DICTIONARY OF EXPLOSIVES

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INTRODUCTION

It is a generation since a dictionary of explosives has been published, and, in the meantime, many new explosives have been introduced. It is hoped, therefore, that this small volume, giving concise information about these special materials, may prove useful to those who have to deal with them. In Cundill and Thomson's "Dictionary of Explosives," issued in 1895, there are many entries of the names of inventors and of mixtures which had been proposed but have never been used commercially, nor are likely to be. As modern explosives were then in their infancy, it was no doubt wise to insert all the available information whether it appeared to be important or not; but now it seems to me better to restrict the scope of the dictionary so as to keep its size within moderate limits. Practically only explosives with special or proprietary names are therefore dealt with here. For information concerning chemical substances, such as the nitro-toluenes and other nitro-compounds, reference should be made to the text-books on explosives and chemistry.

A few words may, however, be said here about the nitro-celluloses. These are made by treating cellulose with a mixture of nitric and sulphuric acids, and then purifying the product by washing it thoroughly with hot water. The variety of cellulose most used for this purpose is cotton, and the product obtained from it is frequently called nitrocotton, three special varieties of which are collodion cotton, pyro-collodion and guncotton (*q. v.*). The only other form of cellulose which is nitrated on a commercial scale is "chemical cellulose" obtained by the treatment of wood or straw.

Nitrated wood cellulose has long been used for the manufacture of smokeless powders for shot-guns, and during the War the Germans made powders for rifled fire-arms from it.

No trouble has been spared to make the dictionary complete and accurate, but there must inevitably be omissions and errors in it, especially as regards the explosives of foreign countries. The author will be grateful for any additional information that may be sent him.

Explosives may be classified in various ways, according to the purpose of the classification, but the great majority of them fall naturally into two main divisions: propellants and high explosives. Propellants explode comparatively slowly, and are used to propel projectiles from fire-arms. High explosives are much more rapid in their action, and are used for bursting and shattering. Propellants are of two sorts, according as they are intended for use in shot-guns or rifled fire-arms. Those for shot-guns burn more rapidly than those for the latter, but both practically always contain a considerable proportion of nitrocellulose, gelatinised by means of such solvents as acetone or ether-alcohol, according as it is of high or low nitration. Some contain also nitroglycerine, and are then called nitroglycerine powders, whereas those that do not contain this substance are termed nitrocellulose powders. Many powders also contain other ingredients, as may be seen from the compositions given in this dictionary.

Of high explosives an important class is used for charging shells and bombs. As a rule, but not necessarily, these are not the same as the explosives used for mining operations and other general blasting purposes. Another important class is that of the coal-mine explosives, which are designed to give only a short and comparatively cool flame so as to diminish the danger of igniting fire-damp and coal-dust. Nearly half the explosives in this dictionary are coal-mine explosives. The reason for this large number is that no finality has yet been reached as to the best and safest explosives to use in coal mines. When more experience has been gained it is probable that the number of these explosives

on the market will be reduced. In England the Permitted List has recently been cut down considerably.

In Great Britain these coal-mine explosives have to be submitted to the Inspectors of Explosives, and are subjected to tests for safety and strength. If they pass they are placed on the list of "Permitted Explosives," and the compositions are published in the Explosives in Coal Mines Orders. In these Orders the upper and lower limits of the percentage of each constituent are given, but in this dictionary intermediate percentages are given so that the sum for any explosive amounts to 100. In the Explosives in Coal Mines Orders the percentage of such a substance as wood, meal or starch, is given in the dried condition, but here it is given in the air-dry state on the assumption that it then contains about 10 per cent. of moisture.

In France and Belgium also the compositions of the coal-mine explosives are published, but in Germany, as a rule, only a list of the constituents is given, and sometimes an upper or lower limit for one or more of the principal constituents. Moreover, it is not stated explicitly whether the explosives are intended for use in coal mines or for general blasting purposes. In the United States of America, explosives intended for use in coal mines are examined by the Bureau of Mines, which, however, has no power to prevent the use of others because regulations on this matter are made by the individual states. If they pass they are placed on the list of "Permissible Explosives." The compositions are not published, but the class of composition is stated.

Until the second half of the nineteenth century, gunpowder was practically the only explosive used on a considerable scale, and it was employed for all purposes. Consequently it does not fall into any of the classes mentioned, or rather it could be placed in several of them.

Another class of explosives that has not yet been mentioned is that of the primary igniters, of which fulminate of mercury may be taken as typical. The characteristic of these is that they can be exploded or ignited by a spark or moderate

friction, and consequently they can be employed to fire other, less sensitive explosives. There are, however, practically no explosives of this class which possess special or proprietary names, and consequently they are not dealt with in this dictionary.

Naini Tal, India.
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CLASSIFICATION

COAL-MINE EXPLOSIVES

American Permissible Explosives.

Actna Coal Mine Powder.
Bental Coal Powder.
Bituminite.
Black Diamond.
Cameron Mine Powder.
Carbonite.
Coalite.
Coal Special.
Collier Powder.
Cronite.
Detonite.
Du Pont Permissible.
Eureka.
Fort Pitt Mine Powder.
Fuel-ite.
Giant Coal Mine Powder.
Guardian.
Hecla No. 2.
Hygrade Coal Powder.
Kanite.
Lomite.
Lowinite.
Meteor.
Miners' Friend.
Min-ite.
Monobel.
Nitro Low-Flame.
Red H.
Trojan Coal Powder.
Tunnelite.
Vigorite.
Xpdite.

Austrian and Hungarian.

Chloratit.
Dynammon.
Progressit.
Titanit.

Belgian Explosifs S.G.P.

Alsilite.
Antigel de Sûreté.
Baelenite.
Colinite antigrisouteuse.
Cornil.
Densite.
Dynamite antigrisouteuse.
Favier Explosives.
Flammivore.
Forcite antigrisouteuse.
Fractorite.
Grisoutine II.
Grisoutite.
Ingélite.
Minerite.
Minite.
Minolite.
Pulvérite.
Sabulite antigrisouteuse.
Securophore.
Wallonite.
Yonckite.
(There were also several explosives made in Germany.)

British.

*Abbcite.
*Abelite.
*Ajax Powder.
*Albionite.
*Amasite.
*Ammonal.
Ammonite.
*Amvis.
*Anchorite.
*Aphosite.
*Arkite.
*Barking Powder.
Bellite.
Bobbinite.
*Britonite.
*Bull Dog.
Cambrite.
*Carbonite.
*Celtite.
*Cliffite.
Cliffite (Super-).
*Clydite.
*Cornish Powder.
*Coronite.
*Curtisite.
*Curtisite (Super-).
Denaby Powder.
*Dominite.
*Dragonite.
*Dreadnought Powder.
Du Pont Permissible.
*Duxite.
Dynobel.
*Electronite.
Essex Powder.
*Excellite.
Excellite (Super-).
Expedite.
*Faversham Powder.
Fortex (New).
*Fracturite.
*Gathurst Powder.
*Good Luck.
Haylite.
*Herculite.
*Kent Powder.
Kentite.
*Kolax.
*Kolax (Super-).
*Kynarkite.
*Kynite.
*Melling Powder.
*Mersey Powder.
*Minite.
Monarkite.
Monobel.
*Monobel Powder.
*Nationalite.
Negro Powder.
*Neonal.
*Nitro-Densite.
*Nobel Ammonia Powder.
*Normanite.
*Oaklite.
*Odite.
*Permon Powder.
*Permonite.
*Phœnix Powder.
*Pitite.
*Pitsea Powder.
Rex Powder.
*Rexite.
*Rippite.
Rippite (Super-).
Roburite.
*Russelite.
Samsonite.
*Saxonite.
Seamex.
*Sheppey Powder.
*Stanford Powder.
*Steelite (Colliery).
*St. Helen's Powder.
Stomonal.
*Stow-ite.
*Sunderite.
*Superite.
*Swale Powder.

British (continued)

*Swalite.
*Syndite.
Thames Powder.
*Tutol.
*Uplees Powder.
*Victor Powder.
*Victorite.
Viking Powder.
*Virite.
*Westfalite.
*Withnell Powder.

(Those marked * are not now on the Permitted List.)

French.

Favier explosives.
Grisounite.
Grisoutine.
N.
Naphthalite (Grisou-).

German.

Albit (Wetter-).
Astralit (Wetter-).
Bautzener Sicherheitspulver.
Bavarit.
Cahuecit (Ammon-).
Carbonite.
Chloratzit.
Chromamonit.
Cosilit.
Dahmenit.
Detonit.
Donarit.
Dorfit.
Dynamit (Wettersicheres).
Elsagit (Ammon-).
Foerder Sicherheitssprengstoff.
Foerdit.
Fulmenit (Wetter-).
Gehlingerit.
Gesilit.
Glueckauf.
Kohlenkarbonit.
Koronit (Kohlen-).
Lenit (Neu-).
Lignosit.
Monachit.
Naphthalit.
Nobelit.
Orkanit.
Pastanit.
Permonit.
Perrumpit.
Persalit (Wetter-).
Plastomenit.
Rhenanit (Wetter-).
Roburite.
Romperit (Wetter-).
Salit.
Schlesit.
Securite.
Siegenit.
Teutonit.
Tremonit.
Tunnelit.
Walsrode (Wetter-).
Westfalit.
Wetter-Dynamit.

BLASTING EXPLOSIVES

Aerolit.
Aetna.
Albit.
Alkalsit.
Amasite.
Ammonal.

BLASTING EXPLOSIVES (*continued*)

Ammoniakkrut.
Anagon.
Anilit.
Astralit.
Atlas Powder.
Barbarit.
Blastine.
Blasting Gelatine.
Bomlit.
C.
Cahuecit.
Carbite d'Ablon.
Carbo-Dynamite.
Carlsonite.
Cheddite.
Chloratzite.
Cugnite.
Dahmenite.
Denaby Powder.
Densite.
Dominit.
Donarit.
Dynamite.
Electronite.
Ergite.
Erin Gelignite.
Extra Dynamite.
Forcite.
Fumenit.
Gehlingerit.
Gelatinée a l'Ammoniaque.
Gelatine Dynamite.
Gelignite.
Giant Powder.
Halalite.
Hammonit.
Helagon.
Helit.
Hercules Powder.
Imperialite.
Judson Powder.
Kausolit.
Kinetit.
Kiwit.
Koronit.
L.C. Pulver.
Leonit.
Ligdyn.
Lignosit.
Lithofracteur.
Loewenpulver.
Luxit.
M.B. Powder.
Marsit.
Meganit.
Melanite.
Mercurit.
Miedziankit.
Minolite.
Mitchellite.
Monachit.
Naphthalit.
Nitrolit.
O.
Oakley Quarry Powder.
Oxyliquit.
Pastanil.
Peragon.
Perchlorit.
Perdit.
Perilit.
Persalit.
Petroklastit.
Petrolit.
Pfalzit.
Pierrite.
Plastammon.
Plessit.
Pniowit.
Polarite.
Praeposit.
Prométhée.
Prosperit.
Rack-a-Rock.
Raschit.
Red Cross.
Rendrock.
Rexol.

BLASTING EXPLOSIVES (*continued*)

Rhenanit.
Rhexit.
Rivalit.
Rockite.
Romperit.
Roslin Giant Blasting Powder.
Sabulite.
Saxonite.
Sebomite.
Sengite.
Siegenit.
Silesia.
Sprengel Explosives.
Sprengsalpeter.
Steelite.
Stonax.
Telsit.
Territ.
Teutonit.
Thornit.
Titanite.
Tonite.
Tremonit.
Velox Gelatine.
Vender.
Vigorite.
Vulcan Powder.
Wilhelmit.
Yonckite.

HIGH EXPLOSIVES

(*For Shells and Bombs.*)

Alumatol.
Amatol.
Amatoxol.
Anilite.
Astralit.
Baratol.
Cilferite.
Crésylite.
Dunnite.
Echo.
Ecrasite.
Fuellpulver.
Fumyl.
Granatfuellung.
H.E.
Hellhofite.
Himalayite.
Hudson's Explosive.
Lyddite.
Macarite.
Melinite.
Nitrolit.
Panclastite.
Perdit.
Plastrotyl.
Schneiderite.
Shellite.
Stabilite.
T.N.T.
Toxol.
Triplastit.

MISCELLANEOUS EXPLOSIVES

Black Powder.
C.P.
Centralite.
Cheesa Sticks.
Collodion Cotton.
Flobert Ammunition.
Glonoine.
Halakite.
Ophorite.
Pulvérin.
Pyrocollodion.
Pyroxyline.
Stabilite.
Tetryl.
White Gunpowder.

PROPELLANTS

(*For Shot-guns.*)

Amberite.
Cannonite.
Clermonite.
Cooppal's Powder.
Crystal.
Du Pont Smokeless Powder.
E.C. Powder.
Economic.
Eley Smokeless Powder.
Empire.
Felixite.
Fulmen Powder.
Henrite.
Ideal Powder.
J.
K.S.
M.
Mischpulver.
Mullerite.
Neonite.
New Explosives Co.'s Smokeless Powder.
Normal Powder.
Plastomenit.
Primrose Smokeless.
Red Star.
Rifleite (Shot Gun).
Rottweil Smokeless Powder.
Ruby Powder.
S.
S.S.
Schultze Powder.
Smokeless Diamond.
Stowmarket Smokeless.
T.
Troisdorf Smokeless Powder.
Walsrode Shot Gun Powder.

(*For Rifled Fire-arms.*)

Amide Powder.
Ammonpulver.
Apyrite.
Axite.
B.
Ballistite.
Brugère's Powder.
Cocao Powder.
Cordite.
C.S.P.
Filite.
Hebler Powder.
Indurite.
Lafflin and Rand.
Moddite.
N.C.T.
Neonite.
Nitrokol.
Normal Powder.
P.C./88.
R.F.G.
R.L.G.
Rifleite.
Rottweil Smokeless Powder.
S.K.
S.R.
S.V.
Solenite.
Troisdorf Smokeless Powder.
Wetteren.

