

The two essential component principles of atmospheric air are extremely different in their properties, and yet both are necessary in the economy of nature. The oxygen gas is the supporter of combustion, and is required for the sustenance of animal life, while on the other hand nitrogen is destructive to both. If a lighted taper be placed in a receiver inverted over water, it will be in a short time extinguished; and if the remaining gas be examined, it will be found that the whole of the oxygen has been expended in the combustion. In the same manner an animal confined in such a situation that it can only breathe a certain amount of air, will soon abstract all the oxygen, and will then die, being unable to breathe the nitrogen. This was the cause of the death of the miserable prisoners in the Black-hole of Calcutta; and of the two men who, some years since, went down in a diving-bell, and by an accident were unprovided with a fresh supply of air. And yet oxygen alone would be very unfit for respiration, for Dr. Higgins has stated that the pulse of a young man that beat 64 times in a minute was raised to 120, after he had inhaled oxygen gas for a short time. It would be equally unfit as the supporter of combustion, for all combustible bodies are burnt in it with so great a rapidity, and with such an intensity of light, that it would be exceedingly unsuited as an atmosphere. The nitrogen seems to neutralize in part, or rather to modify its effects, adapting combustion to our power of beholding it, and preventing a too violent circulation of the blood.

The atmosphere supports life by giving out oxygen and caloric to the blood. When the blood is brought into the lungs it is of a dark purple colour, but it then throws off the hydrogen and carbon, and receives oxygen, which gives it a bright red colour. By every inspiration a man of average size inhales from sixteen to twenty cubic inches of air. It was estimated by Allen and Pepys that 26.6 cubic inches of carbonic acid are given off every minute by a healthy man, but this is perhaps somewhat more than the truth. A portion of the nitrogen that is received by the lungs appears to be absorbed, while the other and larger part is rejected and thrown back again into the atmosphere, in which it immediately rises, being lighter than air. But this uncombined nitrogen gas would very soon accumulate, and prove detrimental to animal life, if there were not some provision for its recombination. This provision has been made in the constitutional