

Let us now go to the next difference: Science is evaluated by how well the facts support the theory or conclusion while technology is evaluated by how well it works.

A good example here would be malaria. Malaria comes from the word *mal* which means bad and *aria* which means air. Literally it means bad air. It might interest you to know that *malaria* is a misnomer or a wrong name. Why is it the wrong name? It is because people used to believe that malaria is caused by the bad odor coming from the swamps. A swamp is a stagnant body of water. The theory arose from the observation that most people who live near the swamps contracted the disease so they thought that the odor coming from the swamps, the bad air, that is inhaled by people around them was the cause of the disease. So it was called Malaria, bad air. That was the theory so that is why the disease came to be known as malaria. But this conclusion or theory could not be supported in the long run because some people get sick of the disease even if they don't live near the swamps. So doctors conducted more research and eventually found that malaria is not caused by the odor from the swamps. Rather, it was caused by mosquitoes that breed in the swamps.

The notion that malaria is caused by the odor from the swamps could not be supported by the facts but unfortunately, the name stuck so we still call malaria as malaria instead of calling it “bad mosquito”.

We will have another interesting discussion related to this when we compare the geocentric theory and the heliocentric theory in the subsequent chapters.

How do we test technology?

Let us take medicine for malaria. Medicine is a technology.

Suppose we have two different medicines manufactured by different pharmaceutical companies to cure malaria. How do we compare which of these two medicines work better?

We compare those two medicines on the basis of which one of them cures the disease permanently, which of them is able to cure the disease faster, which has lesser side effects.

Consider the mechanical reapers they now use for rice and corn. Before, a large number of people had to be hired to harvest a rice field or corn field. With the use of rice or corn reapers, all that you need would be two or three people. Among manufacturers of mechanical reapers, preference is also given to the brand that is most efficient. Suppose you have a reaper that merely puts harvested rice in sacks, it would not be as efficient as one that does not only put the rice harvest in sacks but also has an added technological feature of drying the harvested grain. So the farmer could proceed directly to the buying station to sell his harvest without going through the tedious process of drying his harvest on pavements or highways. Now, suppose one is able to come up with one that also mills the grain so that he could immediately sell his product to rice retailers. That would even be more efficient than the second one. The third would by all means be a better brand.

Another example would be the cellular phone that you use. Right now, we charge cellphones by plugging them to a power source, either from electricity or power bank. Imagine if you have a solar powered cellphone that is simply left under the sun for 3 minutes and gets a full charge afterwards. Or, what if you could simply insert your phone in your armpit and it gets charged just the same.

We proceed to the next.

Science is limited by the ability to collect relevant facts while technology is limited by financial costs and safety concerns. A good example here would be Near Earth Asteroids (NEA). In fact on August 16, 2020, a 3 to 6 meter size asteroid traveling at 12 kms per second whizzed by earth. Just try to imagine one that is the size of a basketball court or one as big as city hall. It would be a catastrophe if one that big strikes the earth. NASA, knowing the danger that near earth asteroids pose to humans are intent on studying them. But the problem is they could only rely on pictures. But there is not much that you can learn from pictures. So what does NASA need to do? NASA probably wants to invent a spacecraft that could get samples from the asteroid itself. Imagine a spacecraft traveling at the same speed as an asteroid with an astronaut or a robot alighting on the asteroid to take samples. Right now that is not possible or it is very expensive. There are technological limitations as well as financial limitations which limit the extent of scientific investigations. Scientists may want to get samples from near earth asteroids but the available technology on space exploration does not make that possible yet. No matter how much they want to learn about these objects, the attempt to study them is limited by the currently available technology and funding.