DICTIONARY OF EXPLOSIVES

ABBCITE.—A coal-mine explosive made by Kynoch, Ltd. The original composition which passed the Woolwich Test was—

Ammonium nitrate	80
Nitroglycerine	10
Wood meal	10

To enable it to pass the Rotherham Test sodium chloride was added, and a little dinitro-toluene was also introduced—

ABBCITE No. 2.

Date of Permit	3-7-15
Ammonium nitrate	58
Nitroglycerine	8·5
Wood meal	9
Dinitro-toluene	1·5
Sodium chloride	23
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·54″

The permit has now been repealed.

ABELITE.—A coal-mine explosive made by the Lancashire Explosives Co. Two formulas were approved—

	No. 1.	No. 4.
Date of Permit	7-4-14	15-1-15
Ammonium nitrate	68·5	67
Dinitro-benzene	7	—
Trinitro-toluene	7	14·5
Sodium chloride	17·5	7
Starch	—	11·5
Limit charge	14 oz.	18 oz.
Power (swing of ballistic pendulum)	2·85″	2·79″

The permits have now been repealed.

Abelite (without distinguishing number) is simply a mixture of ammonium nitrate and trinitro-toluene—

Ammonium nitrate	83
Trinitro-toluene	17

It is therefore a variety of Bellite in which the dinitro-benzene has been replaced by trinitro-toluene. It is used for filling grenades and general blasting purposes, but is not permitted in dangerous coal mines.

AEROLIT is a Danish ammonium nitrate explosive, *e.g.*—

Ammonium nitrate	78·125
Potassium nitrate	7·5
Sulphur	8·75
Fat	2·5
Sago meal	1·25
Manganese dioxide	1·25
Resin	0·625

AETNA COAL POWDER is an American coal-mine powder on the Permissible List. Brands A, B and C are nitroglycerine explosives. AA and No. 2 are ammonium nitrate explosives.

AETNA POWDER.—A variety of American dynamite containing 15 to 65 per cent. of nitroglycerine mixed with wood pulp and sodium nitrate. Roasted flour has sometimes been substituted for wood pulp.

AJAX POWDER.—A coal-mine explosive made by Nobel's Explosives Co.

Date of Permit	1-9-13
Nitroglycerine	22·3
Nitrocotton	0·7
Di- and trinitro-toluenes	3·5
Potassium perchlorate	37
Wood meal	11·5
Ammonium oxalate	25
Limit charge	12 oz.
Power (swing of ballistic pendulum)	2·69″

In 1914, 329,000 lbs. were used in coal mines, but the permit has now been repealed.

ALBIONITE.—A mixture of gelignite and ammonium oxalate. It was formerly on the Permitted List.

ALBIT.—A German chlorate explosive introduced in 1915 in consequence of the scarcity of nitrates due to the War. It is defined as consisting of not more than 80 per cent. sodium or potassium chlorate, not more than 4 per cent. nitroglycerine, and mono- or dinitro-hydrocarbons. It may also contain inorganic salts and carbon carriers such as vegetable meal, oils, soaps or carbohydrates. A variety made for use in coal mines is called Wetter-Albit or Kohlen-Albit.

ALDORFIT. See **DORFIT.**

ALKALSIT.—A German chlorate or perchlorate explosive made by the Dynamit A.G. of Hamburg. It contains not more than 80 per cent. sodium or potassium chlorate, or not more than 80 per cent. sodium, potassium or ammonium perchlorate, and 19 per cent. of aromatic nitro-hydrocarbons and nitrocotton, also coal, hydrocarbons or carbohydrates, and nitrates. The chlorate mixtures must not contain ammonium salts. Alkalsit I contains not more than 27 per cent. of potassium perchlorate, ammonium nitrate, not more than 24 per cent. of sodium nitrate, not more than 8 per cent. of trinitro-toluene, also wood meal, flour and nitro-naphthalene. Alkalsit A contains not more than 55 per cent. of potassium perchlorate, ammonium nitrate, not more than 31 per cent. trinitro-toluene, and not more than 5 per cent. of a neutral liquid mixture of nitrated toluenes. Alkalsit B is similar except that it contains also ammonium nitrate.

ALSILITE S.G.P.—A Belgian coal-mine explosive on the list of Explosifs S.G.P. It is of the Ammonal type—

Ammonium nitrate	62
Trinitro-toluene	11
Ferro-silicon-aluminium	5
Sodium chloride	22
Charge limite	900 g.

ALUMATOL.—A mixture of ammonium nitrate, trinitro-toluene and a little aluminium powder, used for charging trench-mortar bombs, etc.

AMASITE.—A coal-mine explosive formerly on the Permitted List—

Ammonium perchlorate	34
Sodium nitrate	31
Myrobolans	34·7
Agar agar	0·3

It was made by the Société Anonyme de Vilvorde in Belgium, and was originally called Ugolite.

Rock Amasite and S.T. Amasite are non-permitted explosives of composition somewhat similar to the above.

AMATOL.—A mixture of ammonium nitrate and trinitro-toluene. The composition is shown by the figures placed after the name; thus Amatol 40/60 contains 40 per cent. ammonium nitrate and 60 per cent. trinitro-toluene, and Amatol 80/20 consists of 80 parts ammonium nitrate and 20 parts trinitro-toluene. These explosives are used very extensively for filling shell and other projectiles. The mixtures rich in trinitro-toluene can be cast after being heated to temperature above the melting-point of this constituent, but those rich in ammonium nitrate are stemmed into the projectile hot or pressed. Similar mixtures are used by the Germans and other powers under various names. In Germany it is called Füllpulver (q. v.).

AMATOXOL.—A mixture of ammonium nitrate and Toxol, which consists of trinitro-toluene and trinitro-xylene.

***AMBERITE.**—A smokeless shot-gun powder made by Curtis's and Harvey at Tonbridge. Amberite No. 1 contained nitroglycerine as well as nitrocotton and various other substances. According to "Arms and Explosives," 1917, p. 78, a sample of Amberite No. 2 had the composition—

Insoluble nitrocotton	18·0
Soluble ,,	46·0
Nitrates of potassium and barium	28·0
Vaseline	6·0
Volatile matter	1·4

This is still on the market. It is a fibrous 42-grain bulk powder.

***AMIDE POWDER** or Chilworth Special Powder was an early attempt at a smokeless powder. Under the name of Amidpulver it was used by the German artillery for some years in the 'eighties of the last century. Its composition was—

Ammonium nitrate	35–38
Potassium nitrate	40–46
Charcoal	14–22

See also Ammonpulver and Hebler Powder.

AMMONAL is a blasting explosive containing ammonium nitrate, aluminium powder, charcoal, and generally trinitrotoluene. It was patented in 1900 by G. Roth of Vienna, and the following are some of the compositions made by his firm at Felixdorf in Austria—

	a	*b*	*c*	*d*
Ammonium nitrate	80·75	90	88	80
Aluminium	15	4	8	18
Charcoal	4·25	6	4	2

More violent mixtures made by the same firm are—

	I	II
Ammonium nitrate	46	32
Trinitro-toluene	30	50
Aluminium	22	16
Charcoal	2	2

and modifications of this have been used largely in the British service. It is not suitable for use in underground workings as it forms on explosion the poisonous gas carbon monoxide, unless the proportion of ammonium nitrate be large. It

has been used for charging grenades, and by the Austrians for trench howitzer bombs.

When the explosive is detonated, the aluminium is converted into the oxide, evolving no gas, but a considerable amount of heat, which increases the power of the explosive. The aluminium powder also renders the explosive easier to detonate.

Three explosives of this type passed the Woolwich Test, and were on the old Permitted List for coal mines, namely, Ammonal B, Ripping Ammonal and Saint Helen's Powder (q. v.).

	Ammonal B.	Ripping Ammonal.
Ammonium nitrate . .	94·5	86
Aluminium . . .	3	8
Charcoal . . .	2·5	2·5
Potassium bichromate .	—	3·5

No explosives containing aluminium are on the present Permitted List.

AMMONCAHUECIT } See **CAHUECIT.**
AMMONCARBONIT } See **CARBONIT.**

AMMONIAKKRUT was the first ammonium nitrate explosive. It was invented by J. Ohlsson and J. H. Norrbin, two Swedes, and was protected by English Patent 2766 of 1869. It consisted of ammonium nitrate together with 5 or 10 per cent. of charcoal, coal dust, etc., to which mixture was added 10 to 30 per cent. of nitroglycerine to make it less difficult to detonate.

AMMONITE is a coal-mine explosive of the Favier type, made by the Miners' Safety Explosives Co. The original composition, which passed the Woolwich Test was—

Ammonium nitrate	88
Dinitro-naphthalene	12

To pass the more severe Rotherham Test a number of compositions have been made and approved, but some of them have been repealed. Those now on the Permitted List are—

	Ammonite No. 1.	Ammonite.	Ammonite No. 5.
Date of Permit . .	29–8–14	5–11–17	2–8–18
Ammonium nitrate .	74·5	73·5	74·5
Dinitro-naphthalene .	—	5·5	—
Trinitro-naphthalene .	—	—	5
Trinitro-toluene . .	5	—	—
Sodium chloride . .	20·5	21	20·5
Limit charge . .	24	18	26 oz.
Power (swing of ballistic pendulum) . .	2·42	2·44	2·41″

Ammonite No. 1 is used on a considerable scale in coal mines. A non-permitted explosive called Ripping Ammonite is also made.

***AMMONPULVER** is a propellant which was used by the Austrians from 1890 to 1896 in guns of various calibres—

Ammonium nitrate	80–90
Charcoal	10–20

It was superseded by a powder of the ballistite type, but has been reintroduced recently by the Germans to replace a part of the charge of nitrocellulose powder in their field gun. The advantages claimed for it are small erosion of the gun, absence of muzzle flame, chemical stability, and cheapness. On the other hand, it gives high pressures, and if used by itself requires a gun with a specially large chamber; but the most serious objection to it is that on keeping, physical changes take place in the pellets, leading to the production of very high pressures. It is said that moisture promotes these changes. See also Amide Powder.

AMVIS.—A coal-mine explosive formerly on the Permitted List—

Ammonium nitrate	90
Wood meal	5
Dinitro-benzene Chlorinated naphthalene	5

Neu ANAGON.—A German blasting explosive containing not more than 70 per cent. of ammonium nitrate, zinc-aluminium alloy and charcoal.

ANCHORITE.—A coal-mine explosive of the Favier type, formerly on the Permitted List. It was made by Kynoch-Arklow, Ltd.

Date of Permit	13–5–14
Ammonium nitrate	34·3
Sodium nitrate	33·3
Ammonium chloride	20·2
Trinitro-toluene	12·2
Limit charge	14 oz.
Power (swing of ballistic pendulum)	2·73″

ANILIT.—A German explosive containing not less than 70 per cent. of ammonium nitrate, not more than 5 per cent. of sugar, and copper sulphate-aniline or copper oxalate-aniline.

ANILITE.—A French liquid explosive of the Sprengel class used for aerial bombs.

ANTIGEL DE SÛRETÉ.—A Belgian coal-mine explosive—

Nitroglycerine	25
Sodium nitrate	20
Dinitro-toluene	15
Ammonium sulphate	5
Cellulose Wood meal	35

The Charge limite is 900 grammes, which is equivalent to 524 grammes of dynamite No. 1. The composition is the same as that of Ingélite. It is a low-freezing nitroglycerine explosive.

APHOSITE.—A coal-mine explosive formerly on the Permitted List—

Ammonium nitrate	60
Potassium nitrate	29·5
Charcoal	4
Wood meal	4
Sulphur	2·5

***APYRITE.**—A nitrocellulose smokeless powder formerly made in Sweden by the Société Grakrut.

ARKITE.—A coal-mine explosive made by Kynoch, Ltd. The original composition which passed the Woolwich Test was—

Nitroglycerine	52·5
Nitrocotton	3·5
Potassium nitrate	22
Wood meal	7
Ammonium oxalate	15

The proportions were modified, and the following passed the Rotherham Test, and was on the Permitted List—

ARKITE No. 2.

Date of Permit	7–4–14
Nitroglycerine	32
Nitrocotton	1
Potassium nitrate	27
Wood meal	10
Ammonium oxalate	30
Limit charge	40 oz.
Power (swing of ballistic pendulum)	2·41″

It has now been repealed.

ASTRALIT.—An ammonium nitrate explosive containing a little blasting gelatine, made by the Dynamit A. G. Nobel of Hamburg. It has been used largely in Germany for a variety of purposes.

Astralit I and II are defined as consisting of ammonium nitrate, charcoal, vegetable meal, not more than 15 per cent. of aromatic nitro-bodies not more dangerous than trinitrotoluene, not more than 4 per cent. of blasting gelatine; also paraffin oil.

Astralit IV consists of ammonium nitrate, not more than 10 per cent. of aromatic nitro-bodies not more dangerous than dinitro-naphthalene, vegetable meal, and not more than 4 per cent. of blasting gelatine.

Astralit V, which has been introduced recently, contains up to 10 per cent. of potassium perchlorate in addition to ammonium nitrate, also vegetable meal, not more than 16 per cent. of aromatic nitro-compounds, and not more than 4 per cent. of nitroglycerine.

Gelatine-Astralit is a gelatinised or powdery mixture of the nitrates of ammonium and sodium (or potassium), not more than 50 per cent. of dinitro-chlorhydrin, not more than 5 per cent. of nitroglycerine, not more than 2 per cent. of collodion cotton, vegetable meal, aromatic nitro-bodies such as nitro-toluenes or nitro-naphthalenes, but not more than 4 per cent. of trinitro-toluene; also hydrocarbons.

Wetter-Astralit is a coal-mine explosive, and differs from Astralit in that part of the ammonium nitrate is replaced by sodium chloride.

Wetter-Gelatine-Astralit is also a coal-mine explosive, and differs from Gelatine-Astralit in that it contains also fatty oils and neutral salts, such as potassium chloride, sodium chloride or an oxalate.

The following percentage compositions have been given—

	Astralit.	Wetter-Astralit.
Nitroglycerine	4	4
Ammonium nitrate	84·5	74·5
Trinitro-toluene	7	7
Wood meal	1	1
Charcoal	1	1
Paraffin oil	2·5	2·5
Sodium chloride	—	10

	Gelatine-Wetter-Astralit.
Nitroglycerine	4
Dinitro-chlorhydrin	16
Nitrocotton	0·5
Ammonium nitrate	40
Sodium nitrate	7·5
Dinitro-toluene	4
Nitro-toluene	1
Wood meal	0·5
Potato meal	8
Rape oil	2
Ammonium oxalate	2·5
Sodium chloride	14

Explosives of the Astralit type have also been used extensively by the Germans for filling trench howitzer shell and similar projectiles. The following is approximately the composition used for this purpose—

Nitroglycerine	3
Nitrocotton	0·5
Ammonium nitrate	77
Trinitro-toluene	16
Wood meal	3·5

This explosive was authorised in England under the name of Australite.

ATLAS POWDER.—A brand of American straight dynamite.

AUSTRALITE. See **ASTRALIT.**

***AXITE.** A smokeless powder made by Kynoch, Ltd., and used for sporting rifles. It is a sort of Cordite MD, with a little of the guncotton replaced by potassium nitrate, and is in the form of flat strips. A sample had the composition—

Nitroglycerine	29·7
Guncotton	63·1
Potassium nitrate	1·9
Mineral jelly	5·1
Volatile matter	0·2

***B.**—Poudre B is the French service propellant. It consists of nitrocotton gelatinised with ether-alcohol, in which it is partly soluble. A little diphenylamine is added to increase the stability. Formerly, various other additions have been made. A letter or letters are added to show the size of the powder and the purpose for which it is used—

Poudre BF for rifles(from *f*usil).
BNF a later powder for rifles (from *n*ouveau).
BC for field guns (from *c*ampagne).
BSP for siege howitzers (from *s*iège et *p*lace).
BGC for larger military guns (from *g*ros *c*alibre).
BM for naval ordnance (from *m*arine); a figure is added to show the size.

Further letters and figures are added to show other particulars about the powder; D_2 means 2 per cent. of diphenylamine has been added as a stabiliser, or AM_8, 8 per cent. of amyl alcohol. The place and date of manufacture are similarly indicated.

BAELENITE.—A Belgian mining explosive—

	I.	II.
Ammonium nitrate . . .	85	95
Trinitro-toluene	15	5
Charge limite.	0	75

It is authorised for manufacture in, or importation into the United Kingdom.

***BALLISTITE.**—One of the first military smokeless powders, invented by Nobel. It consisted of about equal parts of nitroglycerine and soluble nitrocotton incorporated together under water, then passed repeatedly through rolls and cut into flakes. It was adopted by a number of Continental powers, but in consequence of the severe erosion of the guns which it caused, it has been modified or abandoned. The percentage of nitroglycerine is reduced, and consequently it is necessary to use a solvent such as acetone. A little mineral jelly or other stabiliser is sometimes added.

BARATOL.—A mixture of barium nitrate and trinitro-toluene.

BARBARIT.—A German chlorate explosive made at the Sprengstoff-fabriken Kriewald bei Gleinitz.

Potassium chlorate	90–92
High-boiling petroleum	8–10

The petroleum has a flash point not below 105° C., and commences to boil not below 242°.

Gelatine-Barbarit has the composition—

Potassium chlorate	80
Trinitro-toluene	10
Liquid mono- and dinitro-toluenes gelatinised with 5 per cent. collodion cotton	10

BARKING POWDER.—A mixture of ammonium perchlorate and nitrated naphthalene, formerly used in coal mines.

BAUTZENER SICHERHEITSPULVER.—A German coal-mine explosive containing not less than 70 per cent. of ammonium nitrate, barium nitrate, and not more than 15 per cent. of trinitro-toluene.

BAVARIT.—A German coal-mine explosive similar to Grisounite. It contains 90 per cent. of ammonium nitrate together with nitrated naphthalene; charcoal may be added.

BELLITE is essentially a mixture of ammonium nitrate and metadinitro-benzene. It has been used extensively as a coal-mine explosive, and was patented by C. Lamm of Stockholm in 1885. Two varieties passed the Woolwich Test and were on the old Permitted List—

	No. 1.	No. 3.
Ammonium nitrate . . .	83·5	93·5
Dinitro-benzene	16·5	6·5

No. 1 contains just enough oxygen for complete combustion, and No. 3 contains a large excess of oxygen. To enable the explosive to pass the Rotherham Test sodium chloride has been added. There were four varieties on the present Permitted List, but all except the following, No. 1, have been repealed—

	No. 1.
Date of Permit . . .	3–2–16
Ammonium nitrate . .	63·5
Dinitro-benzene . . .	15
Sodium chloride . . .	16·5
Starch	5
Limit charge . . .	20
Power (swing of ballistic pendulum) . . .	2·74

BENTAL COAL POWDER.—An American coal-mine explosive on the Permissible List. It is an ammonium nitrate explosive.

BITUMINITE.—There are several coal-mine explosives of this name on the American Permissible List. Nos. 1, 3, 4 and 8 L.F. are nitroglycerine explosives. No. 5 is an ammonium nitrate explosive.

BLACK DIAMOND.—There are several coal-mine explosives of this name on the American Permissible List. Nos. 2A, 8A and 6 L.F. are nitroglycerine explosives, whereas Nos. 5, 7 and 8 are ammonium nitrate explosives.

BLACK POWDER is a name for ordinary gunpowder, a mixture of potassium nitrate, sulphur and charcoal.

BLASTINE is a high explosive having approximately the composition—

Ammonium perchlorate	60
Sodium nitrate	23
Dinitro-toluene	11
Paraffin wax	6

As the sodium nitrate in the above is not equivalent to the ammonium perchlorate, part of the chlorine is given off in the form of the poisonous gas, hydrogen chloride (hydrochloric acid).

BLASTING GELATINE.—Nitroglycerine, stiffened by having collodion cotton dissolved in it. Discovered by Nobel in 1875. It contains about—

Nitroglycerine	93
Collodion cotton	7

and also often a fraction of a percentage of calcium or mag-

nesium carbonate to increase its stability. This is the most powerful of all the explosives in common use.

BOBBINITE.—The only explosive of the gunpowder class the use of which is permitted in coal mines in England. In most foreign countries explosives of this class are not allowed to be used in them at all. The permission is only temporary, but has been extended to the end of 1920, and is restricted to mines that are not gassy or dangerous from coal dust. There are two definitions, but the second is the one that is generally manufactured apparently—

	First.	Second.
Potassium nitrate . . .	63·5	65
Charcoal	18·5	20
Sulphur	2	2
Sulphates of ammonium and copper	15	—
Rice or maize starch . .	—	9
Paraffin wax	—	3
Moisture	1	1

More than a million pounds of this explosive are used in coal mines every year. It shatters the coal less than high explosives do.

BOMLIT.—A German potassium perchlorate blasting explosive made by Wolff et Cie. at Walsrode. It contains also ammonium nitrate, trinitro-toluene and guncotton. Other ingredients that may be present are potassium and sodium nitrates, starch meal, vaseline, naphthalene and other hydrocarbons, charcoal and castor oil.

BRITONITE.—A coal-mine explosive of the Carbonite type, made by the British Explosives Syndicate, Ltd., Pitsea. The original composition passed the Woolwich Test and was on the list of Permitted Explosives, but on the introduction of the Rotherham Test it became necessary to add ammonium oxalate or sodium chloride. Nos. 2 and 3 were on the Permitted List, but have now been repealed.

Date of Permit		No. 2. 1-9-13	No. 3. 28-1-15
Nitroglycerine	26	24	24·5
Sodium nitrate	—	—	28
Potassium nitrate	32·7	30	—
Wood meal	41	38	35·5
Sodium carbonate	0·3	—	—
Ammonium oxalate	—	8	—
Sodium chloride	—	—	12
Limit charge	—	24	24 oz.
Power (swing of ballistic pendulum)	—	2·26	2·17″

BROWN POWDER. See **COCOA POWDER.**

BRUGÈRE'S POWDER consisted of—

Ammonium picrate	54
Potassium nitrate	46

It was stated to give good results in the Chassepôt rifle, but picrate mixtures are liable to detonate, and are therefore dangerous to use as propellants.

BULL DOG Gunpowder Pellets were used in coal mines. They contained the same constituents as Bobbinite, which superseded them, but in different proportions.

Explosifs **C** were mixtures of ammonium cresylate with ammonium or sodium nitrate. They were made in France at one time, but their manufacture was dropped, as they were more expensive to make than Grisounite, and no more powerful.

CAHUECIT.—This was invented in the 'seventies of the last century by R. Cahuc, and was manufactured at Dartford in Kent under the name of Safety Blasting Powder or Carbo-azotine. It is still made in Germany. The ingredients are—

	English.	German.
Potassium nitrate	64	70
Sulphur flowers	12	12
Lampblack or soot	7	8
Bark or wood pulp	17	10

to which are added a few per cent. of sulphate of iron. The incorporation is carried out with the assistance of a considerable quantity of water, which is afterwards evaporated off. The mixing is not very thorough. The explosive is a comparatively mild one, but is used sometimes for blasting basalt. In the German explosive the potassium nitrate may be replaced by the corresponding sodium salt.

AMMONCAHUECIT.—In this explosive the potassium nitrate is replaced mainly or wholly by ammonium nitrate, and it contains not more than 15 per cent. of trinitro-toluene or trinitro-naphthalene or other nitro-body.

The brand labelled "Fram" contains ammonium nitrate, not more than 25 per cent. of trinitro-toluene gelatinised with 4 per cent. collodion cotton, wood meal or other vegetable meal and neutral stable salts. The brand "Indra" is similar, except that it contains also not more than 10 per cent. potassium nitrate, and the percentage of trinitro-toluene may be raised to 20.

CAMBRITE is a coal-mine explosive of the Carbonite type made by Nobels at Ardeer. It consists practically of Nobel Carbonite, to which 8 per cent. of a cooling agent has been added. Unlike most of the explosives on the old Permitted List, it passed the Rotherham Test with practically no alteration—

	Cambrite.	No. 2.
Date of Permit . . .	1-9-13	1-4-15
Nitroglycerine . . .	23	23
Barium nitrate . . .	4	4
Potassium nitrate . .	27·5	27·5
Wood meal. . . .	37·2	37
Calcium carbonate . .	0·3	0·5
Ammonium oxalate . .	8	—
Potassium chloride . .	—	8
Limit charge . . .	80	24 oz.
Power (swing of ballistic pendulum)	1·98	2·00

Only No. 2 is now on the Permitted List.

CAMERON MINE POWDER.—There are a number of coal-mine explosives of this name on the American Permissible List. Nos. 1A, 2A and 2A LF are ammonium nitrate explosives, whereas Nos. 3A and 5A are nitroglycerine explosives.

***CANNONITE** was a smokeless powder made by a firm called the War and Sporting Smokeless Powder Syndicate, Ltd. It consisted of about 86 per cent. of nitrocellulose mostly insoluble in ether-alcohol, and a few per cent. of barium nitrate, together with small quantities of some of the following: potassium nitrate, charcoal, lampblack, vaseline, rosin, stearine, dinitro-benzene, trinitro-toluene, potassium ferrocyanide, graphite. For shot-guns the powder was of the forty-two grain type, dense and gelatinised. The rifle powder was colloidal. These powders were made in the 'nineties of the last century.

CARBITE D'ABLON is a sort of Carbonite made in France—

Nitroglycerine	26
Potassium nitrate	33
Wood meal or flour	41

CARBOAZOTINE. See **CAHUECIT.**

CARBO-DYNAMITE was an explosive patented by W. D. Borland. It differed from ordinary dynamite in that the nitroglycerine was absorbed in cork charcoal instead of kieselguhr. One part of the charcoal sufficed to absorb nine parts of nitroglycerine.

CARBONITE (or Karbonit) was one of the earliest and one of the most successful coal-mine explosives. It was first made by Bichel and Schmidt at Schlebusch in Germany in 1885, and after some modifications gave satisfactory results at the Neunkirchen testing station in 1887. It

contains about 26 per cent. of nitroglycerine, 33 per cent. of a nitrate, and 40 per cent. of wood meal or starch flour, and small quantities of other substances. Nobel Carbonite passed the Woolwich Test and had the composition—

Nitroglycerine	26
Barium nitrate	4
Potassium nitrate	29
Wood meal	40·5
"Sulphuretted benzol"	0·25
Sodium and calcium carbonates	0·25

The Carbonite made at the works of the Carbonite Syndicate at Schlebusch, and imported into Great Britain, was practically the same as this, but they also made another explosive which passed the Woolwich Test, and contained 85 per cent. of nitroglycerine gelatinised with nitrocotton, and smaller proportions of nitrates and wood meal than are given above: this was called Extra-Carbonite. They have also made explosives to numerous modifications of this formula for use on the Continent. The essential feature of all of them is that they contain so much of the combustible constituents, such as wood meal, that most of the carbon appears in the products of explosion as carbon monoxide, and the temperature of the gases is consequently low.

Nobels at Ardeer also made a low freezing explosive in which part of the nitroglycerine was replaced by a nitro-compound. This was called Arctic Carbonite—

Nitroglycerine	15·5
Nitro-hydrocarbon	10·5
Potassium nitrate	42
Wood meal	31·7
Calcium carbonate	0·3

Various manufacturers have made explosives of the type of Carbonite and placed them on the market under different names, such as Tutol, Kolax, Kohlen-Carbonite, Minite and Colinite. These, however, do not pass the Rotherham Test for Permitted Explosives, unless ammonium oxalate or other

cooling agent be added, as in the case of Cambrite, Super-Kolax and Britonite No. 2.

On the Continent, explosives similar to Arctic Carbonite have been produced under the names Antigel de Sûreté and Ingélite.

There are several Carbonites on the American Permissible List. Of these Nos. 1 to 4 are in order of diminishing violence: Nos. 5 and 6 are low freezing varieties. There are also a number of other explosives of the Carbonite type on the List.

Ammonkarbonit is a German coal-mine explosive, containing about 80 per cent. of ammonium nitrate and 4 per cent. of blasting gelatine, together with 5 or 10 per cent. of potassium nitrate, and a combustible such as flour, starch or coal dust. Sodium or potassium chloride may be added as a cooling agent. It has been used for blasting clay.

Gelatine-Karbonit is a Carbonite containing ammonium nitrate, and a considerable proportion of nitroglycerine gelatinised with collodion cotton.

Halokarbonit is similar to Ammonkarbonit, except that a considerable proportion of the ammonium nitrate is replaced by other nitrates.

CARLSONITE was the first ammonium perchlorate explosive submitted to H.M. Inspectors of Explosives. It was proposed in 1898 by Carlson of Stockholm, and some of the mixtures were reported on favourably, but no licence was ever taken out in the United Kingdom for this explosive.

C.E. (Composition Exploding) is the same as Tetryl.

CELTITE was a coal-mine explosive made by Dr. R. Nahnsen & Co., Hamburg, and formerly permitted for use in British coal mines, having passed the Woolwich Test.

Nitroglycerine	57
Nitrocotton	8
Potassium nitrate	19
Wood meal	9
Ammonium oxalate	12

It was also called Zeltit.

*CENTRALITE is not an explosive, but is a name given to a substance which has been used to modify the surface of smokeless powder, and make it burn progressively. The substance is dimethyl-diphenyl-urea. (See Brit. Pat. 29,882 of 1909.) It acts also as a stabiliser.

CHEDDITE is a chlorate explosive which has been rendered less sensitive by having the particles of chlorate coated with castor oil or paraffin wax. It is manufactured by the French Government at the Vonges Powder Works, and has also been made in other countries. The two types that have been most used in France are—

	02 or No. 4.	05 or No. 1.
Potassium chlorate . .	79	—
Sodium chlorate . .	—	79
Castor oil . . .	5	5
Mononitro-naphthalene .	1	—
Dinitro-toluene . .	15	16

*CHEESA STICKS are sticks of cordite coated with powdered ammonium oxalate and shellac. They are used in South Africa as fuses for blasting charges. They are authorised in England only for manufacture and immediate export.

*CHILWORTH SMOKELESS POWDER. See C.S.P.

*CHILWORTH SPECIAL POWDER. See AMIDE POWDER.

CHLORATIT is an Austrian explosive, which was permitted for use in coal mines during the War.

CHLORATZIT.—A German explosive containing potassium chlorate or perchlorate, aromatic nitro-bodies, resins and carbohydates. For use in coal mines neutral salts are added as cooling agents, and the name then has WETTER or KOHLEN prefixed to it.

CHROMAMONIT was a coal-mine explosive formerly made in Germany—

Ammonium nitrate	63·25
Potassium nitrate	17·5
Collodion cotton	9·25
Chromium ammonium alum	9·5
Vaseline	0·5

***CLERMONITE.**—A Belgian shot-gun powder made by the Cooppal Co. It is a 10-grain fibrous powder of the bulk type and coloured green.

CLIFFITE was a coal-mine explosive made by Curtis's and Harvey, and formerly on the Permitted List—

Nitroglycerine	47
Collodion cotton	3
Starch	50

SUPER-CLIFFITE differs considerably from this. There are two formulæ which have passed the Rotherham Test, but only No. 2 is still on the Permitted List—

	No. 1.	No. 2.
Date of Permit	21–9–16	21–9–16
Nitroglycerine	9·5	9·5
Collodion cotton	0·5	0·5
Ammonium nitrate	59	59·5
Wood meal	6	6
Sodium chloride	15	19·5
Ammonium oxalate	10	5
Limit charge	26	30 oz.
Power (swing of ballistic pendulum)	2·53	2·53″

CLYDITE was a coal-mine explosive formerly made by Nobels at Ardeer. It was similar to Nobel Carbonite, but the potassium nitrate was replaced by the barium salt, and it might contain up to 8 per cent. of ammonium oxalate.

COALITE.—There is a series of coal-mine explosives of this name on the American Permissible List. Varieties X, 3X, and 3XC are ammonium nitrate explosives; whereas 1, 2D, 2DL and 2MLF are nitroglycerine explosives.

COAL SPECIAL are American coal-mine explosives on the Permissible List. They are all nitroglycerine explosives.

COCOA POWDER or Brown Powder was a variety of gunpowder made with a brown charcoal prepared from straw—

Potassium nitrate	70
Sulphur	3
Straw charcoal	18

It was compressed to a density of 1·8 into prisms or grains of considerable size, and was used in guns of large calibre. E.X.E. and S.B.C. were special varieties of this.

COLINIT ANTIGRISOUTEUSE.—A Belgian coal-mine explosive of the Carbonite type. The ordinary formula is practically the same as that of Kohlencarbonite and Minerite. Type B consists of—

Blasting gelatine	26
Potassium perchlorate	6
Ammonium nitrate	20
Trinitro-toluene	12
Rye flour and cellulose	29
Magnesium sulphate	7

COLLIER POWDER.—There are a number of coal-mine explosives of this name on the American Permissible List. Varieties BNF, KN, X, XLF, 5, 5LF, 5 Special, 9, 11, and 11LF are ammonium nitrate explosives whereas 2 and 6LF are nitroglycerine explosives.

COLLODION COTTON is a variety of nitrocotton of low nitration, almost completely soluble in a mixture of ether

and alcohol. It contains not more than 12·3 per cent. of nitrogen. It also dissolves in nitroglycerine and liquid nitro-compounds, rendering them gelatinous and so preventing their exudation.

***COOPPAL'S POWDER.**—A Belgian smokeless shotgun powder. Formerly it was much the same as Schultze Powder, consisting of nitrolignin carefully purified, and mixed with nitrates with or without the addition of starch. The following analyses were published in "Arms and Explosives" for July 1917—

	No. 1. 1892. Fibrous 42-grain bulk.	No. 2. 1900. Gelatinised 30-grain dense.
Nitrocellulose, insoluble . .	13·0	71·1
,, soluble . .	60·5	20·1
Metallic nitrates . . .	21·3	2·0
Shellac	3·2	—
Nitro-hydrocarbons . .	—	5·5
Moisture	2·0	1·3

CORDITE is the principal smokeless powder of the British Services. It was originally adopted in 1888, and is made by mixing nitroglycerine with guncotton and mineral jelly (a sort of crude vaseline), and incorporating them together with the aid of acetone, which gelatinises the guncotton. In consequence of the severe erosion of the guns experienced during the South African War the proportions were altered, some of the nitroglycerine being replaced by guncotton. The propellant thus "modified" is called Cordite M.D., whereas that of the original composition is Cordite Mk.I. Both are still in use, especially M.D.—

	Mk. I.	M.D.
Guncotton	37	65
Nitroglycerine	58	30
Mineral jelly	5	5

During the great European War a further variety was introduced to extend the basis of supply of solvents. This

is called Cordite R.D.B. (Research Department B), and contains a nitrocotton of comparatively low nitration that can be gelatinised by means of a mixture of ether and alcohol—

Nitrocotton	52
Nitroglycerine	42
Mineral jelly	6

It is designed to give about the same ballistics as Cordite M.D. A further letter is sometimes added to show the form of the powder. Thus Cordite M.D.T. is M.D. pressed into tubes; S. stands for strip. The size is indicated by a numeral, which shows the diameter in hundredths of an inch of the die through which it has been pressed. In the case of tubular powder both the external and internal diameters are given approximately: *e. g.* Cordite M.D.T. 5–2.

Poudre blanche **CORNIL.**—A Belgian coal-mine explosive containing ammonium nitrate, potassium or sodium nitrate, dinitro-naphthalene and lead chromate, with or without the addition of ammonium chloride.

CORNISH POWDER.—A coal-mine explosive which passed the Woolwich Test and was formerly on the Permitted List, made by the National Explosives Co., Ltd.—

Nitroglycerine	55
Nitrocotton	8
Potassium nitrate	18
Wood meal	7
Magnesium sulphate	17

CORONITE was a coal-mine explosive of the Carbonite type, which was on the Permitted List at one time. It had also been called Permittite.

Picric acid has been called by this name in Sweden.

See also **KORONIT.**

COSILIT.—A German coal-mine explosive of the Carbonite type made by Nahnsen. A published analysis gives its composition as—

Nitroglycerine	30
Sodium nitrate	22·3
Vegetable meal	40·5
Sodium chloride	7·2

COTTON POWDER. See **TONITE**, also **CP.**

CP_1 and **CP_2** are varieties of nitrocotton (Coton Poudre) made in France, principally for the manufacture of Poudre B and other smokeless powders. CP_1 is a guncotton containing about 13 per cent. of nitrogen, and only about 10 per cent. of matter soluble in ether-alcohol. CP_2 is almost completely soluble in ether-alcohol, and contains about 12 per cent. of nitrogen.

CRÉSYLITE.—A French high explosive used for filling shell and other military purposes. Crésylite 60/40 consists of picric acid and nitrated cresol in about the proportions of 40 of the former to 60 of the latter. It melts below the temperature of boiling water. The nitrated cresol consists largely of trinitro-metacresol.

Crésylite No. 2 is simply crude trinitro-meta-cresol.

CRONITE is an American coal-mine explosive. There are two varieties on the Permissible List, Nos. 1 and 5, both of which are ammonium nitrate explosives.

***CRYSTAL** is a smokeless shot-gun powder made by Curtis's and Harvey. It is a non-solvent powder for cheap loading, and the charge is thirty-three grains.

C.S.P.[3] (Chilworth Smokeless Powder, No. 2) is a modification of Cordite, containing a little sodium bicarbonate as a stabiliser. It is stated to have been adopted by the Brazilian navy (see "Engineering" for August 18, 1911, p. 237) and other powers.

CUGNITE.—A French blasting explosive manufactured by the Société Française des Explosifs—

Nitroglycerine	27
Nitrocotton	0·7
Ammonium nitrate	30
Sodium nitrate	30
Wood meal	11
Barium sulphate	1·3

CURTISITE.—A coal-mine explosive of the Grisounite class made by Curtis's and Harvey. It was formerly on the Permitted List—

Ammonium nitrate	88
Trinitro-toluene	8
Mononitro-naphthalene	4

SUPER-CURTISITE was a modification of the above to enable it to pass the Rotherham Test—

Date of Permit	7-4-14
Ammonium nitrate	38·5
Potassium nitrate	29·5
Trinitro-toluene	10
Ammonium chloride	22
Limit charge	16 oz.
Power (swing of ballistic pendulum)	2·71″

The permit has been repealed.

DAHMENITE is an ammonium nitrate explosive which has been used to a considerable extent in Germany. One variety known as Dahmenite A, made by De Gezamenlijke Buskruidmakers van Noord-Holland, was formerly on the British Permitted List for use in dangerous coal mines—

Ammonium nitrate	92·5
Naphthalene	5·5
Potassium bichromate	2

Ordinary Dahmenite contains up to 15 per cent. of potassium nitrate instead of bichromate, and has been used for blasting clay. Some varieties contain curcuma meal and other constituents. The following are some examples—

	Gesteins-Dahmenit.	No. 76.
Ammonium nitrate	84·5	71·5
Potassium bichromate	2·5	0·5
Curcuma meal	12	6·25
Dinitro-benzene	1	—
Trinitro-toluene	—	12
Sodium chloride	—	9·75

	Gelatine Dahmenit.
Ammonium nitrate	82
Sodium nitrate	5·5
Potassium nitrate	2
Dinitro-glycerine	27·4
Nitrocotton	0·6
Naphthalene	0·5
Trinitro-toluene	4·5
Alkali chloride	27·5

	Neu-Dahmenit. B	
Ammonium nitrate	68	65
Potassium nitrate	2	2
Vegetable meal	2·5	0·5
Coke	2	7
Trinitro-toluene	10	8
Alkali chloride	15·5	17·5

DENABY POWDER.—There was formerly a blasting explosive of this name, consisting of a compressed mixture of Securite and charcoal—

Potassium and barium nitrates	73·2
Dinitro-benzene	21·5
Nitrocotton and charcoal	5·1
Moisture	0·2

In 1914 a coal-mine explosive was introduced under the same name and passed the Rotherham Test—

Date of Permit	13–5–14
Ammonium nitrate	84
Potassium nitrate	33·5
Trinitro-toluene	13
Ammonium chloride	19·5
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·74″

It is made by British Westfalite, Ltd.

DENSITE.—A Belgian blasting explosive containing one or more of the following nitrates: ammonium, strontium, sodium, potassium; also trinitro-toluene, and sometimes dinitro-toluene and ammonium chloride. This explosive is

practically the same as Nitralite. Varieties have been made for use in coal mines.

See also Nitro-densite.

DETONIT V.—A German coal-mine explosive containing ammonium nitrate, charcoal, vegetable meal, neutral salts, and not more than 4 per cent. of blasting gelatine.

DETONITE SPECIAL is an American coal-mine explosive on the Permissible List. It contains ammonium nitrate.

DOMINITE.—A coal-mine explosive made by the Westphalia Anhalt Explosives Co. in Germany, and formerly on the British Permitted List—

Nitroglycerine	59·3
Nitrocotton	4
Paraffin oil	0·7
Ammonium oxalate	8·5
Potassium nitrate	18·5
Potassium chloride	4
Wood meal	5

DOMINIT XI.—A German blasting explosive containing ammonium nitrate, dinitro-toluene, glycerine, and not more than 4 per cent. of blasting gelatine.

