that will cause an ignitable mixture are shown in the table below. The quantity shown is the percentage by volume of air. If the fuel-air mixture is too lean or too rich, it will not ignite. The amounts shown are therefore called limits of inflammability.

		Gases (% by volume of air)
Fuel (Gas)	**Lower Limit**	**Upper Limit**
Water Gas Or Blue Gas	7.0	72
Natural Gas	4.7	15
Hydrogen	4.0	75
Acetylene	2«	81
Propane	2.2	10
Butane	1.9	9

Comments:

These fuels have been tested under laboratory conditions. They are effective. Ignition depends on method of initiation, uniformity of mixture, and physical conditions.

References:

Bulletin 29, Limits of Inflammability of Gases and Vapors H.F. Coward and G.W. Jones, Bureau of Mines, US Government Printing Office, 1939.

182.ANARCHY 'N' EXPLOSIVES - VOLUME 3 by Exodus

This is the MOST important or one of the most important volumes regarding the various mixtures of anarchy that I will be "publishing" to the "public". Also, it may as well be the MOST DANGEROUS to prepare, the substance we will be dealing with is Trinitrotoluene, or short - TNT. This high explosive is a VERY DANGEROUS, slightly unstable substance. The crystallized crude TNT is about the color of brown sugar and feels greasy to the touch. It is suitable for many uses as a high-explosive, but not for the use in high-explosive shells. It is also highly reactive to many other chemical substances. It can be incorporated into dynamite and many other explosives that will be explained in further detail later, in other volumes of ANARCHY.

WARNING:

DO NOT ATTEMPT TO FINISH THIS PROJECT UNLESS YOU ARE FULLY CAPABLE SAFELY EXECUTING THE PROCESSES IN A SAFE ENVIRONMENT! IF YOU CHOOSE TO CONTINUE, READ THE INSTRUCTIONS COMPLETELY THROUGH BEFORE BEGINNING AND HAVE ALL MATERIALS AND TOOLS (INCLUDING SAFETY/EMERGENCY EQUIPMENT) READY FOR USE WHEN OR IF THEY ARE NEEDED. THIS IS NOT A JOKE! USE AT YOUR OWN RISK!!!!!

Preparation of Trinitrotoluene (Three Stages). A mixture of 294 grams of concentrated sulfuric acid (density 1.84) and 147 grams of nitric acid (density 1.42) is added slowly from a dropping funnel to 100 grams of toluene in a tall 600-cc. beaker, while the liquid is stirred vigorously with an electric stirrer and it's temperature is maintained at 30øC to 40øC by running cold water in the vessel in which the beaker is standing. The addition of acid will require from an hour to an hour and a half. The stirring is then continued for half an hour longer without cooling; the mixture is allowed to stand over night in a separatory funnel; the lower layer of spent acid is drawn off; and the crude mononitrotoluene is weighed. One-half of it, corresponding to 50 grams of toluene, is taken for the dinitration. The mononitrotoluene (MNT) is dissolved in 109 grams of concentrated sulfuric acid (d. 1.84) while the mixture is cooled in running water. The solution in a tall beaker is warmed to 50øand a mixed acid, composed of 54« grams each of nitric acid (d. 1«0) and sulfuric acid (d. 1.84), is added slowly drop by drop from a dropping funnel while the mixture is stirred mechanically. The heat generated by the reaction raises the temperature, and the rate of addition of the acid is regulated so that the temperature of the mixture lies always between 90øand 100ø The addition of the acid will require about 1 hour. After the acid has been added, the mixture is stirred for 2 hours longer at 90ø100øto complete the nitration. Two layers separate on standing. The upper layer consists largely of dinitrotoluene (DNT), but probably contains a certain amount of TNT. The trinitration in the laboratory is conveniently carried out without separating the DNT from the spent acid.

While the dinitration mixture is stirred actively at a temperature of about 90ø 145 grams of fuming sulfuric acid (petroleum containing 15% free SO3) is added slowly by pouring from a beaker. A mixed acid, composed of 72« grams each of nitric acid (d. 1«0) and the 15% petroleum, is now added drop by drop with good agitation while the heat of the reaction maintains the temperature at 100-115ø After about three-quarters of the acid has been added, it will be found necessary to apply external heat to maintain the temperature. After all the acid has been added (taking 1 « to 2 hours), the heating and stirring are continued for 2 hours longer at 100-115ø After the material has stood overnight, the upper TNT layer will be found to have solidified to a hard cake, and the lower layer of spent acid to be filled with cdata bstals. The acid is filtered through a Buchner funnel (without filter paper), and the cake is broken up and washed with water on the same filter to remove excess of acid. The spent acid contains considerable amounts of TNT in solution; this is precipitated by pouring the acid into a large volume of water, filtered off, rinsed with water, and added to the main batch. All the of the product is washed three or four times by agitating it vigorously with hot water under which it is melted. After the last washing, the TNT is granulated by allowing it to cool slowly under hot water while the stirring is continued. The product, filtered off and dried at ordinary room temperature, is equal to a good commercial sample of crude TNT. It may be purified by dissolving in warm alcohol at 60øand allowing to cool slowly, or it may be purified by digesting with 5 times its weight of 5% sodium hydrogen sulfite solution at 90øfor half an hour with vigorous stirring, washing with hot water until the washings are colorless, and finally