
The complete(?) IMPROVISED KITCHEN

I'm still in search of "KITCHEN IMPROVISED FERTILIZER EXPLOSIVES" by Tim Lewis (i suppose...)
so plz guys, if you own it - scan it, upload it somewhere, post it in [the forum](#)...

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KITCHEN IMPROVISED PLASTIC EXPLOSIVES

by Tim Lewis

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FOREWARD

In a nation of free people, the right to know and the freedom of information are essential to the evolution of freedom. This knowledge should never be curtailed. I advise my fellow Americans to be watchdogs looking and fighting the coming regulation of such knowledge. This loss will mark the reduction of our freedoms and liberties that our forefathers sought to obtain for their descendants. In a police state, this regulation is another way to control the people. It saddens me greatly to see the youth of our great nation lose the desire for knowledge. This knowledge is the only way that we as Americans can ever even hope to keep our freedom. You can bet that this book would never be published or even available in the Soviet Union. This book can be the beginning of low cost blasting, demolition and explosives as well as many new manufacture applications.

I hope and pray that this information is never used to kill innocent people. It is the lowest form of life that kills innocent people with a randomly placed bomb. These people should die the most horrible death imaginable when convicted, but the sad part is that usually they are never caught.

If the world is ever caught in the grips of a nuclear war perhaps this information will help the survivors "get by" and hammer a new society out of the ashes. I hope and pray this will never happen and God will give the leaders of our great country the wisdom to somehow lead us away from a nuclear holocaust. Hey Saddam, are you listening? I hope that you enjoy this book!!!

WARNING !!!

The procedures in this book can be dangerous. The compounds produced in these procedures are or can be dangerous. The actual manufacture of explosives is illegal and classified as a felony. These processes are given as information and information only! The actual use of this information by persons not familiar with proper laboratory procedures and safety can be dangerous if not fatal. Students of explosives should obtain a good college level chemistry book and laboratory procedure handbook. Reasonable care has been used in the compilation of this book and this information has been presented for its educational value only. Due to the nature of these explosive compounds, neither the publisher or the author can or will accept any responsibility for this info and its subsequent use. All responsibility is assumed by the reader!

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CHAPTER 1 - AMERICAN PLASTIQUE EXPLOSIVES

Since the first part of WWII, the armed forces of the United States has been searching for the perfect plastique explosives to be used in demolition work. This search led to the development of the C composition plastique explosives. Of this group, C-4 being the latest formulation that has been readily adopted by the armed forces. This formulation was preceded by C-3, C-2, and composition C.

In this chapter we will cover all of these explosives in their chronological progression as they were developed and standardized by the armed forces. All of these explosives are cyclonite or R.D.X. base with various plastisizing agents used to achieve the desired product. This plastisizer usually composes 7 - 20 % of the total weight of the plastique. The procedure for the manufacture of R.D.X. will be given at the end of this chapter.

All of these explosives are exceedingly powerful and should be used with the utmost care (detonation velocity from 7700 - 8200M/sec.). All of these C composition plastique explosives are suitable for and usually the explosives of choice for all demolition work using shaped charges, ribbon charges, and steel cutting charges. All these explosives are relatively easy to detonate with a #6 blasting cap, but as with all explosive charges the highest efficiency is obtained through the use of a booster in conjunction with the blasting cap.

COMPOSITION 'C' - This explosive is just a copy of a British explosive that was adopted early in WWII. This explosive is the 'C' explosive of choice for home manufacture due to its ease of manufacture and the more easily obtained compound. This explosive was available in standard demolition blocks. The explosive was standardized and adopted in the following composition:

R. D. X.	88.3 %
Heavy Mineral Oil	11.1 %
Lecithin	0.6 %

In this composition, the lecithin acts to prevent the formation of large crystals of R.D.X. which would increase the sensitivity of the explosive. This explosive has a good deal of power. It is relatively non - toxic except if ingested and is plastic from 0-40 deg. C.. Above 40 deg., the explosive undergoes extrudation and becomes gummy although its

explosive properties go relatively unimpaired. Below 0 deg. C., it becomes brittle and its cap sensitivity is lessened considerably. Weighing all pros and cons, this is the explosive of choice for the kitchen explosives factory due to the simple manufacture of the plastic compound.

Manufacturing this explosive can be done in two ways. The first is to dissolve the 11.1 % plasticizing in unleaded gasoline and mixing with the R. D. X. and then allowing the gasoline to evaporate until the mixture is free of all gasoline. All percentages are by weight. The second method is the fairly simple kneading of the plasticizing compound into the R.D.X. until a uniform mixture is obtained. This explosive should be stored in a cool dry place. If properly made, the plastic should be very stable in storage, even if stored at elevated temperatures for long periods of time. It should be very cap sensitive as compared to other military explosives. With this explosive, as mentioned earlier, a booster will be a good choice, especially if used below 0 deg. C.. The detonation velocity of this explosive should be around 7900 M/sec..

COMPOSITION C-2 - Composition C-2 was developed due to the undesirable aspects of composition 'C'. It was formerly used by the United States armed forces, but has been replaced by C-3 and C-4. Its composition is much the same as C-3 and its manufacture is the same also.

I won't go into much detail on this explosive because of its highly undesirable traits. It is harder to make than C-4 and is toxic to handle. It also is unstable in storage and is a poor choice for home explosives manufacture. It also has a lower detonation velocity than either C-4 or C-3. But for those of you that are interested, I will give the composition of this explosive anyway. It is manufactured in a steam jacketed (heated) melting kettle using the same procedure used in incorporation of C-3. Its composition is as follows:

R.D.X.	80 %
(Equal parts of the following):	
Mononitrotolulene	
Dinitrotolulene	
T.N.T. guncotton	
Dimethylformide	20 %

COMPOSITION C-3 - This explosive was developed to eliminate the undesirable aspects of C-2. It was standardized and adopted by the military as the following composition:

R. D. X.	77 %
Mononitrotolulene	16 %
Dinitrotolulene	5 %
Tetryl	1 %
Nitrocellulose	1 %

C-3 is manufactured by mixing the plasticizing agent in a steam jacketed melting kettle equipped with a mechanical stirring attachment. The kettle is heated to 90-100 deg. C. and the stirrer is activated. Water wet R.D.X. is added to the plasticizing agent and the stirring is continued until a uniform mixture is obtained and all water has been driven off. Remove the heat source but continue to stir the mixture until it has cooled to room temperature. This explosive is as sensitive to impact as is T.N.T.. Storage at 65 deg. C. for four months at a relative humidity of 95% does not impair its explosive properties. C-3 is 133% as good as an explosive as is T.N.T.. The major drawback of C-3 is its volatility which causes it to lose 1.2% of its weight although the explosive's detonation properties are not affected. Water does not affect the explosive's performance. It therefore is very good for U.D.T. uses and would be a good choice for these applications. When stored at 77 deg. C., considerable extrudation takes place. It will become hard at -29 deg. C. and is hard to detonate at this temperature. While this explosive is not unduly toxic, it should be handled with utmost care as it contains aryl-nitro compounds which are absorbed through the skin. It will reliably take detonation from a #6 blasting cap but the use of a booster is always suggested. This explosive has a great blast effect and was and still is available in standard demolition blocks. Its detonation velocity is approximately 7700 M / sec..

COMPOSITION C-4 C-4 was developed because of the hardening and toxicity that made C-3 unreliable and dangerous due to the dinitrotolulene plasticizer. The following composition is the standardized plastic explosive as adopted by the armed forces:

R. D. X.	91.0 %
Polyisobutylene	2.1 %
Motor Oil	1.6 %

Di-(2-ethylhexyl)sebecate 5.3 %

The last three ingredients are dissolved in unleaded gasoline. The R.D.X. explosive base is then added to the gasoline-plasticizer and the resultant mass is allowed to evaporate until the gasoline is completely gone (this can be done quickly and efficiently under a vacuum). The final product should be dirty white to light brown in color. It should have no odor and have a density of 1.59 gm/cc. It does not harden at -57 deg. C. and does not undergo extrusion at 77 deg. C.. It can be reliably detonated with a #6 blasting cap. The bristance of this explosive (ability to do work or fragment ordinance) is 120 % greater than T.N.T.. C-4 is the best plastique explosive available in the world and probably will remain so for quite some time. This is the #1 demolition explosive in the world and if you've never seen this stuff used it is absolutely amazing. The detonation velocity of C-4 is 8100 M/sec..

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CHAPTER 2 - R.D.X. MANUFACTURE

Cyclotrimethylenetrinitramine or cyclonite is manufactured in bulk by nitration of hexamtehlenetetramine (methenamine, hexamine, tec.) with strong red 100 % nitric acid. The hardest part of this reaction is obtaining this red nitric acid. It will most likely have to be made. More on this later. The hexamine or methenamine can usually be bought in bulk quantities or hexamine fuel bars for camp stoves can be used, but they end up being very expensive. To use the fuel bars they need to be powdered before hand. The hexamine can also be made with common ammonia water (5 %) and the commonly available 37% formaldehyde solution. To make this component, place 400 g. of clear ammonia water in a shallow pyrex dish. To this add 54 g. of the formaldehyde solution to the ammonia water. Allow this to evaporate and when the crystals are all that remains in the pan, place the pan in the oven on the lowest heat that the oven has. This should be done only for a moment or so to drive off any remaining water. These crystals are scraped up and plaecd in an airtight jar to store them until they are to be used.

To make the red nitic acid, you will need to buy a retort with a ground glass stopper. In the retort, place 32 grams of sulfuric acid (98-100%) and to this add 68 g. of potassium nitrate or 58 g. of sodium nitrate. Gently heating this retort will generate a red gas called nitrogen trioxide. This gas is highly poisonous and this step as with all other steps should be done with good ventilation. This nitric acid that is formed will collect in the neck of the retort and form droplets that will run down the inside of the neck of the retort and should be caught in a beaker cooled by being surrounded by ice water. This should be heated until no more collects in the neck of the retort and the nitric acid quits dripping out of the neck into the beaker. This acid should be stored until enough acid is generated to produce the required size batch which is determined by the person producing the explosive. Of course the batch can be bigger or smaller but the same ratios should be maintained.

To make the R.D.X., place 550 g. of the nitric acid produced by the above procedure in a 1000 ml beaker in a salted ice bath. 50 g. of hexamine (methenamine) is added in small portions making sure that the temperature of the acid does not go above 30 deg. C.. This temperature can be monitored by placing a thermometer directly in the acid mixture. During this procedure, a vigorous stirring should be maintained. If the temperature approaches 30 deg. C., immediately stop the addition of the hexamine until the temperature drops to an acceptable level. After the addition is complete, continue the stirring and allow the temperature to drop to 0 dcg. C. and allow it to stay there for 20 minutes continuing the vigorous stirring. After the 20 minutes are up, pour this acid - hexamine mixture into 1000 ml of finely crushed ice and water. Crystals should form and are filtered out of the liquid. The crystals that are filtered out are R. D. X. and will need to have all traces of the acid removed. To remove the traces of acid, first wash these crystals by putting them in ice water and shaking and refiltering. These crystals are then placed in a little boiling water and filtered. Place them in some warm water and check the acidity for the resultant suspension with litmus paper. You want them to read between 6 and 7 on the Ph scale (E. Merik makes a very good paper) and it accurate and easy to read. If there is still acid in these crystals, reboil them in fresh water until the acid is removed, checking to see if the litmus paper reads between 6 and 7. Actually the closer to 7 the better. To be safe, these crystals should be stored water wet until ready for use. This explosive is much more powerful than T.N.T.. To use, these will need to be dried for some manufacture processes in this book. To dry these crystals, place them in a pan and spread them out and allow the water to evaporate off them until they are completely dry. This explosive will detonate in this dry form when pressed into a mold to a density of 1.55 g./cc at a velocity of 8550 M./sec..

COMPARISON OF DETONATION VELOCITY

M/sec	TNT	RDA	Comp C	C-2	C-3	C-4
8600						
8500	***					
8400	***					
8300	***					
8200	***					
8100	***					
8000	***	***				
7900	***	***	***			
7800	***	***	***	***		
7700	***	***	***	***	***	
7600	***	***	***	***	***	
7500	***	***	***	***	***	
7400	***	***	***	***	***	
7300	***	***	***	***	***	
7200	***	***	***	***	***	
7100	***	***	***	***	***	
7000	***	***	***	***	***	***
6900	***	***	***	***	***	***

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CHAPTER 3 - FOREIGN PLASTIQUE EXPLOSIVES

Italian Plastique Explosives - During World War II, the Italian military adopted R.D.X. and P.E.T.N. as their standard explosive. Naturally then their plastique explosive are R.D.X. based. Their explosive suits itself very well to home manufacture. It is mixed together by kneading the components together until a uniform mixture is obtained. This explosive is composed of the following:

R.D.X. 78.5 %
 Nitroglycerin or
 Nitroglycol 17.5 %
 Petroroleum Jelly 4.0 %

This is a very powerful explosive composition as are most that contain R.D.X. Its major drawback is toxicity. Since it contains nitroglycerin or glycol, these components can be absorbed through the skin. These are cardiovascular dilators and handling them will give the most intense headaches and are poisonous. Therefore, skin contact should be avoided. This explosive is almost as powerful as C-4 and will work very well. It is equivalent to C-3 in power and can be considered its equivalent in charge computation. It is less toxic than C-3 and a little more plastic. Its detonation velocity is approximately 7800 M/sec.

OSHITSUYAKA JAPANESE PLASTIQUE EXPLOSIVE - An explosive that will lend itself to home manufacture is this explosive that was used by the Japanese in WWII. It is an explosive that was used in ribbon charges and demolition rolls. Of course, the main ingredient is R.D.X. which, composes most of the explosives weight. This being a plastique explosive with a wax plastisizer is limited in the temprature that can be used. These properties can be improved on somewhat by the substitution of short fiber grease (wheel bearing grease) or bees wax for part of them percentage of wax. Their composition is as follows:

R.D.X. 80 %
Wax (1/2 wax, 1/2 wheel bearing grease) 20 %

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CHAPTER 4 - PLASTIQUE EXPLOSIVE FROM BLEACH

This explosive is a potassium chlorate explosive. This explosive and explosives of similar composition were used in World War I as the main explosive filler in grenades, land mines, and mortar rounds used by French, German and some other forces involved in that conflict. These explosives are relatively safe to manufacture. One should strive to make sure these explosives are free of sulfur, sulfides, and picric acid. The presence of these compounds result in mixtures that are or can become highly sensitive and possibly decompose explosively while in storage. The manufacture of this explosive from bleach is given just as an expedient method. This method of manufacturing potassium chlorate is not economical due to the amount of energy used to boil the solution and cause the 'dissociation' reaction to take place. This procedure does work and yields a relatively pure and a sulfur, sulfide free product. These explosives are very cap sensitive and require only a #3 cap for instigating detonation. To manufacture potassium chlorate from bleach (5.25% sodium hypochlorite solution) obtain a heat source (hot plate, stove etc.) a battery hydrometer, a large pyrex or enameled steel container, (to weigh chemicals), and some potassium chloride (sold as salt substitute). Take one gallon of bleach and place it in the container and begin heating it. While this solution heats, weigh-out 63 G. potassium chloride and add this to the bleach being heated. Bring this solution to a boil and boil until when checked with a hydrometer, the reading is 1.3 (if a battery hydrometer is used it should read full charge).

When the reading is 1.3, take the solution and let it cool in the refrigerator until it is between room temperature and 0 deg. C.. Filter out the crystals that have formed and save them. Boil the solution again until it reads 1.3 on the hydrometer and again cool the solution. Filter out the crystals that are formed and save them. Boil this solution again and cool as before. Filter and save the crystals. Take these crystals that have been saved and mix them with distilled water in the following proportions: 56 G. per 100 ml. distilled water. Heat this solution until it boils and allow it to cool. Filter the solution and save the crystals that form upon cooling. The process of purification is called fractional crystallization. These crystals should be relatively pure potassium chlorate. Powder these to the consistency of face powder (400 mesh) and heat gently to drive off all moisture. Melt five parts vaseline and five parts wax. Dissolve this in white gasoline (camp stove gasoline) and pour this liquid on 90 parts potassium chlorate (the crystals from the above operation) in a plastic bowl. Knead this liquid into the potassium chlorate until intimately mixed. Allow all the gasoline to evaporate. Place this explosive in a cool dry place. Avoid friction and sulfur, sulfides and phosphorous compounds. This explosive is best molded to the desired shape and density (1.3 g./cc) and dipped in wax to water proof. These block type charges guarantee the highest detonation velocity. This explosive is really not suited to use in shaped charge applications due to its relatively low detonation velocity. It is comparable to 40% ammonia dynamite and can be considered the same for the sake of charge computation. If the potassium chlorate is bought and not made, it is put into the manufacture process in the powdering stages preceding the addition of the wax-vaseline mixture. This explosive is brilliant and powerful. The addition of 2 - 3 % aluminum powder increases its blast effect. Detonation velocity is 3300 M/sec.

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CHAPTER 5 - PLASTIC EXPLOSIVE FROM SWIMMING POOL CHLORINATING COMPOUND (H.T.H.)

This explosive is a chlorate explosive from bleach. This method of production of potassium or sodium chlorate is easier and yields a more pure product than does the plastique explosive from bleach process. In this reaction the H.T. H. (calcium hypo-chlorate - CaClO) is mixed with water and heated with either sodium chlorate (table salt, rock salt) or potassium chloride (salt substitute). The latter of these salts is the salt of choice due to the easy crystallization of the potassium chlorate. This mixture will need to be boiled to ensure complete reaction of the ingredients. Obtain some H.T.H. swimming pool chlorination compound or equivalent (usually 65% calcium hypochlorite). As with the bleach is also a dissociation reaction. In a large pyrex glass or enameled steel container place 1200 g. H.T.H. and 220 G. potassium chloride or 159 g. sodium chloride. Add enough boiling water to dissolve the powder and boil this solution. A chalky substance (calcium chloride) will be formed. When the formation of this chalky substance is no longer formed, the solution is filtered while boiling hot. If potassium chloride was used, potassium chlorate will be formed. This potassium chlorate will drop out or crystallize as the clear liquid left after filtering cools. These crystals are filtered out when the solution reaches room temperature. If the sodium chloride salt was used this clear filtrate (clear liquid after filtration) will need to have all water evaporated. This will leave crystals which should be saved.

These crystals should be heated in a slightly warm oven in a pyrex dish to drive off all traces of water (40 - 75 deg.C.). These crystals are ground to a very fine powder (400 mesh). If the sodium chloride salt is used in the initial step, the crystallization is much more time consuming. The potassium chloride is the salt to use as the resulting product will crystallize out of solution as it cools. The powdered and completely dry chlorate crystals are kneaded, together with vaseline in plastique bowl. ALL CHLORATE BASED EXPLOSIVES ARE SENSITIVE TO FRICTION, AND SHOCK, AND THESE SHOULD BE AVOIDED. If sodium chloride is used in this explosive, it will have a tendency to cake and has a slightly lower detonation velocity. This explosive is composed of the following:

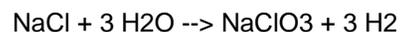
Potassium or sodium chlorate 90 %
Vaseline 10 %

The detonation velocity can be raised to a slight extent by the addition of 2 - 3 % aluminum powder substituted for 2 - 3 % of the vaseline. The addition of this aluminum will give this explosive a bright flash if set off at night which will ruin night vision for a short while. The detonation velocity of this explosive is approximately 3200 M/sec. for the potassium salt and 2900 M/sec. for the sodium salt based explosive.

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CHAPTER 6 - PLASTIQUE EXPLOSIVE FROM TABLE SALT

This explosive is perhaps the most easily manufactured of the chlorate based explosives. Sodium chlorate is the product because rock salt is the major starting ingredient. This process would work equally as if potassium chlorate were used instead of the sodium chloride (rock salt). The sodium chlorate is the salt I will cover due to the relatively simple acquisition of the main ingredient. The resulting explosive made from this process would serve as a good cheap blasting explosive and will compare favorably with 30 % straight dynamite in power and blasting efficiency. This explosive can be considered the same as 30 % straight dynamite in all charge computation. These explosives and similar compositions were used to some extent in World War I by European forces engaged in conflict. It was used as a grenade and land mine filler. Its only drawback is its hygroscopic nature (tendency to absorb atmospheric moisture). These explosives also have a relatively critical loading density. These should be used at a loading density of 1.3 g./cc. If the density is not maintained, unreliable or incomplete detonation will take place. These shortcomings are, easiily overcome by coating the finished explosive products with molten wax and loading this explosive to the proper density. This explosive is not good for shaped charge use due to it's low detonation rate (2900 M/sec.). The major part of the manufacture of this explosive from rock salt is the cell reaction where D.C current changes the sodium chloride to chlorate by adding oxygen by electrolysis of a saturated brine solution. The reaction takes place as follows:



In this reaction the sodium chloride (NaCl) takes the water's oxygen and releases its hydrogen as a gas. This explosive gas must be vented a ways as sparks or open flame may very well cause a tremendous explosion. This type of process or reaction is called a 'cell' reaction. The cell should be constructed of concrete or stainless steel. I won't give any definite sizes on the cell's construction because the size is relative to the power source. This cell would have to be large enough to allow the brine to circulate throughout the cell to insure as uniform a temperature as possible.