DOMINIT XVIII, which has been introduced recently, contains up to 10 per cent. of potassium perchlorate, and is practically the same as Astralit V.

DONARIT is a German blasting explosive of the Grisoutine type made by the Carbonite Co. of Hamburg. As a standard for the sensitiveness of ammonium nitrate explosives, the Imperial German Railway Commission use Donarit of the composition—

Ammonium nitrate	80
Trinitro-toluene	12
Rye flour	4
Nitroglycerine	4

and this may be taken as the usual composition of the explosive, but the nitroglycerine is sometimes gelatinised with collodion cotton.

DONARIT A contains up to 16 per cent. of aluminium powder and no nitroglycerine.

DONARIT V, which has been introduced recently, contains up to 10 per cent. of potassium perchlorate, and is practically the same as Astralit V.

Wetter-Donarit contains also sodium chloride or other cooling agent.

Gelatine-Donarit contains up to 20 per cent. of dinitrochlorhydrin gelatinised with collodion cotton, in addition to the constituents of Donarit, and may also contain sodium nitrate.

DORFIT is a German coal-mine explosive made by the firm of Allendorf—

	I.	II.	Gesteins.
Ammonium nitrate .	65	61	66
Potassium nitrate . .	5	5	5
Trinitro-toluene . .	6	15	15
Flour	4	4	4
Sodium chloride . .	20	15	10

ALDORFIT is a simpler mixture intended for use where there is no danger of fire-damp—

Ammonium nitrate	81
Trinitro-toluene	17
Flour	2

It is authorised in Great Britain.

PERDORFIT contains not more than 52 per cent. of potassium perchlorate, sodium and ammonium nitrates, not more than 29 per cent. of trinitro-toluene and vegetable meal or gums.

DRAGONITE.—A coal-mine explosive made by Curtis's and Harvey, formerly on the Permitted List—

Nitroglycerine	35·5
Nitrocotton	2·5
Potassium nitrate	44·5
Vaseline	5·5
Wood meal and charcoal	12

DREADNOUGHT POWDER.—A coal-mine explosive made by Roburite and Ammonal, Ltd., for a time on the Permitted List—

Date of Permit	1-9-13
Ammonium nitrate	75·4
Trinitro-toluene	4
Ammonium chloride	5
Sodium chloride	15·5
Red oil	0·1
Limit charge	32 oz.
Power (swing of ballistic pendulum)	2·05″

There is also Quarry Dreadnought Powder, which is not a permitted explosive.

DUNNITE.—A high explosive used by the United States for filling shell. It is stated to give dangerous compounds with iron, so apparently is a compound of picric acid.

DU PONT PERMISSIBLE.—An American coal-mine explosive. The following is on the British Permitted List—

	No. 1.
Date of Permit	26-4-16
Nitroglycerine	9·5
Ammonium nitrate	67·5
Wood pulp	8
Sodium chloride	15
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·82″

***DU PONT SMOKELESS POWDER.**—An American shot-gun powder of the fibrous 36-grain bulk type—

Soluble nitro-cellulose	95·8
Metallic nitrates	2·2
Moisture	2·0

DUXITE.—A coal-mine explosive made by the Westphalia Anhalt Explosives Co. It passed the Rotherham Test, and was for a time on the British Permitted List—

Nitroglycerine	32
Nitrocotton	1
Sodium nitrate	28
Wood meal	10
Ammonium oxalate	29
Limit charge	12 oz.
Power (swing of ballistic pendulum)	2·45″

Sicherheits Gallerte-**DYNAMIT.**—A German coal-mine explosive—

Nitroglycerine	32·25
Collodion cotton	1·25
Ammonium nitrate	22·6
Sodium nitrate	10·8
Vegetable meal	18
Potassium chloride	5·5
Gelatine	1·05
Dextrin	1·05
Glycerine	4·3
Moisture	3·2
Limit charge	50 g.

Wettersicheres Gelatine-**DYNAMIT.**—A German coal-mine explosive—

	I.	Ia.
Nitroglycerine	40	38
Collodion cotton	1	1
Ammonium nitrate	27	25·5
Potassium nitrate	4	5
Ammonium oxalate	—	2·5
Rye flour	10	4
Liquid hydrocarbons	3·5	14
Fatty acid salt	12·5	10
Wood meal	2	—
Limit charge	50	100 g.

DYNAMITE is a name that has been given to various nitroglycerine explosives. Dynamite No. 1 consists of—

Nitroglycerine	75
Kieselguhr	25

the explosive being held in the pores of the kieselguhr. In other dynamites the nitroglycerine is absorbed in a material like wood meal, and a nitrate is added to oxidise the latter on explosion.

In Gelatine Dynamite the nitroglycerine is gelatinised with collodion cotton. See under Gelatine.

American Dynamites are not generally gelatinised with collodion cotton. They are made in a number of grades, depending on the percentage of nitroglycerine.

For further details about various dynamites, see text-books on explosives.

DYNAMITE ANTIGRISOUTEUSE.—Belgian coal-mine explosive made at Baelen Wezel—

IV.		V.	
Nitroglycerine . .	24	Nitroglycerine . .	44
Collodion cotton . .	1	Sodium sulphate . .	44
Ammonium nitrate .	75	Wood meal . . .	12

Of the above, IV. was found only to be safe in very small charges in the presence of fire-damp. No. V. has a "charge limite" of 700 grammes.

DYNAMMON.—The coal-mine explosive provided by the Austrian State monopoly—

	Dynammon.	Wetter-Dynammon.
Ammonium nitrate .	87–88	94
Potassium nitrate .	—	2
Red charcoal . .	12–13	4
Density . . .	0·9	0·85

DYNOBEL.—A coal-mine explosive made by Nobels. The first formula to pass the Rotherham Test contained potassium perchlorate—

Date of Permit	1-9-13
Nitroglycerine	33
Collodion cotton	0·7
Potassium perchlorate	27
Wood meal	10·3
Ammonium oxalate	29
Limit charge	22 oz.
Power (swing of ballistic pendulum)	2·61″

Subsequently other formulæ of somewhat different composition passed the test—

Date of Permit	No. 2. 16-8-15	No. 3. 14-4-16	No. 4. 14-4-16
Nitroglycerine	19·5	15	15
Collodion cotton	0·5	0·5	0·5
Trinitro-toluene, Dinitro-toluene, Dinitro-benzene (together)	2	1·5	3
Ammonium nitrate	42	52	46
Wood meal	5·5	5·5	5·5
Sodium chloride	30	25	29·5
Magnesium carbonate	0·5	0·5	0·5
Limit charge	24	18	30 oz.
Power (swing of ballistic pendulum)	2·46	2·50	2·35″

Of these only Nos. 3 and 4 are still permitted.

***E.C. POWDER** was one of the first smokeless shotgun powders, and is still one of the most successful. The composition has been varied somewhat from time to time, but it has always been a fibrous bulk powder. The following analyses were given in "Arms and Explosives," 1917, p. 76—

Date of Introduction	No. 1. 1882	No. 2. 1890	No. 3. 1897
Class	42-grain	42-grain	33-grain
Nitrocotton, insoluble	30·0	15·9	44·0
,, soluble	28·2	41·0	30·4
Metallic nitrates	37·8	38·3	14·0
Resin	2·1	2·0	—
Vaseline	—	—	6·0
Camphor	—	1·0	4·0
Moisture	1·9	1·8	1·6

The powder is manufactured at Green Street Green, near Dartford in Kent. The name is derived from "Explosives Company."

ECHO or **EKKO** is a blasting explosive made at Nitedal in Norway, consisting of ammonium nitrate, nitrocotton, trinitro-toluene, aluminium powder, and sometimes ferro-silicon. It has been used on the Continent for filling hand-grenades.

***ECONOMIC SMOKELESS SPORTING POWDER** is a 42-grain bulk powder for shot-guns, made by the E.C. Powder Company.

ECRASITE or **EKRASIT** is a high explosive used in Austria for filling shell and other military purposes. It is the ammonium salt of trinitro-cresol.

ELECTRONITE.—There have been several explosives of this name, but none of them have been used extensively, and all are dead now. There was a coal-mine explosive formerly on the Permitted List—

Ammonium nitrate	73
Barium nitrate	19
Starch and slightly-charred wood meal .	8

It was made by Curtis's and Harvey.

ELEY SMOKELESS SPORTING POWDER is a shot-gun powder similar to **E.C.**

Ammon-**ELSAGIT** is a German coal-mine explosive. It contains ammonium nitrate, vegetable meal, not more than 6 per cent. of trinitro-toluene or other nitro-body, not more than 4 per cent. of blasting gelatine, and may also contain fatty oils, alkali chlorides or oxalate, and sodium or potassium nitrate.

Gesteins-**ELSAGIT** has much the same composition, but the percentage of trinitro-toluene may be raised to 12, and it contains no sodium or potassium nitrate.

***EMPIRE POWDER** is a smokeless shot-gun powder

introduced in 1902 by Nobel's Explosives Company. It is a fibrous 33-grain bulk powder, and, according to an analysis published in "Arms and Explosives," 1917, p. 77, its composition is—

Nitrocotton, insoluble	48·0
,, soluble	34·0
Metallic nitrates	9·0
Vaseline	7·0
Moisture	2·0

ERGITE.—A blasting explosive which was made for a few years in a factory in North Wales. Other explosives were also made under the names of Granergite, Shattergite, etc.

ERIN GELIGNITE.—A Gelignite containing a small percentage of dinitro-toluene to prevent the nitroglycerine freezing.

ESSEX POWDER.—A coal-mine explosive made by the Explosives and Chemical Products, Ltd. It is on the Permitted List—

Date of Permit	1-9-13
Nitroglycerine	23
Nitrocotton	1
Potassium nitrate	34
Wheat flour	36
Ammonium chloride	6
Limit charge	38 oz.
Power (swing of ballistic pendulum)	2·17″

EUREKA No. 2 is an American coal-mine explosive on the Permissible List. It contains nitroglycerine and a hydrated salt.

EXCELLITE.—A coal-mine explosive formerly on the Permitted List—

Nitroglycerine	8
Ammonium nitrate	82·5
Collodion cotton	1
Dinitro-toluene	3
Wood meal	4·5
Castor oil	1

SUPER-EXCELLITE is a modification of this, containing salts as cooling agents. Three formulæ passed the Rotherham Test—

		No. 2.	No. 3.
Date of Permit	1-9-13	7-4-14	22-6-14
Nitroglycerine	4	5	9·5
Collodion cotton	—	—	0·5
Ammonium nitrate	75·5	50	59
Potassium nitrate	7	20	—
Starch	3·5	5	4·5
Castor oil	—	—	1
Ammonium chloride	—	5	—
Sodium chloride	—	—	15
Ammonium oxalate	10	15	10·5
Limit charge	10	14	36 oz.
Power (swing of ballistic pendulum)	2·74	2·72	2·73″

It will be seen that all three are about equal as regards power, but that No. 3, which contains the largest proportion of cooling agents and more nitroglycerine, can be used safely in much greater charges. In 1916 807,000 lbs. of No. 3 were used in mines and quarries, principally in coal mines. It is recommended by the makers, Curtis's and Harvey, for hard coal and colliery work generally. The permits of the others have been repealed.

EXPEDITE is a coal-mine explosive on the Permitted List made by Explosives and Chemical Products, Ltd.—

Date of Permit	25-11-13
Ammonium nitrate	35
Potassium nitrate	33
Trinitro-toluene	12
Ammonium chloride	20
Limit charge more than	32 oz.
Power (swing of ballistic pendulum)	2·62″

See also **XPDITE.**

EXPLOSIFS N, O, etc. See under respective letters.

EXTRA DYNAMITE is a variety of American dynamite containing ammonium nitrate.

FAVERSHAM POWDER is a coal-mine explosive of the Grisounite type made by the Cotton Powder Co. The mixture, which was on the old Permitted List, had the composition—

Ammonium nitrate	90
Trinitro-toluene	10

To make it pass the Rotherham Test, part of the ammonium nitrate was replaced by potassium nitrate, and ammonium chloride was added—

	No. 2.
Date of Permit	10-2-14
Ammonium nitrate	47·5
Potassium nitrate	24
Ammonium chloride	18·5
Trinitro-toluene	10
Limit charge	24 oz.
Power (swing of ballistic pendulum)	2·61″

but this also has now been repealed.

FAVIER explosives consist essentially of ammonium nitrate mixed with nitro-compounds. Favier took out patents in 1884 and 1885 for mixtures of ammonium nitrate with mononitro-naphthalene, paraffin and resin. Their manufacture was undertaken soon afterwards by the French Government, and is still continued under the names of Explosifs N, or Explosifs Favier or Grisounites. Their composition has been varied from time to time, but the following are those now authorised—

	Grisou-naphtalite-couche.		Grisou-naphtalite-roche.		Grisou-totrylite-couche.	For mines free from fire-damp, etc.
	N_1a.	N_4.	N_1b.			N_1c.
Ammonium nitrate	95	90	91·5	86·5	88	87·4
Potassium nitrate	—	5	—	5	5	—
Dinitro-naphthane	—	—	8·5	8·5	—	12·6
Trinitro-naphthalene	5	5	—	—	—	—
Tetryl	—	—	—	—	7	—

The Grisounites-couche are used in the coal seams as they have theoretical temperatures of explosion of 1500° or less, but N_1a has been replaced to a considerable extent by N_4, because the presence of a proportion of potassium nitrate is found to increase the safety; these are both coloured green. The Grisountes-roche have theoretical temperatures of explosion of 1900° or less, and are used in the rocks in coal mines. N_1b is dyed rose colour, and N_1c pale yellow.

