

THE AIR OF OUR HOUSES.

BY FRANK T. SHUTT, M.A., F.I.S., F.C.S., 1ST VICE-PRESIDENT.

Delivered December 15th, 1892.

I have selected this subject, chiefly, for two reasons. First : although it is one of great importance, and has a vital interest for every one of us, widespread ignorance prevails regarding the grave danger to health from continuously breathing impure and vitiated air. Secondly : because it will form a fitting sequel to the lectures on Water and Food which I delivered on former occasions ' before this Club.

In pursuance of the course I adopted in those addresses, I propose to discuss the subject from the hygienic, as well as from the chemical, standpoint. My endeavour will be to point out the composition of pure, normal air ; the nature, sources, and amounts of impurities in vitiated air ; and the effects of these impurities upon the system.

THE ATMOSPHERE.

The atmosphere that surrounds our earth is composed, chiefly, of two elements—Oxygen and Nitrogen. These gases exist in the air, not as a chemical compound of the two, but in the free and uncombined condition. This can be easily and abundantly proved. I shall content myself, however, with telling you of a few of the reasons why air must be considered as a mechanical mixture of its constituents, and not a compound. The ratio, or proportion of the oxygen to the nitrogen in the air does not correspond to the ratio existing between these elements in any of the oxides of nitrogen, which are true chemical compounds. Neither the relative nor absolute amounts of the oxygen and nitrogen remain always the same and constant ; and it is a *sine qua non* that the ratio between the constituents of a chemical compound should be invariable. Again, water dissolves from air both oxygen and nitrogen, but owing to the greater solubility of the former and the laws of gas absorption, the proportion between them in the dissolved air is not that existing between them in the atmosphere. For instance :