The speed of the reaction depends on two variables. Current density is a very important factor in the speed of the reaction. The advantages of high current densities are a faster and more efficient reaction. The disadvantages are that cooling is needed to carry away excess heat and the more powerful power sources are very expcnsive. For small operations, a battery charger can be used (automotive). This is the example I will use to explain the cell's setup and operation (10 amp /, 12 volt). The current density at the anode (+) and cathode (-) are critical. This density should be 50 amps per square foot at the cathode and 30 amps per square foot at the anode. For a 10 amp battery charger power source, this would figure out to be 5 5/16" by 5 5/16" for the cathode. The anode would be 6 15/16" by 6 5/16". The anode is made of graphite or pressed charcoal and the cathode is made of steel plate (1/4"). These would need to be spaced relatively close together. This spacing is done with some type of non-conducting material such as glass rods. This spacing can be used to control the temperature to some extent. The closer together they are, the higher the temperature. These can be placed either horizontally or vertically although vertical placement of the anode and cathode would probably be the ideal set up as it would allow the hydrogen to escape more readily. The anode would be placed at the bottom if placed horizontally in the cell so that the chlorine released could readily mix with the sodium hydroxide formed at the cathode above it. As the current passes through, the cell chlorine is released at the anode and mixes with the sodium hydroxide formed at the cathode. Hydrogen is released at the cathode which should bubble out of the brine. This gas is explosive when mixed with air and proper precautions should be taken. **PROPER VENTILATION MUST BE USED WITH THIS OPERATION TO AVOID EXPLOSION.**

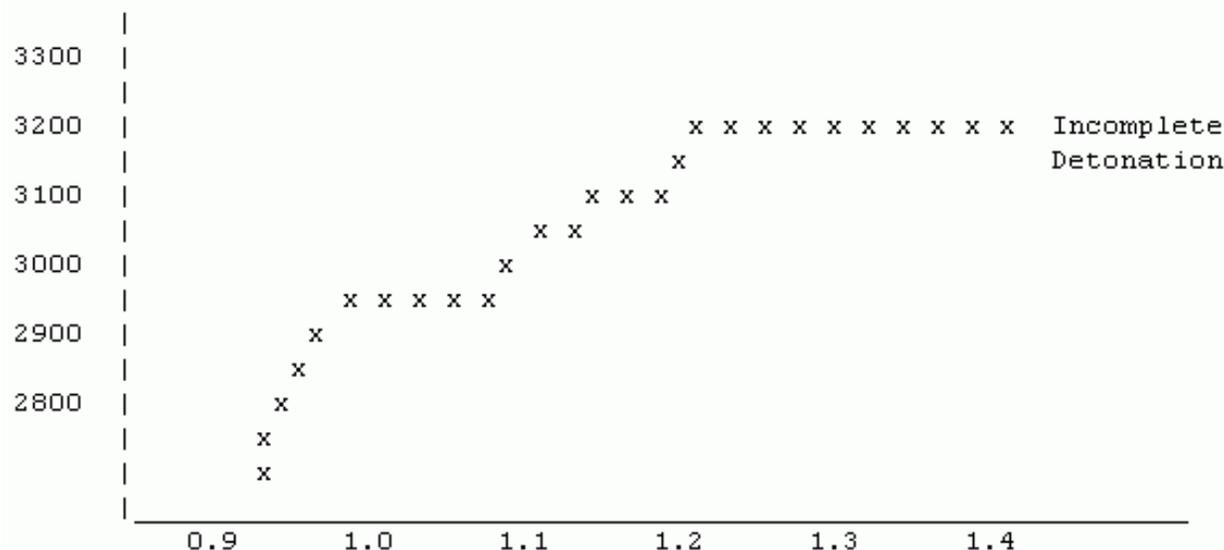
Temperature control is left up to the builder of the cell. The temperature of the cell should be maintaincd at 56 degrees C. during the reaction. This can be done by the circulation of water through the cell in pipes. But the easiest way would be to get an adjustable thermostatic switch adjusted to shut the power source off until the cell cools off. This temperature range could be from 59 degree shut off to a 53 degree start up. An hour meter would be used on the power source to measure the amount of time the current passes through the cell. If the water-cooling coil design appeals to the manufacturer and an easily obtained cheap source of cool or cold water is available, this would be the quickest design to use. Again a thermostatic type arrangement would be used to meter the cold cooling water through the cell. The cooling coils would best be made of stainlcss steel to overcome the corrosiveness of the salts although this is not entirely necessary. A thermostatic valve would be set to open when the brine electrolyte was heated above approximately 58 deg C. and set to close when the temperature fell to approximately 54 deg C.. Again this would be the best and most efficient method and the waste heat could be used relatively easily to heat either a house or perhaps even a barn or shop.

To run the cell, after the cell has been constructed and the concrete has been sealed and has set and cured for several weeks, is very simple. First, to seal the concrete I suggest Cactus Paint's CP 200 series, two componant epoxy paint or an equivalent product. To fill the cell, place 454 g. sodium chloride in thc cell (rock salt is excellent here). Place four liters of distilled water into the cell with the salt. The liquid should cover the anode and the cathode completely with room to spare. Remember that some of the water will be used in the reaction. Thirty three grams of muratic acid, which should be available from a swimming pool supply store is then added to the liquid in the cell. Be careful when handling any acid !!! Then seven grams of sodium dichromate and nine grams of barium chloride is added. The cell is then ready to run if the plates are connected to their respective cables. These cables are best made of stainless steel (the most corrosion resistant available). The power supply is then hooked up and the cell is in operation. The power is best hooked up remotely to lessen the chance of explosion. Any time the cell runs it will be making hydrogen gas. **THIS GAS IS**

EXPLOSIVE WHEN MIXED WITH AIR AND ALL SPARKS, FLAME, AND ANY SOURCE OF IGNITION SHOULD BE KEPT WELL AWAY FROM THE CELL. THIS CELL SHOULD ONLY BE RUN WITH ; VERY GOOD VENTILATION. The steel plate cathode should be hooked to the negative side of the power source and the anode hooked to the positive side. Again these are hooked to the power supply via stainless steel cables. This cell is then run at the proper temperature until 1800 amp hours pass through (amount per pound of sodium chloride) the electrolyte. The liquid in the cell is then removed and placed in an enameled steel container and boiled until crystals form on liquid. It is cooled and filtered, the crystals collected being saved. This is done twice and the remaining liquid saved for the next cell run. The process will become easier as each run is made. It is a good idea to keep records on yields and varying methods to find out exactly the best process and yield. To purify these crystals place 200 grams in 100 ml distilled water. Boil the solution until crystals are seen on the surface. Let cool and filter as before. Save this liquid for the next cell run. These purified crystals are placed in a pyrex dish and placed in the oven at 50 deg C. for two hours to drive off all remaining water.

The explosive is ready to be made. The crystals of sodium chlorate are ground to a powder of face powder consistency. Ninety grams of this sodium chlorate are kneaded with 10 grams of vaseline until a uniform mixture is obtained. This explosive is sensitive to shock, friction, and heat. These should be avoided at all cost. This explosive works best at a loading density of 1.3-1.4 g./cc. If this explosive is not used at this density, the detonation velocity will be low and detonation will be incomplete. To load to a known density measure the volume of the container in which the explosive is to be loaded. This can be done by pouring water out of a graduated cylinder until the container is filled. The total number of ml will equal the cc's of the container. Multiply this number times 1.3 and load that much explosive (in grams of course) into the container after the container has been dried of all water. This procedure should be used with all chlorate explosives (plastique explosive from bleach, plastique explosive from H.T. H.). This explosive is cheap and relatively powerful and is a good explosive.

DETONATION VELOCITY VS. LOADING DENSITY



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CHAPTER 7 - PLASTIQUE EXPLOSIVES FROM ASPIRIN

This explosive is a phenol derivative. It is toxic and explosive compounds made from picric acid are poisonous if inhaled, ingested, or handled and absorbed through the skin. The toxicity of this explosive restricts its use due to the fact that over exposure in most cases causes liver and kidney failure and sometimes death if immediate treatment is not obtained. This explosive is a cousin to T.N.T. but is more powerful than its cousin. It is the first explosive used militarily and was adopted in 1888 as an artillery shell filler. Originally this explosive was derived from coal tar but thanks to modern chemistry, you can make this compound easily in approximately 3 hours from acetylsalicylic acid (purified aspirin).

This procedure involves dissolving the acetylsalicylic acid in warm sulfuric acid and adding sodium or potassium nitrate which nitrates the purified aspirin and the whole mixture drowned in water and filtered to obtain the final product. This explosive is called mtrinitrophenol. Care should be taken to ensure that this explosive is stored in glass containers. Picric acid will form dangerous salts when allowed to contact all metals except tin and aluminum. These salts are primary explosives and are super sensitive.

They also will cause the detonation of the picric acid.

To make picric acid, obtain some aspirin. The cheaper buffered brands should be avoided. Powder these tablets to a fine consistency. To extract the acetylsalicylic acid from this powder, place this powder in warm methyl alcohol and stir vigorously. Not all of the powder will dissolve. Filter this powder out of the alcohol. Again, wash this powder that was filtered out of the alcohol with more alcohol but with a lesser amount than the first extraction. Again filter the remaining powder out of the alcohol. Combine the now clear alcohol and allow it to evaporate in a shallow pyrex dish. When the alcohol has evaporated, there will be a surprising amount of crystals in the bottom of the pyrex dish.

Take forty grams of these purified acetylsalicylic acid crystals and dissolve them in 150 ml of sulfuric acid (98%, specific gravity 1.8) and heat to dissolve all the crystals. This heating can be done in a common electric frying pan with the thermostat set on 150 deg F. and filled with a good cooking oil. When all the crystals have dissolved in the sulfuric acid, take the beaker that you've done this dissolving in (600 ml), out of the oil bath.

This next step will need to be done with a very good ventilation system (it is a good idea to do any chemistry work such as the whole procedure and any procedure in this book with good ventilation or outside). Slowly start adding 58 g. of sodium nitrate or 77 g. potassium nitrate to the acid mixture in the beaker very slowly in small portions with vigorous stirring. A red gas (nitrogen trioxide) will be formed and this should be avoided. (Caution: This red gas nitrogen trioxide should be avoided. Very small amounts of this gas are highly poisonous. Avoid breathing vapors at all cost!). The mixture is likely to foam up and the addition should be stopped until the foaming goes down to prevent the overflow of the acid mixture in the beaker.

When the sodium or potassium nitrate has been added, the mixture is allowed to cool somewhat (30-40 deg C.). The solution should then be dumped slowly into twice its volume of crushed ice and water. Brilliant yellow crystals will form in the water. These should be filtered out and placed in 200 ml of boiling distilled water. This water is allowed to cool and the crystals are then filtered out of the water. These crystals are a very, very, pure trinitrophenol. These crystals are then placed in a pyrex dish and placed in an oil bath and heated to 80 deg C. and held there for 2 hours. This temperature is best maintained and checked with a thermometer. The crystals are then powdered in small quantities to a face powder consistency. These powdered crystals are then mixed with 10 % by weight wax and 5 % vaseline which are heated to melting temperature and poured onto the crystals. The mixing is best done by kneading together with gloved hands. This explosive should have a useful plasticity range of 0-40 deg C.. The detonation velocity should be around 7000 M / sec.. It is toxic to handle but simply made from common ingredients and is suitable for most demolition work requiring a moderately high detonation velocity. It is very suitable for shaped charges and some steel cutting charges. It is not as good an explosive as is C-4 or other R.D.X. based explosives but it is much easier to make. Again this explosive is very toxic and should be treated with great care. Avoid handling bare handed, breathing dust and fumes and avoid any chance of ignition. After utensils are used for the manufacture of this explosive retire them from the kitchen as the chance of poisoning is not worth the risk. This explosive, if manufactured as above, should be safe in storage but with any homemade explosive storage is not recommended and explosive should be made up as needed. AVOID CONTACT WITH ALL METALS EXCEPT ALUMINUM AND TIN!!

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CHAPTER 8 - NITRO-GELATIN PLASTIQUE EXPLOSIVE

This explosive would be a good explosive for home type manufacturer. It is very powerful and is mostly stable. Its power can be compared favorably with the R.D.X. based plastique explosives. The major drawbacks are the problems with headaches in use and its tendency to become insensitive to a blasting cap with age. It is a nitroglycerin based explosive and therefore the manufacturer would need to be familiar with the handling of nitroglycerin and know the safety procedures associated with its handling. All of the explosive's bad points could be overcome through planning ahead and careful handling of its explosive components. Gloves should be worn at all times during this explosive's manufacture and use. The nitro headache can be avoided by avoiding skin contact and avoidance of the gases formed when the explosive would be detonated. This explosive would need to be made up prior to its use to ensure cap reliability and a high detonation rate. Nitroglycerin is sensitive to shock, flame and impurities. Any of these can and possibly would cause the premature detonation of the nitroglycerin. This is something to remember because the detonation of nitroglycerin is very impressive.

Nitroglycerin, discovered in 1846, is still the most powerful explosive available.

This explosive is nitroglycerin made plastic by the addition of 7-9 % nitrocellulose. It is possible to make this nitrocellulose but much more practical to buy it. It is available as IMR smokeless powder as sold by Dupont. It should be easily obtained at any area sporting goods store.

To make this explosive, take 8% IMR smokeless powder and mix it with a 50/50 ether-ethyl alcohol and mix until a uniform mixture is obtained. This should be a gummy putty like substance which is properly called a collidon. To this collidon is added 92 %, by weight, nitroglycerin. This is very, very carefully mixed by kneading with gloved hands. In chapter 10, nitroglycerin and nitroglycol manufacture is covered. A uniform mixture should be obtained by this kneading. THERE IS DANGER INVOLVED IN THIS STEP AND THIS SHOULD NOT BE ATTEMPTED UNLESS THE MANUFACTURER IS WILLING TO TAKE THIS RISK. This nitro-gelatin is then ready for use. It is not recommended that this explosive be kept for any length of time. It should be used immediately. If this is impossible the explosive can be stored with a relative degree of safety if the temperature is kept in the 0-10 deg C. range. This explosive is a good choice if the R.D.X. based plastique's cannot be made. The plastic nature of this explosive will deteriorate with age but can be made pliable again with the addition of a small percentage of 50/50 % ether-ethyl alcohol. The detonation velocity of this explosive should be around 7700-7900 M/sec.. This is a good explosive for underwater or U.D.T. type demolition work.

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CHAPTER 9 - GELATIN EXPLOSIVES FROM ANTI FREEZE

This explosive is almost the same as the previous formula except it is supple and pliable to -10 deg C.. Antifreeze is easier to obtain than glycerin and is usually cheaper. It needs to be freed of water before the manufacture and this can be done by treating it with calcium chloride to the antifreeze and checking with a hydrometer and continue to add calcium chloride until the proper reading is obtained. The antifreeze is filtered to remove the calcium chloride from the liquid. This explosive is superior to the previous formula in that it is easier to collidon the IMR smokeless powder into the explosive and that the 50/50 ether - ethyl alcohol can be done away with. It is superior in that the formation of the collidon is done very rapidly by the nitroethelene glycol. Its detonation properties are practically the same as the previous formula. Like the previous formula, it is highly flammable and if caught on fire, the chances of are good that the flame will progress to detonation. In this explosive as in the previous formula, the addition of 1 % sodium carbonate is a good idea to reduce the chance of residual acid being present in the final explosives. The following is a slightly different formula than the previous one:

Nitro-glycol	75 %
Guncotton (IMR smokeless)	6 %
Potassium nitrate	14 %
Flour (as used in baking)	5 %

In this process, the 50/50 step is omitted. Mix the potassium nitrate with the nitroglycol. Remember that this nitroglycol is just as sensitive to shock as is nitroglycerin. The next step is to mix in the flour and sodium carbonate. Mix these by kneading with gloved hands until the mixture is uniform. This kneading should be done gently and slowly. The mixture should be uniform when the 1MR smokeless powder is added. Again this is kneaded to uniformity. Use this explosive as soon as possible. If it must be stored, store in a cool dry place (0 - 10 deg C.). This explosive should detonate at 7600-7800 M / sec.. These last two explosives are very powerful and should be sensitive to a #6 blasting cap or equivalent. These explosives are dangerous and should not be made unless the manufacturer has had experience with this type compound. The foolish and ignorant may as well forget these explosives as they won't live to get to use them. Dont get me wrong, these explosives have been manufactured for years with an amazing record of safety. Millions of tons of nitroglycerin have been made and used to manufacture dynamite and explosives of this nature with very few mishaps. Nitroglycerin and nitroglycol will kill and their main victims are the stupid and foolhardy. This explosive compound is not to be taken lightly. If there are any doubts ... DON'T.

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CHAPTER 10 - NITROGLYCERIN AND NITROGLYCOL MANUFACTURE

Glycerin and ethylene glycol are related chemically to one another and are grouped as alcohols. Both of these oily substances can be nitrated to form a trinitro group. These trinitro groups are both unstable and will explode with tremendous violence and power. Impurities in this form of the substance will also cause the decomposition of the oil. Glycerin is used for soap manufacture and should be easily bought without question. Ethylene glycol is sold as common antifreeze and should be easily acquired. Ethylene glycol renders a better product and would be the item of choice plus the manufacture of plastique explosives from this oily explosive is much easier than from the glycerin nitro form. If ethylene glycol is used, it is easier to buy the anhydrous form than to dessicate the water from the antifreeze version of this chemical. The glycerin is also best if bought in its anhydrous form. The use of the anhydrous form (water free) prevents the watering down of the nitration acids and thus gives a much higher yield of the final product. This nitration is achieved by the action of an acid mixture on the glycerin or glycol. This acid is composed of the following :

Nitric acid (70 %)	30 %
Sulfuric acid (98 %)	70 %
or	
Nitric acid (100 %)	38 %
Sulfuric acid (98 %)	62 %

Of course, this is by weight as all the percentages in this book. The first acid mixture won't give as good a yield of nitro compound as the second acid mixture. The first acid strength is the only one that is readily available and be bought readily. The 100% nitric acid is however made readily and is really worth the extra trouble because the yield of nitroglycerin or glycol is so much higher. The actual nitration should be carried out in a glass (pyrex) or enameled steel container. The acids are poured into the container. First the sulfuric and then the nitric very slowly. A great deal of heat is generated by this acid mixing. This container should have been previously placed in a salted ice bath. A thermometer is placed in the acid. A stirring apparatus will need to be rigged up. This will be stirred with a fish tank aerator and pump. This compressed air is the only thing that's really safe to stir this mixture as nitration is taking place. As the acid mixture cools, a weight of glycerin or glycol should be measured out. For glycerin, it should equal 1/6 the total weight of the acid mixture. For the glycol, it should also equal 1/6 of the total weight of the acid.

When the temperature of the acid mixture reaches 0-5 deg C., the addition of the glycerin or glycol is begun after the mixed acids have begun being stirred by the air. Again this agitation of the mixed acids is very important. It will create a gradual rise in temperature and ensures the complete nitration of the glycerin or glycol as it is added. The

glycerin-glycol is added in small quantities with a careful eye kept on the temperature of the acids. If at any time, the temperature of the acids rises above 25 deg C., immediately dump the acid-glycol-glycerin into the ice bath. This will prevent the overheating of the nitroglycerin or glycol and its subsequent explosion. If the temperature rises close to the 25 deg C. mark, by all means, stop the addition of the glycerin or glycol. Wait until the temperature starts to fall before continuing the addition. The glycol will generate more heat during the nitration than will glycerin. The ice bath may need more ice before the reaction is complete, so add when necessary. After the addition of the glycerin or glycol is complete, keep the agitation up and wait for the temperature of the glycerin to fall to 0 deg C.. Stop the agitation of the mixed acids and the nitroglycerin. Let the mixture set. Keep a watch on the temperature just in case. A layer of nitroglycerin or nitroglycol should form on top of the acid mixture. This should be removed with a glass basting syringe. Carefully place this with its own volume of water (distilled) in a beaker. To this add small quantities of sodium bicarbonate to neutralize any acid remaining in the nitro compound. In all steps with this nitro oil, keep the oil at ten degrees C. or colder for the glycol. When the addition of the bicarbonate no longer causes a fizzing (reacting with the excess acid), check the water-nitro with litmus paper (E. Merik). The reading should be around 7. If it is below 6.5, add more bicarbonate until the reading is seven or close to it. The nitroglycerin or nitro glycol should be settled. It should again be sucked up off the bottom into the clean basting syringe (glass). USE EXTRA CAUTION WHEN HANDLING THIS NITROGLYCERIN OR NITROGLYCOL, BECAUSE THE SLIGHTEST BUMP OR JAR COULD POSSIBLY EXPLODE. WHEN SUCKING THIS OIL OFF THE BOTTOM OF THE WATER, DO NOT BUMP THE BOTTOM WITH THE TIP OF THE BASTING SYRINGE. If necessary, suck up some of the water and remove it from the nitroglycerin or glycol by forceps and small pieces of calcium chloride. The calcium chloride is placed in such a way that it only contacts the residual water in the nitroglycerin or nitroglycol. To make this oil safer to handle, add acetone to the nitroglycerin or glycol in the following proportions:

acetone	25 %
nitroglycerin or nitroglycol	75 %

This will make the oil less sensitive to shock, etc.. This oil when so mixed will still be sensitive to a #8 blasting cap. Remember that the oil contains this acetone when measuring out the oil to be used in other explosives. It may be mixed in the formulas that call for nitroglycerin or nitroglycol and will usually improve the incorporation of these mixtures. To obtain maximum cap sensitivity the acetone should be allowed to evaporate before use of the finished explosive compound. This oil should not be stored if at all possible. But if completely necessary, store in a cool or cold, dry, place when it is free of acidity. Acidity in this oil can cause the explosive decomposition of this oil in storage. This oil, if handled or the fumes breathed, will cause tremendous ' headaches and should be avoided at all costs. They are cardiovascular dilators when contacted and extreme care should always be used when handling these explosives.

As stated earlier, these explosive oils have been produced in large quantities and therefore should be reasonably safe. This manufacture process should never be tried by someone that is unfamiliar with chemistry, chemistry lab procedure, and the explosive compounds produced and their dangers.

Nitroglycerin and nitroglycol detonate at approximately 6700-8500 M/sec. depending on the power of the detonators - the stronger, the higher the velocity.

Well that's about it. Good luck and hope you enjoyed the info.

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KITCHEN IMPROVISED PLASTIC EXPLOSIVES II

by Tim Lewis

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C-4 PLASTIQUE

One of the most famous and widely used plastique explosive in use today. This is due to the extremely high performance, good storage stability, water resistance, high detonation rate and relative low cost. The manufacture of C-4 was covered in Kitchen Improvised Plastic Explosives. But the R.D.X. manufacture method (Henning method) has a low yield. This method yields type A R.D.X. While type A R.D.X. is of high power the type B R.D.X. covered in the section on R.D.X. manufacture in this book is of greater power. This type B R.D.X. has a 10% impurity of H.M.X.. H.M.X. is a greater power explosive than is R.D.X. and has very desirable explosive properties. This type B R.D.X. is actually the explosive called for in the military specifications for C-4 manufacture.

C-4 is cheap because of the polyisobutylene (P.I.B.) binder/plasticizer used. P.I.B. is widely used in the manufacture of calking compounds and even used in Bazooka bubble gum. This would be a possible source of the plasticizer for home C-4 manufacture. The P.I.B. compound desired should have a molecular weight of over 1,000,000. One source of this is from Gulf Oil Co. (chemical division) under the product designation of MM-120. Ethyl hexyl sebacate is available as a plasticizer component in many chemical and manufacturing processes. Motor oil is available from any auto parts house or even K-Mart. The solvent used in the manufacture is unleaded gasoline (Heptane). The detonation rate of this explosive will be over 8000 M/sec. This will yield an explosive identical to the military C-4. It can be used for any high explosive work such as demolitions and fabrication of shaped charges. The closest commercial product is the Detaflex series of explosives as made and distributed by DuPont. These are not the same but their uses would be very similar.

