We see at once that the number of cc. of gas is the same as the number of degrees on the absolute scale. Thus, we get a new enunciation for the

Law of Charles or of Gay-Lussac.—*The volume of a gas varies directly as its absolute temperature.*

Now, if we want to find out what the volume of a gas measured at one temperature will become if the temperature be changed, we proceed as follows: First, see that the temperatures are on the absolute scale (if expressed in Centigrade, add 273°); secondly, divide the volume of the gas by its original temperature to find what it would be at 1° Abs. and then multiply this by the new temperature.

EXAMPLE.—A gas measures 31 cc. at 18°C.; what will be its volume at 0°C.?

18°C. = 18° + 273° = 291° Abs. and 0°C. = 273° Abs.

31 ÷ 291 is what the volume will be at 1° Abs.

(31 ÷ 291) × 273, or 31 × $\frac{273}{291}$, is what it will be at 273° Abs. = 0°C.

Thus we see, that to reduce a volume from one pressure to another we multiply by a fraction made up of the old and new pressures; and for change in temperature, we use a fraction made up of the old and new temperatures (on the absolute scale). These corrections may be applied independently or both together. In applying these fractions, however, we must do so thoughtfully and not mechanically. Thus: A gas measures 927 cc. under a pressure of 775 mm. and at a temperature of 18°C. What will be its volume under standard conditions, at S.T.P. (*i.e.*, 760 mm. and 0°C.)? Suppose we are not sure of our equation and cannot remember whether we should multiply by $\frac{775}{760}$ or $\frac{760}{775}$. Think of it in this way: The pressure is to change from 775 to 760 mm., *i.e.*, is to become less; then the volume of the gas will become greater; so we must multiply by a fraction that will make it greater, *i.e.*, $\frac{775}{760}$. Similarly with the temperature: