's Own' likened scientific discovery to a shapely pebble, in contrast to a work of art that "is like a spider's web, attached ever so lightly.. to life at all four corners". A pebble surely come to her mind because it was definite, and not in need of creation. It simply lay there, waiting for one or another of our distinguished discoverers to trip over it.

Virginia Woolf would, I hope, have welcomed the news that this view of science is nonsense. Yet for many it is as plausible today as it was to her, three quarters of a century ago.

For somehow we have to reconcile the pebble of scientific discovery with such well-known nuggets as Cold Fusion. The supposed facts of Cold Fusion — the release of nuclear energy from a beaker of water — derived from observations made in several respected laboratories. How curious then that this pebble gradually vanished. Could it be that it never was a pebble, but a shimmer on Miss Woolf's spider's web of creation, "attached ever so lightly.. to life at its four corners"?

For a scientific discovery at birth, like a story at the moment of telling, is at best ten percent pebble and ninety percent shimmer. In order for a discovery to be at any time one hundred percent pebble, it would be necessary that there exist evidence that admits of no doubt. That is not a concept that sits well with either the legal profession or the scientific profession.

In truth, the scientist is in the position of a lawyer trying to convince a jury of his peers that certain events, alleged to have taken place in his laboratory, establish the identity of a guilty fact. The scientist has doubts, the jury of peers has doubts, but the judge (who also has doubts) makes a ruling, good for the present.

That is scientific proof. It has to be, since science if it is to affect the course of history must influence not an equation or a computer, but people. There is no machinery of proof that supersedes human judgement.

It is because of the centrality of human judgement that we speak so often of the need for 'peer review'. Only occasionally, as in the case of the Nobel Lord here, does this mean consulting a member of the British Upper House. What it actually means — and we too often forget it in this country — is recourse to a judge capable of understanding the case.

It could hardly be more in keeping with this occasion that I should find myself telling you that science is done by scientists, and that, since scientists are people, the progress of science depends more upon scientific judgement than upon scientific instruments.

Do not on that basis take away our instruments. There is a limit — to embark on a new simile — to what one can paint without a brush. We may be

reaching that limit. I forebear comment. But it is certainly painting that we do, since the pebble of fact exists for us, as for any observer, only as the play of light on a partly exposed surface.

The simile of painting serves to remind us that there is 'style' in science. One great scientist remarked (in print) of another whose style differed from his, that this colleague was always "lounging around arguing about problems, instead of doing experiments". The remark was made by Max Perutz, who is sitting there, about James Watson, who is sitting at the nearby table. Jim Watson's form of idleness, Max Perutz went on, to say, had allowed him to solve "the greatest of all biological problems, the structure of DNA". "There is more than one way of doing good science", Perutz concluded. It is a point worth bearing in mind in an age devoted to the government of scientific research as a means to enhanced efficiency.

If the scientist, calculator in hand, is sketching a picture of the world much as does the painter, pencil in hand, then to profit by the activity of science we must be at pains to support individuals who have a vision, and then give them the freedom to pursue that vision. In return we have every right to expect a work of art, and should insist on it.

But what do we in fact do? We begin, in Canada, by labelling the pursuit of discovery as 'curiosity oriented research'. 'Curiosity', as we all know, is distinguished by its lack of direction. You are curious about this, I am curious about that. But creative effort is different. Success in creation is the reward for having a sense of direction sustained, in the face of awful setbacks, over a period of years.

Michelangelo spent four years, with his head tilted back at an agonizing angle, painting a vast composite of Creation on the ceiling of the Sistine Chapel. In the course of this he made a discovery in regard to space, colour and form, that has affected the understanding of generations.

Did he paint the ceiling out of curiosity? Or was he possessed of a vision — together, of course, with the desire to show up Botticelli and the others who had painted the frescoes below?