MANUFACTURE

Place 21 grams of finely powdered polyisobutylene in a glass container. To this is added 100 ml of unleaded gasoline (camp stove gasoline). This is allowed to stand until the P.I.B. dissolves completely. To this liquid is added 53 grams of ethyl hexyl sebacate (Di-(2-ethylhexyl) sebacate) and 16 grams of ten weight nondetergent motor oil. Allow 60 ml of the gasoline to evaporate and then mix, by kneading with gloved hands, with 910 grams type B R.D.X. (see R.D.X. section of this book). This is kneaded until a uniform mixture is formed. It is then rolled out thin and allowed to set for two hours. It is again kneaded for 5 minutes with gloved hands. This rolling out and kneading process is repeated until the gasoline can no longer be smelled. The final product will be plastic from -60 to 170 degrees F. It will be a dirty white to light grey in color and will have the consistency of a stiff putty. P.E.T.N. could replace all or part of the R.D.X. as could most crystalline high explosives.

Acetic anhydride is commonly available and thus most likely could be bought. The commercial product as always will be more consistent and much easier and more expedient. This process does however work. Efficiency is in the 85 to 90% range based on the amount of acetone used.

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R.D.X. MFG.

KA PROCESS:

The "KA" process is a modified process for the nitration of hexamine to R.D.X. It is not as easy as the "E" process but yields are very good and it requires less acetic anhydride. It does require concentrated nitric acid (90%+) and requires the hexamine to be nitrated to its dinitrate form first. The product does not contain as much H.M.X. as a byproduct. This amount will be approximately 1-3% H.M.X. The "KA" process requires smaller amounts of chemicals due to the lower amount of water produced. CAUTION: Nitric acid and acetic anhydride are both very dangerous chemicals. They are caustic and dangerous. The vapors and all contact with them should be avoided. This procedure should be done with good ventilation and with proper protective gear.

PROCESS:

Dissolve 50 grams of hexamine (see Kitchen Improvised Plastic Explosives) in 150 ml. of water. To this is added 70 ml. nitric acid (70%) until the solution is acid to litmus paper. A white precipitate is formed and is filtered out of the solution. This precipitate is hexamine dinitrate. It is thoroughly dried and is ready for the next step of the process. 95 grams of this white dinitrate is placed in a beaker or wide mouth jar. In another container place 60 grams of ammonium nitrate and 47 grams of 90%+ nitric acid. To the 95 grams of white dinitrate add 228 grams of acetic anhydride. Add the ammonium nitrate/nitric acid mixture to the acetic acid/hexamine dinitrate solution. A vigorous reaction will take place. After the reaction subsides the liquid is filtered. The product thus obtained is washed twice with cold water twice with boiling water. It is dried and dissolved in the least amount of boiling acetone possible. This acetone is chilled and the product will fall out. Reduce the volume of the acetone to 1/2 by boiling and chill and filter again. Allow the acetone to evaporate and the type "B" R.D.X. is ready to use.

CAUTION: Acetone is very flammable and great care should be used in handling it. Avoid breathing the fumes of acetone.

E. PROCESS:

This process was developed by the Germans initially prior to WWII. It is still in use today for the manufacture of Type B R.D.X. Military specifications for C4 call for type B R.D.X. This is due to the higher performance of this grade. 10% of the final product is H.M.X. It has much more power than the R.D.X. component in the final product of the "E" process.

The basis for this process is the ease of manufacture of the R.D.X. Acetic anhydride, ammonium nitrate and paraformaldehyde. Acetic anhydride is a very common industrial chemical and at the time of this writing can be purchased for \$220.00 per 398 lbs. Ammonium nitrate is available as a common fertilizer. Its cost is approximately

\$7.00 for 50 lbs. in it's fertilizer form. Paraformaldehyde is available as another common industrial chemical. It is also possible to evaporate the 37% aqueous formaldehyde solution to dryness to obtain paraformaldehyde. Paraformaldehyde costs at the time of writing around sixty cents per pound. Thus it is feasible to make home C4 for under four dollars per pound.

This process is very simple and requires a minimum of equipment. This is also a very safe process if the instructions are followed and the fumes produced by the reaction mixture avoided.

PROCESS:

Place 260 ml acetic anhydride in a one gallon jar. To this add 105 grams of ammonium nitrate in the acetic anhydride. This is placed in a pan partially filled with cooking oil. This is heated to 70-90 degrees C. After reaching this temperature begin an addition of 38 grams of paraformaldehyde. This addition is done in four 9.5 gram portions.

CAUTION: This addition will produce fumes that are hazardous and flammable. This should be done with very good ventilation. Paraformaldehyde is a cancer causing agent. A mask and gloves should be worn while handling it. Acetic anhydride and it's vapors are hazardous and all contact should be avoided. It is caustic and very flammable. Allow the reaction to subside before the next addition. After all the additions have been made, take the reaction vessel out of the oil bath and allow it to cool. The crystals of

type "B" cyclonite will form. These crystals are filtered out of the liquid. Filtering is best done in a vacuum (e.g. Buchner) filtering apparatus.

CAUTION: The liquid remaining is glacial acetic acid. Avoid contact and the fumes.

This liquid can then be changed back into acetic anhydride in the process in that section. There is still product dissolved in the glacial acetic acid. If the liquid is to be turned back into acetic anhydride these crystals will fall out in the liquid after the acetic anhydride is formed and could be filtered out after the chemical recovery. If this recovery step is not desired then dilute the remaining reaction liquid from above after removal from the oil bath and it's subsequent cooling. All the crystals will fall out and can be recovered then by filtering. In either case the product should be washed twice with water, twice with boiling water. The product is then dissolved in the least amount of hot acetone possible. Acetone is a common solvent and can be found at any hardware store or paint store. This saturated solution is then cooled and chilled and the final product will fall out as crystals. The resulting fine white to buff colored powder is type "B" cyclonite and is ready to use in plastique explosive manufacture or other suitable uses.

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ACETIC ANHYDRIDE MFG.

Acetic anhydride is a common industrial chemical. It is used for synthetic polyester manufacturer. It is a highly dehydrated acetic acid compound. It is dehydrated by the addition of ketane gas to acetic acid. The acetic acid produced by the "E" process as a by product is fortified to it's original anhydride form by the addition of this ketane gas after filtering out the product from the reaction liquid. Acetic acid is also readily available from photo developers as a common photography chemical. Acetone is available from hardware stores or paint stores as a common solvent. This process reacts the acetone by heat into the necessary ketane gas and it is subsequently absorbed by acetic acid to form the acetic anhydride product. This is attractive due to the ability to recycle the chemicals for other batches.

CAUTION: Acetic anhydride is a caustic dangerous chemical. It's vapors are harmful and should be avoided. All contact should be avoided. It is also highly flammable and should be used with the utmost caution. Wear appropriate protective clothing.

PROCESS:

Acetic anhydride is produced by absorption of ketane vapors in acetic acid. Acetone is injected into a chrome/iron alloy pipe through one end equipped with a feed valve and assembly. This pipe is previously purged with argon or nitrogen. The pipe is heated to 650 to 670 degrees C. This heating can be done by electric heat with a thermostat or by a coal or gas fired oven. The injection of acetone into the reaction tube is begun when the proper temperature is reached. The other end of the pipe is attached to a stainless steel 3/8" tubing. This tubing is placed through a two hole stopper in a gallon jar placed in a salted ice bath. This is to collect all unreacted acetone. In the other hole in the stopper on this bottle is placed a second stainless steel tubing. This goes to another gallon jar through a two hole stopper. In this jar is placed the acetic acid. The second hole in this stopper is placed in line for venting purposes. This line is placed outside or in a safe place for the poisonous fumes to go.

Acetone is injected slowly into the chrome/iron pipe @ 650 to 670 degrees C. This will react approximately 15-25% of the acetone into ketane. The vapors from the reactor is directed into the first bottle. The unreacted acetone will collect here. The ketane vapor will continue through the tubing to the next jar. The ketane vapors are absorbed here by the glacial acetic acid. These vapors are absorbed until the density of the liquid is 1.08 @ 20 degrees C. This is checked by a hydrometer placed in the glacial acetic acid. At the time this specific gravity is reached the material in the second jar is acetic anhydride. If glacial acetic acid is used from previous "E" process filtering then the acetic anhydride will need to be filtered to remove the remaining type "B" R.D.X.

CAUTION: Acetone is highly flammable. Great care is needed to ensure total absence of air in the reactor prior to injection of acetone. Failure to do this can result in an explosion. The whole reaction should be done with very good ventilation.

NITRO METHANE PLASTIQUE #1

This plastique explosive is similar to the Astrolite explosives. Detonation velocity is high in the 7000-7500 M/sec. range. Brisance is good as is the detonation pressure produced. This explosive would find uses in shaped charges and as a standard demolition explosive. It has the drawback of the nitro methane being very volatile. This would limit the storage stability of the finished explosive. This of course could be controlled by storing finished explosives in a cold magazine to reduce this evaporation tendency. The addition of the glass microballons (microspheres) is necessary to reduce the density and therefore give a product that has good detonation tendencies and sensitivity.

MANUFACTURE:

Place 600 grams of nitro methane in a plastic bowl or similar container. Add to this a mixture of 200 grams ammonium nitrate and 60-70 grams of nitrocellulose. The nitrocellulose can be smokeless powder (IMR type), nitrostarch or guncotton. Add 10ml. acetone and 45 grams of microballons. This whole mixture is kneaded together with gloved hands for 5-10 minutes until a very uniform mixture has formed. This kneading should be done carefully to avoid breaking the microballons. The resulting putty is a high power explosive sensitive to a #6 cap. Store this putty in a cool place until ready for use. If this is not possible then make up as needed.

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NITRO METHANE PLASTIQUE #2

This plastique explosive is very simple to make. It makes use of the tendency of nitromethane to gelatinize or collidanize nitrocellulose. The nitromethane used in this process is obtained from model airplane racing fuel. The fuel used is 35% nitromethane content. Ammonium nitrate and glass microballons or powdered styrofoam are used. As in other explosive compositions the glass microballons (microspheres) are used to reduce the density of the explosive thus sensitizing it to detonation from a #6 blasting cap. This novel explosive does not require the nitromethane to be separated out of the model airplane fuel. This explosive will be the equivalent of 75% dynamite. Brisance is very high and detonation rate should be around 6000-6600 M/sec.

MANUFACTURE:

Place 200 grams of 35% nitromethane model airplane racing fuel in a glass container (jar). Add to this 30 grams IMR smokeless powder (DuPont) in the racing fuel and let set for three days. The nitromethane will gel the nitrocellulose (smokeless powder) and after this amount of time the gooey gelled nitromethane/nitrocellulose is scooped out of the liquid with a spoon.

The oil remaining on the goo is allowed to run off and the gelled nitromethane is then mixed with 210 grams of finely powdered ammonium nitrate fertilizer. This is kneaded with gloved hands until a very uniform mixture is obtained. To this putty is added 8-10 grams of microspheres or powdered styrofoam. This is again kneaded with gloved hands until a uniform mixture is obtained. This explosive putty is then ready to use. It may be stored in a cool dry place. If after storage the putty hardens somewhat the addition of 2-3 grams acetone after kneading in will return the explosive to a very soft putty form.

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COMPOSITE PLASTIQUE #1

This explosive composition is simple and cheap to make. Unlike other compositions in this book this composition is as simple as making bread dough or other similar very familiar processes. This mixture is cap sensitive but would require it's use in larger quantities than explosives containing crystalline high explosives. Ingredients are simple to find and cheap. Hexamine is available as army ration heating tablets. Nitric acid can be either bought or made (see nitric acid MFG.). Ammonium nitrate is available as a (common) fertilizer. Sodium nitrate is commonly available from chemical suppliers. Potassium perchlorate can be obtained from fireworks suppliers. Guar gum is obtained from oil well drilling mud suppliers, Henkel Corp. (Minneapolis, Minn.) or other suppliers.

Detonation velocity is not as high as others but this explosive is powerful and brisant. Detonation velocity should be around 5500 M/sec. This explosive should be made up as needed to ensure the gell is good and stiff.

MANUFACTURE:

In a large mouth gallon jar place 60 ml. of water. In this liquid dissolve 40 grams of hexamine (see Kitchen Improvised Plastic Explosives for manufacture instructions). Add nitric acid of any strength available to this solution until it has a Ph value of 5.0-5.4. This can be checked with litmus paper (e.g. E Merick brand). The addition of the acid to this liquid should be done at such a rate so the temperature does not rise above 66 degrees C. To this liquid add 12 grams of potassium perchlorate, 16 grams of sodium nitrate and 80 grams of ammonium nitrate. This mixture is stirred until all the solids dissolve into the solution.

To this liquid add 161 grams of ground ammonium nitrate mixed with 6 grams of guar gum. Stir the mixture until it begins to thicken appreciably. Dissolve 1/2 gram of

potassium dichromate in 1-2 ml. of water and add into the mixture with stirring. Stir until this crosslinking agent is thoroughly dispersed throughout the gelled explosive. To this gelled explosive add 20 grams of very fine aluminum powder. This is stirred or kneaded (with gloved hands) into the explosive gell. Without this aluminum addition the explosive will not be cap sensitive. This explosive is then placed in a moisture free storage place. This gell will only keep 6 months at ordinary temperature. It would be made up only as needed.

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COMPOSITE PLASTIQUE #2

This plastique is a water gell type explosive. It is sensitized with monomethylamine nitrate. This is formed by the reaction of formaldehyde or paraformaldehyde with ammonium nitrate. These ingredients are widely available and are cheap and easy to obtain. Density will range from .6 to 1.2 G./cc. Detonation velocity will not be as high as other plastique explosives in this publication. It is however sensitive to an A.S.A. #6 blasting cap. This reaction is a methylation of the ammonium nitrate component by the methyl group of the formaldehyde. This while being a very simple explosive to make has the drawbacks of low detonation velocity and it is hygroscopic. Protection from moisture is needed. The gell could be protected by storing in Ziplock plastic bags, jars, plastic containers and by spooning into polyethylene tubes (2-5 mil.) Larger charges should be used as very small quantities could give inconsistent detonation.

MANUFACTURE:

Place 300 grams paraformaldehyde and 300 grams of ammonium nitrate in a stainless steel pan. Add 65 ml of water and place the lid on the pan. Heat the liquid to 40-45 degrees C. A reaction will take place. It will generate heat and should then be removed from the heat source. This reaction should be allowed to run at temperatures less than 95 degrees C. This can be done by checking the temperature with a thermometer. If the temperature rises above 95 degrees C. immerse the pan bottom into a dishpan or similar container filled with cool water. Water should be added to maintain the liquid level. Let the reaction run into completion and the foaming will cease (1-2 hours). Sodium hydroxide (lye) is added at this time to neutralize the formic acid produced as a by product of the reaction. Water content of this liquid should be 8-10%. To this liquid is added 39 grams powdered sodium nitrate, 55 grams powdered sodium perchlorate and 16 grams powdered sulfur. This is stirred until all the solid is dissolved. Of course the sulfur will not dissolve. 8 grams guar gum is added while stirring. The liquid will thicken. 1/4 gram of sodium dichromate is dissolved in 1 ml of water and is added to the thickening explosive gell. It is then stirred until a homogeneous mixture is obtained. This gelled explosive is then ready to use. Storage life of this explosive will be 3-6 months in ordinary magazine conditions. Storage at elevated temperatures will destroy the gell matrix and result in a poor explosive composition. This explosive is best made as needed. Protection from moisture is needed in storage and in use.

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MYROL (Methyl nitrate)

Myrol was developed as a substitute explosive by the Germans at the end of WWII. Myrol is one of the most brisant explosives known. Prior to this application it was considered inferior to other explosives due to its poor storage stability. This instability was due to early manufacture processes and their tendency to leave acidity in the final product. The process developed by the Germans in the latter part of the war when explosives were in short supply and stretching agents and substitute explosives were used. This manufacture process was a distillation from the nitration acids instead of the nitroglycerin type nitration used earlier. This explosive requires only methanol alcohol and nitric and sulfuric acids. Also required is the nitric acid still from the nitric acid section of this publication. With simple manufacture and easily acquired ingredients this is a very attractive choice. Methyl nitrate is less shock sensitive than nitroglycerin or nitroglycol but is slightly less sensitive to friction.

MANUFACTURE:

In a beaker or wide mouthed jar place 125 grams nitric acid (70%) density 1.42. Add to this 40 grams of concentrated sulfuric acid. CAUTION: Nitric and sulfuric acid are corrosive and dangerous. Fumes and all contact with them should be avoided. Proper clothing and protective equipment should be used!

To this is added drop by drop with stirring, 40 grams (50 ml.) of anhydrous methanol alcohol with one gram urea (fertilizer) dissolved in it. Keep the temperature below 10 degrees C. during the addition by regulation of the amount of methanol added.

After all the methanol has been added pour the cold acid mixture into the 2000 ml erlenmeyer flask in the nitric acid still (see nitric acid section). This should be done slowly and very carefully avoiding bumps between the reaction beaker and the flask. This "still" should be cleaned thoroughly before and after use. To the liquid in the flask add 5 grams of urea (fertilizer). (Place the stopper in the flask and the second jar of the clean still is placed into an ice bath.) The first distillation flask is placed in an oil bath heated to 40 degrees C. This should be done remotely if possible.

The vacuum is applied and the methyl nitrate will immediately begin to come over and collect in the second flask. Yield should be 60 grams of methyl nitrate. Remove the vacuum immediately when this much liquid is in the second jar. Add 10 grams of methanol to the liquid in the second jar and swirl until mixed. Test the Ph of the liquid with Ph paper (E. Merck). The reading should be between 6 and 7. If it is less, add small quantities of sodium bicarbonate and test. This is done until the mixture is between 6 and 7 Ph. This is liquid myrol. It will detonate at velocities of 7500-800 M.sec. It is more powerful than T.N.T. and R.D.X. and is one of the most brisant explosives known.

CAUTION: Myrol is a dangerous compound. The addition of methanol reduces the sensitivity of the liquid but caution should be used in handling this explosive. At no time

standpoint. It does have a lower detonation velocity but has extremely high brisance and gas production upon detonation.

MANUFACTURE:

Place 500 grams of myrol (methyl nitrate) in a plastic bowl. To this is added with very gentle stirring 50 grams of smokeless powder or nitrostarch. The mixture will immediately begin to thicken. Continue the gentle stirring until the mixture takes on the consistency of putty and is very uniform. The addition of 500 grams of ammonium nitrate in a finely powdered form and 50 grams of powdered aluminum with stirring is then made. Stir gently until a very uniform mixture is obtained. This explosive is then stored in a cool dry place in a container with a nonscrew type lid.

CAUTION: Avoid contact with the finished product or the myrol additive. Contact will cause unbearable headaches and continued contact will result in heart disease. Myrol is friction sensitive and flame sensitive and care should be taken in handling this explosive liquid and products made from it.

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NITRIC ACID

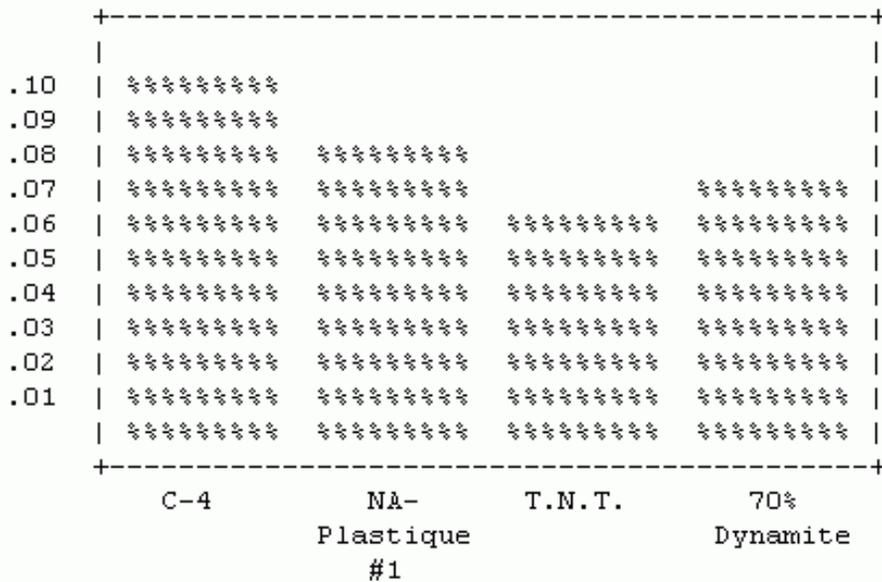
Nitric acid is the most important acid for home manufacture of explosives. It is the primary acid used in nitrations. Nitrations produce a good many explosive compositions. Most commercial nitric acid is a 70% strength with a density of 1.4 G/cc. This acid is too weak for most nitrations. The process below will give an apparatus and procedure to make a 95-100% grade of acid with a density of 1.52 G/CC. This acid is of sufficient strength to perform most nitrations requiring a strong acid. Precursors are sulfuric acid 98% (density 1.8), technical 70% nitric acid or sulfuric acid as above and sodium or potassium nitrate. The sulfuric acid is available in grocery stores as drain opener and at janitorial or plumbing suppliers, Battery acid can be used if it is boiled remotely until white fumes are given off. Technical nitric acid is available from most commercial suppliers and is available from gallon sizes to drum sized quantities. Potassium nitrate is available as a stump remover from garden supply stores or from chemical suppliers. Sodium nitrate is available from chemical suppliers and as a fertilizer. Ammonium nitrate will also work but is deemed inferior to the two nitrate salts above.

CAUTION: Sulfuric acid and nitric acid are caustic agents. Contact with skin and breathing of vapors could very well be fatal. Use with proper protective clothing and with very good ventilation.

NITRIC ACID MANUFACTURE:

In a 2000 ml. erlenmeyer flask place 500 grams technical grade nitric acid. Add to this 500 grams concentrated sulfuric acid. Obtain or make a viton stopper to fit this flask. It should have one hole in it to accept 3/8" 316 stainless steel tubing. Tubing should just reach through the stopper. The other end of this tubing should be placed through another viton stopper with two holes in it. The tubing should reach all the way to the bottom of the gallon jar used to catch the nitric acid. This gallon jar is placed into a salted ice bath. This ice bath should surround most of the jug. The other hole of the stopper should have a line running to an operating vacuum source. The pressure is reduced to ensure the highest yield possible. Place the flask containing the acid in a frying pan filled with cooking oil and heat to 220 degrees F. Turn the water on to the asperator vacuum source and pull a vacuum on the whole system. Nitric acid will distill over into the gallon jar where it is cooled and is not affected by the vacuum. Run the setup until there is 500 ml. remaining in the flask. The vacuum is unhooked and the acid in the gallon jar is ready for use.

