In Fig. 3 is shown a comparison between centimetres and inches.

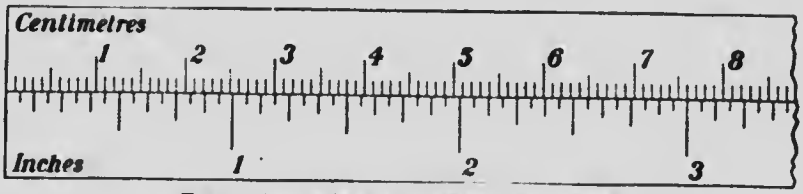

FIG. 3.—Comparison of inches and centimetres.

7. Units of Surface and Volume. The ordinary units of surface and volume (sq. yd., sq. cm., cu. ft., cu. metre, etc.) are at once deduced from the lineal units. The *litre* is a cubic decimetre and hence contains 1,000 cu. cm. As a unit of volume we also use the *imperial gallon*, which is defined to be the volume of 10 pounds of water at 62° F., which is found to be 277.274 cu. inches. (The U. S. or Winchester or wine gallon = 231 cu. in.)

The following relations are also useful :—

1 sq. yd. = 0.836 sq. m.	1 gal. = 4.546 litres.
1 cu. in. = 16.387 cu. cm.	1 litre = 1.76 quarts.

PROBLEMS.

1. How many millimetres in $2\frac{1}{2}$ kilometres?

2. Change 186,330 miles to kilometres. (Light travels 186,330 miles in 1 sec.).

3. How many sq. cm. in a rectangle 54 metres by 60 metres?

4. Change 760 mm. into inches.

5. Reduce 1 cubic metre to litres and to cubic centimetres.

6. Lake Superior is 602 feet above sea level. Express this in metres.

7. Dredging is done at 50 cents per cubic yard. Find the cost per cubic metre.

8. Air weighs 1.293 grams per litre. Find the weight of the air in a room 20 x 25 x 15 metres in dimensions.

9. Which is cheaper, milk at 7 cents per litre or 8 cents per quart?

10. The speed of sound, at 61° F., is 341 metres per second; express this in feet per second.

11. Express, correct to a hundreth of a millimetre, the difference between 12 inches and 30 centimetres.