a closed bottle the flame will soon be extinguished. (*a*). Why does not the candle continue to burn? (*b*). How is the composition of the air affected by the flame?"

(*a*). The flame of the candle is caused by the Oxygen of the air uniting with the Hydrogen and Carbon of the candle. This union produces sufficient heat to render some of the particles of Carbon incandescent, thus giving off light. Now, as soon as all the Oxygen of the air in the bottle has united with the elements of the candle the chemical combination ceases, therefore there is no more heat evolved and the candle ceases to burn.

(*b*). The composition of the air is affected by the flame of a candle as follows: the Oxygen is taken from the air and combines with the Hydrogen of the candle to form water, which is given off as aqueous vapor into the air; some of the Oxygen also unites with the Carbon to form Carbonic Dioxide, which passes into the air.

Q. 5.—(*a*). Explain the action of Hydric Chloride (HCl) on Calcic Carbonate. (*b*). If you pass Carbonic Acid over a layer of red hot charcoal it becomes converted into a combustible gas. Explain the reaction which takes place between the Carbonic Acid and the hot charcoal."

(*a*.) The Calcium of the Calcic Carbonate ($CaCO_3$) is replaced by the Hydrogen of the acid forming Hydric Carbonate (H_2CO_3) and Calcic Chloride ($CaCl_2$). The H_2CO_3 an unstable compound then splits up into water and Carbonic Dioxide. The following equation shows the reaction:

$$CaCO_3 + 2HCl = CaCl_2 + H_2CO_3 = CaCl_2 + H_2O + CO_2.$$

(*b*). The Carbonic Acid (CO_2) is reduced, giving up one atom of O to unite with the red hot charcoal to form Carbonic Oxide, according to the following equation:

$$CO_2 + C = 2CO.$$

And this CO burns with a bright blue flame.

Q. 6.—"Silica has no taste and does not act on blue litmus. Why do we call this substance Silicic Acid?"

Silica unites with bases to form Silicates, and in this respect exhibits the character of an acid. The hydrated solution of Silica has a feeble acid reaction, and might be regarded as the true Silicic Acid. Silica deserves no more the name of acid than Sulphuric Dioxide, Phosphoric Trioxide or Phosphoric Pentoxide, or Cl_2O or Cl_2O_3.

Q. 7. "If you heat common Salt with Hydric Sulphate (H_2SO_4) Hydric Chloride is given off. How many cubic centimetres of Hydric Chloride at O° cent, and 760 min. pressure could you liberate from a thousand grammes of Sodic Chloride?"

$NaCl + H_2SO_4 = NaHSO_4 + HCl$,
$NaCl = 23 + 35.5 = 58.5$ parts of Salt,
$HCl = 1 + 35.5 = 36.5$ parts of Hyd. Chloride,
hence we get 36.5 parts of Hydric Chloride from 58.5 parts of Salt ∴ from a thousand grammes of salt we would get $1000 \times \frac{10}{585} \times \frac{365}{10} = \frac{73000}{117}$ grams., but 11.2 litres of HCl weigh $\frac{36.5}{2} = 18.25$ at O° cent. and 760 min. pressure ∴ in $\frac{73000}{117}$ grammes we have $\frac{73000}{117} \times \frac{100}{1825} \times \frac{112}{10} = \frac{44,800}{117}$ litres $\frac{44800000}{117}$ C.C $= 382905\ \frac{115}{117}$ C.C.