If the sulfuric acid/nitrate salt is to be used simply place 400 grams sulfuric acid in the flask. 680 grams of potassium nitrate or 580 grams of sodium nitrate is then added. The apparatus is run the same way as the tech. nitric acid/sulfuric acid process above.



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NITRIC ACID PLASTIQUE #2

This explosive is another sprenkel type explosive using nitric acid as an oxidizer. Nitric acid used, again is a high strength acid (95%+). This explosive makes use of another plastic polymer. Polystyrene is a very common plastic. It is commonly available as foamed packing "peanuts". It is also used for molded products and molded interior shipping protection for finished goods. This explosive is very high in detonation velocity and brisance. It, as with all nitric acid plastiques, makes a good demolition explosive and would find much use in shaped charges. This explosive has good storage stability but due to the nitric acid oxidizer it cannot be handled with unprotected hands. It is cap sensitive and detonates at 7600 M/sec. It is one of the most attractive plastique explosives due to the easy acquisition of all its ingredients.

MANUFACTURE:

In a quart jar place 415 grams of 95% nitric acid (see nitric acid section). 85 grams of polystyrene powder is added. Powdered polystyrene is made by placing the polystyrene foamed beads in a blender a few at a time. Blend at high setting until powdered sufficiently. After adding all the polystyrene heat to 40 degrees C. in an oil or water bath with stirring and continue stirring for 30 minutes. The compound will set up and become a tacky gell suitable for plastique explosive applications.

CAUTION: Nitric acid is corrosive. Use great care when handling and avoid breathing its fumes. Avoid all contact with the acid and the finished product. Wear protective clothing and safety equipment. Proceed only in an area with excellent ventilation!

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RED PHOSPHOROUS-COFFEE-SILICONE OIL-

This plastique is powerful and cap sensitive. It is a high performance explosive with a 60% dynamite equivalency. It is very similar to the composition in Kitchen Improved Fertilizer Explosives. It uses this explosive's high power and cap sensitivity coupled with a polymerized silicone oil. The addition of the dried coffee (e.g. instant, freeze dried) and raises the detonation velocity greatly and subsequently the power. It is simple to prepare, powerful and cheap. These parameters are very important to the home explosives manufacturer.

MANUFACTURE:

Powder 190 grams of ammonium nitrate (powdered fertilizer) and place in a wide mouthed container of glass or stainless steel. To this is added 7 grams soybean oil, 2 grams red phosphorous. This is carefully stirred until a uniform mixture is formed. In a separate container place 14 ml water. In a separate container mix 8 grams of silicone oil (General Electric Product #SF-96 or equivalent) with 0.1 grams of benzoyl peroxide. Heat this mixture to 120 degrees C. for ten minutes until a stiff gell is formed. It is then kneaded with gloved hands into the powdered explosive in the other container. Knead this composition until it is of a uniform consistency. When uniform knead in 1

gram of instant coffee. Glassmicro balloons can be used here instead of said instant coffee. When this mixture has been kneaded to a highly uniform mixture the explosive is ready for use. This explosive can be considered the equivalent of 60% straight dynamite and is sensitive to a #6 blasting Gap at temperatures as low as -10 degrees F.

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SILICONE OIL/R.D.X. PLASTIQUE #2

This explosive like others in this section makes use of the tendency for some selected silicone oils to polymerize. This results in a gel matrix of very fine qualities. Resulting explosives prepared with cyclonite are nearly a equivalent of C-4. They have a slightly lower detonation velocity. They do however exhibit good plasticity from -65 to 170 degrees F. This would make a good choice for a C-4 alternate explosive. Charges would have to be increased 15-25% to obtain a use equivalence to C-4. A good choice for all demolition uses. Detonation velocity will be around 7000 M/sec. This explosive is easier to make than C-4. This is due to the ease of preparation of the silicon plasticizer. C-4 is used by the military due to the cost difference in these explosives. C-4 uses "cheaper" plasticizers than does this composition. It can be considered a C-4 equivalent for all practical purposes.

MANUFACTURE:

Two parts of polymerized silicon paste (Dow Corning Silastic 126 or equivalent) was mixed, in a beaker or stainless steel pan, with 3 1/2 parts polymerizable silicon oil (General Electric Silicon Oil #9981 or equivalent). This mixture then would have 0.025 parts benzoyl peroxide added. This cream like mixture would then be heated slowly to 150 degrees C. This heating should be done over a period of fifteen minutes. It is then allowed to cool. It will thicken somewhat with cooling. Take 410 grams R.D.X. and 45 grams of the gell and place them in a plastic dish (dishpan). Knead the components together until a uniform mixture is obtained. The resulting putty can be considered the equivalent of C-4. It is very storage stable and safe to manufacture. fnord. This results in a gell matrix of very

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SILICONE OIL/NITRO MANNITE PLASTIQUE #3

This plastique is easily made. Precursors would be simple to obtain. Nitro mannite is a high explosive with great power. It's power is close to that of nitroglycerin. From the same token the sensitivity to shock and friction are also similar. Nitromannite's manufacture process is covered in Kitchen Improvised Blasting Caps. I believe the addition of the silicon gell to this explosive would desensitize it somewhat. Nitromannite is sensitive to elevated storage temperatures so they would be best avoided. Nitromannite has a detonation rate of 8200 M/sec. #4 or #3 blasting caps would most likely set this explosive off well. This is due to the high sensitivity of the nitromannite explosive filler.

MANUFACTURE:

Take 1 parts by weight of silicone paste (Dow Corning Silastic 126 or equivalent) and 2 parts silicone oil (Dow Corning product #9996 or equivalent) and place in a stainless steel pan. Add to this .015 part benzoyl peroxide. Stir in well. Heat this mixture to 135 degrees for 15 minutes and let the thick gell cool.

Fifteen parts of this gell are added to 85 parts nitromannite (See Kitchen Improvised Blasting Caps). These are kneaded until a very uniform consistency exists.

CAUTION: Nitromannite is a very sensitive explosive. Great care would be needed in handling this explosive. Friction and shock sensitivity is the same as nitroglycerin. This explosive is flame sensitive. Ignition of this explosive could very well cause it's detonation.

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SILICONE OIL/AMMONIUM PERCHLORATE PLASTIQUE #4

This plastique is easily made. Precursors are very simple to obtain. This mixture of ammonium perchlorate and copper chromite has all the power that R.D.X. has. I do not believe the detonation velocity will be as high however. It is cap sensitive and very powerful. The copper chromite component of this explosive composition is available as a chemical reagent and as a catalyst. Ammonium perchlorate is widely available as an oxidizer in pyrotechnics, solid rocket propellants, and JATO motor construction. This explosive plastique would be a very good choice if the precursors are available.

MANUFACTURE:

Take 1 parts by weight of silicone paste (Dow Corning Silastic 126 or equivalent) and 2 parts silicone oil (Dow Corning Product #9996 or equivalent) and place in a stainless steel pan. Add to this .015 part benzoyl peroxide. Stir in well. Heat this mixture to 135 degrees for 15 minutes and let the thick gell cool.

In another container 95 parts of ammonium perchlorate are mixed carefully with 5 parts copper chromite. These are of course finely powdered before mixing. Mix these together until a uniform mixture is obtained. Fifteen parts of this gell are added to 85 parts the explosive mixture from above. This mixture is kneaded until a very uniform consistency exists. This will yield an explosive of great power and very good plasticity. One would want to use a #8 cap for this explosive to ensure good performance.

SILICONE OIL PLASTIQUE #5

This plastique is a good choice. It can use a variety of explosives for the main explosive in the compositions. These are: Picric Acid (Kitchen Improvised Plastic Explosives), Nitro Starch, P.E.T.N., R.D.X., Pentryl, T.N.T., Tetranitronaphthalene (Kitchen Improvised Blasting Caps) and other crystalline high explosives. Of course the detonation velocity will vary per explosive filler used. This plastique will exhibit good plasticity from -60 to 170 degrees F.

MANUFACTURE:

A polymerizable silicone oil with a viscosity of 1000 centistrokes at 100 degrees F. is obtained (G.E. Silicone oil #81245 or equivalent). 500 grams of this oil would be placed in a stainless steel pan. 2.5 grams benzoyl peroxide is added and the mixture is stirred to mix. It is then heated to 125 degrees C. and held at that temperature for 10 minutes. This oil will polymerize to a thick tacky gell.

This gel is added to 3.3 Kg. of one of the powdered high explosives (see above). This is kneaded in a plastic container until a very uniform mixture is obtained. The resulting doughlike mixture would then be ready for use. This plastique explosive should be sensitive to a #6 cap with most of the explosive fillers above. The exception would be T.N.T. It would require a #8 or larger cap for proper detonation.

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SILICONE PLASTIQUE #6

This plastique makes use of a polymerizable silicone oil matrix with a crystalline high explosive. This gives plastique explosives with good high and low temperature plasticity. Storage stability is good and the detonation velocity is very high as well as is the brisance. The oil is gelled by heating with benzoil peroxide. The gell formed is mixed with the powdered high explosive. This is kneaded with gloved hands until a uniform mixture is formed. High explosives used can be one of the following: R.D.X. (see Kitchen Improvised Plastic Explosives or section in this book), PETN (See Kitchen Improvised Plastic Explosives or the section in this book), Picric Acid (See Kitchen Improvised Plastic Explosives), Mannitol Octanitate (see Kitchen Improvised Blasting Caps), Tetryl (see Kitchen Improvised Blasting Caps). Explosive performance will vary, of course, with the high explosive used. R.D.X. and P.E.T.N. will give the highest performance. This plastique is easily made and has very high performance. The precursors are not as easily found as other plastique formulations in this book. Detonation velocity will be between 6700 M/sec. to 8100 M/sec. This variation will depend upon the high explosive chosen.

MANUFACTURE:

Obtain a polymerizable silicone oil with a viscosity @ 100 degrees F., of 1000 centistrokes. Place 150 grams of the oil in a beaker. To this is added .75 grams of benzoyl peroxide. This peroxide is widely used as a catalyst in the plastic industry. The mixture is heated with stirring until the oil polymerizes into a stiff tacky gell. Mix this gell intimately with 850 grams of crystalline high explosive. This is mixed by stirring or kneading with gloved hands until a very uniform mixture is formed. This explosive is plastic from -65 degrees F. to 170 degrees F. It is sensitive to a #6 blasting cap. It is almost an equivalent of C-4 in power and in usability.

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NITRO GLYCOL-MFG.

The manufacture of nitroglycol was covered in Kitchen Improvised Plastic Explosives. That process made use of ethylene glycol and it's subsequent nitration with a mixed acid solution. Ethylene glycol is a common chemical and should be widely available. The process below makes use of ethanol (drinking alcohol). It is by a reaction broken down into ethylene gas. This gas is then bubbled through a mixed nitration acid. The resulting nitrated product consists of nitroglycol and B-nitroethyl nitrate. This nitration product is separated by hydrolysis and the nitroglycol in a very pure state is obtained. Ethanol is easily manufactured from grain or sugar producing substances. A good book on this process is available from The Mother Earth News, P.O. Box 70 Hendersonville, NC, 28793. This book has a very simple vacuum still that produces 90% ethanol. This ethanol would work very well in this process.

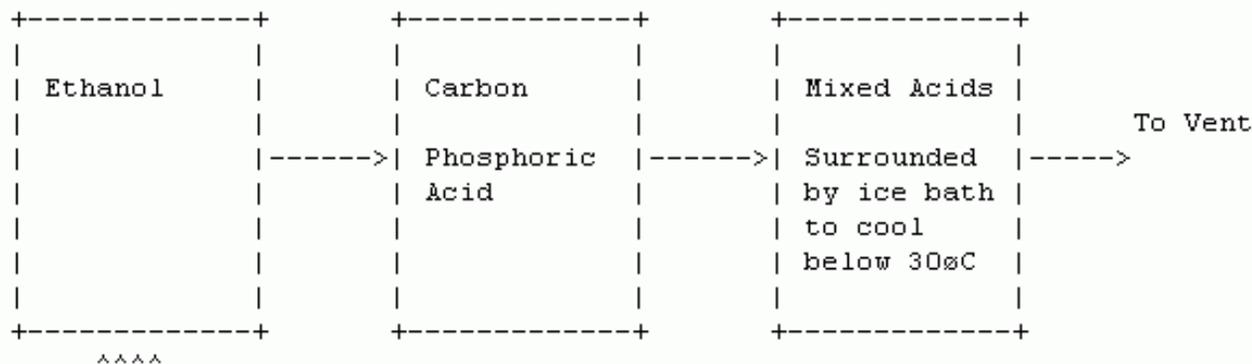
Nitroglycol is more powerful than even nitroglycerin and is much less sensitive. It's detonation rate is over 7800 M/sec. under ideal conditions. It makes very good plastique explosives. They are however cardiovascular dilators and great care should be used handling this explosive oil.

MANUFACTURE:

Place 75 ml ethanol alcohol in a 500 ml. earlenmeyer flask. In the top of this flask is placed a one hole stopper. Tubing is placed in this hole and the other end placed through one hole in the next two hole stopper. This stopper is placed in a 1000 ml. flask as above. In this second flask is placed 400 grams carbon (ground charcoal or coke) and 150 grams strong phosphoric acid. This is mixed well. The hose inserted in the stopper is pulled through the stopper until it contacts the bottom of the flask. In the second hole in this flask's stopper is placed another hose. In a 600 ml. beaker is placed 114 grams of nitric acid (95% and 186 grams of strong sulfuric acid

(98%). The hose (316 stainless tubing) from the second flask is placed in this mixture such that it nearly touches the bottom of the beaker containing the mixed acids. The beaker should be surrounded by a salt ice bath to keep the temperature down. The first flask is heated. Ethanol vapors are generated and go through the hose to the second flask. In the second flask the ethanol vapors are reacted to form ethylene gas. This gas is conducted through the acid resistant hose (316 stainless tubing) and is bubbled through the mixed acid in the beaker. In this beaker the nitration will take place. If at any time this acid mixture's temperature goes above 30 degrees stop the gas generation until the temperature falls to an acceptable level. This ethylene gas is bubbled through the acid mixture until all of the ethanol is gasified in the first flask and has been forced into the second reaction flask. This should complete the reaction. The nitro glycol mixed with beta nitroethanol nitrate will form a visible layer on top the acid mixture. This liquid is sucked off the top of the liquids with a syringe or similar device. This liquid is placed in a small beaker and warm water is added (80-90 degrees C.) and is very gently stirred and allowed to cool. This will decompose the beta nitroethanol nitrate. The nitro glycol will settle to the bottom of the liquid. Nearly all the liquid is poured off the nitroglycol leaving a small amount of water with the glycol. Bicarbonate of soda (baking soda) is added in small quantities until the effervescent reaction subsides with each new addition. This neutralizes the acid and the product is separated from the remaining water and is then ready for use.

CAUTION: Ethanol and ethylene are very flammable. They should be used with great care to ensure that they are not ignited. Breathing these compounds should be avoided. Nitric and sulfuric acid fumes and contact with them or the chemicals should be avoided. This process should be done with very good ventilation. Nitro glycol is sensitive to shock, friction and flame. All contact with nitroglycol should be avoided as it will cause vascular dilation. Continued or repeated exposure could very well cause circulatory problems. Mixtures of alcohols and nitroglycol are much less friction and shock sensitive and are highly desirable (3/1 nitroglycol/alcohol). Care should be exercised to ensure the lack of acidity in the nitroglycol as this tends to make for an unstable compound!



Heat, to boil

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NITROGLYCOL PLASTIQUE

This plastique makes use of the tendency of nitroglycol to function as a sensitizing agent. While this explosive in all respects very similar to dynamite the addition of smokeless powder to the explosive forms very plastic mixtures. Nitroglycol is a very powerful explosive and should be used with great care. Any explosive containing nitroglycol. should be completely free of contaminants and acidity. This explosive is a mixture of nitroglycol, sodium nitrate and aluminum powder. Brisance of this explosive is very high. This is due to the nitroglycol and the aluminum powder in conjunction with the sodium nitrate oxidizing salt. While the detonation rate is not as high as other plastiques covered in this book the brisance is very high and this explosive could find use in blasting as well as different types of munitions loading. Another attractive aspect of this explosive is the relative low amount of nitroglycol required to achieve good performance. Moisture in this composition should be avoided as this could impair the performance and sensitivity of this explosive.

MANUFACTURE

In a plastic mixing bowl place 200 grams of fine aluminum powder (Alcan 2100 or equivalent). To this is added 200 grams of sodium nitrate and 25 grams of IMR series smokeless powder. This is mixed with a plastic spatula or stirring rod.

CAUTION: Avoid friction and flame when handling these powders after their combination. This powder is very highly flammable and any source of ignition should be avoided. Combustion temperature of this powder will be in excess of 3000 degrees C. Of course avoid breathing the aluminum powder at all costs. Exposure to this dust can cause severe respiratory disfunction. When these are intimately mixed set this bowl aside. 50 grams of nitroglycol are mixed with 10 grams of acetone. This liquid is poured into the powdered ingredients in the bowl previously prepared. This mixture is kneaded with gloved hands until a uniform puttylike explosive remains. This is the explosive plastique. This explosive should be stored in a cool place in a sealed container. Evaporation of the acetone will result in a hardening of the putty. This can however be

replaced by adding more acetone to the mixture and kneading again with gloved hands until the desired consistency is obtained. This explosive will have a greater brisance than T.N.T. and a detonation rate of 6000 M/sec.

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P.E.T.N.

Pentaerythrite tetranitrate is a powerful explosive used in many plastique explosive compositions. It is also the main ingredient in primacord. It is also the main explosive component in Detaflex explosives as made by DuPont. It is an explosive of greater power than R.D.X. and has a somewhat greater sensitivity to caps than does R.D.X. It is powerful and cheap. This manufacture process has a very high yield with a good stable product as a result. It is also a good choice for a blasting cap base charge explosive. Detonation velocity is 8500 M/sec. This is at 1.65 G/cc. density. The pentaerythrite is the reaction product of four mole weights of formaldehyde and one mole weight of acetaldehyde. This is reacted in a warm aqueous solution in the presence of calcium hydroxide. To nitrate this compound 95% nitric acid and pentaerythrite are all that are needed. Pentaerythrite is available as a common industrial chemical in the resin and paint/varnish industries.

MANUFACTURE:

Place 400 ml. of strong nitric acid from nitric acid manufacture process in an 800 ml. beaker in a salted ice bath. Add three grams urea (fertilizer) to the acid and allow to cool. One hundred grams of finely ground pentaerythrite is added to the acid a little at a time with stirring. Addition is done such that the temperature of the acid mixture does not go above 5 degrees C. After all the P.E. has been added the mixture is stirred while keeping temperature below 5 degrees C. for 20 minutes. This mixture is then poured into three liters of water and cracked ice. The 220 G. of crude product is filtered out of the solution and washed three times with cold water. It is then placed in a hot 0.5% solution of water and baking soda (sodium bicarbonate). It is then filtered out and washed again and dried. It is then dissolved in the least amount possible of hot acetone and allowed to cool. The crystals will fall out of the solution and are filtered out. The volume of the acetone is reduced to 1/3 it's original volume by boiling and cooled and filtered again. The combined crystals are then dried and are then ready to use.

CAUTION: Acetone is very flammable. Keep away from all sources of ignition and avoid breathing the acetone vapors!

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DETAFLX EQUIVALENT PLASTIQUE

This commercial explosive is very popular for a multitude of uses. It finds uses from agricultural uses to specialty shaped charge fabrication to sever offshore oil platform legs off. This is one of the best of the commercial demolition explosives. It also finds a good use in explosive welding of metals and other operations of this type. This explosive is very similar to the C-4 composition given earlier. In fact they can be considered equivalent. P.E.T.N. is a very powerful explosive. It is actually more powerful than R.D.X. but is also more friction and impact sensitive. It makes use of polyisobutalene with ethylhexyl sebecate or ethylhexyl adipate as the plasticizer. Also small amounts of 10 weight motor oil are added to increase the plasticity and consistency of the explosive. One would exercise care in handling P.E.T.N. due to it's friction sensitivity. In the explosives industry P.E.T.N. is kept water wet until ready for final manufacture into explosives. These plasticizers are incorporated into explosive plastiques commercially by heating with the solvent until dissolved. Water wet R.D.X. or P.E.T.N. is then added and the heat with stirring is continued under reduced pressure. This is the quickest method and yields the most uniform product. But this process is not feasible as other simpler processes work with good results.

MANUFACTURE

Place 12 grams of polyisobutalene in a container with 70 ml of unleaded gasoline ("white gas").

CAUTION: Avoid skin contact with the gasoline and keep away from all sparks and open flames. Gasoline is highly flammable! Great care should be used to ensure fumes are avoided.

When the PIB has dissolved 2.5 grams of 10 weight nondetergent motor oil is then added. This is allowed to evaporate to 1/2 it's original volume. To this is added with stirring 2.5 grams of ethylhexyl sebecate or ethylhexyl adipate. The mixture will begin to thicken. To this thickened mixture add 200 grams of P.E.T.N. and the mixture stirred until thoroughly mixed. This is allowed to set with occasional kneading until completely free of gasoline. When the gasoline smell is gone the grey to off white pütty is rolled out like bread dough with a rolling pin. This is rolled out to 2-3 mm thick sheets and cut to size. The resulting sheets of high explosive are then ready for use. This explosive is better in thin layers than is C4. This is due to the greater sensitivity of the P.E.T.N. explosive component. This explosive is storable for 10 plus years with no decrease in performance. Sensitive to a #6 ASA blasting cap.

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NITROSTARCH-MFG.

Nitrostarch is a powerful explosive. It can be considered the equivalent of nitrocellulose. With a detonation velocity of 6200 M/sec. (13% nitrogen) at a density of 1.5 G/cc., it is very powerful. It has the drawback of being very sensitive to friction and residual acid in the finished product. Acidity can be controlled by neutralization of the acid in the product with ammonia. This effectively neutralizes all acid in the nitrostarch product rendering a stable product. While P.E.T.N and R.D.X. are a good deal more powerful than N.S. it is still an attractive explosive due to the ease of manufacture and the ease of acquisition of the required ingredients. Nitric acid is produced by the process described elsewhere in this book. Sulfuric acid is available as drain opener from janitorial and plumbing suppliers. Starch is available in the grocery store. Corn starch will work but tapioca starch is much preferred for this process.