Many explosives of this type are in use in different countries. On the old British Permitted List were Ammonite, Westfalite, Bellite and Roburite amongst others. Those now on the List contain ammonium or sodium chloride to enable them to pass the Rotherham Test, *e. g.* the later Ammonites, Bellite Nos. 2 and 4, Faversham Powder and Negro Powder.

On the Belgian list of Explosifs S.G.P. is Favier II bis—

Ammonium nitrate	77·6
Dinitro-naphthalene	2·4
Ammonium chloride	20
Charge limite . .	More than 293 grammes.

FAVORIT. See **KORONIT.**

***FELIXITE** is a smokeless shot-gun powder introduced in 1906 by the New Explosives Company. It is a fibrous 42-grain bulk powder, and, according to an analysis published in "Arms and Explosives," 1917, p. 76, has the composition—

Nitrocellulose, insoluble	40·5
,, soluble	20·5
Metallic nitrates	30·0
Nitro-compound	5·0
Vaseline	2·7
Moisture	1·3

***FILITE** was a smokeless powder formerly used in the Italian services. It was a Ballistite consisting generally of equal parts of nitroglycerine and collodion cotton, to which 0·5 to 1 per cent. of aniline or diphenylamine was added as a

stabiliser. It was gelatinised with a solvent and drawn out into cords.

FLAMMIVORE.—A Belgian coal-mine explosive made at Arendonck—

O.		I.	
Ammonium nitrate	70	Blasting gelatine	4
Barium nitrate	15	Ammonium nitrate	82
Cellulose	5	Potassium nitrate	10
Dinitro-toluene	10	Rye flour	4
Charge limite	100g.	Charge limite	500g.

III.

Nitroglycerine	6
Ammonium nitrate	70
Ammonium sulphate	9
Barium sulphate	7
Dextrin	8
Charge limite	650 g.

In the United Kingdom this is "authorised" but not "permitted" for use in dangerous mines.

FLOBERT ammunition consists of small cartridges, like detonators, charged with a small quantity of mercury fulminate, and some antimony sulphide and potassium chlorate. It is used for target practice and shooting small birds.

FOERDER SICHERHEITSSPRENGSTOFF.—A German coal-mine explosive containing ammonium nitrate, not more than 4 per cent. of blasting gelatine, mono- and di-nitro-aromatic compounds, vegetable meal and neutral salts.

FOERDIT.—A German coal-mine explosive containing nitroglycerine gelatinised or ungelatinised, carbohydrates, glycerine, nitro-compounds, inorganic nitrates and sodium or potassium chloride.

Ammon-Foerdit is a similar mixture, except that it contains a larger percentage of ammonium nitrate and no other inorganic nitrates. The nitroglycerine is gelatinised, and there is a little diphenylamine. The following are examples of these two explosives—

	Foerdit.	Ammon-Foerdit.
Nitroglycerine	25·5	8·8
Collodion cotton	1·5	0·2
Ammonium nitrate	37	85
Nitro-toluene	5	—
Dextrine or flour	4	4
Glycerine	3	2
Diphenylamine	—	1
Potassium chloride	24	4

Ammon-Foerdit F, which has been introduced recently, contains up to 10 per cent. of potassium perchlorate and is similar to Astralit V.

FORCITE.—A variety of gelatine dynamite or gelignite made in Belgium. It contains blasting gelatine 36 to 64 per cent., sodium or ammonium nitrate, wood meal, magnesia and sometimes bran.

An American explosive of the same name is a dynamite containing wood tar—

Nitroglycerine	49
Collodion cotton	1
Sodium nitrate	38
Sulphur	1·5
Wood tar	10
Wood pulp	0·5

FORCITE ANTIGRISOUTEUSE 3.—A Belgian coal-mine explosive of the Carbonite type—

Nitroglycerine	26
Potassium nitrate	33
Barium nitrate	1
Rye flour	38·5
Bran	1
Sodium carbonate	0·5
Charge limite	750g.

FORTEX.—A coal-mine explosive made by Explosives and Chemical Products, Ltd. The mixture, which was on the old Permitted List, was—

Ammonium nitrate	78·5
Tetryl	21·5

NEW FORTEX.—A modification of the above to pass the Rotherham Test—

Date of Permit	25–11–13
Ammonium nitrate	35
Potassium nitrate	33
Tetryl	12
Ammonium chloride	20
Limit charge	10 oz.
Power (swing of ballistic pendulum)	2·61″

FORT PITT MINE POWDER NO. 1 is an American coal-mine powder on the Permissible List. It is a nitroglycerine explosive.

FRACTORITE.—A Belgian coal-mine explosive—

B.		D.	
Ammonium nitrate	75	Ammonium nitrate	75
Dinitro-naphthalene	2·8	Sodium nitrate	10
Ammonium oxalate	2·2	Nitroglycerine	4
Ammonium chloride	20	Ammonium oxalate	7
		Flour	4
Charge limite	450 g.	Charge limite	700 g.

FRACTURITE.—A coal-mine explosive formerly on the Permitted List, made by the British Explosives Syndicate, Ltd.—

Nitroglycerine	52·5
Collodion cotton	3·5
Potassium nitrate	23
Wood meal	6
Ammonium oxalate	15

FUEL-ITE.—There is a series of coal-mine explosives of this name on the American Permissible List. Nos. 1 and 2 are nitroglycerine explosives of the Carbonite type. No. 3 is an ammonium nitrate explosive.

FUELLPULVER (or **FP.**) is the name given by the Germans to mixtures of trinitro-toluene and ammonium nitrate used for filling shell. Fp. 60/40, for instance, is a mixture of 60 parts trinitro-toluene and 40 parts of ammonium nitrate, and is consequently the same as Amatol 40/60. Fp. without figures stands for trinitro-toluene.

***FULMEN POWDER** is a 33-grain smokeless powder for shot-guns made by the Schultze Gunpowder Co.

FULMENIT.—A blasting explosive made by the German Nobel Co., containing ammonium nitrate, vegetable meal or charcoal, paraffin oil, trinitro-toluene and guncotton.

WETTER-FULMENIT is a coal-mine explosive which has been much used. It differs from the above in containing also sodium or potassium chloride—

	Fulmenit.	Wetter-Fulmenit.	
Ammonium nitrate . .	86·5	76	76·5
Guncotton . . .	4	0·5	4
Trinitro-toluene . .	5·5	11·8	5·5
Charcoal	1·5	1·5	1·5
Paraffin oil . . .	2·5	0·2	2·5
Sodium chloride . .	—	10	10

FUMYL.—A smoke-producing explosive containing trinitro-toluene and ammonium chloride, used for opening poison-gas shell, etc.

GATHURST POWDER.—An explosive of the Grisounite class. According to an analysis given in Cundill and Thomson's Dictionary it consisted of—

Ammonium nitrate	83·4
Dinitro-benzene	16·5
Moisture	0·1

GEHLINGERIT.—A German blasting explosive. Gesteins-Gehlingerit III. contains—

Ammonium nitrate	80
Trinitro-toluene	15
Flour	5

Wetter-Gehlingerit, which is a coal-mine explosive, contains also sodium or potassium chloride, and may contain up to 4 per cent. of nitroglycerine to increase its sensitiveness.

GELATINÉ À L'AMMONIAQUE.—A Belgian explosive, a mixture of blasting gelatine and ammonium nitrate.

GELATINE DYNAMITE is a mixture of blasting gelatine, potassium nitrate and a little wood meal. That made in Britain must contain between 70 and 77 per cent. of nitroglycerine; it may contain up to 2 per cent. of calcium or magnesium carbonate, or ½ per cent. of mineral jelly as a stabiliser. The following may be taken as an example of its composition—

Nitroglycerine	74·5
Collodion cotton	5·5
Wood meal	4
Potassium nitrate	15·5
Calcium carbonate	0·2
Moisture	0·3

In America brands are made of 35 to 80 per cent. strength.

GELIGNITE is similar to Gelatine Dynamite except that it contains a smaller proportion of blasting gelatine; in Britain the percentage of nitroglycerine must be between 56 and 63, *e. g.*—

Nitroglycerine	61
Collodion cotton	4·5
Wood meal	7
Potassium nitrate	27
Calcium carbonate	0·2
Moisture	0·3

There are also a number of modified Gelignites, which either contain sodium or barium nitrate in partial or entire replacement of the potassium nitrate, or else contain some substance to reduce the freezing point of the nitroglycerine and so diminish the danger of freezing, such as dinitro- or trinitro-toluene or dinitro-glycol.

GESILIT.—A German coal-mine explosive made by Nahnsen. It contains blasting gelatine, inorganic nitrates, sodium chloride, carbohydrates and dinitro-toluene—

	I.	II.	III.
Blasting gelatine . .	30·75	30·75	32·5
Ammonium nitrate . .	—	22	22
Sodium nitrate . .	18	—	—
Dinitro-toluene . .	5·25	5·25	5·25
Dextrin	39	21	—
Pea flour . . .	—	—	20
Sodium chloride . .	7	21	20·25

When tested in a gallery with an explosive gas mixture I. proved to be safer than the other two.

GIANT COAL-MINE POWDERS are American coal-mine explosives on the Permissible List. No. 5 is an ammonium nitrate explosive, whereas Nos. 6, 7 and 8 are low-grade dynamites mixed with hydrated salts.

GIANT POWDER is a name given in America to dynamite. No. 1 is a kieselguhr dynamite containing about 75 per cent. of nitroglycerine. Many varieties, however, do not contain kieselguhr, but consist of nitroglycerine mixed with wood pulp, sodium or potassium nitrate, resin, sulphur or other combustible matter. The nitroglycerine is sometimes gelatinised with collodion cotton, or in the "Extra" varieties is partially replaced by ammonium nitrate.

GLONOINE was an early name for nitroglycerine.

GLUECKAUF.—A German explosive of the Grisounite type consisting of ammonium nitrate and vegetable meal,

to which might be added any of the following: sugar, resin, fatty oil, potassium nitrate, sodium nitrate, dinitro-benzene, ammonium oxalate, copper oxalate, copper nitrate ammonia, or sodium chloride. It was used for a time by several potash mines; was given up again by most of them.

GOOD LUCK was an explosive made by the Sprengstoffwerke Glueckauf A.-G., and was on the old British Permitted List for coal-mine explosives. It had the composition—

Ammonium nitrate	82·5
Dinitro-benzene	1
Turmeric	10·5
Copper oxalate	6

GRANATFUELLUNG (*i. e.* Shell-filling) is a name given by the Germans to certain high explosives used for filling shell. Granatfuellung C/88 is picric acid, and C/02 is trinitro-toluene. See Fuellpulver. Other substances used in German shell and bombs are trinitro-anisole, dinitro-benzene, hexanitro-diphenylamine and hexanitro-diphenyl sulphide, otherwise picryl sulphide.

GRISOUNITE.—A French coal-mine explosive. See **FAVIER** Explosives.

GRISOUTINE or **GRISOU-DYNAMINE** is the only explosive except Grisounite allowed in the more dangerous French coal mines. It consists of ammonium nitrate mixed with blasting gelatine. As the State monopoly does not extend to explosives containing nitroglycerine, it is made by private firms, but the compositions are regulated by the "Commission des Substances Explosives," which in 1911 resolved that they should be uniformly as follows—

	Couche.	Couche au Salpêtre.	Roche.	Roche au Salpêtre.
Nitroglycerine	12	12	29	29
Collodion cotton	0·5	0·5	1	1
Ammonium nitrate	87·5	82·5	70	65
Potassium nitrate	—	5	—	5

The calculated temperatures of explosion of the Grisoutines couches are below 1500°, and those of the Grisoutines roches below 1900°. The addition of 5 per cent. of potassium nitrate is found to increase the safety.

There are a number of explosives of this type made in other countries also, but they usually contain small proportions of combustible substances such as wood meal, and nitro-bodies such as trinitro-toluene. Of British explosives of this type, mention may be made of Monobel, Super-Excellite and Monarkite. German explosives of this sort include Salit, Tremonit, Donarit, Ammon-Karbonit and Astralit.

On the Belgian list of Explosifs S.G.P. is Grisoutine II., which is identical in composition with Dynamite anti-grisouteuse V.

GRISOUTITE.—A Belgian coal-mine explosive—

Nitroglycerine	44
Magnesium sulphate	44
Cellulose	12
Charge limite	300 g.

GUARDIAN.—American coal-mine explosives. Nos. 2, 2X, 3 and 3X are ammonium nitrate explosives, whereas Guardian A and Guardian Coal Powder B are nitroglycerine explosives.

GUNCOTTON.—A highly nitrated cotton containing about 13 per cent. of nitrogen and only slightly soluble in ether-alcohol.

GUNPOWDER. See **BLACK POWDER.**

***HALAKITE** attracted public attention out of all proportion to its merits, of which it possessed none, in consequence of the extravagant claims made on its behalf by its "inventors" and their dupes. Early in 1917 the British Government caused an inquiry to be held, and the case for the explosive collapsed in a ludicrous manner. According

to patent specification, No. 685 of 1915, the basis of the explosive was an admixture of lead nitrate with glycerine and other substances, and under the working conditions the glycerine was said to react with the nitrate to form a nitro-compound, which, of course, is not true. The substance actually submitted to the British and French authorities consisted of cordite mixed with lead nitrate, barium nitrate and lead chromate. This was stated by the promoters to be equally effective as a high explosive and a propellant! See "Interim and Final Reports of the Army Council (Halakite) Inquiry," Cd. 8446.

HALALIT.—A German blasting explosive made by Nahnsen, containing not more than 65 per cent. of potassium perchlorate, ammonium nitrate, and not more than 32 per cent. of nitrated toluene, of which not more than 20 per cent. must be trinitro-toluene. It may also contain collodion cotton to gelatinise the liquid nitro-toluene, and sodium nitrate and wood meal or other vegetable meal.

Ammon-Halalit A, which has been introduced recently, is similar to Astralit V.

HALOKLASTIT. See **PETROKLASTIT.**

HAMMONIT.—A German blasting explosive containing not more than 40 per cent. of potassium or sodium perchlorate, not more than 4 per cent. of nitroglycerine, aromatic nitro-bodies, ammonium nitrate, sodium or potassium nitrate, neutral salts and vegetable meal or other combustible matter.

HASSIA-CHLORAT is an explosive that was introduced in Germany during the War. It consists of 65 per cent. potassium chlorate and 35 per cent. combustible, and it is claimed that the large proportion of the latter not only makes it a mild explosive, but also renders it comparatively insensitive. It is also called Spreng-chlorat.

HAYLITE.—A coal-mine explosive made by the National Explosives Co. There were three varieties on the

Permitted List: No. 1 was also on the old Permitted List, but has now been repealed.

Date of Permit	No. 1. 1-9-13	No. 2. 21-11-16	No. 3. 30-5-18
Nitroglycerine	26	15·5	9·5
Collodion cotton	1	0·3	—
Ammonium nitrate	—	—	60·5
Potassium nitrate	20	—	—
Sodium nitrate	—	59·5	—
Barium nitrate	20	—	—
Trinitro-toluene	—	5	—
Mineral jelly	7	—	—
Wood meal	15	7·7	5·5
Sodium chloride	—	—	19·5
Ammonium oxalate	11	—	5
Borax	—	12	—
Limit charge	10	18	16 oz.
Power (swing of ballistic pendulum)	2·18	1·96	2·44″

H.E. stands for High Explosive, used for charging shell or other military purpose.

***HEBLER POWDER** was a so-called smokeless powder which was manufactured at one time in Switzerland. According to an analysis published by Cundill and Thomson, it was ordinary gunpowder in which about a fifth of the saltpetre had been replaced by ammonium nitrate. It did not appear to have a greater tendency to absorb moisture than ordinary powder. It was also called Wellite. See also Ammonpulver.

HECLA NO. 2 is an American coal-mine explosive on the Permissible List. It is an ammonium nitrate explosive made by the Du Pont Co.

HECLA POWDER is a brand of American dynamite.

HELAGON is a German perchlorate explosive made by the Köln-Rottweil Pulverfabriken. It contains not more than 10 per cent. of potassium perchlorate, not more than

5 per cent. of zinc-aluminium alloy, aromatic nitro-bodies and neutral nitrates, excepting those of potassium and barium. It may also contain flour or potato meal and neutral substances.

HELIT is a similar explosive to Helagon, except that it contains dinitro-chlorhydrin, not more than 6 per cent., in the place of the zinc-aluminium alloy.

HELLHOFITE } are different names for what is prac-
HELLITE }

tically the same explosive of the Sprengel type. It consists of a mixture of strong nitric acid and various nitro-compounds, *e. g.*—

Dinitro-benzene . .	1	Nitro-benzene . .	1
Nitric acid . . .	1·5	Nitric acid . .	2·5

A form of this explosive was tried by Gruson as a charge for shell many years ago. See also Panclastite.

***HENRITE** is a smokeless shot-gun powder of the fibrous 33-grain bulk type. A sample examined in 1902 had the composition—

Nitrocellulose, insoluble	71·0
,, soluble	7·1
Metallic nitrates	7·5
Nitro-compounds	7·6
Paraffin	5·5
Moisture	1·3

HERCULES POWDER.—The name of a brand of American dynamite.

HERCULITE.—This name has been given to several explosives. One was a mixture of sawdust, camphor, potassium nitrate and other substances, which was used for blasting. There was a coal-mine explosive of this name on the Permitted List, made by the British Explosives Syndicate, Ltd.—

Date of Permit	22–6–14
Nitroglycerine	33
Collodion cotton	1
Potassium perchlorate	27
Wood meal	10
Ammonium oxalate	29
Limit charge	16 oz.
Power (swing of ballistic pendulum)	2·72″

but the permit has been repealed.

HIMALAYITE.—A high explosive made from potassium chlorate, potato starch and a drying oil. The chlorate and starch are first heated together with water, and when dry the oil is mixed in. The explosive is said to have been adopted by the Portuguese for filling shell. It passed the chemical tests in England, but no licence was taken out for its manufacture.

HUDSON'S EXPLOSIVE.—A stiff blasting gelatine made by incorporating nitroglycerine and collodion cotton together with the aid of acetone. It was tried in America in 1889 for filling shell, but is not used now for this purpose.

HYGRADE COAL POWDER NO. 2 is an American coal-mine explosive on the Permissible List. It is a nitroglycerine explosive.

***IDEAL POWDER** is a shot-gun powder made by Nobels.

IMPERIALITE is of no practical importance, but is interesting, as its history is that of the explosive one meets in the comic papers. The Marquis R. Imperiali had large private means and some knowledge of chemistry. He took out patents for a number of explosive mixtures and built a small factory in N. Italy, which started work in 1911. An explosion occurred the first day and killed five of the fifteen workers. Imperiali escaped and re-erected his factory. The day after it was restarted it blew up again and Imperiali

was killed. The composition of the explosive that was being made is not known, but several of the mixtures for which Imperiali had taken out patents were decidedly dangerous.

***INDURITE** was a smokeless powder patented by C. E. Munroe in 1893. It was made by incorporating guncotton with nitro-benzene to a hard mass. It was used for a time in the American Navy. Samples made in 1891 were still stable apparently in 1914, but some cases of instability occurred and it was given up.

INGÉLITE is the same in composition as **ANTIGEL DE SÛRETÉ.**

*Poudre **J.**—A French smokeless powder used for shot-guns and revolvers. Its composition is—

Nitrocotton	83
Ammonium bichromate	14
Potassium bichromate	3
Moisture	about 3

It is incorporated with the aid of ether-alcohol and pressed into strips, which are cut into cubes and then converted into grains of irregular shape. The fine siftings are used for revolver and practice ammunition.

JUDSON POWDER.—A mild blasting explosive used in America. It is a sort of crude gunpowder coated with nitroglycerine to increase the violence of the explosion. The percentage of nitroglycerine may vary from 5 to 20, but is generally near the lower limit. Judson Powder R.R.P. has the composition—

Nitroglycerine	5		Nitroglycerine	5
Sodium nitrate	64	or	Sulphur, coal and resin	35
Sulphur	16		Sodium nitrate	60
Cannel coal	15			

The sodium nitrate is mixed with the combustibles and the mixture is heated beyond the melting-point of the sulphur

and resin. The slightly porous mass thus formed is then coated with nitroglycerine. The explosive is fired with a priming cartridge of dynamite. The following four grades are made by the Du Pont Co.—

FFF	20 % nitroglycerine
FF	15 „
F	10 „
RRP	5 „

KANITE A is an American coal-mine explosive on the Permissible List. It is an ammonium nitrate explosive.

KARBONIT. See **CARBONITE.**

KAUSOLIT.—An ammonium perchlorate explosive, introduced about 1915 by the Stockholm Superphosphatenfabriks A.-b.

KENT POWDER was a coal-mine explosive made by the Cotton Powder Co. It was of the Carbonite type and was on the Permitted List. It is now no longer "permitted."

Date of Permit	10-2-14
Nitroglycerine	24
Potassium nitrate	32·5
Wood meal	33·5
Ammonium oxalate	10
Limit charge	over 32 oz.
Power (swing of ballistic pendulum)	2·01″

KENTITE is a coal-mine explosive made by British Westfalite, Ltd. It was on the old Permitted List and also passed the Rotherham Test, and so is still "permitted"—

Ammonium nitrate	34
Potassium nitrate	34
Trinitro-toluene	17
Ammonium chloride	15
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·64″

KIESELBACHER CHLORATSPRENGSTOFF. See **MIEDZIANKIT.**

KINETIT.—A German explosive made by gelatinising nitro-cellulose with nitro-benzene, and incorporating it with potassium nitrate and chlorate. It is somewhat sensitive to blows, etc. Early samples contained also antimony sulphide which rendered them decidedly dangerous.

KIWIT.—A German chlorate explosive introduced during the War. It contains not more than 77 per cent. of sodium or potassium chlorate, carbon carriers such as paraffin, naphthalene, vaseline, meal or oil, also not more than 15 per cent. of liquid trinitro-toluene, and may contain dinitro-toluene, dinitro-naphthalene, sodium chloride and not more than 4 per cent. of guncotton.

KOHLENKARBONIT. See **CARBONITE.**

KOLAX.—A coal-mine explosive of the Carbonite type formerly on the Permitted List, made by Curtis's and Harvey—

Nitroglycerine	23
Potassium nitrate	26
Barium nitrate	5
Wood meal	34
Starch	10

SUPER-KOLAX was a modification of this to meet the requirements of the Rotherham Test—

		No. 2.
Date of Permit	1-9-13	7-4-14
Nitroglycerine	25·5	28·5
Collodion cotton	—	1
Potassium nitrate	25·5	16·5
Barium nitrate	5	5
Wood meal	29·5	30·5
Starch	7·5	9
Ammonium oxalate	7	9·5
Limit charge	30	over 32 oz.
Power (swing of ballistic pendulum)	2·10	2·21

The permits of both have been repealed.

KORONIT, also known as **FAVORIT,** is a German chlorate blasting explosive introduced during the War. See also Coronite.

Gesteins-Koronit (or -Favorit) contains not more than 85 per cent. of potassium or sodium chlorate, not more than 15 per cent. of nitro-bodies (but no trinitro-compounds), paraffin or fatty oils, naphthalene, vegetable meal, powdered coal, inert substances, and not more than 4 per cent. of blasting gelatine.

Kohlen-Koronit (or -Favorit) contains not more than 68 per cent. of potassium or sodium chlorate, aromatic hydrocarbons and nitro-hydrocarbons (but not more than 12 per cent. of aromatic nitro-bodies and no trinitro-compounds), sodium chloride or similar salts, paraffin or fatty oils, vegetable meal or other organic substance; not more than 4 per cent. of blasting gelatine and not more than 4 per cent. of powdered coal.

PERKORONIT is similar to Koronit except that it contains potassium or sodium perchlorate instead of chlorate. Part of the perchlorate may be replaced by nitrate.

***K.S., K.S.G.**—Kynoch's Smokeless Powder. It is a fibrous bulk powder for shot-guns made by Kynochs, Ltd. The following analyses were given in "Arms and Explosives," 1917, p. 78—

	Kynoch's Smokeless.	K.S.	K.S.G.
Date of Introduction	1901	1913	1912
Class	42-grain	42-grain	33-grain
Nitrocellulose, insoluble	49·5	40·4	41·5
,, soluble	5·5	27·0	36·5
Metallic nitrates	25·0	28·0	12·0
Nitro-compound	19·0	—	5·0
Vaseline	—	3·0	3·0
Moisture	1·0	1·6	2·0

KYNARKITE is a coal-mine explosive of the Carbonite type made by Kynoch, Ltd. It is no longer on the Permitted List—

Date of Permit	1-9-13	No. 2. 15-1-15
Nitroglycerine	25	26
Potassium nitrate	28	29·5
Barium nitrate	3	—
Dinitro-toluene	—	2·5
Wood meal	39	34
Ammonium oxalate	5	8
Limit charge	20	28 oz.
Power (swing of ballistic pendulum)	2·21	2·06″

KYNITE was a coal-mine explosive on the old Permitted List, but has been superseded by Kynarkite—

	Kynite.	Kynite Condensed.
Nitroglycerine	26	23
Barium nitrate	33	33·5
Wood meal	40·7	6·5
Starch	—	34·7
Calcium carbonate	0·3	0·3

***LAFFLIN AND RAND W.A.** was a tubular smokeless powder tried in America for small arms. It consisted of—

Guncotton	67·25
Nitroglycerine	30
Metallic salts	2·75

gelatinised by means of 40 parts of acetone. A gelatinised dense shot-gun powder of similar composition was also made.

L.C. PULVER is a German Cheddite.

Gesteins-**LEONIT** is a German perchlorate explosive for blasting rock—

Alkali perchlorate	about 60 %
Ammonium nitrate	10
Nitro-compounds	15
Meal	10
Blasting gelatine	4

It is practically the same as Permonit A.

Neu-**LEONIT** is a modification of this for use in coal mines—

	I.	II.
Potassium perchlorate	35	35
Ammonium nitrate	20	10
Sodium nitrate	—	3
Trinitro-toluene	5	11
Dinitro-toluene	5	
Wood meal	8	2
Vegetable meal	4	5
Blasting gelatine	4	4
Sodium chloride	24	30

It is practically the same as Wetter-Persalit.

LIGDYN is a nitroglycerine explosive similar to American dynamite made in South Africa. 40 per cent. Ligdyn consists of—

Nitroglycerine	40
Sodium nitrate	45
Wood meal	13
Wheat flour	2

***LIGHTNING.**—A 33-grain smokeless shot-gun powder made by the Schultze Gunpowder Co. See Schultze Powder.

LIGNOSIT is a German blasting explosive containing a considerable percentage of ammonium nitrate. Lignosit I. contains also aromatic nitro-compounds, of which not more than 15 per cent. must be trinitro-compounds or wood meal, and not more than 6 per cent. of potassium nitrate, not more than 1 per cent. of collodion cotton and bauxite or salts, such as sodium chloride or carbonate.

Lignosit II. may contain up to 10 per cent. of collodion cotton, but no wood meal or nitro-compounds. It is somewhat sensitive.

Lignosit III. differs from I. in that it may contain up to 4 per cent. of blasting gelatine and contains no bauxite.

The object of adding the neutral salts is evidently to make the explosive safer in coal mines. When intended for this purpose it is called Wetter-Lignosit I. or III.

Lignosit IV. consists of ammonium nitrate, not more than 13 per cent. of trinitro-toluene, not more than 13 per cent. of aluminium powder, and wood meal.

