08-29-08 Always More to Discover

In this seemingly magic digital age of blue tooth, wireless, "Beam me up, Scotty" capabilities, children may conclude that everything has already been discovered; anything that matters, anyway. They also may not realize that the discoveries of the past were achieved mostly through a process of observation and critical thinking; not entirely dependent on technology or "Googling" the discoveries of others. Of course, the scientific process is usually based on theories providing the guiding force for studies involving measurements and replication. The scientific process has also historically involved observations, curiosity and questioning with an open mind. Having a mind open to various interpretations of what is observed is a key ingredient to making those discoveries. As Dr. Kevin Dyer says, "Look at things differently and the things become different."

Take for example, Dr. Ronald Ross. As a child he was known to be a day-dreamer, preferring drawing and writing poetry to studying. His father, knowing his son's intelligence, suggested he become a doctor. In India, much of Dr. Ross's time was spent treating soldiers with malaria. Ross observed that mosquitoes always accompanied the stagnant water and considered them a nuisance. At that time, in the late 1800's, it was believed that breathing "bad air" caused malaria. People believed this bad air came from areas of water that were not deep and did not move. It seemed that malaria was most common near swamps. Does this sound familiar? What we now call standing or stagnant water has all along bred disease-carrying mosquitoes but people did not always know this.

In eighteen-eighty, a French doctor, Alphonse Laveran, discovered that the Plasmodium parasite causes the disease. This information influenced Dr. Ross when, in 1889, while on leave in England, he took a course in bacteriology. This was a new discipline and the class had a microscope! Yet, despite the technological advances, five years later, scientists still did not know how malaria was spread. It was not until 1895 that Dr. Ross was able to share his theories with Dr. Patrick Manson who specialized in tropical diseases. Together, they decided to examine the blood of sailors who were returning from Africa. Examined under a microscope, the blood revealed the Plasmodium parasite in the red blood cells. Dr. Ross felt determined to test his developing theories on a connection between mosquitoes and disease.

At times he felt discouraged. At one point he wrote to his wife, "I have failed in finding parasites in mosquitoes fed on malaria patients, but perhaps I am not using the proper kind of mosquito."

Ahhh…now he's thinking! I call this self-therapy. Talking out loud and/or writing down one's thoughts does wonders for realizations.

Dr. Ross began to look at the mosquitoes more closely, noticing various markings and patterns. He decided to observe one that he called "dappled" and he decided to pay a malaria patient, Husein Khan, to allow himself to be bitten by these dappled mosquitoes, keeping the insects captive for his experiment! Brilliant!

On August 17, 1897 Ross killed and dissected two of these mosquitoes, finding nothing unusual.

On August 19, he killed another and found "some peculiar vacuolated cells in the stomach about 10 microns in diameter". Uncertain as to what he was observing, he was uncertain as to the meaning of these cells.

On August 20, 1897, Ross once again killed and dissected some mosquitoes that had fed on patient Khan. To his surprise, he saw; "a clear and almost circular outline, too small to be the stomach-cell of an ordinary mosquito. I looked a little further. Here was another and another exactly similar cell".

Dr. Ross had discovered that the malaria parasite in the Anopheles mosquito was responsible for the spread of malaria. During the next few years, Ross furthered his knowledge at a lab in Calcutta. There, he heard about the work of an American scientist, MacCallum, who had identified the Plasmodium parasite in infected birds. Ross decided to follow up on this by taking mosquitoes fed on infected birds and allowing them to feed them on uninfected birds. The results were dramatic and obvious: the uninfected birds became infected. Ross had successfully completed the puzzle of the parasite. It bred in the stomach of female mosquitoes. From there it traveled via the bloodstream to the salivary glands where it was injected into the host, thus providing the blood-meal for the female. Be it human or bird, the malaria parasite was received along with the nuisance bite of a mosquito.

Although many people and many ideas and lots of hard work led to the final meaningful understanding of mosquito borne disease, it was Dr. Ross's willingness and ability to see what others did not that made the discoveries possible. Since then, August 20 has been known as Mosquito Awareness Day.

The worldwide effort to end malaria was suspended in 1969. Now, the World Health Organization tells us that malaria control programs must be developed for local areas, involving everyone in each community. That sounds familiar, too, doesn't it? We are so fortunate to live in a region with a Mosquito Control Program. We need your help, too. Be observant. Do not allow standing water to remain in your yard for more than a few days. From mid-August to mid-September, avoid outdoor activities from dusk to dawn. Do all you can to prevent the bite.

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