MANUFACTURE:

Place 305 grams of 95-100% acid in a 2000 ml beaker or equivalent. To this is added slowly 500 grams sulfuric acid (97-100%). This mixing will generate heat. Cool this acid mixture to 32 degrees C. Surround the acid mixture container with a cool water bath. Begin the addition with vigorous stirring of 200 grams of tapioca starch. This addition should be done in small quantities. Regulate the temperature by the speed of addition. Temperature should be maintained between 35-40 degrees C. After the addition is complete continue stirring for 5 minutes. Pour this acid mixture into twice its volume of cracked ice water. The nitrostarch will fall out and should then be filtered out. Wash this granular material three times with cold water. This washing is of course done by pouring water through the material in the filter paper. This material is then removed and placed in a container and 400 ml water is mixed with it. Begin to add clear ammonia water (grocery stores) to the liquid. Check the pH reading with test paper (E. Merick brand). Continue adding the clear ammonia water in small portions until the PH reading is 9. Filter out the product and again wash with three 200 ml. washings of clear water. The material is then dried and is ready for use.

CAUTION: Nitrostarch is friction and shock sensitive. It is also very flame sensitive. This compound is a high explosive and should be treated with great care.

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NITROSTARCH PLASTIQUE-MFG.

Nitrostarch has been used a good deal in the explosives industry. This is due to its low cost and easy manufacture. It can be considered almost an equivalent of guncotton. Nitrostarch is a good base explosive in plastiques. It is overshadowed by R.D.X. and P.E.T.N. as well as other high explosives- However starch (tapioca, corn, potato) is widely available from grocery stores. This explosive formulation has the disadvantages of poor storage and very limited plasticity. It is however quick and simple to manufacture. A homemade grade of nitrostarch would very likely have residual acidity which would cause storage instability. This explosive uses nitrostarch in conjunction with short fiber wheelbearing grease to form the needed plastique. CAUTION: Avoid all flame and friction when handling nitrostarch. It is highly flammable and friction could cause the premature explosive of this compound. Also avoid breathing the dust and skin contact would best be kept at a minimum. This explosive would be cap sensitive to a #6 blasting cap or equivalent. Detonation rate would be around 5500-5900M/sec.

MANUFACTURE:

In a pan place 10 grams of short fiber wheel bearing grease. Heat this grease until it melts. Let this cool to 75 degrees C. Pour this into 100 grams of nitrostarch. Knead this with gloved hands. This is kneaded until a uniform mixture is obtained and the material is then ready for use or storage. Care taken during the manufacture of the nitrostarch to ensure the absence of acidity is highly recommended for storage stability.

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PENTRYL

(Trinitro N Nitranilino Ethanol Nitrate

Phenylethanolamine after nitration forms Pentryl. This is not to be confused with eutectic mixtures of P.E.T.N. and other high explosives. They are called pentryl also. Pentryl is a very powerful high explosive. Its detonation velocity is 7300 M/sec. It is 118% as powerful as picric acid and 130% greater than T.N.T. It is formed by the nitration of phenylethanolamine. Phenylethanolamine is used in the chemical industry to inhibit the hardening of styrene plastics. It also finds uses as a chemical intermediary in other chemical processes. This explosive is very much more sensitive than T.N.T. and picric acid to friction. Toxicity is listed as low. Exposure is limited to dermatitis and other mild symptoms. This compound should not be ingested and contact should be avoided. It is unattractive due to the P.E.A. Precursor and its acquisition. It is easy to make and has very high power. It would make a good choice for plastique explosive manufacture. Other necessary ingredients are sulfuric acid (100%) and nitric acid (90%). These are readily available or can be made.

MANUFACTURE:

Place 1000 grams of sulfuric acid (95%) or equivalent. To this is added 100 grams of Phenylethanolamine with stirring. This addition is done so that the temperature of the acid does not rise above 30 degrees C. After the P.E.A. dissolves in the acid the mixture is added slowly over 15 minutes to 720 grams of 90% nitric acid. The temperature is maintained during this addition at 25-30°C. After all the P.E.A./sulfuric acid is added the mixture is stirred for 30 minutes at 30 degrees C. The temperature is then raised to 40 degrees and stirred for 30 minutes. The temperature is then raised to 50 degrees for thirty more minutes with stirring discontinued. This mixture is then poured

into 3 times its volume. Of water/ice and the resulting product is filtered out. It is then washed three times with 600 ml water. Then the product is washed with 500 ml water and add 25 grams of sodium bicarbonate (baking soda). It is again washed with 500 ml of fresh water and dried. This product is Pentryl. It may be recrystallized from benzene if desired for purification.

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POTASSIUM PERCHLORATE PLASTIQUE

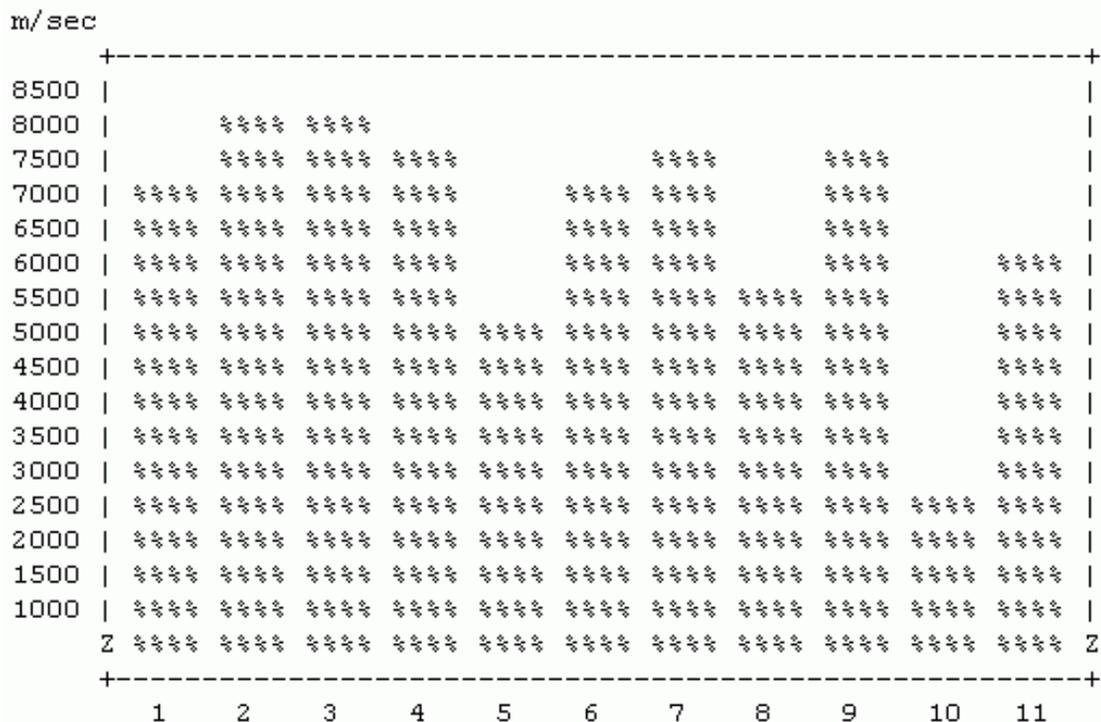
This explosive makes use of potassium perchlorate as an oxidizer with several high energy fuels. Plasticity is gained by the addition of a crankcase oil viscosity increaser such as S.T.P. Oil Treatment. Also the addition of finely powdered flake aluminum gives this explosive a very high detonation temperature. Temperature of the detonation will be 3000-4000 degrees C. This explosive will not have the high detonation velocity of some of the other explosives in this book. Blast coefficient will be very high with the free hydrogen giving a secondary air blast due to its secondary combustion. This explosive would not be a good choice for shaped charge application as its detonation velocity will be too low. It could be used for a variety of other demolition type uses however.

MANUFACTURE:

Place 400 grams of potassium perchlorate in a plastic mixing bowl. Add to this 140 grams of finely powdered aluminum (400 mesh). This is mixed very well with a wooden or plastic stirring rod or spoon.

CAUTION: When the aluminum powder and potassium perchlorate is mixed it is flame and friction sensitive. Great care should be used when mixing these compounds together. Also breathing of aluminum dust is very hazardous and proper precautions should be taken to avoid this (respirator). When these two components are well mixed add 18 grams of motor oil additive (S.T.P. Oil Treatment) and knead carefully into the powder. Of course the kneading is done by hand with gloved hands. This is kneaded until a very uniform mixture is obtained. The resulting grey putty is then ready for use. It can be stored for a good length of time but the mixture should be kneaded well before being stored.

Comparison of approximate detonation velocities



1: TNT, 6700 m/s

- 2: C-4, 8200 m/s
- 3: Methyl nitrate plastique #1, 7800 m/s
- 4: Nitric acid plastique #1, 7600 m/s
- 5: Silicone plastique #1, 5200 m/s
- 6: Silicone plastique #3, 7800 m/s
- 7: Silicone plastique #2, 8000 m/s
- 8: Composite plastique #1, 5500 m/s
- 9: Nitro Methane plastique #1, 7500 m/s
- 10: ANFO, 2500 m/s
- 11: 60% Dynamite, 5800 m/s

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KITCHEN IMPROVISED BLASTING CAPS

by Tim Lewis

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HOW BLASTING CAPS WORK

I know you have seen before, on T.V., the western where the good guy sticks a fuse in a stick of dynamite and presto he has a fuse detonation device? If you have used explosives in the military or otherwise you know that this is a bunch of huey! While there are explosive compositions that can be made to detonate this easily, this same trait gives them a dangerous nature that requires very special precautions, if they can be used at all.

Detonation is in essence a chemical reaction brought about by a high velocity shock wave at speeds as low as 1100 M/sec. and going up to 9300 M/sec. for "Medina" explosives. This shock wave is initially produced by the blasting cap and is continued throughout the explosive charge as the detonation progresses. These waves have the appearance, in high speed photos, similar to ripples in a smooth pond of water as a pebble is thrown in. These detonation waves must meet or exceed certain strength and rate requirements to detonate a particular charge or explosive. Each explosive has a different requirement for detonation from the blasting cap standpoint. A good rule of thumb for any explosive is to use more blasting cap than is needed. This is a good idea as most explosives can be overdriven with a larger than needed detonator. By overdriven, I mean that an abnormally high detonation rate can be achieved as the high speed detonation from the cap will carry over in the explosive.

Many people with whom I have conversed, have mentioned pipe bombs that are made by filling a pipe with either black powder or smokeless powder. These pipe bombs are poor for fragmentation due to the actual deflagration nature of this type ordinance. Deflagration is the simple burning of a propellant or explosive. This will generate pressure great enough to rupture the container (pipe) and no more. 2" schedule 40 pipe will rupture at approximately 7144 P.S.I. If black powder or smokeless powder is being used, this is the maximum pressure a pipe bomb would generate. If this same pipe were filled with powdered ammonium nitrate-fuel oil explosive and detonated with a blasting cap with an approximate pressure of detonation of 600,000 P.S.I. plus. This same set up (cap initiated) with "Bullseye" brand smokeless powder from Hercules Inc. Wilmington Delaware as a pipe filler with a blasting cap will generate approximately 2,000,000 P.S.I. plus detonation pressure. This amounts to an 8300% and 28000% increase over deflagration respectively. As these figures prove, true detonation is awesome and an unbelievable increase over simple propellant deflagration explosive fillers. Most of the high CHNO explosive groups will make the transition from deflagration to detonation. Usually this transition will require the build up of a good deal of pressure. The ammonium nitrate cargos of the High Flyer and Grandcamp are said to possibly have undergone this type of deflagration to detonation transition. This transitions, caused the detonation of their cargos of thousands of tons of fertilizer grade ammonium nitrate. This detonation in Texas City, Texas Harbor, in 1947 generated 50 million dollars damage and jiggled seismograph needles in Denver, Colorado. This was the largest nonnuclear explosion in U.S. history.

As mentioned earlier we have explained that detonation is a shock wave introduced chemical reaction. This detonation wave, and what happens, is perhaps explained easier in the drawing below. In this drawing the zone in front of the shock wave is the unreacted zone. Behind this zone, the shock wave is seen. This area of the shock wave is called the "Shock zone." This is the mechanical shock wave that originated at the detonator. This shock zone is usually 0.00001 cm long. The "chemical reaction zone" immediately follows the shock zone. The shock zone is the point of the highest pressure of the detonation. The "chemical reaction zone" is the part of the detonation zone that has the highest temperature and velocity. This chemical reaction zone is where the actual chemical reactions of the detonation, and the subsequent detonation byproducts are produced. This zone does not actually include the detonation byproducts because the reactions are not complete. This chemical reaction zone is usually 0.1 to 1.0 cm long. One of the characteristic differences of deflagration and detonation is the flow of the byproducts. In deflagration the products flow from the combustion zone. In detonation the products flow toward the shock zone.

At times the detonation zone in an explosive can progress through the explosive at a much slower than normal rate. This is called low order detonation. Nitroglycerin, one of the most powerful explosives known, still has this undesirable trait. "Nitro" can detonate with high order detonation rates of over 8000 M/sec. while low order detonation can be as low as 1500 M/sec..

Density of explosives have a great bearing on the rate of the detonation zone than the explosive mass. Every explosive has a greater detonation velocity with respect to the density. These are fixed and unchangeable under ideal conditions. Usually, the greater the density, the higher the detonation rate. Also, the higher the density, the lower the sensitivity. These statements, of course, are generalizations and will not hold true always. In a classic sense they give somewhat of an idea as to the way explosives perform.

As this is a field of explosive that can become a lifelong study, we won't attempt to give course in these theories. It is good, however, to understand why explosives perform the way they do so that maximum use could be had from them. The theory above is the hydrodynamic theory of detonation. This is the most generally accepted of the explosive detonation theories. For further reading here are two good books:

-DETONATION AND TWO-PHASE FLOW

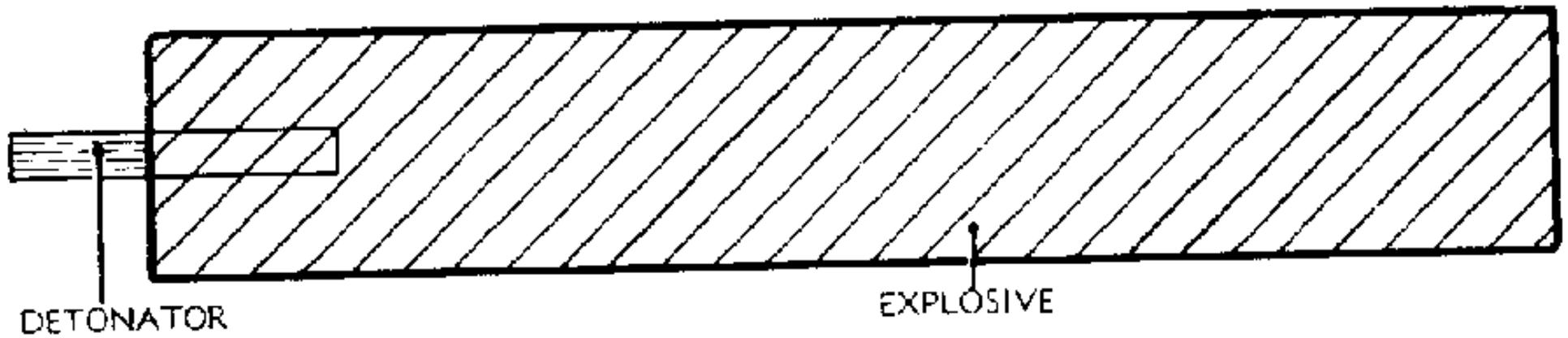
Vol. 6 of "Progress in Astronautics and Rocketry"

by S.S. Penner & B.P. Mullins Academic Press (NY NY)

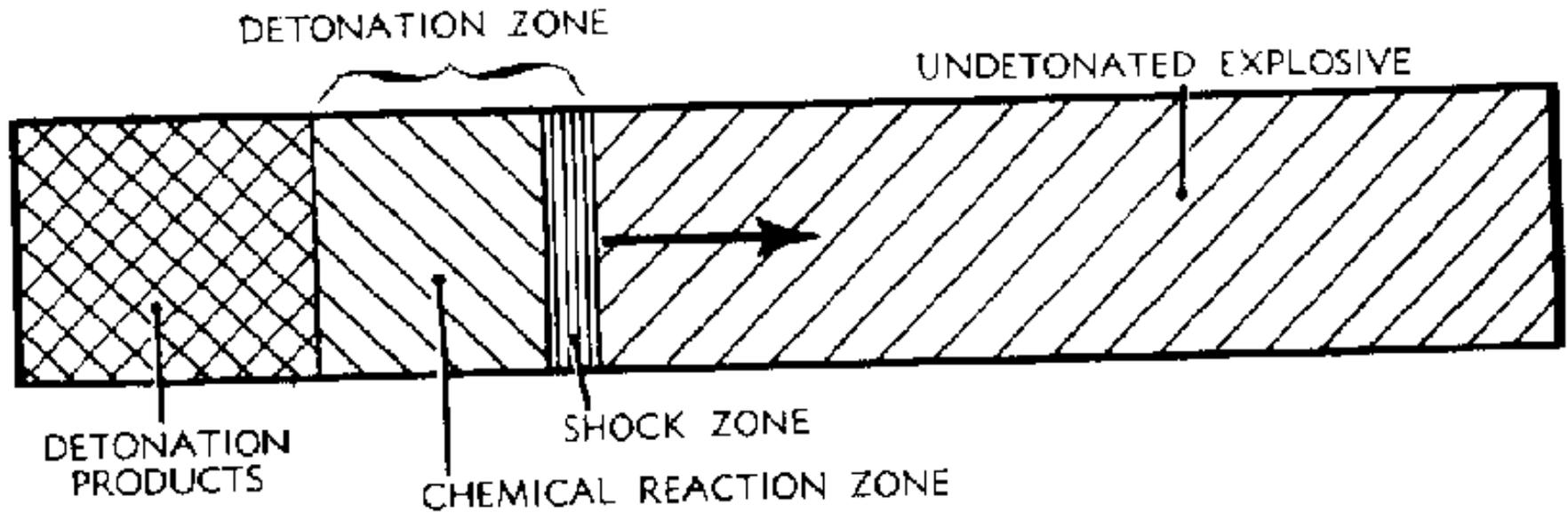
-SCIENCE OF HIGH EXPLOSIVES

by M.A. Cook

Available from Information Publishing



A—EXPLOSIVE BEFORE DETONATION



B—EXPLOSIVE PARTIALLY DETONATED

For the purpose of this book we will cover two different types of explosives. Primary and base explosives, with respect to blasting cap manufacture and the manufacture of these explosives.

Primary explosives are usually sensitive to shock, friction, and heat. They are used to detonate the base charge in blasting caps. These explosives are used due to the ability of the primary explosive to make an easy and quick transition to detonation. As a general rule, these explosives require very little confinement to make the deflagration to detonation transition.

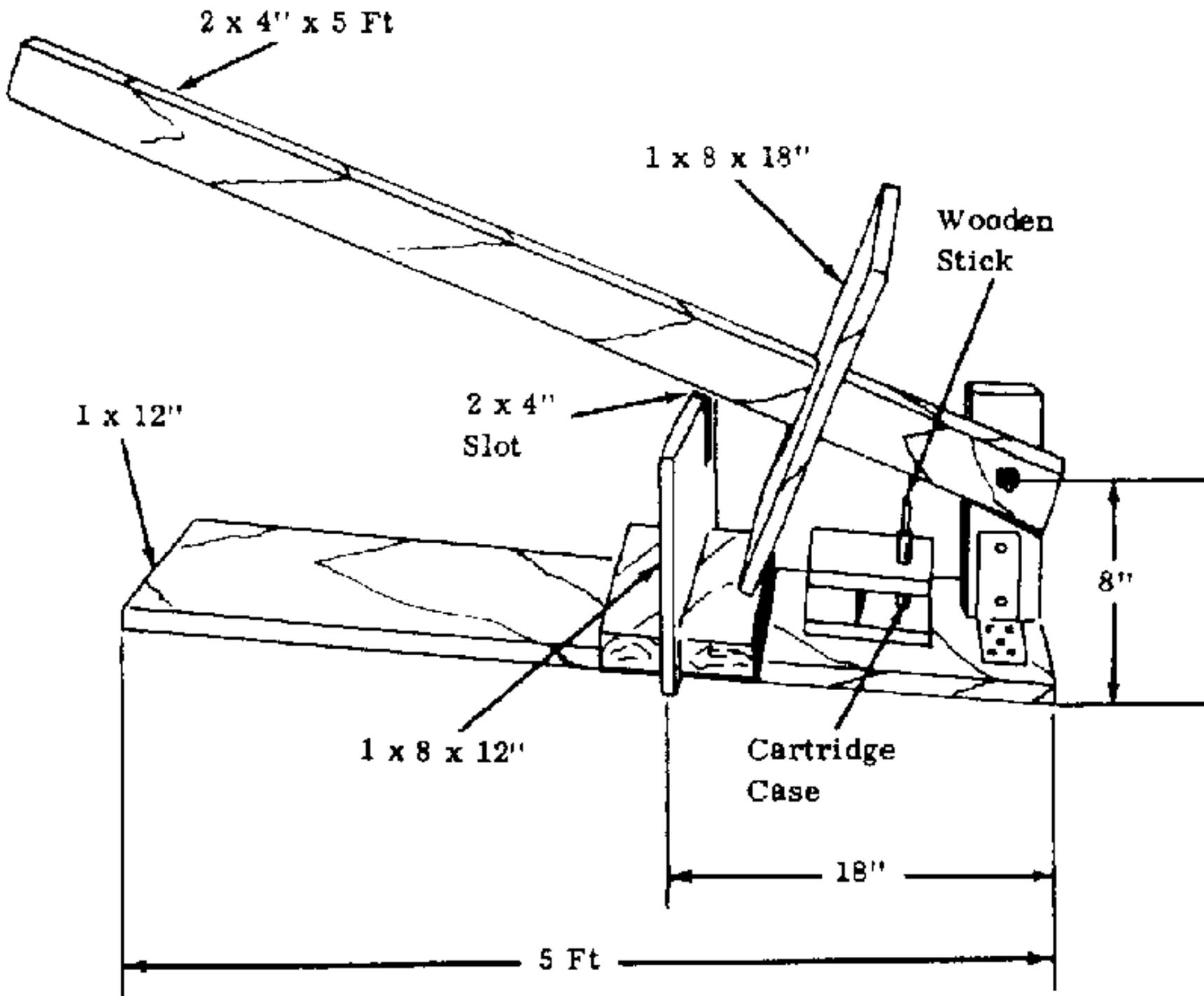
The detonation wave set up by the primary explosive is the beginning of the detonation process. This primary shock wave will detonate the base charge in the caps. The base charge of the cap is normally R.D.X. or some other high explosive. The base charge needs to be powerful and stable, but still sensitive to the primary detonation wave. The 6700 M/sec. plus base charge detonation velocity, will set off the main charge and with lower velocity explosive will overdrive them by sending such a high velocity shock wave through the explosive.

