be observed in its preparation. It is much easier to prepare pure ether or chloroform than pure nitrous oxyd. It is sometimes difficult to obtain pure nitrate of ammonia. Here are two specimens, neither fit to be used as ordinarily directed. The gas prepared from this, by the ordinary process, produces a sense of suffocation, and tonic spasm of the muscles of the throat, and sometimes of the respiratory muscles these symptoms continuing with greater or less severity, in some cases for several days. The salt contains a soluble chloride. The other specimen which I show you does not contain a chloride, but when ordinarily used, yields a gas but little less suffocating than the former. The muscular spasm of the throat is not so continuous as in the former case, but quite as prolonged. Of course the experiments with such agents have been but few. The latter specimen yields pure nitrous oxyd, after about one-fourth of it has evaporated. (It is less difficult to obtain the pure salt now.—W)

But the use of a pure salt, by no means insures a pure gas. To obtain such a result, several conditions are to be observed. The nitrate is to be decomposed at the proper temperature; and this implies some reliable method of *regulating* the heat. In short, the apparatus should be automatic; for no one can regulate the heat properly on the basis of observation.

The thing to be aimed at is to decompose the nitrate so as to obtain only protoxyd of nitrogen and water, as indicated in this equation:

$$NH^3, NO^5 = 3HO + 2NO.$$

It is difficult, and perhaps impracticable, to obtain exactly this result, as below the the proper temperature the order of decomposition is not wholly as indicated by the equation, and of course, in reaching the proper degree of heat, this lower temperature has to be passed. For this reason, the heat should be rapidly raised from the melting point of the salt to the degree of proper decomposition.

By decomposing the nitrate at about 470 ° Fahrenheit, I have obtained the most satisfactory results; and any temperature between 465 ° and 480 ° will afford good gas, if proper care is taken in other respects.

By running the heat too high, a part of the nitrate is decomposed so as to yield binoxyd of nitrogen, sometimes called nitric oxyd, as indicated thus:

$$NH^3, NO^5 = 2NO^2 + HO + H^2.$$

As nitrous oxyd is formed at the same time, it and the free hydrogen