and although we can point to some animal substances of a very permanent character which contain nitrogen, nevertheless I am afraid we must admit that on the whole the subject of our lecture is a fickle and unreliable element. It is a constituent of almost every explosive, and these owe their effectiveness to the ease with which nitrogen and its associates part company and resolve themselves into gases, the sudden production and expansion of which fractures and ruins their environment, whatever that may be, unless properly confined or regulated. The chief raw material for the old explosive gunpowder was, as you know, saltpetre, but now, for the high explosives so-called, nitric acid is employed. The aim of the manufacturers of these new explosives, whose name is legion, is to get rid of all unnecessary constituents and employ only such as will resolve themselves completely into gas, and as much of that as can be produced. In place of sulphur and charcoal used of old in making gunpowder, cotton and various forms of cellulose, glycerine and even sugar have been substituted and nitrified or nitrised by nitric acid. In this way guncotton is produced as well as nitroglycerine. The latter substance is composed of C_2 H_5 N_3 O_9 and when exploded 2 molecules of it yield 6 of carbonic acid, 5 of water, 1 of nitrous oxide.and 4 of nitrogen, one part by bulk will yield on combustion.

554	volumes of	aqueous vapour
469	"	carbonic acid
39	"	oxygen
236	"	nitrogen

1298 volumes in all.

But M. Noble tells us that the heat set free by explosion causes the gases to expand to eight times their bulk ; so that one volume of nitroglycerine will yield 10,384 volumes of gas while one part by bulk of ordinary gunpowder yields only 800 volumes. Noble was not the discoverer of nitroglycerine. The first inventor was Sobrero, in 1847 while a student in the laboratory of Pelonze at Paris. Noble began its manufacture 15 years afterwards in 1862. From that sleep of 15 years it has awakened with such violence as almost to make people wish it had never been invented.