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FUSE CAP MANUFACTURE

Being totally realistic one cannot hope to produce a blasting cap comparable to commercial products. The precision of modern manufacturing can produce caps cheaply and safely. The actual loading process is a dangerous one, but can be made relatively safe by taking the precautions outlined in the processes below. The home producer, can however, manufacture a cap that will work 99% of the time. These "homemade" caps will detonate most of the high explosives that their commercial counterparts will.

Fuse caps are blasting caps that are fired by the flame from a safety fuse. This flame ignites the flash charge of loose black powder. This, in turn, ignites the primary explosive. This primary explosive makes the transition from burning (deflagration) to detonation. These caps can be loaded as a simple cap or a compound cap. The simple cap has only the flash charge and the primary explosive. The compound caps have both these ingredients plus a high explosive base charge. The compound caps are usually a good deal stronger due to the high explosive base charge. To manufacture these caps the explosives are simply pressed into the cap container. This container should be 1/4 inch in diameter (or larger) copper or aluminum tubing 1.25" long or a 5.56 mm N.A.T.O. spent cartridge. The tubing can have one end sealed with a wooden plug or simply be crimped closed with a pair of pliers. The burr should be removed from the open end of the tubing. After removing this burr, these tubes would be ready to load with the explosive charges. When using a 5.56 mm N.A.T.O. spent case the primer would need to be removed. After this has been done the flash hole would need to be enlarged enough to accept the fuse. This could be accomplished with a hand drill or by using a nail. The cap case would then be ready to insert the fuse and load with the explosive charges. The copper or aluminum tubes would need the base charge to be pressed in first. This pressing should be done with a close fitting wooden dowel. This should also be done with the tube supported rigidly from underneath and surrounded with bags of sand to absorb the explosion, if necessary. Find in this section a drawing of a loading apparatus. This apparatus would be safe as the operator would be remote. This press would be simple to make and would be highly recommended. Next the primary charge should be pressed into the tube.



CAUTION: Primary explosives are very sensitive to friction and impact! Extreme care should be taken in this step of the procedure. A foul up here could be very dangerous! After this primary charge is pressed a very small amount of black powder is placed on top of the primary charge. This will ensure the ignition of the primary charge. The fuse

is then placed in the mouth of the filled tube so that the end contacts the black powder ignition charge.

NOTE: Use only good quality safety fuse available from: Westech Corp. P.O.B. 593, Logan UT. 84321, Zeller Enterprises, P. O. Drawer W 2, Wickenburg A Z.85358. Good fuse can be made by soaking cotton twine in a saturated solution of potassium chlorate. This, however, will not be as reliable and therefore not as safe.

A small wad of cotton is then pressed on top of the fuse and igniter charge so that the fuse can exit the tube on one side. This is then crimped with pliers. Care should be taken to ensure the primary explosive is not present in the area of the tube to be crimped, as this crimping with this primary in between the tube walls could very well cause the premature detonation of the cap. This cap would then be ready to use.

Simple caps can be loaded similarly with the deletion of the base charge in the loading. They can also be loaded into a .22 magnum spent cartridge case in a manner similar to the method above. These small caps will not be as powerful as the larger caps. Some of the primaries would not be suitable and all of the others would need their primary charge doubled for maximum performance.

The 5.56 mm cartridge case would be load is the exact opposite of the copper or aluminum tube caps. The fuse would be inserted into the case through the flash hole. The black powder ignition charge would then be place in the bottom of the case. The primary would then be placed in the bottom of the case. The primary would then be pressed into the case carefully and of course on top of that would be the base charge. After these were pressed into the case a small ball of cotton or paper would be pressed into the case to fill the remaining portion. Then the end of the case would be crimped with pliers to close the cap. This cap would then be ready to use.

1/4" aluminum or copper tube.

Igniter: Black Powder .20 G.

Primary:

HMTD .75 G.

DDNP .50 G.

Mercury Fulminate .75 G.

Double Salts .75 G.

Nitromannite .50 G.

Base:

RDX 1.0 G.

PETN 1.0 G.

Picric Acid 1.0 G.

TeNN 1.0 G.

Nitromannite 1.0 G.

MMAN (3/8 " tubing) 3.0 G.

Nitroguanidine 2.0 G.

Tetryl 1.5 G.

As you can see by the above chart the nitromannite is listed as both a primary and a base charge. The reason for this is, that while it is not actually a primary explosive, it tends to function as one. Nitromannite's use as a base charge makes use of the 8000+ M/sec. detonation velocity. This nitromannite is a very touchy substance with sensitivity approaching that of nitroglycerin. It would be best used as a last resort.

5.56 mm Empty cartridge case:

Igniter: Black powder 2.0 G. 3 grains

Primary:

HMTD

DDNP .50 G.

Mercury Fulminate .75 G.

TACC 1.0 G.

Double Salts .75 G.

Lead Picrate 3.0 G.

Nitromannite .50 G.

TACN	4.5 G.
Base:	
PETN	1.0 G.
RDX	1.0 G.
TeNN	1.0 G.
Nitromannite	1.0 G.
Picric Acid	1.0 G.
Nitroguanidine	2.0 G.
MMAN (7.62 case)	3.0 G.
Tetryl	1.5 G.

TACN is listed here as a primary. This is given due to the ease of manufacture. This primary is stated in literature to detonate T.N.T.. The need for a heavy wall thickness detonator capsule would limit this to 5.56 mm shell detonators or larger empty shells. The use of MMAN would require waterproofing the finished cap by dipping in molten wax or paraffin.

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ELECTRIC BLASTING CAP MANUFACTURE

Electric blasting caps offer a good deal more versatility to the blaster. This allows better and more remote blasting operations and the possibility for timed blasting applications are great but cannot offer the versatility of application. The electric blasting cap (EBC) can.

EBC's are very simple in their function. Current is passed through the two wires leading from the cap. This current, due to resistance, heats a small "bridge wire" which in turn fires an ignition mixture. This, in turn, fires the primary explosive and base charge respectively. The problem with improvisation is finding a suitable performing bridge wire which will give reliable performance. Earlier literature has stated that the "guts" from light bulbs will work. They will work but cannot be expected to resist corrosion produced by some situations and could not be expected to give stable reliable detonation instigation.

Take a spent 7.62 mm N.A.T.O. case. with a small pin punch, nail or other small slender rigid object, reach into the case and knock out the fired primer. Enlarge the flash hole with a 1/8 inch diameter drill. Deburr this enlarged hole so that the wires passing through will not have their insulation cut by these burrs, and thus causing a dud. Pass two sections of 22 gauge insulated wire, twelve inches long, through the 1/8 inch hole so that they go completely through the case, and their ends are free of the case mouth. Strip 1/8 inch of the insulation off the wires protruding from the case mouth. Cut a 3/8 inch section of .01 inch "nichrome wire", which is available at any hobby store or from nearly any electronics supplier. Nichrome wire is the wire inside toasters and other appliances that gets hot when current is passed through it. Discarded appliances could be another source of this wire. This piece of nichrome wire is spliced into both of the wires at the case mouth. Splice the 22 gauge wires to both ends of the nichrome wire bridge. This splice can be formed by twisting the nichrome wire around the upper part of the stripped 22 gauge wire and the lower part of the 22 gauge wire bent up to form a loop. A drop of solder is placed on these splices to ensure a good circuit. Outside dimensions of this improvised "bridge wire" should not be greater than .28 inches. A small wooden support should then be placed above the junction of the bridge wire. This will help the improvised bridge resist deformation and breaks from loading the cap. This wooden support could be made of a wooden match stick cut to length. This support should be 1/4 inch or less in length, with the ends notched out for the 22 gauge wire. These wires should be glued on the support stick. This whole bridge wire unit should be narrow enough to allow it to be pulled inside the 7.62 mm case even with the priming mixture on it. The wires should be twisted together on the other side of the wooden support after the glue on the ends of the support stick have dried, securing the wires in place. These bridge wire units are now ready to have their igniter composition placed on them. We will give three different compositions for this.

#1

Match heads (ground damp with acetone)	50%
Smokeless powder	50%

#2

Black powder (improvised will work)	50%
Smokeless powder	50%

#4

Potassium Perchlorate	60%
Sulfur	38%

White glue (Elmer's) enough to form a pasty mass

The first two of these compositions should be used by mixing and slightly dampened with acetone. This will form a putty type mixture. This is pressed very gently around the bridge wire assembly. Remember, you have to get this back into the case, and when dry this priming mixture will be as hard as rock. It should also be said that great care should be taken to ensure the continuity of the circuit. This can and should be checked by using a ohm meter. Let these dry, and they are almost ready to load with explosives. You may want to test one of these before loading to see how they work. In tests, these bridge wires when used in ignition squibs, were 98% reliable. They are also sensitive to 2 "C" batteries or larger.

Gently pull the bridge assembly into the case with the wires extended from the other side: When firmly in the case as far as possible, put several drops of "model airplane glue" in the recess where the spent primer was. This is allowed to dry. When dry, these are ready to load.

These are loaded with the same amounts of explosives as the fused caps so use the table in that section of this book to find the quantity to load. The only difference is the amount of black powder igniter used. Use 1/8 to 1/4 gram of black powder for the igniter charge. This is done to cushion the bridge wire when the primary and base explosives are pressed in. After the addition of the black powder igniter, tap the case to settle this charge. The primary explosive charge is very carefully pressed on top of the igniter charge with a wooden dowel and remotely if possible. Best results will be obtained with the press apparatus. See the drawing. The base charge is then pressed on on top of the primary charge. Check the circuits, one at a time, with a OHM meter from behind a barricade. Press cotton in the remaining part of the case, a crimp with cotton, in the part of the case that is being crimped. These can be water proofed by dipping the completed cap in hot wax for just long enough to immerse them completely. These caps are ready to use and will equal a #8 or #10 blasting cap.

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HMTD (Hexamethylenetriperoxidodiamine)

DETONATION VELOCITY

4511 M/sec. @ 0.88 G/cc

5100 M/sec. @ 1.10 G/cc

FRICION SENSITIVITY

Very Sensitive!!

BEHAVIOR TO FLAME

Small quantities flash like guncotton, large accumulations will detonate.

HMTD is a high performance initiating explosive. It is one of the better initiating explosives but has some definite drawbacks. HMTD is not stable at even slightly elevated temperatures. Room temperature will even cause a decrease in performance with storage time. As one would imagine, due to the extreme excess of oxygen, the corrosion of metals in contact with the peroxide is a problem. The metals that will cause problems are aluminum, zinc, antimony, brass, copper, lead and iron. These metals in contact with the HMTD even when dry, will cause corrosion. With water present, in the HMTD, the corrosion would more quickly disable an improvised blasting cap that could be made with this material. Spraying the inside of your copper tubing with urethane plastic would most likely reduce greatly, if not completely stop, this corrosion problem. To manufacture HMTD, use one of the processes below.

Process #1

Obtain 6% hair bleaching peroxide which is available from any beauty salon or beauty supply store. This is a 20 volume hydrogen peroxide. Place 9 teaspoons of this. 6% peroxide in a one pint canning jar or 500 ml beaker. In three portions dissolve by stirring 2-1/2 teaspoons of powdered hexamine (Crushed U.S. Army ration heating tablets, See "Kitchen Improvised Plastic Explosives" chapter 2, "Urintropine" etc.). This is stirred until all the hexamine dissolves. The solution should then be chilled in a ice water bath for 1/2 hour. To this chilled solution add, in four portions, 4-1/2 teaspoons of powdered citric acid. Citric acid is readily available and should be found with canning supplies or in a pharmacy. With each addition the solution should be stirred until the citric acid dissolves in the liquid before another addition is made. When all the additions have been made continue stirring the liquid. The beaker or jar containing the solution should remain in the ice bath. The solution will become cloudy. With the completion of the 1/2 hour stirring the liquid is placed in a refrigerator. This will speed the process. If a refrigerator is not available let the solution stand for 24 hours. Filter the solution through a paper towel or coffee filter. The white substance is the explosive.

CAUTION: HMTD is sensitive to shock, impact, friction, heat and open flame. Extreme care should be exercised. HMTD will detonate from any of these stimuli even when soaked with water.

These white crystals are washed with 45 ml of distilled water. Tap water can be used if necessary, but will yield a compound of lesser purity. They are then washed with 75 ml methanol alcohol. These crystals are allowed to dry in a cool dry place. If a 30% technical grade ("Superoxol") of hydrogen peroxide is available it should be used instead of the 6%. If 30% is used the proportions are as follows to use in the same process as above are:

HYDROGEN PEROXIDE (30% d. 1.11 G/cc)	185 G
HEXAMINE (Crushed ration heating tablets)	56 G
CITRIC ACID (tech. grade or food grade)	84 G

These are used in the procedure given above. Simply "plug in" the amount immediately above for the spoon wise proportions given in the 6% hydrogen peroxide process and the washing would be done with 150 ml cold water. Of course in the procedure if 35% or 40% is the only type hydrogen peroxide available, then simply calculate the actual weight of hydrogen peroxide. We know that 185 G. of peroxide are used above. This is 30% hydrogen peroxide. $185 \text{ G.} \times .30 = 55.5 \text{ G.}$ We know that we need 55.5 G. hydrogen peroxide. Suppose we have some 40% peroxide. We take our 55.5 and divide by .40 thus $55.5 / 0.40 = 138.75$. Simply use 139.0 G. of this 40% hydrogen peroxide in the procedure above. The yield of this process with 30% hydrogen peroxide is much greater than is the use of 6% hydrogen peroxide. But with the 6% being the easier of the two to obtain it still would hold possibilities

PROCESS #2

This second process is one of very easy acquisition of the main ingredients. Yield is not as high as the procedure above with either strength peroxide. This process makes use of the easy formation of hexamine and the parallel formation of a slightly acid solution. This acid is liberated from the ammonium sulfate salt. It is, of course, sulfuric acid. This acid performs the function of the citric acid in the procedure above. This is after the free ammonia and the formaldehyde form hexamine. Yield will be relatively low with this procedure but the materials are readily available and cheap. Since this procedure takes place at an elevated temperature there will be some loss of product to this subsequent heat and the decomposition that will accompany it. This process will work and could be used if necessary.

Five hundred grams of 3% hydrogen peroxide are placed in a quart jar or 1000 ml beaker. Three percent hydrogen peroxide is available as an antiseptic solution in grocery stores, etc... To this is added fifty grams ammonium sulfate. Ammonium sulfate is available as common fertilizer. This is stirred until dissolved. This liquid should be heated in a water bath to 55 degrees C. (131 degrees F.). Immediately when the temperature reaches this temperature add 5.3 grams of 37% formaldehyde solution. Stir this solution well and take off water bath. Let this liquid cool to room temperature and set for 24 hours. A white product will be seen in the liquid at this time.

CAUTION: This white product is dangerous and sensitive to FRICTION, SHOCK, HEAT OR FLAME. Handle with great care !! Even wet H.M.T.D. is dangerous and will detonate with ease.

This is filtered out and washed with one washing of 50 ml distilled water and then with 75 ml of 100% methanol. The methanol will speed the drying process. This white fluffy powder will be H.M.T.D. This powder will be sensitive to friction and small quantities should be handled.

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DDNP (Diazodinitrophenol)

DETONATION VELOCITY 4400 M/sec. @ 0.9 G/cc
6600 M/sec. @ 1.5 G/cc
6900 M/sec. @ 1.6 G/cc

FRICTION SENSITIVITY Less sensitive than mercury fulminate and the same as lead azide.

BEHAVIOR TO FLAME Small quantities flash like gun cotton. 6 grams and larger would likely detonate.

DDNP is one of the highest in performance of nearly all the homemade primary explosives. It is stable and compatible with other explosives, but, lead azide. This is a good choice for manufacture as the precursor to this DDNP primary explosive is picric acid. Picric acid is more powerful than T.N.T. with a detonation rate of 7200 M/sec. it becomes the base charge for your homemade caps. It is prepared by a diazotization reaction on picramic acid. This is produced from picric acid, sodium hydroxide (lye) and sulfur. See picric acid for its manufacture instructions.

MANUFACTURE:

In a pint glass jar place 90 ml warm water and 1.5 grams of lye (sodium hydroxide). Mix these with a "teflon" stirrer until all the lye had dissolved. Dissolve 9 grams of picric acid crystals in the lye-water solution by stirring. Label this jar solution #1. In a 500 ml beaker 3 ml of water is placed. Dissolve 7.5 grams of sulfur and 7.5 grams of lye (sodium hydroxide) by stirring the solution. Boil this solution over a heat source. When the solution turns dark red remove and allow the liquid to cool. Label this solution #2. Add this cooled solution #2 in three portions, to solution #1. Stir with a teflon rod while the liquid is being added. Again allow the solution mixture cool. Filter this mixture through filter papers (coffee filter, paper towels). Small red particles will gather on the paper. Discard the liquid. Dissolve these red particles in 180 ml of boiling water. Remove and filter this hot liquid through a filter paper (coffee filter, paper towels). Discard the particles left on the paper and label the liquid left #3. To Solution #3

with an eyedropper slowly add sulfuric acid (Janitor supply, boiled battery acid) to the filtered solution until it turns orange brown. Add an additional 7.5 grams of acid to the liquid. In a separate pintjar, dissolve 5.4 grams of potassium or sodium nitrite in 240 ml of water. Label this solution #4. In one portion solution #4 is added with stirring to solution #3. Allow the solution to stand for 10 minutes. The mixture will turn light brown.

CAUTION: At this point the brown color is the DDNP that has formed. Keep away from flame, avoid friction and keep from shock.

Filter the light brown solution through a filter paper (paper towel, coffee filter). Wash the particles left on the paper with 60 ml of water. Allow to completely dry for 24 hours. Drying time can be reduced to 2 hours if crystals are placed in a shallow pyrex dish and this placed in a hot (notboiling) water bath.

CAUTION: DDNP is sensitive to shock, friction and flame. Expose to any of these will very likely detonate the compound prematurely.

This powder should be stored in small quantities in stoppered glasscontainers. More safety in storage leave 25% water in the powder and dry immediately prior to use.

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ACETONE PEROXIDE (Acetonetriperoxide)

DETONATION VELOCITY 3750 M/sec @ 0.92 G/cc
5300 M/sec @ 1.18 G/cc

FRICION SENSITIVITY Very sensitive. One of the more sensitive in this book.

BEHAVIOR TO FLAME Burns violently and sometimes detonates even in small quantities.

Acetone peroxide is a powerful primary explosive. It, as with other explosive peroxides, seems to be very volatile. In standing 10 days at room temperature, 50% of the sample will completely volatilize. It is a powerful, brisant explosive. It's vaporizable nature makes it a explosive that would have to be used immediately after manufacture. However, this explosive is compatible with metals and will not cause their corrosion and the subsequent dangers involved. It is also compatible with picric acid, R.D.X., T.N.T., P.E.T.N., Tetryl, potassium chlorate and antimony sulfide.

It is highly friction sensitive and extreme care should be taken to avoid this. Acetone peroxide is one of the most sensitive explosive known to man. Great care would be needed to handle this explosive carefully. It is a powerful primary base charge in the cap. Also mixtures of R.D.X. and Picric acid with acetone peroxide are reported to be used between primary explosive and the base charge.

CAUTION: Acetone peroxide one of the most sensitive explosive known to man. this composition is dangerous and would need to be handled by someone with a lot of common sense. Mixtures such as picric acid/acetone peroxide (40/60) or similar mixtures with R.D.X. and P.E.T.N. will give explosives greatly increased resistance to impact without losing much initiation performance.

Great care would be needed to ensure the safety of the manufacturer due to the high sensitivity of the acetone peroxide. These dried crystals would be ready to load into detonators for immediate use as the storage stability is not very good.

MANUFACTURE:

Acetone peroxide is formed when hydrogen peroxide 30% acts on acetone. The introduction of dilute sulfuric acid causes the reaction to go into completion. Procedure is as follows. 50 ml acetone is placed in a one pint jar or 500 ml beaker. To this is added 30 ml hydrogen peroxide (30%). This liquid is placed in an ice water bath and cooled to 5 degreescentigrade. To this cooled mixture is added 3 ml of sulfuric acid (20%). This addition is done at 5 degrees centigrade and done in a dropwise fashion. When the temperature begins to rise (10 degrees C.), slow the addition until the temperature falls again. With the completion of the addition stir the mixture. A flocculent precipitate will form. This is filtered out after the mixture stands for one hour. Wash the white product three times with water (distilled preferably). Let the material filtered out of the reaction liquids and washed and dry this solid. By spreading out the acetone peroxide this drying process can be speeded up. These dry crystals are now ready for loading into the caps as a primary explosives.

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DOUBLE SALTS

DETONATION VELOCITY 3600 M/sec. @ 3.96 G/cc

FRICION SENSITIVITY This primary explosive is on the same order of sensitivity as is lead azide.

BEHAVIOR TO FLAME Burns violently and sometimes detonates even in small quantities.

These double salts are a basic acetylide group primary explosive. This explosive has good sensitivity, powder and performance. It is readily made from silver (coin), nitric

acid and calcium carbide/ water or acetylene. This is an easy compound to make. What I found interesting is the fact that this primary is not photo active. Most silver salts are light sensitive. This would be a good choice due to the wide availability to the main ingredients. DDNP, HMTD and mercury fulminate, are better primary explosives but this one has many possibilities. With this primary explosive suitable caps could be made and would be very usable and storage stable as some others in this publication could not.

MANUFACTURE:

Dilute 10.1 ml of nitric acid (red fuming) with 6.75 ml of water. If reagent or technical grade acid is available (70% strength) this will not need any water mixed with it to reduce the strength. Simply use 17.5 ml of this 70% nitric acid. Place a silver dime or equivalent amount of silver metal in the acid. It will dissolve leaving a green solution.

