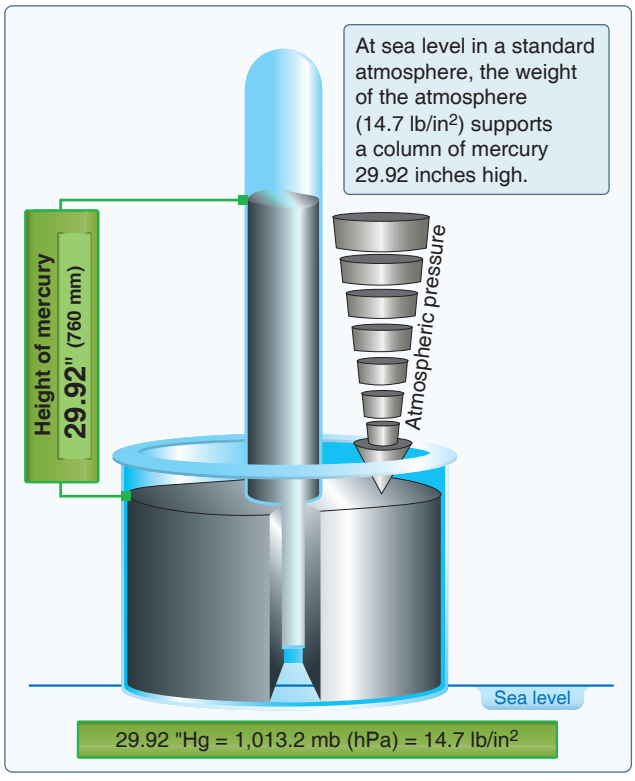

Figure 12-6. *Although mercurial barometers are no longer used in the U. S., they are still a good historical reference for where the altimeter setting came from (inches of mercury).*

An aneroid barometer is the standard instrument used to measure pressure; it is easier to read and transport. *[Figure 12-7]* The aneroid barometer contains a closed vessel called an aneroid cell that contracts or expands with changes in pressure. The aneroid cell attaches to a pressure indicator with a mechanical linkage to provide pressure readings. The pressure sensing part of an aircraft altimeter is essentially an aneroid barometer. It is important to note that due to the linkage mechanism of an aneroid barometer, it is not as accurate as a mercurial barometer.

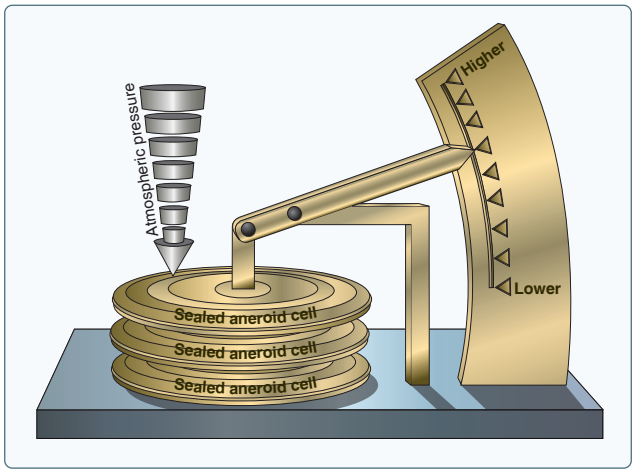

Figure 12-7. *Aneroid barometer.*

To provide a common reference, the International Standard Atmosphere (ISA) has been established. These standard conditions are the basis for certain flight instruments and most aircraft performance data. Standard sea level pressure is defined as 29.92 "Hg and a standard temperature of 59 °F (15 °C). Atmospheric pressure is also reported in millibars (mb), with 1 "Hg equal to approximately 34 mb. Standard sea level pressure is 1,013.2 mb. Typical mb pressure readings range from 950.0 to 1,040.0 mb. Surface charts, high and low pressure centers, and hurricane data are reported using mb.

Since weather stations are located around the globe, all local barometric pressure readings are converted to a sea level pressure to provide a standard for records and reports. To achieve this, each station converts its barometric pressure by adding approximately 1 "Hg for every 1,000 feet of elevation. For example, a station at 5,000 feet above sea level, with a reading of 24.92 "Hg, reports a sea level pressure reading of 29.92 "Hg. *[Figure 12-8]* Using common sea level pressure readings helps ensure aircraft altimeters are set correctly, based on the current pressure readings.

By tracking barometric pressure trends across a large area, weather forecasters can more accurately predict movement of pressure systems and the associated weather. For example, tracking a pattern of rising pressure at a single weather station generally indicates the approach of fair weather. Conversely, decreasing or rapidly falling pressure usually indicates approaching bad weather and, possibly, severe storms.

Altitude and Atmospheric Pressure

As altitude increases, atmospheric pressure decreases. On average, with every 1,000 feet of increase in altitude, the atmospheric pressure decreases 1 "Hg. As pressure decreases, the air becomes less dense or thinner. This is the equivalent of being at a higher altitude and is referred to as density altitude. As pressure decreases, density altitude increases and has a pronounced effect on aircraft performance.

Differences in air density caused by changes in temperature result in a change in pressure. This, in turn, creates motion in the atmosphere, both vertically and horizontally, in the form of currents and wind. The atmosphere is almost constantly in motion as it strives to reach equilibrium. These never-ending air movements set up chain reactions that cause a continuing variety in the weather.