carbon di-sulphide and somewhat elastic. If allowed to stand for a few hours it gradually becomes hard, changing into the crystalline form.

(*b*) There are two compounds of sulphur with hydrogen, their formulas being H_2S and H_2S_2. Only the first of this is of importance, the latter being very unstable, decomposing into H_2S and sulphur, and consequently difficult to prepare. Hydric sulphide H_2S is prepared by treating a metallic sulphide such as ferrous sulphide with sulphuric acid. The equation representing the preparation being $FeS + H_2SO_4 = FeSO_4 + H_2S$. H_2S is a gas, colorless, invisible, with a very offensive odor, somewhat soluble in water, density 17 ($H = 1$.) It is combustible in the air, the reaction resulting in the formation of water and sulphur dioxide if there is an excess of air, but if the supply of air is limited, the products are water, sulphur and probably some sulphur dioxide The gas is an acid, its hydrogen being replacable by a metal. It is much used in qualitative analysis.

(*c*) There are two compounds of sulphur with oxygen, sulphur dioxide and sulphur trioxide.

Sulphur dioxide is formed by the burning of sulphur, but in the laboratory it is prepared by heating together copper and strong sulphuric acid. Equations, $Cu + H_2SO_4 = CuSO_4 + 2H$. $2H + H_2SO_4 = 2H_2O + SO_2$

Combining these equations we have $Cu + 2H_2SO_4 = CuSO_4 + SO_4 + 2H_2O$.

SO_2 is a gas colorless, invisible, with a penetrating odor, soluble in water, with which it combines to form sulphurous acid; it is therefore an anhydride. Its density is 32 ($H=1$).

SO_2 is largely used as a bleaching agent, its action being that of a reducing agent.

Sulphur trioxide SO_3 is prepared by passing a mixture of sulphur dioxide and oxygen over finely divided platinum highly heated. It is a white solid with a strong affinity for water, with which it unites to form sulphuric acid.

6. (*a*.) The pressure on the sides of the vessel will vary directly as the absolute temperature.

∴ the pressure at 100° C. will be $700 \times {}^{373}/_{333} = 784.08$ m. m.

(*b*.) 10 litres of air 60° C. and 700 m m. becomes $10 \times {}^{273}/_{333} \times {}^{700}/_{760}$ litres under normal conditions.

11.2 litres of air, normal conditions, weigh 14 44 grams.

∴ $10 \times {}^{273}/_{333} \times {}^{700}/_{760}$ litres weigh.

$10 \times {}^{273}/_{333} \times {}^{700}/_{760} \times {}^{1444}/_{1120} = 9.73$ grams.

7. The solubility of ammonia may be shown by filling a Florence flask with the gas and inverting the flask over a vessel of water.

The basic character of ammonia is shown by passing the gas into a solution of red litmus.

That ammonia will burn when mixed with oxygen may be demonstrated by putting some ammonia hydrate in a test tube, passing a current of oxygen into the hydrate, and igniting the mixture as it issues from the tube. Heating the test-tube slightly will ensure the success of the experiment.

If some ammonia gas, say 20cc be put in an eudiometer over mercury, and a series of electric sparks be passed through the eudiometer the gas will gradually decompose, the resultant gases occupying 40cc. Now, if a quantity of oxygen be passed into the eudiometer and then an electric spark passed through the mixture of gases, an explosion occurs and it will be found that a small quantity of water is formed, therefore there must have been some hydrogen in the mixture, and if the residual oxygen that is in the eudiometer is removed the remaining gas will be found to be nitrogen. As a result of the explosion there is a decrease in volume of 45cc