CAUTION: Avoid the brown gas (nitrogen dioxide) produced when dissolving the silver metal in the acid. This gas is a deadly poison and the immediate exposure to the gas and its subsequent damage will not show up for hours or even days! This should be done with good ventilation!

It may be necessary to heat the liquid to get the coin or metal to completely dissolve. Pour this green solution into a tall slender glass jar such as an olive jar. Place this jar with the green solution in it in a hot water bath and heat. Crystals will form. The heating is continued until these crystals dissolve again. In another flask or even a "Coke" bottle, place ten teaspoons of calcium carbide into this flask with a cork with a hose passing through a hole in the cork. Place the other end of the hose in the tall jar with the solution in it. Remove the stopper from the flask or bottle and add one teaspoon of water.

CAUTION: Acetylene gas is highly flammable and an explosion hazard. Keep away from heat and flame as much as possible.

The gas should begin generating. Add one more teaspoon and place the stopper back into the container. The acetylene gas generated by the calcium carbide and water should be going through the hose and bubbling through the solution in the tall glass. Bubble this gas through the solution for 5-8 minutes. Brown vapor will be given off by the liquid as it absorbs acetylene and white flakes will begin to be formed in the silver solution. Remove the solution from the heat source and allow it to cool. Filter the liquid through a filter paper (paper towel, coffee filter) into a glass container. Green crystals will be caught on the filter paper. These green crystals would then be washed with 45 ml alcohol. The crystals will change from green to white in color and the methanol wash will turn green. Place these white crystals on a paper towel and allow to air dry.

CAUTION: Handle this dry explosive with great care. Do not scrape or handle roughly. Keep away from flame or spark source or heat and store in a cool dry place.

These salts will perform well and are easy to make. Their stability is good, which is very important. A good choice of primary explosives.

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TACC (Tetraminecopper (II) Chlorate)

DETONATION VELOCITY	Not given
FRICITION SENSITIVITY	This primary explosive is as sensitive as is lead azide
BEHAVIOR TO FLAME	Deflagrates with a green flame. Requires confinement to detonate.

Tetramine copper chlorate is a very interesting primary explosive. While it has these good properties it is also easily made. Its drawbacks are the tendency to "deadpress" or become so packed that it will not detonate the base charge in the cap and water contamination problems. For this primary explosive to detonate it must be loose in the detonator shell. It would be best used in caps where the base charge is pressed in first. Rifle shell improvised blasting caps would not work well with this explosive due to this property. In this reaction the sodium chlorate and the copper sulfate are heated together with methanol. This reaction produced copper chlorate. This copper chlorate dissolved in methanol. It then has ammonia gas bubbled thru the solution. The tetramine group is added in this step. So the main actors in this chemical play are copper sulfate other wise known as "blue vitriol". Copper sulfate is available from feed stores or electroplating chemical supplier. Sodium chlorate is also a chemical required and would be available from matches, dyes, textiles manufacture and as a weed killer. "Kitchen Improvised Plastic Explosives" has a section on chlorate manufacture in chapters four five and six. Ammonia is the last building block. This can be generated in one of two ways which will be explained in the manufacture section. The methanol used is just a reaction liquid and a carrier, as it does not actually enter into the reaction. One problem with this process is the contamination of the methanol with water. This allows the sodium sulfate to become soluble in the first reaction and will remove the ability to separate the products of the reaction. The process is longer than others but is simple and produced a good purity, stable product. This primary explosive should be kept dry, as it could begin to decompose in the presence of moisture.

MANUFACTURE:

Measure 15 grams of sodium chlorate into a large mouth pint bottle. Sodium chlorate is the oxidizer in matches. It is also available as a weed killer. Add 360 ml of methanol or ethanol to the sodium chlorate in the pint jar. To this add 24 grams of copper sulfate. Place this liquid in a hot water bath. Heat at the boiling point for 30 minutes with occasionally stirring the liquid during the reaction.

CAUTION: Remember methanol is very flammable and great care should be taken to ensure the lack of open flame in its proximity. Avoid breathing the vapors of methanol.

Keep the volume constant by continually adding alcohol to replace what is being boiled away. After 30 minutes remove the jar from the water bath. The color of the solution should change from blue to light green. Filter the solution into a jar through a paper towel or drip coffee filter. The filtrate (liquid) should be caught in a jar similar to the one used in the first step. Label this liquid #1. In a narrow necked gallon jar or flask and a stopper (one hole) place 1500 ml clear ammonia water in the solution. This is available from the grocery store in a clear non-soapy form. In the mouth of this is placed a stopper with one hole and a plastic or rubber hose. This is placed into a hot water bath. Ammonia will begin to generate out of the gallon jug. A better ammonia generator could be made by filling a long necked bottle or flask with 250 grams lye (sodium hydroxide). 500 grams of dry ammonium nitrate fertilizer or ammonium sulfate fertilizer is added. Addition of small quantities of water and closing with a stopper hose set up could generate greater quantities of ammonia and it would be drier ammonia due to the nature of its generation. Generation would be maintained by the addition of more water. But with either method the hose should be placed in the liquid in the liquid #1. The ammonia gas should be bubbled through the liquid. It will begin to absorb ammonia turn light blue. Continue bubbling for 10 minutes.

CAUTION: The ammonia gas generated will kill or cause grave damage if exposure is severe. Use with good ventilation.

The solution will turn dark blue. Bubble the ammonia gas through solution #1 for ten more minutes and remove the hose from the solution. Reduce the volume of the liquid by pouring into a shallow pyrex dish. Set this dish under a fan and allow 1/2 the alcohol to evaporate. Filter (paper towel or drip coffee filters) the crystals that remain in the liquid and wash them with 50 ml very cold methanol. Set these aside to dry for 16-24 hours.

CAUTION: Explosive is shock and flame sensitive and great care should be exercised during handling.

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MERCURY FULMINATE

DETONATION VELOCITY 3500 M/sec. @2.0 G/cc.
4250 M/sec. @3.0 G/cc.
5000 M/sec. @4.0 G/cc.

FRICION SENSITIVITY Sensitive to friction and shocks

BEHAVIOR TO FLAME Deflagrates when one crystal is ignited. Layers several crystals deep detonate violently.

Mercury fulminate had it's industrial beginnings in 1867. Alfred Nobel took out a British patent on the blasting cap, its use and makeup. His first blasting caps were simple ones very similar in many ways to the one in this book. Mercury fulminate was chosen out of a field of explosive fulminating compositions. This was mainly due to the stability that could be obtained and the ability to lend it's self to commercial manufacture at that time. Of course, the primary explosives used today are much superior to mercury fulminate. Mercury fulminate is not good for storage at elevated temperatures over 6-12 months. Five years in the magazine could disable caps. It is a good choice for clandestine manufacture. It would also be a very good choice for electric cap manufacture. The drawbacks would be the poor elevated temperature storage and the toxic nature of mercury and subsequent problems in loading.

MANUFACTURE:

In a pint large mouth fruit jar or 500 ml beaker place either 2 ml water and 10 ml 90%+ nitric acid. Water first of course. If 70% nitric acid is available then place 11.5 ml of it instead of the 90% in the pintjar. Add 1 1/4 gram of mercury. Mercury should be available in thermometers, mercury switches and in old radio tubes.

CAUTION: Mercury fulminate manufacture generates fumes that are poisonous and this whole procedure should be done with very good ventilation.

The metal in the bottom of the jar should begin to bubble. If not add water dropwise to the solution until it does. A vigorous effervescent reaction takes place and red fumes are produced. They should be avoided as they are very poisonous. The mercury will all dissolve in the solution. If not heat gently but from a remote position until it does. After it is dissolved let it cool somewhat. Warm 90 cc of ethanol (90%+, "Everclear") in a quartjar. Add the metal/acid to this ethyl alcohol. The reaction should start within 5 minutes. The fumes put off by this mixture should be avoided. When the reaction is complete the fumes will have subsided and a grey powder will have settled to the bottom.

CAUTION: The fumes produced are poisonous and flammable and they should be avoided as well as flame should be kept away as fumes are highly flammable too!

Filter the grey powder out of the liquid.

CAUTION: The grey powder is the explosive and shock, friction and flame or heat should be avoided! Contact with the crystals should be avoided as the free mercury still poses a health problem!

These grey mercury fulminate crystals should be washed with 60 ml ethyl alcohol. Allow the crystals to dry by spreading them out gently. These dry mercury fulminate crystals are then ready to use. This explosive can safely be stored under water and these crystals could be mixed with 200 ml distilled water and stored until needed.

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LEAD PICRATE

DETONATION VELOCITY 4400 M/sec.

FRICITION SENSITIVITY This primary is very sensitive to shock friction and heat or flame. This sensitivity is high and care should be used in handling.

BEHAVIOR TO FLAME Burns violently and sometimes detonates even in small quantities.

This is a good choice. The precursors to lead picrate and picric acid, lead monoxide and methanol. PA can be used as the base charge in the caps therefore reducing problems and simplification of production. It is not nearly as good a primary explosive as H.M.T.D. or D.D.N.P. but will work and is simple to make. Litharge, picric acid and methanol is all that is needed to make this one. This is a very dense heavy primary due to the lead in it's makeup. So from a cap volume use it is in the same class as all the other primaries in this publication.

MANUFACTURE:

In a shallow glass dish, dissolve two grams of picric acid (see PA section) in ten ml of methanol. All stirring should be done with a teflon or wooden stirrer. Slowly while stirring add two grams of litharge (lead monoxide, white lead litharge-plumbing supply stores) to the methanol/PA solution.

CAUTION: At this point this is a primary explosive. Keep away from flame. Continue stirring mixture until all the alcohol has evaporated. When this happens the mixture will suddenly thicken. Stir the mixture occasionally to stop any lumps from forming.

CAUTION: Beware of drying material forming on the inside of the container. This material will be shock, flame and friction sensitive.

Spread this lead picrate in a flat shallow pan to dry. If possible dry the mixture on a hot water bath for two hours. This will ultimately give a better product with more stability.

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NITROGEN SULFIDE

DETONATION VELOCITY CHARGE WEIGHT - 2.0 Grams in 3/8 copper tubing only.

FRICITION SENSITIVITY Very sensitive to friction great care would be needed to produce this compound.

BEHAVIOR TO FLAME Small quantities (less than one gram) deflagrate with a puff and larger sizes will detonate.

Nitrogen sulfide is a dangerous compound to make. It is sensitive to friction and heat. Mercury fulminate is much safer to use from the friction aspect. This compound is more powerful than mercury fulminate but with slightly less brisance. Storage stability is good for "straight" nitrogen sulfide. In the proper mixture with potassium chlorate the primary explosive is not stable @50 degrees C. for long periods of time. Heat can and will cause detonations. It is however despite these problems, easily prepared from common ingredients. This preparation is a simple one, with a variety of raw materials. As good a primary explosive as lead picrate. The recommended filler with this primary explosive is nitrogen sulfide 80% and completely dry potassium chlorate 20%. This is mixed and 2 grams are loaded over the charge and pressed on top the base charge. Better primary explosives can be had but this one is easy and expedient.

MANUFACTURE:

Place 100 grams of finely powdered sulfur (brimstone: garden supply store, pharmacy, industrial chemical supply) is placed in a tall narrow flask or narrow necked bottle equipped with a two hole stopper and placed in a frying pan filled with oil and heated until the sulfur melts (215 degrees C., 420 degrees F.). In this place a hose from the chlorine gas generator. This generator is a gallon jar with either liquid laundry bleach (5.25% Sodium hypochlorite aqueous solution) or 31% hydrochloric (Muriatic acid, swimming pool supply). to the bleach (total 1.2 gallons) is added in small portions sodium bisulfite ("Saniflush": bathroom cleaners, sodium acid sulfite, swimming pool additive). This generation with the bleach/bisulfite generator should have the bleach split into three equal amounts and reacted with the bisulfite one at a time. The second and third. 4 gallon refill should be done only after the green gas is no longer generated by new sodium bisulfite additions. The spent bleach is poured out of the gallonjug. The second or third fill are poured into the jug the process repeated until all three 2/5 gallon bleach solutions are reacted and the chlorine bubbled through the molten sulfur. To 255 grams hydrochloric acid is added 53 grams manganese dioxide (black manganese oxide: dry cell battery mfg., phosphating solutions, steel mfg.) in small portions. This is done in small additions until all the manganese dioxide is dissolved and the chlorine has stopped it's bubbling.

CAUTION: Chlorine gas is toxic avoid contact and used with very good ventilation. Used as a war gas in WWI.

Immediately after the addition and beginning chlorine generation place a one hole stopper to which some stainless steel or plastic (heat resistant) tubing has been inserted in the hole. The other end of this hose directs the chlorine gas generated through the two hole stopper into the bottom of the now molten sulfur. The other hole of the two hole stopper has a hose inserted just through the stopper. The end of this hose is placed into a flask or narrow necked bottle cooled by a salted ice bath. This sulfur will begin to absorb the chlorine generated. This reaction forming sulfur dichloride. A total of 42 grams of chlorine need to be absorbed by the sulfur. As this chlorine is dissolved sulfur dichloride will begin to form. Sulfur is very soluble in sulfur chlorides and will begin to be dissolved in the chloride already formed. This sulfur chloride will vaporize and collect in the bottle chilled by the salted ice bath. This is done until the temperature drops and begins to boil. Continue to pass the chlorine gas through the liquid. After all the chlorine has gone through the sulfur heat until the sulfur liquid no longer boils. Heat for another ten minutes and allow to cool. The last flask should have caught most of the sulfur dichloride liquid. Take the mixture off the heat and allow to cool. Dissolve 212 gram of this liquid in 1700 grams benzene (common industrial solvent).

CAUTION: Sulfur dichloride (Sulfur chloride) is a pungent oily liquid. All contact should be avoided! All steps of this process should be carried out with good ventilation. Benzene is a very dangerous liquid. Contact with the skin, breathing of the vapors are dangerous and should be avoided. Great care should be used when handling this known carcinogen. It is also highly flammable.

Filter this solution through a paper coffee filter. This filtering should remove nearly all the sulfur. The remaining liquid should have no solids in it. Then ammonia gas generator is set up and ammonia gas is bubbled through the solution. The ammonia generator (ammonium nitrate/lye) is described in TACC section of the primary explosive section of this book. A dark brown powdery powder will collect in the bottom as the ammonia bubbles through the liquid. Keep bubbling the ammonia gas through the solution. Until this brown powder dissolves in the solution and a orange- yellow color is observed. Flocculent ammonia chloride crystals are seen in the liquid. Warm the benzene until it boils. Filter immediately through a filter with 200 grams fresh benzene. Add this benzene wash to the liquid just filtered (filtrate). Let this liquid evaporate until a mushy crystalline mass remains and filter. Let these crystals dry. These golden yellow to orange-red are nitrogen sulfide.

CAUTION: This explosive is friction, flame and shock sensitive. Handle with the greatest care.

This powder must be pressed into the cap using the apparatus shown in the cap manufacture section for proper performance and moisture should be avoided. Contamination with sulfur in mixtures with potassium chlorate could very well cause an explosion!

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SILVER FULMINATE

DETONATION VELOCITY CHARGE WEIGHT - 1.0 G. compound cap

FRICITION SENSITIVITY Extremely friction sensitive! Should not be used if other primary explosives can be made.

BEHAVIOR TO FLAME Single crystals explode violently. Larger amounts than given in the process below should not be made.

Silver fulminate (SF) is an extremely dangerous compound. Friction flame and sometimes contact with the dried product will cause it's detonation. It's performance is fair and the acquisition of the raw ingredients is simple. Never used due to the extremely unstable nature of SF. If other primary explosive options existed they would be better choice than this one. To use this primary explosive it must be mixed with tapioca starch (flour) to reduce this explosive extreme sensitivity. It is easily obtained due to the abundance of silver (coins, powder, ingots). Small batches of SF should be made with protective barricades between the operator and the reaction vessel. Again this explosive is dangerous and should be avoided if at all possible.

MANUFACTURE:

Place 6 ml nitric acid (1.42 G/cc common technical grade acid or "watered" down stronger acid) in a 100 ml pyrex beaker containing 1.2 ml water and heated to 95-100 degrees F.. Place one gram of silver, (coins, bars, powder) in this acid solution.

CAUTION: This addition should be done with excellent ventilation as the nitrogen dioxide fumes generated are very toxic even in small quantities!

This will begin to bubble as the silver is dissolved. This will form silver nitrate in a very acid solution. When the silver dissolves (gentle heating may be necessary to get all the mercury to dissolve). In a 500 ml beaker surrounded by an ice bath place 15 ml 95% + ethyl alcohol ("Everclear" or redistilled concentrate whiskey etc.) and add the silver/acid solution to the liquid not allowing the temperature to rise above 65 degrees C.

CAUTION: This addition will cause the generation of poison gases and should be done with good ventilation.

A vigorous reaction will take place with this addition. Dense white poisonous fumes are given off. As time lapses, the density of these fumes will diminish. The reaction will subside in 20-25 minutes. When the foaming reaction ceases, pour this solution into 200 ml water. The white crystals are then allowed to settle and the clear liquid on top poured off. Add 0.25 gram tapioca starch to the white crystals and filter the solution. The crystals filtered out through a paper towel or drip coffee filter. They are then washed with 30 cc ethanol. These crystals are then used in an area away from sunlight.

CAUTION: This white powder is extremely flame, friction and light sensitive. Friction and impacts should be avoided and the material should be expected to explode at any time. Again this explosive is dangerous even for someone with much laboratory experience. This composition should be avoided and it's manufacture undertaken only as a last resort.

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NITROMANNITE (Mannite hexanitrate)

DETONATION VELOCITY	7000m/sec. @1.50 G/cc
FRICITION SENSITIVITY	As sensitive as nitroglycerin. The sensitivity is greater when between two hard surfaces.
BEHAVIOR TO FLAME	Will deflagrate under some conditions but local overheating from a match will cause detonation.

Mannite is a simple sugar. It finds wide use as a baby laxative, in artificial resins and as a pharmaceutical dilutant. It can, through nitration, become a superb base charge for blasting caps. This explosive is attractive because of it's power and performance characteristics. It has a high detonation rate, good brisance and initiation properties. It has several bad points. It requires concentrated acid (90%+) which is harder to prepare. It has elevated temperature storage problems with greatly increased sensitivity. This instability is brought on by storage at 75 degrees C. for two days. The mixture of tetracene and nitromannite (40/60) will give a powerful brisant primary explosive that detonates from moderate heat. Nitromannite is usually used straight as a base charge for blasting caps with 0.75 gram charge weights giving 100% reliability.

MANUFACTURE:

One hundred grams of nitric acid (Specific Gravity 1.51 G/cc) is placed in a quart jar or 800-1000 ml beaker. This is cooled by surrounding with a salted ice bath. 20.2 G. mannite is added in very small portions with gentle stirring. The temperature should be kept below 0 degrees C. This is done by controlling the amount of time between the additions of the mannite. When the temperature approaches 0 degrees C. stop additions until the temperature has fallen some. After all the mannite has be added 200 G. 98% sulfuric acid is added dropwise to the solution. This is done while the mixture is stirred and with the temperature below 0 degrees C, temperature is again maintained by the speed of the addition. When the temperature rises close to 0 degrees stop the addition and allow the liquid reaction mass to cool before addition is resumed. Completing the addition of sulfuric acid the porridge-like mixture is stirred for 5 minutes and then filtered. This filtering can be done through hardened filter paper or 10 drip coffee filters (simultaneously). This product is washed with water and then washed with 5% sodium bicarbonate/water solution. Then the crystals are washed again with water. This crude product is then dissolved in boiling alcohol with as much dissolved as possible. Place this container in a refrigerator and when chilled filter through one drip coffee filter. The liquid remaining is reheated and water is added until a turbidity is seen (churning of the solution). Allow to cool and filter the crystals out of this solution. Completely dry the material and it is ready to use. Could be kept under water for safety until ready to use.

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R.D.X. (Cyclotrimethylenetrinitramine)

DETONATION VELOCITY	5830 M/sec. @1.00 G/cc 8360 M/sec. @1.67 G/cc
FRICITION SENSITIVITY	Slightly less sensitive than T.N.T. but with 180% the actual power. Particle size reduction should be done while wet.
BEHAVIOR TO FLAME	Burns with a yellow flame. Very seldom if ever transforms into detonation.

R.D.X. is a powerful explosive. It is very stable and has good storage properties. It is widely used commercially as a base explosive charge in detonators and blasting caps. One gram of R.D.X. in a cap with a primary charge will detonate anything a #8 cap will detonate. For the process to make R.D.X. from camp stove fuel - see chapter 2 in "Kitchen Improvised Plastic Explosives" This process while not simple will produce a good product. This is a superb explosive and can find many uses. P.E.T.N. is the only explosive that really is close to being as good a base charge explosive as R.D.X. In "Kitchen Improvised Plastic Explosives II" there is a new process to manufacture R.D.X. Below is a process for extracting this explosive powder from "C-4" plastique explosive. The product will be as good as any for base charge use. C-4 could also be used as a base charge as is!

Extraction:

Take a 1/2 pound block of C-4 and place in a container impervious to gasoline. Add one liter of gasoline. Let this gasoline soak the block until the plasticizers are dissolved (just a powder is settled on the bottom of container) and filter the gasoline. Save the powder and discard the gasoline filtrate. Let this powder dry until it is free of gasoline. This should yield 206 grams of R.D.X.. This powder is ready to use as a base charge in a improvised blasting cap.

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PETN (Pentaerythrite Tetranitrate)

DETONATION VELOCITY	5830 M/sec. @ 1.09 G/cc.
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7490 M/sec. @ 1.51 G/cc.

8300 M/sec. @ 1.77 G/cc.

FRICITION SENSITIVITY

Sensitive to friction between two hard surfaces

BEHAVIOR TO FLAME

Burns quietly after melting with a slightly luminous flame.

PETN is a powerful explosive. Its power is slightly greater than R.D.X. and it is slightly more sensitive to initiation. It is powerful, stable, safe and efficient for the manufacture of improvised blasting caps. PETN is found, in its common form, as the filler in detonating cord (E-cord etc.). If a person had access to this detonating cord he could salvage the PETN out of the cord by splitting it and simply scraping out the filler with a pocket knife or similar tool. The larger primer cord could yield as much as 1.7 lb. (771 grams) of the powder per hundred feet of cord. If access was available this method would be much better and easier than actual manufacture. This manufacture requires the acquisition of fuming nitric acid. This can be bought or made. For manufacture see chapter 2 of "Kitchen Improvised Plastic Explosives" Then the pentaerythrite must be obtained. It is available and is used in the paint and varnish industries as well as in the manufacture of synthetic resins. It is cheap, but could raise a few questions in its acquisition. Sulfuric acid is available from cleaning supply houses and as some generic drain openers. This is one of the best choices for cap base charge explosives. It has great power and will, in a properly constructed cap, give super reliable detonation initiation.

