

8. Standards of Mass. We may define the *mass* of a body as the *quantity of matter* in it. According to our present views, matter may change its form, but it can never be destroyed. A lump of matter might be transported to any place in the universe but its mass would remain the same: it would still have the same quantity of matter in it.

There are two units of mass in ordinary use, namely, the *pound* and the *kilogram*.

The standard pound avoirdupois is a certain piece of platinum preserved in London, England, of the form shown in Fig. 4. The *grain* is $\frac{1}{7000}$ of the pound and the *ounce* is $\frac{1}{16}$ of the pound or 437.5 grains.



FIG. 4.—Imperial Standard Pound Avoirdupois. Made of platinum. Height 1.35 inches; diameter 1.15 inches. "P.S." stands for *parliamentary standard*.



FIG. 5.—Kilogram, made of an alloy of platinum and iridium. Height and diameter each 1.5 inches.

The original standard kilogram was also constructed of platinum, and it is still carefully preserved in Paris. It was intended to represent the mass of 1,000 c.c. (1 litre) of water when at its maximum density (at 4° C.). Thus 1 c.c. of water = 1 gram. Duplicate standard kilograms have been made for various nations out of the platinum-iridium alloy (Fig. 5).

The relation of the pound to the kilogram is officially stated thus:—

$$1 \text{ kilogram (kg.)} = 2.2046223 \text{ pounds avoirdupois,}$$

but, as before, in changing from metric to English measures we need not use so many decimal places.

We may take

$$1 \text{ kg.} = 2.20 \text{ pounds av.}; 1 \text{ gram} = 15.4 \text{ grains}; 1 \text{ oz. av.} = 28.3 \text{ grams.}$$

9. Unit of Time. If we reckon from the moment when the sun is on our meridian (noon), until it is on the meridian again, the interval is a *solar day*. But the solar days thus

7 3/4 days ...