

A diagram showing how the earth casts a circular shadow on the moon.

weight is everywhere the same. Steam vessels and railway trains end their journeys with the same weight of freight as when they started.

Owing to the attraction of gravity, water or any other liquid is drawn toward the centre of the earth until it becomes *level*. When we refer to a surface of large area as being level, we do not mean that it is flat like the floor. We mean that it has no eurvature other than the general eurvature of the earth's surface.

By up, we mean away from the centre of the earth. So, people on the opposite side of the earth stand with their feet down and their heads up, just as we do.

Size of the Earth. The exact size of the earth is of no great importance to us. To know that it is about 25,000 miles in circumference gives us some idea of the length of time required to go around it in a fast steamer, travelling 500 miles a day, if we



A diagram of the carth showing the axis, the equator, the prime meridian, and the poles

could follow a straight path. But the earth is not quite a sphere, and the longest distance around it in a north and south direction is fortytwo miles less than the longest

distance around it in an cast and west direction. The difference, however, is too small to be shown by a globe or hy any drawing we can make.

The earth is usually classed as an ohlate spheroid; that is, it is flattened at the poles and bulged out at the Equator, as indeed are all the other planets. As a result, degrees of latitude increase in length as one approaches the poles. In the north of Sweden, for example, a degree of latitude measures 3,000 feet more than in Peru. This is due to the flattening of the earth near the poles. And, as the flattening increases the force of gravity, a body weighs more near the Arctie Circle than at the Equator. For the same reason, a pendulum clock is found to gain time as it is moved from the Equator toward the poles.

The oblate spheroid form of the earth, which some of the other planets, such as Jupiter and Saturn, possess in a much greater degree, has been caused by its rapid rotation. When a plastic body is made to rotate rapidly, it bulges out where the motion is greatest and flattens where the motion is least. This may easily be shown by a simple experiment.



Effect of Rotation.

III. THE MOTIONS OF THE EARTH

Kinds of Motions. The earth is constantly in motion. It turns on its axis, or *rotates*, once in twenty-four hours; and it moves through the heavens, or *revolves* around the sun, in a fixed path once a year.

Rotation; the Earth's Axis; the Poles. The earth rotates daily about an *axis* or imaginary central line. The two extremities of this line on the earth's surface are known

10