

Студ. А.А. Мороз, А.М. Эль-Шейх Нажиб  
Науч. рук.ст. преп. С.И. Шпановская

(кафедра межкультурных коммуникаций и технического перевода, БГТУ)

## **HOW SIMPLE IDEAS LEAD TO SCIENTIFIC DISCOVERIES**

Scientific discoveries can arise in various ways and in various fields of human life. The manner of occurrence is not always systematically, does not always follow scientific methods. They can be brought forth by chance. Motivation for this may be: facilitate human life to cope with tasks; curiosity and exploration, economic necessity etc. There are methods of producing discoveries systematically. However it is good to always remember that the sum of what we not know is much smaller than what we know. So always stay nice and curious.

One of the funny things about owning a brain is that you have no control over the things that it gathers and holds onto, the facts and the stories. In addition, as you get older it only gets worse. Things stick around for years sometimes before you understand why you are interested in them before you understand their import to you.

When Richard Feynman was a young boy, he went for a walk with his dad and his wagon and a ball. And he noticed that when he pulled the wagon, the ball went to the back of the wagon. Moreover, he asked his dad, "Why does the ball go to the back of the wagon?" And his dad said, "That's inertia". He asked: "What's inertia?" In addition, dad did not how explained it. And nobody really knows. Richard Feynman ended up winning the Nobel Prize in Physics. And he credits that conversation with his father as giving him a sense that the simplest questions could carry you out to the edge of human knowledge, and that that's where he wanted to play. Moreover, play he did.

Now Eratosthenes was the third librarian at the great Library at Alexandria, and he made many contributions to science. But the one he is most remembered for began in a letter that he received as the librarian. The writer said at noon on the solstice, when he looked down this deep well, he could see his reflection at the bottom, and he could also see that his head was blocking the sun.

Now, we want to point out the idea that Christopher Columbus discovered that the world is spherical is total bull. It is not true at all. In fact, everyone who was educated understood that the world was spherical since Aristotle's time, and Aristotle had proved it with a simple observation. He noticed that every time you saw the Earth's shadow on the Moon it was circular, and the only shape that constantly creates a circular shadow is a sphere, Q.E.D. the Earth is round. But nobody knew how big it was until

Eratosthenes got this letter with this fact. So he understood that the sun was directly above the city, because looking down a well, it was a straight line all the way down the well, right past the guy's head up to the sun.

Eratosthenes knew another fact. He knew that a stick stuck in the ground in Alexandria at the same time and the same day, at noon, the sun's zenith, on the solstice, the sun cast a shadow that showed that it was 7.2 degrees off-axis. Now, if you know the circumference of a circle, and you have two points on it, all you need to know is the distance between those two points. He needed to know the distance between Swenet and Alexandria and it was 500 miles and Eratosthenes knew it because he was good at geography. Multiply that times 50, you get 25,000, which is within one percent of the actual diameter of the Earth. He did these 2,200 years ago.

Forever enshrined in scientific legend, the discovery of penicillin – a group of antibiotics used to combat a variety of bacterial infections – is really just a case of dirty dishes. Scottish biologist Alexander Fleming took an August vacation from his day-to-day work in the lab investigating staphylococci, known commonly as staph. Upon his return on Sept. 3, 1928, the perceptive scientist found a strange fungus on a culture he had left in his lab – a fungus that had killed off all surrounding bacteria in the culture. Modern medicine was never the same.

Now, we live in an age where multi-billion-dollar pieces of machinery are looking for the Higgs boson. We're discovering particles that may travel faster than the speed of light, and all of these discoveries are made possible by technology that's been developed in the last few decades. But for most of human history, we had to discover these things using our eyes and our ears and our minds.

We love the idea that different branches of science are called fields of study. Most people think of science as a closed, black box, when in fact it is an open field. And we are all explorers. The people that made these discoveries just thought a little bit harder about what they were looking at, and they were a little bit more curious. And their curiosity changed the way people thought about the world, and thus it changed the world. They changed the world, and so can we.