

nitrogen, are in a gaseous state, composing a mixture which may be detonated with a fresh addition of oxygen; and in this way all the hydrogen may be saturated with oxygen, and the nitrogen may be obtained as a final result of the process.

From a set of experiments thus conducted, the proportion of hydrogen to the nitrogen in ammonia was pretty uniformly 70·6 to 29·4; but there was some irregularity in the entire quantities of both, the highest results being as much as 200·6, and the lowest only 182 from 100 of alkaline gas; a difference which Dr. Henry cannot fully explain, but supposes it may arise from absorption of ammonia by mercury, and subsequent liberation by the shock.

The letter concludes with the mention of some experiments on the electrization of carburetted hydrogen, olefiant gas, carbonic oxide, and carbonic acid.

Carburetted hydrogen and olefiant gas were each expanded considerably in bulk; no carbonic acid was generated, but charcoal was deposited on the surface of the tube.

Carbonic acid was also partially decomposed by long electrization, and was converted into carbonic oxide and oxygen; and accordingly carbonic oxide underwent no change by the same operation.

Some Observations on the foregoing Paper of Dr. Henry. By Humphry Davy, Esq.

Mr. Davy, having lately had much occasion to pay particular attention to the electrization of ammonia during his researches on the decomposition of nitrogen, has observed various sources of error that may occur in the process, and may account for the difference between his results and those of Dr. Henry.

The first precaution that is to be taken, is to boil the mercury over which the decomposition is to be effected; next to prepare the gas in a separate vessel, and thence transfer it to the boiled mercury for electrization; for unless these precautions are taken, water contained in the mercury becomes the cause of that absorption of ammonia suspected by Dr. Henry, and by thus adding fresh ammonia during the process, occasions a fallacious result.

A second error may also be occasioned, when the mercury has not been boiled, by common air adhering to the sides of the tube.

In a late experiment, Mr. Davy obtained from 15 measures of ammonia 27 of permanent gases, consisting of 73 hydrogen and 27 nitrogen, agreeing so nearly with his original results of 74 to 26, that he conceives either of them to be more near the truth than Dr. Henry's estimate of $71\frac{1}{2}$ and $28\frac{1}{2}$.

With respect to Dr. Henry's attempt to prove the existence of oxygen in ammonia by the formation of water, Mr. Davy does not see much probability of success, as water existing in ammonia may elude any hygrometrical test. And although in his own electrization of ammonia the platina wires were tarnished, at the same time that the ammoniacal gas seemed to lose weight during decomposition, he

does not think the experiment conclusive, with regard to the existence of oxygen as an ingredient essential to the constitution of ammonia.

New analytical Researches on the Nature of certain Bodies, being an Appendix to the Bakerian Lecture for 1808. By Humphry Davy, Esq. Sec. R.S. Prof. Chem. R.I. [Phil. Trans. 1809, p. 450.]

Mr. Davy, having in the experiments described in the late Bakerian lecture, found that a quantity of nitrogen disappeared during the action of potassium on ammonia, and that it could not be made to resume its gaseous state but by the agency of oxygen in water, has been from that time much occupied in determining, with certainty, all the circumstances of the process; and though he cannot yet speak with precision as to the quantities, he thinks the general results decisive with respect to a decomposition of nitrogen having been effected.

When potassium is heated in ammoniacal gas, it becomes an olive-coloured fusible substance, losing all its metallic properties, a quantity of hydrogen is evolved, and ammonia disappears.

In the Bakerian lecture it was stated, that upon heating the olive-coloured substance a part of the ammonia is recovered; but when all moisture is carefully excluded, this quantity of ammonia does not amount to one tenth part of the quantity absorbed; and even this quantity appears to be owing to the almost unavoidable presence of moisture or oxygen.

In the present experiments, after taking all possible care to exclude moisture, since the glass of the vessels might possibly yield oxygen when in contact with potassium, a small tray of platina, containing the potassium intended to act upon the ammonia, was introduced into a retort containing the gas, and afterwards transferred expeditiously into a clean iron or platina tube made air tight, and furnished with a stop-cock.

In one experiment it was ascertained that $12\frac{1}{2}$ cubic inches of ammonia are decomposed by nine grains of potassium, and evolve $8\frac{1}{4}$ of hydrogen.

In a second experiment, instead of reserving the gas for experiment, an equal quantity of potassium was used, and immediately transferred into an iron tube. The tube being then filled with hydrogen, and connected with a mercurial apparatus, was heated gradually. The quantity of gas collected previously to its acquiring a red heat, amounted to $9\frac{1}{2}$ cubic inches, and four inches more were collected by raising the heat to whiteness. Of the former portion, about three fourths of an inch were ammonia; the remainder of the gas consisted of hydrogen and nitrogen, in the proportion of 8 to 3; so that the total quantity of hydrogen collected in this analysis, amounted to $16\frac{1}{2}$ inches, and the nitrogen to three cubic inches. If the same quantity of ammonia had been decomposed by electricity, it would have yielded 15 of hydrogen, and 6 or 7 of nitrogen; so