Fuming nitric acid:

To make the red nitric acid you will need to buy a retort with a ground glass stopper. In the retort place 32 grams sulfuric acid, (98%-100%), and to this add 68 grams of potassium nitrate or 58 grams of sodium nitrate. Gently heating this retort will generate a red gas called nitrogen trioxide. THIS GAS IS HIGHLY POISONOUS AND THIS STEP, AS WITH ALL OTHER STEPS, SHOULD BE DONE WITH GOOD VENTILATION.

This nitric acid that is formed will collect in the neck of the retort and form droplets that will run down the inside of the neck of the retort and should be caught in a beaker cooled by being surrounded by ice water. This should be heated till no more collects in the neck of the retort and the nitric acid quits dripping out of the neck into the beaker. This acid should be stored until enough acid is generated to produce the required size batch which is determined by the person producing the explosive. Of course the batch can be larger or smaller but the same ratios should be maintained.

MANUFACTURE:

In a quartjar or a 1000 ml beaker place 400 ml 99% strong white nitric acid. This acid can be bought from a laboratory supply or the fuming red acid produced in process in "Kitchen Improvised Plastic Explosives". This fuming red acid will need to have the excess nitrogen dioxide purged until it is clear. This is done by adding 2-3 grams urea (45-0-0 fertilizer will work) to the acid. The mixture should clear up and lose the red tint. If not, warm the acid in the beaker and bubble dry air through the mixture. With the clear, white acid in the beaker place this beaker in a salted ice bath. Let it cool to below 0 degrees C.. Add with stirring 100 grams of pentaerythrite in small portions to the acid. The addition is done as such a speed that the temperature of the solution does not rise to more than 5 degrees C. When the addition is complete stir the acid/pentaerythrite solution for 15 more minutes. The crystals of the product will probably already have formed somewhat in the liquid.

CAUTION: At this point the crystals are a high explosive and should be treated with respect.

This solution is then poured into a previously prepared gallonjar with 2 1/2 quarts of cracked ice and water. PETN will immediately form and should be filtered out of the solution through a paper towel or drip coffee filters. This should yield 220 grams. This product needs purification. Wash these crystals 3 times with water and then wash 1 time with a 5% sodium bicarbonate solution. Wash once more with water and then dissolve the crystals in hot acetone. Let this cool and the crystals will begin to fall out of solution. Add an equal volume of water to the acetone and the crystals will fall out of solution. Filter these crystals out and wash with methanol and let them dry. This PETN can be dried by either simply air drying for 24 hours or by drying in a hot water bath. These dried crystals are ready to use.

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PICRIC ACID (2,4,6- trinitrophenol)

DETONATION VELOCITY

4965 M/sec. @0.97 G/cc

6510 M/sec. @1.4 G/cc

7480 M/sec. @1.7 G/cc

FRICITION SENSITIVITY

More sensitive than T.N.T. but not substantially. Metals should be coated to ensure the formation of picrate salts. Coating copper tubing or rifle cases with urethane plastic spray could prevent this from happening.

BEHAVIOR TO FLAME

Small quantities burn with a sooty flame after melting. Large quantities can transform the deflagration into detonation in some rare instances.

Picric acid is a good choice of explosive base charges in caps. Relative performance would be 120% (T.N.T.=100%). Nitrophenols have been with us for a while. Their creation from nitric acid and animal horn was the first of these discoveries. Nearly 100 years passed before researchers found out it could be made to explode. It is this

relative insensitivity of the material and its good primary sensitivity yield many used for this explosive. It is very stable in storage with samples from late 1800's showing little signs of deterioration. The only reason that we do not use PA as an explosive in modern ordinance is mostly from a cost standpoint. PA can be reacted with ammonium hydroxide to form "Explosive D". This is a superb shaped charge explosive and does find some demolition and specialized munition loading. Brisance is very high for picric acid and it will detonate easily from the primary explosives in the primary section of the publication. Picric acid is poisonous and all contact should be avoided. This process uses the phenol byproduct used everyday as an analgesic. Aspirin (acetylsalicylic acid) in its purified form, sulfuric acid (98%) and sodium or potassium nitrate are the ingredients. Aspirin is available in any drug store or supermarket. Sulfuric acid is available at janitorial supply houses and plumbing suppliers. Battery acid that has been boiled until white fumes appear will also work. Sodium or potassium nitrate should be available from hobby stores and as stump remover in garden stores. The methanol carrier can be found at hardware stores and from janitorial supplies. Caution should be used in handling the product of the process below. Contact should be avoided. Contact includes breathing dust and exposure of the skin or any other part of the body. Liver and kidney failure could result. Use gloves and retire any utensil that will be used in the process.

MANUFACTURE:

Crush 100 aspirin tablets. Powder these crushed aspirin tablets. To them add 500 ml alcohol (95%) This alcohol will dissolve the acetylsalicylic acid in the aspirin and leave all the pill fillers in solid form in the bottom. Stir this aspirin/alcohol liquid for five minutes while warming it gently. Filter the warm liquid and keep the filtrate (liquid) and discard the remainder. Evaporate this liquid in a shallow pan in a hot water or oil bath. Collect the dried acetylsalicylic acid crystals. Place 700 ml sulfuric acid in the bottom of a gallon jar. To this acid is added the acetylsalicylic acid crystals from above. This gallon jar is placed in an oil bath (electric frying pan would be easiest but flame heat will work). This is heated with stirring until all the crystals are dissolved in the hot acid. The crystals having dissolved will allow you to begin the addition of sodium or potassium nitrate. This addition is done in three portions, allowing the acid mixture to cool some between additions.

CAUTION: The addition of the nitrate to the hot acid will generate nitrogen dioxide which is a deadly poison. This step should be carried out with excellent ventilation!

This liquid will react vigorously, as the 75 grams of either of the nitrates are added to the solution in this three part addition. The solution should turn red and then back to the yellow-orange color. After the additions let the solution cool to room temperature while stirring occasionally. Pour this room temperature solution into 1500 ml of cracked ice and water (1/4 ice). The product will precipitate out immediately as a brilliant yellow compound. Filter through a paper towel or 5 drip coffee filters in a funnel. Wash these crystals with 450 ml cold water. Discard the filtrate (liquid remaining after filtering). The yellow crystals are trinitrophenol. These crystals need to be dried for 3 hours on a boiling water bath or on a 105 degree C. oil bath. They are then ready to load into a detonator as a base explosive. Avoid contact with the yellow composition as it is highly poisonous. Wear gloves (viton) when working with this explosive.

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MMAN (Monomethylamine nitrate)

DETONATION VELOCITY	6100 M/sec. @ 1.2 G/cc 6600 M/sec. @ 1.4 G / cc
FRICITION SENSITIVITY	Very insensitive. Similar to T.N.T..
BEHAVIOR TO FLAME	Burns if heated to 370-390 degrees C. and will burn completely in 6-8 seconds.

M.M.A.N. is a powerful explosive with 112-120% the power of T.N.T. with a greater detonation rate. This explosive is not as sensitive as others in this publication to primary explosive requiring 2 G. mercury fulminate or 1.25 grams of H.M.T.D. Methylamine is a basic building block of modern chemistry. It is an intermediary for hundreds of more common chemicals. It is easily obtained or purchased cheaply. Nitric acid does not require highly concentrations with as low as 20% acid strength working perfectly. This is a good feature as requirements for explosives made with concentrated acids take time to produce and cannot be produced as fast or cheaply. This explosive is simple enough that it would require little experience and few setups in a lab. This explosive is very hygroscopic. It will absorb its weight in water at a relative humidity of 50% in 21 days. The other drawback of this explosive is the fact that it requires larger quantities of primary explosive as other base explosives. Both are acceptable and the hygroscopic nature of the salt can be controlled by loading caps on "dry days" of low humidity. These caps should also be dipped into molten wax to ensure their "waterproofness". This explosive is best used in a cap made with 3/8" tubing because 5 grams of this explosive are required. This will give a detonator 3/8" x 2-3/4". This cap should have the primary loaded first as the base explosive does not need the high density that the primary needs for maximum performance. Load this base charge explosive to a density of 1.2 G/cc. Higher densities will cause the explosive to become insensitive to the primary explosive. This cap should detonate most explosives and will be a great deal more powerful than a #10 blasting cap.

MANUFACTURE:

Place 250 ml of 33% methylamine aqueous solution in a stainless bowl or beaker. Add in four portions either 832 G. 70% nitric acid, 971 G. 60% nitric acid or 583 G. 100% nitric acid + 250 ml water. A good deal of heat will be generated by this neutralization. The solution will boil due to the heat. Allow the heat from the previous additions to subside before the next addition is made. After the additions have been made check the solution with PH paper (e. mark brand) from your lab supply store. If the PH is above 7 add acid 1/4 teaspoon at a time until the PH is between 6 and 7. If when checked the PH is 6 or below then add methylamine solution until the PH

rises to between 6 and 7. This liquid is then put in a vacuum flask with a stopper. This will be placed in a hot oil bath (frying pan filled with good cooking oil). The oil bath should be 75 degrees C. (167 degrees F.). The flask is hooked up to a vacuum source and the vacuum applied. The vacuum will allow the waters removal in a much quicker amount of time. The vacuum source can be an aspirator type (cost around \$5.00). This is the ideal source of vacuum. A gauge is placed in the line and the vacuum drawn at first recorded. This vacuum will remain the same until the water is all evaporated. At this point the vacuum suddenly will increase greatly. This signifies the end point. The crystals in the flask are scraped out in a dry (atmospheric humidity) room. This is placed in a sealed container to keep moisture out of the solutions. This is the explosive. It could be toxic if eaten in large quantities but at worst, prolonged handling of this explosive will give only a rash. The only thing to remember is to keep away from moisture and keep in a sealed container. Load large 3/8" diameter caps with 4-6 grams of MMAN as a base charge with large charges of primary explosives. Seal the caps immediately by dipping in hot molten wax. These caps are powerful and will take most of a forearm off a foolish person.

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TETRYL (2,4,6-trinitrophenylmethylnitramine)

DETONATION VELOCITY	7260 M/sec. @ 1.6 G/cc
FRICITION SENSITIVITY	Comparable to T.N.T.
BEHAVIOR TO FLAME	Burns slowly, very rarely exploding.

This is one of the better base charge explosives. This is still used in the military but R.D.X. and P.E.T.N. are replacing it. Generating 4.4 million P.S.I. upon detonation this is a good choice. The corrosiveness of the salt to brass limits it's use to copper tubing caps manufacture. It also is not made of the most common ingredients but these could be found if the desire was great enough. Very sensitive to primary explosives but not sensitive to normal handling. More powerful than picric acid. Could be an interesting possibility for improvised blasting caps.

MANUFACTURE:

Sixty grams of dimethylaniline is dissolved in 850 grams sulfuric acid (janitorial supply) in a quart jar or 600 ml beaker in cool waterbath. The temperature of the liquid during this addition should be kept below 25 degrees C. This liquid (solution # 1) is added by pouring into a separatory funnel or similar container equipped with a valve. This is done so solution #1 can be metered out drop by drop. Solution # 1 is added drop by drop into 515 grams of 70% nitric acid in a two liter beaker or pyrex equivalent heated in an oil bath to 55 to 60 degrees C. Solution #2 is stirred vigorously, while the temperature is kept at 65 to 70 degrees C.. This addition will require approximately one hour. After all solution #1 has been added to solution #2, the stirring is continued and the temperature is kept at between 65 and 70 degrees C. for an hour longer. The solution is allowed to cool and then filtered with an asbestos filter or fiberglass filter. The solid material is boiled with water for one hour and filtered again on a paper filter. Water will need to be added from time to time to keep the water level constant. This is then ground while wet and dissolved in benzene (industrial solvent) and the solution filtered. The filtrate (liquid) is saved and the liquid allowed to evaporate. The resulting crystals are tetryl and will be yellow in color. These crystals should be of sufficient quality and particle size.

[Yes, the author does not specify solution #2 anywhere... and we probably know by now that solution #1 can be metered out drop by drop :)]

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TETRANITRONAPHTHALENE (TeNN)

DETONATION VELOCITY	7000 M/sec. @ 1.6 G/cc (In 1/4" aluminum tube)
FRICITION SENSITIVITY	Similar to T.N.T.
BEHAVIOR TO FLAME	Rapid heating can cause detonations!

These yellow crystals are prepared by the nitration of naphthalene flakes in a two stage nitration. The product of the first stage is the dinitronaphthalene. This "di" product is nitrated to the "tetra". This is done in two different nitration steps. This product can be considered the equivalent of T.N.T. in power with a slightly greater detonation rate. This tetra compound is stable even at elevated "magazine" temperatures and is an explosive of greater power and brisance than T.N.T.. Has been proposed an artillery shell filler. T.N.T. has been cheaper due to continuous manufacture processes. It is however a powerful explosive with detonator usage promise. It has the same impact properties as does Tetryl with the same potential. It is easily made from naphthalene, nitric acid and sulfuric acid. These compounds are easy to come by and thus would make this a easily manufactured product. Naphthalene flakes, balls or powder are used as insecticides and are familiarly known as "Moth balls". Sulfuric acid is easily obtained from plumbing and janitorial supplies. Nitric acid can be made see "Kitchen Improvised Plastic Explosives" Recovery of spent acids in both steps will reduce acid demand and can be done by heating the spent acid until white fumes are produced.

CAUTION: Care should be taken to avoid all fumes from heated acid mixtures and that this spent acid being recovered is free of nitronaphthalene products. Failure to do this could result in a very violent explosion! Great care should be used to ensure the lack of remaining nitro compounds in the spent acid solutions. Caps should have a 1.5 G.+ charge of TeNN for best performance. This explosive should be loaded to a density of 1.6 G/cc. This explosive will melt around 200-210 C.

CAUTION: This meltable explosive should be used in its crystalline form. The melt loading should only be attempted by someone with chemistry lab experience. Rapid heating will most likely cause a high order detonation and fatalities! This heating would be done slowly as rapid heating could cause detonation. This melted compound could then be cast into the detonator case prior to loading the primary explosive. This could produce charges that required greater amounts of primary explosive to ensure detonation!

MANUFACTURE:

Tetranitronaphthalene is produced by nitration of naphthalene. Naphthalene is a coal tar or synthetic petrochemical. It is readily available in the form of moth balls, moth flakes or moth crystals. Place 64 grams in a 2 liter beaker of "pyrex" container. To this add 105 cc distilled water. Slowly add 287 grams (160 cc) concentrated sulfuric acid of a concentration of greater than 90% strength (Specific gravity 1.8). CAUTION: Addition should always be acid to water and never water to acid. The acids used in this process are very dangerous and should be used with great care. Goggles and full protective gear should be worn. Fumes produced should be avoided at all costs. This whole process should be done under a vent hood or in a very well ventilated place!

The temperature of this acid mixture will rise immediately. To this is added 115 grams (81 cc) of 70% nitric acid. This mixed acid is allowed to cook to room temperature. 150 grams of naphthalene is added slowly with stirring in small portions over a three hour period while the temperature is allowed to rise to 50 degrees C. When all the naphthalene is added, the beaker or "Pyrex" container is heated to 55 degrees in a oil bath, which melts the crude mononitronaphthalene. The stirring is then stopped and the MNN allowed to solidify. This solid MNN is broken up off the top and placed in a second acid mixture. This acid mixture is prepared by placing 130 cc water in a 1000 cc beaker or "Pyrex" container. To it is slowly, carefully added 293 G. sulfuric acid (162 ml) density 1.8 G/ cc. (95% +). This mixture will heat up when mixed and should be cooled to 25 degrees C. by placing in an ice bath. When the acid mixture is at 25 degrees 152 grams of potassium nitrate is added. The mixture is stirred vigorously and the addition of the MNN from above is begun. It is added in small quantities keeping the temperature between 38-45 degrees C. by the speed of the addition. During this addition (1 hour +), the temperature is not allowed to rise to over 45 degrees C. After one hour, the temperature is allowed to rise to 55 degrees C. and the stirring is continued. This is continued until the emulsion is replaced by the formation of DNN crystals. These crystals are then filtered out by a glass fiber filter (fiberglass). These crystals are washed six times with cold water and allowed to dry. These are then dissolved in boiling acetone. Not all will dissolve. Filter this solution while hot and allow to cool. Chill this solution and crystals will form. Filter out the crystals that form. Reduce the volume of the acetone by 1/2 and chill again and filter. Add the crystals together from these acetone recrystallization steps and allow to dry. These crystals will be a good grade of 1.8 Dinitrotaphthalene. These crystals will be nitrated, in the process below, to the tetro form.

Place 750 ml fuming nitric acid, of 90% or greater strength (See Kitchen Improved Plastic Explosives), in a two liter "pyrex" container or a 2000 ml beaker. Add to this very slowly and carefully 750 ml concentrated sulfuric acid. This acid mixture is stirred and cooled in a ice bath until the temperature drops below 20 degrees C. The 1.8, DNN from above is added in small quantities while the temperature is not allowed to rise above 20 degrees C. When all the DNN has been added, the temperature is allowed to rise slowly. Heat will need to be applied. This heating should be done such that the temperature rises from 20 to 80 degrees C. for three hours and then allowed to cool. The solid formed is filtered out and the filtrate (liquid remaining after filtering) drowned in twice it's volume of ice water. This step will drop more crystals out of the filtrate. These are filtered out and added to the crystals filtered out of the reaction mixture. These are then washed three times with water and then dissolved in hot from 95% ethanol. This alcohol is chilled and then the crystals formed are filtered out. This last step is not necessary, but highly desirable to give a very storage stable product. These crystals are 1,3,6,8-tetranitronaphthalene. They should be dried by heating in a shallow pyrex dish by the way of a hot water bath.

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NITROGUANIDINE

DETONATION VELOCITY 5630 M/sec. @ 1.0 G/cc.
7650 M/sec. @ 1.5 G/cc.

FRICION SENSITIVITY Very insensitive

BEHAVIOR TO FLAME Melts with sublimation and decomposition.

Nitroguanidine is a powerful explosive. First made from bat guano, by extraction and formation of guanidine nitrate and subsequent treatment of this nitrate with sulfuric acid (95% +) and filtration of the product. This explosive is similar in performance to picric acid and T.N.T.. While not being quite as brisant as these two explosives the ease of manufacture and lack of friction sensitivity make nitroguanidine an attractive choice for a blasting cap base charge explosive. It is a cool explosive and does not give a high temperature of detonation but gives a larger volume of gases upon detonation. This base charge explosive, should be loaded in the caps with the density not exceeding 1.35 G./cc. Excess loading densities will render the base charge undetonatable with 1.5 G. charges of H.M.T.D.. This explosive will work and work well and is very storage stable. Larger diameter cap containers (3/8" +) should be used to ensure propagation of the detonation through the entire cap. Given below is the manufacture techniques for production of nitroguanidine. This procedure will work well but is rather lengthy and labor intensive.

MANUFACTURE:

Obtain two clay flower pots with a small hole in their bottoms. Fitted to one of these is stainless steel tubing. A refractory made from "firebrick" and fired by charcoal should be built. The flower pots will need to fit into this refractory and have ample room around them to pack the charcoal. An air blower (e.g. hairdryer, vacuum cleaner is hooked up to blow air through the coal to generate the heat needed. In the bottom flower-pot, a stainless steel screen will be needed to keep from clogging the stainless steel tubing from the ammonia inlet tube. Place 200 grams of calcium carbonate (Limestone, chalk) in the bottom flower pot, with, the stainless tubing attached. Place the other flowerpot upside down directly on top of the bottom pot. Place this in the refractory furnace and place a pyrometer or high temperature thermometer into the hole in the top clay flower pot. Start the furnace and blow air through the burning charcoal until the temperature inside the pots reaches 700 degrees C.. At this time begin to pass ammonia gas through the stainless tubing into the lime inside. The temperature should never go over 820 degrees C. as the lime will decompose. The ammonia generator the gas generator in the TACC section. The amounts needed in the generator are 170 G. ammonium nitrate fertilizer, 100 G. sodium hydroxide and adding 100 ml water to the mixture. This water addition would be done in small portions to ensure the absorption of the gas by the calcium carbonate. This gas needs to be generated slowly! When all the ammonium nitrate has been added and the gas ceases to generate from the generator deprive the charcoal of oxygen to extinguish the flame. Let the refractory furnace cool and remove the flowerpots from it. The black material in the bottom is calcium cyanamide.

Place 216 grams of urea in a stainless steel pan. Heat until it begins to melt. Add in small portions 1300 grams ammonium nitrate.

CAUTION: This is dangerous and extreme care should be used in this step. This mixture could explode if allowed to burn. Water should be used if a fire does break out by immediate dilution and quenching of the reaction mixture!!

Keep the temperature of the melt at 120 degrees centigrade. When the addition of the ammonium nitrate is complete and the mixture is liquid and at 120 degrees C. the calcium cyanamide from above is added in portions over a twenty minute period. This mixture's temperature is held at 120 degrees C. for two hours and then diluted with 720 ml water. This liquid is heated to 95 degrees C. and then filtered through several coffee filters or a "fast" filter paper. The liquid thus obtained is allowed to cool to 25 degrees C. and then the crystals formed are filtered out. The liquid is reduced to 1/2 its volume by boiling. It is cooled and filtered and the crystals obtained are added to those from the first filtration. These crystals are washed with 40 ml cold water. They are then dried in a shallow pyrex dish while heated in a hot oil bath at 110 degrees C. for two hours. These crystals are guanidine nitrate (90% purity).

Immerse a one liter flask, containing 500 ml. concentrated sulfuric acid, in cracked ice. This acid is stirred until the temperature drops to 10 degrees C. or less. In small portions, add 400 grams of dry guanidine nitrate to the acid with stirring to keep the temperature below 11 degrees C.. When all the guanidine nitrate is dissolved, pour the now milky liquid into three liters of cracked ice and water. Let this stand until the nitroguanidine is completely crystallized out of the liquid. Filter these crystals out and dissolve in four liters of boiling water (distilled if possible). Allow to cool by standing overnight and filter the crystals out. Dry these crystals by heating gently in a container placed in a pan of boiling water. This dried material is then ready to store in a plastic container or to load into finished caps.

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