WHAT IS THE MOST IMPORTANT ENGINEERING FEAT THAT HAS PROMOTED DISCOVERY?

Researching a new stream of bacteria. Discovering a new galaxy. Inspecting an ant farm on your driveway. None of these would be possible without one very important invention: the optical lens. Although not the most impressive feat of engineering, the lens led to some of the greatest discoveries known to man. From the inside of our cells to the outside of our galaxy, the optical lens is ever expanding what the human eye can see.

Lenses are assumed to have been invented shortly after the development of glass-making in 2000 BC. Excavations have found curved glass lenses dating back to the 600s BC. The first written record of the lens is from Ancient Greece, one used to create fire by focusing the sun's rays. Also developed was a glass bowl filled with water to use for magnification. The Roman Empire was said to have used this "burning glass." They are also said to have begun to use it to correct vision. In the 13th century a lens used for the purpose of magnifying an image was developed (our modern magnifying glass.) Lenses were incorporated into eyeglasses or spectacles between 1268 and 1289 to improve people's eyesight.

The telescope was invented in the 16th century by Hans Lippershey. It was improved by Galileo Galile to what we know it to be today. With the instrument, Galileo observed moons orbiting Jupiter. This discovery led to his contradiction to the theory that the Earth was the center of the universe. The most famous telescope is probably the Hubble Space Telescope. It was launched in 1990 and has been orbiting Earth ever since. The telescope has been able to help establish the Hubble constant, the rate at which the

universe is expanding. Its image of galaxies, stars, and black holes are some of the most incredible in science; the mass amount of knowledge from these is still yet to be learned.

The first microscope was developed at the end of the 16th century. It is believed to have been formed by an inverted telescope. This would lead to the compound microscope, developed by Hooke during the 1600's. In this time, Marcello Malpighi, considered the father of embryology and early histology, studied the human circulatory system. He discovered a network of veins, arteries, and capillaries; Malpighi also observed the microscopic components of many organs. Although he misunderstood the microscopic functions, he laid the groundwork for the cell theory. Microscopes today can magnify objects a hundred thousand times or more. Today's nano-technology would not have been possible without the electron microscope. The computer chip industry is in production of 45 nanometer circuits with research labs down below 10 nanometers. All of these would not be possible without the technology started from the optical lens.

The lens is being used for scientific discoveries every day, from satellite images to contact lenses. Our lives would be very different without this seemingly simple feat of engineering. The ability to expand on the use of the lens ensures that it will contribute to scientific discoveries yet to come. Humans will ever be expanding what they can see and discover.