

the unit might better have been defined by direct reference to the unit of length—as is done in the metric system—and not indirectly through the unit of weight. I may notice here that the unit of capacity is not the unit of volume, the *unit of volume* being a cubic yard. The unit of surface is a *square yard*. I have only one more unit to mention in connection with the Imperial system of weights and measures, this is the unit of money, the pound which is the value of the coin called the sovereign. This coin is made of standard gold which is composed of 11 parts by weight of pure gold to 1 part alloy. 40 lbs. Troy of this standard metal are coined into 1869 sovereigns, so that the sovereign contains a little over $123\frac{1}{4}$ (.274) grains of standard gold. The assertion that there is a very intimate connection between the motions of the heavenly bodies and the intrinsic value of a sovereign is thus fully borne out. I had intended to consider the units of *velocity, force, momentum, work* and some others, but I pass them over for the purpose of directing your attention briefly to the Metric or Modern French system of weights and measures.

The first suggestion of a change in the previous system dates back some hundreds of years, but until near the close of the last century no important progress towards this object had been made. In 1790 the French government made proposals to the British that an equal number of members from the Academy of Sciences and the Royal Society of London should meet in order to determine the length of the simple pendulum vibrating seconds in latitude 45° at the sea level, with a view to making this the unit of a new system of measures. This proposal, however, was unfavorably received, but the French government having undertaken the scheme was determined to carry it through and accordingly secured the appointment of a commission by

the Academy of Sciences, and three units were submitted to them, namely, the length of the pendulum, the fourth part of the equator and the fourth part of the meridian. The commissioners decided on the last of these as the one best suited to their purpose, resolving that the quadrant of the meridian lying between the equator and the pole, measured as along the surface of still water should be divided into ten million equal parts, and that one of these equal parts should be taken as the basis of the new system, and should be called a 'metre.' The measurement of that part of the meridian lying between Dunkirk and Barcelona was immediately undertaken and the result communicated to a committee of 20 members, 9 of whom were French, the others being deputed by the governments of Holland, Denmark, Spain and other European States. By this commission the length of the metre was found to be 443.29 Parisian lines, equivalent to 39.37 English inches, and a standard of it, being a rod of platinum, constructed and deposited among the French archives. The Metric system is a decimal system throughout, the subdivisions of the metre being tenths, hundredths and thousandths of the metre, and measures greater than the metre are either 10 or some power of 10 times the metre.

The unit of length being thus fixed upon, the units of weight and volume are made to depend upon it the same as in the English system but with some modifications of the conditions under which these units are derived. Thus the unit of weight is the weight of a cubic centimetre of distilled water at a temperature of 4° C., or about 39° F., if weighed in a vacuum. This temperature is taken because water is then heaviest or has its maximum density. The name given to this unit is the *gramme*. It will be noticed that in specifying this unit no mention is made of the pressure of the atmosphere, this