so that for each molecule of the gaseous body passing outwards, a molecule of atmospheric air will pass inwards; and consequently under every circumstance of admixture, the bulk of gaseous matter existing in the bag will be the same. This is the simplest case of the diffusion of gaseous bodies, and will serve to give the reader some notion of that most remarkable phenomenon in its elementary form. Philosophers, as we have said, explain the phenomena of diffusion, by supposing that the molecules of any gas are *self-repulsive* or repel each other, in preference to the molecules of all other gases; so that each gas is, as it were, a vacuum to the other: and the mode in which this self-repulsive power may be imagined to operate, will be stated in a subsequent note. The case to be next considered is that in which the air-tight bag is supposed to contain some gaseous body, having a specific gravity *different* from atmospheric air; as for instance, hydrogen gas. In this case, on opening the stop-cock, the hydrogen in the bag, and the exterior atmospheric air will begin to commingle with a force and velocity proportional to the quantities of the gases diffused; and which quantities will be found to vary inversely as the square roots of the specific gravities of hydrogen gas and atmospheric air; that is to say, the volume of atmospheric air diffused inwards being supposed to be equal to 1, the volume of hydrogen diffused outwards will be equal to 3·8 nearly. These phenomena show that the velocity, or rate of diffusion of gaseous bodies has reference to their specific gravities.

Secondly. The law of diffusion of a gaseous body and a vapour is probably different from the law of the diffusion of two gaseous bodies; because the self-repulsive properties of the molecules of vapours and of gases are probably different. On the supposition that the velocities of diffusion between a gaseous body and a vapour, have reference to the specific gravities of the gaseous body and vapour, as is the case between two gaseous bodies; the velocity of diffusion of a vapour, (the vapour of water for instance), through air, must increase as the temperature diminishes; that is to say, as the specific gravity of