Too much importance, however, should not be attached to the absolute amounts of gas found. When all the various manipulations to which the water sample is subjected have been taken intoaccount, there is seen to be considerable room for error, which in the present case might conceivably be as high as half a cubic centimetre. As regards the analysis of the sample of gas after it has been isolated, no such errors are to be feared. The most striking fact shown by the percentage composition of this gas is the deficiency of oxygen. In the water of the 19th it has almost completely disappeared, there being only 0·40 per cent., or not more than 0·06 c.c. per litre of water. In the others the percentage of oxygen was 16·31 per cent. on the 15th, and 23·24 per cent. on the 16th. It must be remembered that the waters collected on the 15th and 16th were both boiled on the 17th, so that while the water of the 16th had stood for twenty-four hours, that of the 15th had stood for forty-eight hours at a temperature of 80° F., but entirely out of contact with the air. Both of these samples were clear. That of the 19th was slightly opalescent, and was boiled on the 20th. Baryta water produced no turbidity in any of the waters. They all gave off ammonia on boiling with carbonate of soda, and frequently the addition of Nessler's reagent indicated its presence in the freshly collected water without heating. Solution of permanganate of potash was also reduced. These indications of the presence of organic matter were confirmed by the appearance of a fungoid growth in all the bottles after the lapse of a few days. It is not unlikely that the opalescence of the water of the 19th was due to the presence of this fungoid matter in greater quantity than in the others. It is certain that some very energetic reducing agent was present in this water, an agent which was capable of depriving it almost completely of its oxygen.

Returning to the consideration of the percentage composition of the gases, it is seen that side by side with the disappearance of oxygen there is production of carbonic acid. Neglecting the amount of carbonic acid which could be ascribed to absorption from the atmosphere, if the oxygen had been all used in the production of carbonic acid the sum of the volumes of the two gases should be equal to that of the oxygen originally present. According to Professor Dittmar a litre of distilled water at 24° C. absorbs from a dry atmosphere of 760 mm. 18·08 c.c. of air containing 33·6 per cent. oxygen and 66·4 per cent. nitrogen. In the Table (VII.) the results have been calculated, putting the nitrogen at 66·4 per cent. in each case, and reducing the amount of oxygen and carbonic acid in the same proportion, the deficiencies which come out are considerable, and vary from 4·46 to 10·74. The meaning of this is that from 5 to 10 per cent. of the air, or from 15 to 30 per cent. of the oxygen, has disappeared without producing an equivalent of carbonic acid. In the oxidation of organic matter some of it has no doubt been used in the formation of water, and it is possible that another part of it may have been utilised in the production of less perfectly oxidised substances, such as, for instance, oxalic acid or intermediate bodies of aldehydic nature.