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“The History of Cavendish Laboratory”

By Dr. Steve Martin

Where did Cavendish Laboratory start? The answer is here, in the middle of town. You may have seen that in the middle of Cambridge. So, more of that in a minute. That is the view you most certainly have seen in Cambridge. That’s the old (1)_____ that was founded by William Cavendish. You saw his picture downstairs.

When I was a (2)_____ student, that’s where I went for my lectures and my laboratory practicals. It’s been a world leader for 200 years, has a tremendous history, of which I will tell you a little, but more important than an impressive history, is we think that it has an impressive (3)_____, because it’s growing so much and doing so many new things. I will have a very, very brief look at one or two of those as well. But before we do that, let’s have a look at one or two famous people who’ve worked here and made a huge (4)_____ to Physics. See if you can recognize them.

Now, James Clerk Maxwell. Any ideas what he did? Any thoughts? The father of electromagnetism. He devised four fairly simple (5)_____ which described all of the behavior of (6)_____ and (7)_____. And that was in the middle of the 19th century.

One of you, have already told me about J.J. Thomson. In a minute, we’ll actually see this. That you may have seen that in textbooks as being the equipment that he used for checking the charge compared with the (8)_____, the charge-mass ratio of the (9)_____. I think one in our cupboard is actually a copy, because the original is too valuable to even have out on display. But you already know about J.J. Thomson.

Let’s move this forward to about 1900, somewhere near there. Now, do you have any idea what this is? You’ll see this one as well, in a minute. Any idea what that piece apparatus is? The Cloud Chamber, the (10)_____ which allows us to see subatomic (11)_____. It creates in a cloud, a trace made of condensed (12)_____, fine liquid droplets. There is a much more modern version of this. I will show you in the museum, in which you’ll see (13)_____ rays which links very nicely with your talk doesn’t it? I checked it, some days it depends on the weather. Some days, the machine doesn’t show any cosmic rays at all. This morning we’ll have plenty of them, I think we’ll see some good cosmic rays today, however. So, cosmic rays in a few minutes time.

Now, any idea what we associate with Ernest Rutherford? The idea that the (14) _____ has a small (15) _____ inside a very big space. That was his idea, but most of the work was done by his research students, Geiger and Marsden. So, although it's called the Rutherford nuclear atom, it's Geiger and Marsden's experiment that demonstrates it.

Now, this takes us to around 1960's...ish. What did they discover? (16) _____. Exactly. In fact, if you go to that gateway I showed you earlier on, I believe the room where they realized about DNA is the one about three windows to the left. And it is a public house, a drinking place, at the end of the street where many people have been reputed to rush out of the Cavendish, having made some sort of discovery, like we've split the atom, we discovered the secret of life. Are we clever?

Yes, of course we look out into space, discovering things like (17) _____ and what have you. That's actually out of town. That's about 5 miles, about 8 kilometers, over the way on the other side of town and its part of our observatory and that is still in the forefront of radio (18) _____. And yes of course, some of our scientists complete to work of CERN. In the same way, I'm sure many Japanese scientists were out there. Almost every year, I end up going up to CERN for something. It's always nice to go to Geneva, and you meet people from every country in the world there in one common course. Still busy even though they found the (19) _____, they still have work to do. They're simply busy at it. So we do contribute to that and to work at Fermilab as well. Now this is rather fun.

Now, this is even cleverer. One single (20) _____. I'm told that the cell which is suffering with cancer has different (21) _____ properties compared with one that is normal. So instead of testing a large piece of (22) _____, just testing one cell, scratching it, healthy cells, cells with cancer as a disease behave differently; and therefore I can tell the difference with the sample of one, just one, cell. Amazing what you can do with (23) _____ if you try.

Now that was a very small sample. Just by way of introduction. If you are interested in this, and you want to be able to read about it at a sensible speed, if you just click on the Cavendish website, just type in Cavendish Laboratory. This is actually one of our webpages and you can see I've stolen, at least some of the illustrations from there. If you want to find out what's inside each one of those, do please go and search on the web and you'll find all sorts of interesting things.