



## The Next Big Thing: Nanotechnology

*The New Machine Age*

### COLIN

What's your speculation about the future of nano technology Harry come on speculate wildly?

### HARRY

Well I look at the work of people like John Walker who determined the structure of ATP synthase, as one of the most exciting er advances in understanding of recent years. Paul Boyer and he got the Nobel Prize in 1997 for discovering that the enzyme that catalyses the formation of ATP from ADP plus phosphate, to give us ATP which is the molecule that stores the energy and allows us to do everything, to talk, if you can, and move your muscles etc, is produced by an electric motor. It's unbelievable. In the mitochondria, on the surface of the mitochondria are these little spinning electric motors run by electricity, made by biological systems millions of years before Faraday. And I think that's the way forward. If we can now produce motors like that, machines like that at the molecular scale then we're going to move forward.

The other nice thing about that discovery is that it reminds me of the Royal Institution discourses to which Mary Shelley went and saw someone stick electrodes into a corpse, and it jumped up and was the Royal Institution discourse that led to Frankenstein and the idea that electricity was the stuff of life, it actually is. And I I think it's fantastic. If I were a young kid and someone said look, there are these little electric motors running around making your muscles move, that you're really running on electricity, it's a wonderful new perspective on the way that we move. And I think it also show what we as nano technologists should aspire to. If these living systems can get all these globular proteins and build an electric motor, surely, we who are able to do something as beautiful as this, as we see on the screen, can produce electric motors that size too.

### COLIN

Jim, final comment.

### JIM

Yeah, well I'm working on that you know. Did produce a molecular rotor okay which is only about a nanometre in diameter but, yet if I had to look into the future, I mean, there it is on the screen. In my opinion mechanical devices, we're going to go back to an age, another kind of revolution of mechanics that was different from the eighteenth century, and that...

### COLIN

...machines.

### JIM

...machines, and there are many reasons, because of energy, because of efficiency, because of the similarity biology, we will come upon a new machine age, and that machine age will have a much broader range of applicability than micro electronics, and it will also be something that will have a bigger economic impact on micro electronics. Okay so that's my crazy prediction.

### COLIN

Well we've only got a few billion nanoseconds to go until the end of this programme, so I'd better quickly say thanks to Harry, Jackie, Jim and Peter, and to you for watching. Join us again to find out about the next big thing, goodbye.