This blend of conviction and conceit is so far removed from *curiosity* as to make one wonder about policies designed for the promotion of science as a 'curiosity-oriented' activity. Those policies are, as you might guess, aimed at directing the scientists' curiosity away from what, to the onlooker, appear to be worthless ends.

If science were indeed curiosity-oriented, such re-direction would be cost-free. Since, however, science is sharply directed toward making discoveries, the cost of re-direction is high.

If only the gains were correspondingly high. But, as our Laureates have been reminding us at this meeting, it is notoriously difficult to select from

among un-made discoveries those that will be the most useful. That is why it is so often a bad bargain to contort the tree of knowledge in order that it grow in chosen directions.

Faced with the admitted difficulty of managing the creative process, we are, I fear, in the course of doubling our efforts to do so. Is this because science has failed to deliver, having given us nothing more than nuclear power, penicillin, space travel, genetic engineering, transistors, and superconductors? Or is it because governments everywhere regard as a reproach activities that they cannot advantageously control?

They used to feel that way about the market place for goods, but some trillions of wasted dollars later they have come to recognise the efficiency of this self-regulating system. Not so, however, with the market place for ideas.

What I say this evening should not be construed as political. My reproach is directed at Charles II of England. He founded the world's first professional association of scientists, the Royal Society of London, and then proceeded to castigate its members for lack of concern about problems that mattered.

He was a modest man who did not claim to know much about science, but he knew what he liked, and it wasn't what the Royal Society was doing. "These gentleman", he observed, correctly, "spend their days debating nothing". They were at the time discussing *vacuum*, which, since it is the science of empty space, bears, as is so often the case with new ideas, the hallmarks of frivolity. 'Vacuum Science', as it came to be called, provided the understanding for the construction of barometers, pumps, hot-air balloons, steam-engines, lightbulbs, vacuum tubes, thermos flasks, dried foods, neon signs and a myriad similar delights.

Charles' ghostly presence can be felt today, mocking the mathematicians who study 'fractals'. Their aim is to discover the mathematical equation for a leaf. Since this will come too late to be of value to God, they are being asked what earthly use it can be. Amazingly, the answer is already at hand. These equations for irregular forms are providing the basis for a new industry that transmits complex messages at low cost. But the answer to the question of utility came, once again, only after the discovery had been made, since it was only then that the question could be meaningfully posed.

It would be hard to exaggerate the resistance to this line of argument. The scientist is told that he has said the same things before, as if consistency were a fault. He is told that his picture of science — unfolding piece-by-piece like a cosmic jig-saw puzzle — takes insufficient account of the scarcity of public funds, as if penury were a reason for waste. He is told, most perniciously of all, that the economic crisis makes it necessary to concentrate on harvesting, and not planting. That claim cries out for response.

Voyce

For one of the wealthiest and most favoured nations in the world to turn its back on the sort of science represented by our visitors today, would be a betrayal of the hope that has brought so many to this country. It would be as if the early settlers, complaining (in their case justly) of the peril of their existence, had declined to map the land that we enjoy.

The prosperity that we owe to those pioneers affords us a dazzling opportunity today to explore the vast new land of science. By exploring with daring we shall leave a legacy that matches the one that is ours.

So far I have been pleading for science, instead of warning against it. We are all conscious of the problems raised by science. Their very magnitude testifies to the success of science as it has traditionally been pursued.

To a degree, I welcome the problems which science has brought, since they require for their solution a more thoughtful world. Under pressure from modern science we have had to reconsider the institution of war, re-assess the meaning of nationhood, respect the environment, and acknowledge our obligation to the dispossessed.

Twenty-five years ago I was one of many who fought the notion, seriously proposed, that in response to the nuclear threat we should go underground. In rejecting the proposal that we stick our heads, or entire beings, into the sand, we were asserting that life is about consciousness. That is why science offers us life.

Every day as a scientist has meant new life for me. This extraordinary party (which only appears to leave me transformed into a Chair) ushers in a further chapter of life, for which I am more grateful than I can say.