LITHOFRACTEUR is a name that has been given to more than one explosive. One introduced about 1873 by Krebs and Co. of Deutz, near Cologne, consisted of nitroglycerine absorbed in kieselguhr mixed with nitrates, charcoal or coal and sulphur. Some of it was imported into England at one time

LOEWENPULVER or Castroper Sprengpulver is a German blasting powder consisting of a compressed or granulated mixture of sodium nitrate, manganese dioxide, sulphur and carbonaceous substances such as briquette powder or coal. It may also contain potassium nitrate, wood meal or tar.

LOMITE NO. 1 is an American coal-mine explosive on the Permissible List. It is a low-grade dynamite containing hydrated salts.

LOWINITE NO. 2-B is an American coal-mine explosive on the Permissible List. It is an ammonium nitrate explosive.

LUXIT I. is a German blasting explosive consisting of ammonium nitrate, not more than 17 per cent. of trinitro-toluene, and not more than 5 per cent. of wood meal.

LYDDITE.—A high explosive used in the British Services for filling shell. It consists simply of picric acid, which is melted under proper precautions and poured into the shell.

*Poudre **M** is a shot-gun powder made by the French Government, and is the one that is most used in France. Its composition is—

Nitrocotton	71
Barium nitrate	20
Potassium nitrate	5
Camphor	3
Binding material	1

The nitrocotton has a solubility of only 15 or 20 per cent., and is partially gelatinised with ether-alcohol aided by the camphor. It is granulated under edge runners, granulated and drummed.

MACARIT.—A Belgian high explosive for filling shell—

Trinitro-toluene	30
Lead nitrate	70

It has a high density and is not deliquescent. For equal weights its power is less than that of trinitro-toluene or picric acid, but for equal volumes it is somewhat greater.

MARKANIT. See **SILESIA.**

MARSIT.—A sort of Oxyliquit. Liquid oxygen is passed into a linen bag containing soot.

M.B. POWDER (Modernised Black) is a black powder mixture in which part of the potassium nitrate has been replaced by potassium or ammonium perchlorate, generally the potassium salt. It is manufactured at Bonnybridge, Stirling, at the works originally erected for making Mitchellite. During manufacture the composition is heated in steam boilers. (See "Arms and Explosives," 1911, p. 7.)

M.D. See **CORDITE.**

MEGANIT is a Hungarian nitroglycerine explosive similar to American dynamite, except that it contains a small percentage of nitrated vegetable ivory.

MELANITE.—A Belgian blasting explosive consisting of—

Nitroglycerine	78
Collodion cotton	4
Sodium nitrate	18

It contains, therefore, a considerable excess of oxygen.

MÉLINITE is a high explosive used by the French for filling shell and other military purposes. It consists essentially of picric acid, to which other substances are sometimes added. Paraffin wax has been added to diminish the sensitiveness. Mélinite D is simply picric acid, but Mélinite O contains also a little Crésilite 2 (q. v.).

MELLING POWDER was a coal-mine explosive on the Permitted List, made by the Cotton Powder Co. The permit has been repealed.

Date of Permit	1-9-13
Nitroglycerine	5
Ammonium nitrate	53·5
Sodium nitrate	12
Trinitro-toluene	6
Wood meal	4·5
Ammonium oxalate	19
Limit charge	12 oz.
Power (swing of ballistic pendulum)	2·62″

MERCURIT is a blasting explosive that has been introduced recently in Germany. It consists of 88 per cent. of potassium chlorate and 12 per cent. of high boiling neutral tar oil. In Mercurit II. up to 20 per cent. of the chlorate may be replaced by perchlorate.

MERSEY POWDER was a coal-mine explosive on the Permitted List, made by the Cotton Powder Co. The permit has been repealed.

Date of Permit	3-7-15
Nitroglycerine	5·5
Ammonium nitrate	51
Sodium nitrate	11
Trinitro-toluene	6
Wood meal	3·5
Ammonium chloride	23
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·60″

METEOR AXXO is an American coal-mine explosive on the Permissible List. It is a low-grade dynamite containing a hydrated salt.

MIEDZIANKIT (also called Egelit or Kieselbacher Chloratsprengstoff) is a German chlorate explosive of the Sprengel class. It consists of porous potassium chlorate impregnated with not more than 10 per cent. of kerosene, having a flash point not below 30° C. It has met with some unfavourable reports, as it is found that results are not uniform unless the impregnation be carried out in special factories, the original idea having been that it was to be done shortly before use.

During the War a modification of the explosive was introduced for use in coal mines. This contains up to 80 per cent. of sodium chloride.

MINERITE.—A coal-mine explosive made by the Forcite Co. of Baelen Wezel in Belgium, identical in composition with Kohlen-carbonite and Colinite antigrisouteuse.

MINER'S FRIEND, NOS. 1 to 6. American coal-mine explosives on the Permissible List. They are ammonium nitrate explosives.

MINITE.—A coal-mine explosive of the Grisounite type which was on the old Permitted List—

Ammonium nitrate	89
Trinitro-toluene	10
Ammonium oxalate	1

There was also an explosive of the Carbonite type of this name made at Arendonck in Belgium—

Nitroglycerine	25
Potassium nitrate	35
Flour	39·5
Soda	0·5
Charge limite	750 g.

MIN-ITE.—American coal-mine explosive on the Permissible List. Brands A, A-2, B, and B-2 are nitroglycerine explosives, whereas Nos. 5-D and 6-D are ammonium nitrate mixtures.

MINOLITE.—A Belgian blasting explosive, which is also approved for transport over the German railways. It contains ammonium nitrate, dinitro- or trinitro-naphthalene with other substances added in some cases. A variety for use in coal mines is called Minolite antigrisouteuse.

	Minolite antigrisouteuse.	Minolite nouvelle.
Ammonium nitrate	72	87
Sodium nitrate	23	3
Trinitro-toluene	3	—
Trinitro-naphthalene	2	5
Dinitro-naphthalene	—	3
Quebracho	—	2
Charge limite	400 g.	

There was also a variety containing lead nitrate, but this could not be used in mines because of the poisonous smoke it evolved.

***MISCHPULVER** is a name given in German to ungelatinised smokeless nitro-cellulose powders.

MITCHELLITE was an explosive that was formerly licensed for manufacture in Great Britain, and was made at Bonnybridge, Stirling, but the factory and the licence were transferred to the M.B. Powder Co. in 1910. It was apparently a chlorate or perchlorate explosive. It is said to be manufactured at Monticello, Indiana, U.S.A.

***MODDITE.**—A sporting rifle powder made by Eley Bros. Analysis of a sample showed—

Nitroglycerine	38·7
Nitrocellulose	56·8
Mineral jelly	4·3
Volatile matter	0·2

Of the nitrocellulose about one-third was soluble in ether-alcohol. It was made in the form of strip.

MONACHIT is a German blasting explosive which was known at one time as Vigorit. It is distinguished by containing nitro-compounds derived from naphtha, mostly nitro-xylenes and nitro-mesitylenes.

Monachit I. contains ammonium nitrate, not more than 15 per cent. of nitro-compounds, of which not more than 60 per cent. must be trinitro-bodies, also vegetable meal and potassium nitrate.

Monachit II. contains in addition not more than 1 per cent. of collodion cotton, not more than 1 per cent. of charcoal, also hydrocarbons and ammonium oxalate or other salts to act as cooling agents, and render the explosive suitable for use in coal mines, *e. g.*—

Ammonium nitrate	81	64
Potassium nitrate	5	3
Nitro-compounds	13	14
Collodion cotton	—	1
Flour	1	—
Charcoal	—	1
Potassium chloride	—	17

The collodion cotton is to gelatinise the nitro-compounds when they are liquid.

MONARKITE is a coal-mine explosive made by Kynoch, Ltd., and is on the Permitted List—

Date of Permit	10–2–14
Revised	20–9–19
Ammonium nitrate	49 [1]
Sodium nitrate	9
Nitroglycerine	11·5
Collodion cotton	0·3
Starch	3·5
Mineral jelly	2
Sodium chloride	24·7
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·30″

[1] Including not more than 2 per cent. of magnesium carbonate.

MONOBEL is a coal-mine explosive made by Nobel's Explosives Co. There are three formulæ which have passed the Rotherham Test, but A 1 is no longer on the Permitted List—

	Monobel No. 1.	A1 Monobel.	A2 Monobel.
Date of Permit	10–2–14	13–5–14	15–1–15
Ammonium nitrate	68	60	59
Nitroglycerine	8·5	10	10
Wood meal	8·5	10	10
Sodium chloride	15	—	—
Potassium chloride	—	20	20
Magnesium carbonate	—	—	1
Limit charge	10	28	22 oz.
Power (swing of ballistic pendulum)	2·81	2·78	2·44"

There is also Quarry Monobel which is not permitted for use in dangerous coal mines, and presumably contains no alkali chloride.

See also Viking Powder and Victor Powder.

MONOBEL, NOS. 1 to 7 are on the American Permissible List. Of these, Nos. 4 and 5 are low-freezing explosives, containing a small percentage of nitro-toluene or similar substance; Nos. 3 and 5 are less violent than the others.

MONOBEL POWDER was the predecessor of the above and was on the old Permitted List. It is now no longer "permitted."

Ammonium nitrate	80
Nitroglycerine	10
Wood meal	10

***MULLERITE.**—A shot-gun powder made by the Muller Co. in Belgium. It is a gelatinised dense powder in the form of green leaflets, and the charge for a 12-bore cartridge was 33 grains. It contains no inorganic salts.

EXPLOSIFS N. See Favier Explosives.

NAPHTHALIT.—A German chlorate explosive introduced during the War. It contains not more than 80 per cent. of potassium chlorate, and aromatic hydrocarbons, such as naphthalene, and not more than 12 per cent. of nitro-hydrocarbons, but no trinitro-compounds; also paraffins, fatty oils, flour or other organic substance. It may contain also alkali chlorides, and not more than 4 per cent. of blasting gelatine.

The prefixes Gesteins- and Wetter- are applied according as the explosive is intended for rock or coal mines.

Grisou-**NAPHTALITE.** See **FAVIER** Explosives.

NATIONALITE.—A coal-mine explosive of the Grisounite class made by the National Explosives Co., Ltd. The composition, which was on the old Permitted List, was—

Ammonium nitrate	92
Di- and Trinitro-toluene . . .	8

But to pass the Rotherham Test it was necessary to add alkali chlorides. There were two formulæ formerly on the Permitted List—

	No. 1.	No. 2.
Date of Permit	22-6-14	28-1-15
Ammonium nitrate	65·5	64
Trinitro-toluene	15	15
Sodium chloride	19·5	—
Potassium chloride	—	21
Limit charge	12	20 oz.
Power (swing of ballistic pendulum) .	2·92	2·63″

The permits have been repealed.

***N.C.T.** is the name given in the British service to the Nitro-Cellulose Tubular smokeless powder, made in the same way as the American service powder. It consists of nitro-cellulose completely soluble in ether-alcohol, but of comparatively high nitration. It is gelatinised with ether-

alcohol and pressed into cords with either one or seven perforations running down them length-ways. These are cut into short cylinders and dried. The powder contains a little diphenylamine as a stabiliser.

N.E. See New Explosives Company's Smokeless Powder.

NEGRO POWDER.—A coal-mine explosive of the Grisounite class made by Roburite and Ammonal, Ltd. The composition, which was on the old Permitted List, was—

Ammonium nitrate	88
Trinitro-toluene	10
Graphite	2

and a small quantity of colouring matter.

To enable it to pass the Rotherham Test, sodium chloride has been added, and Negro Powder No. 2 is now on the Permitted List—

Date of Permit	25–11–13
Ammonium nitrate	57
Trinitro-toluene	15
Graphite	0·7
Sodium chloride	27·3
Colouring matter	small quantity
Limit charge	20 oz.
Power (swing of ballistic pendulum)	2·21″

NEONAL.—A coal-mine explosive made by the New Explosives Company. Two formulæ were at one time on the Permitted List—

		No. 1.
Date of Permit	1–9–13	22–6–14
Nitroglycerine	21	40
Collodion cotton	1	2
Di- and Trinitro-toluene	0·2	—
Wood meal	15·8	5
Potassium perchlorate	37	14
Ammonium oxalate	25	39
Limit charge	16	30 oz.
Power (swing of ballistic pendulum)	2·56	2·51″

Both have now been repealed.

***NEONITE.**—A 30-grain bulk gelatinised smokeless shot-gun powder introduced by the New Explosives Co. in 1907. According to an analysis given in "Arms and Explosives," 1917, p. 76, its composition is—

Nitrocellulose, insoluble	73·0
,, soluble	9·0
Metallic nitrates	10·5
Vaseline	5·9
Moisture	1·6

Neonites are also made for various types of rifled small arms, including military rifles, cadet rifles, revolvers and rim-fire rifles. These are all nitrocellulose powders with or without moderants.

***NEW EXPLOSIVES COMPANY'S SMOKELESS POWDER** or **N.E.**—A 36-grain fibrous bulk powder for shot-guns introduced in 1912. According to an analysis given in "Arms and Explosives," 1917, p. 76, its composition is—

Nitrocellulose, insoluble	50·0
,, soluble	25·8
Metallic nitrates	12·0
Nitro-hydrocarbons	7·0
Vaseline	3·5
Moisture	1·7

NEW FORTEX. See **FORTEX.**

NITRALITE. See **DENSITE.**

NITRO-DENSITE.—A coal-mine explosive made by Kynoch, Ltd. It was of the Carbonite type, and was at one time on the Permitted List—

Date of Permit	1-9-13
Nitroglycerine	18
Barium nitrate	25
Wood meal	5·5
Starch	28·5
French chalk	23
Limit charge	28 oz.
Power (swing of ballistic pendulum)	1·47″

***NITROKOL.**—A gelatinised nitrocellulose powder intended for use in rifles. It consists of a nitrocellulose, mostly soluble in ether-alcohol, and gelatinised with that solvent. It is made up in the form of small square flakes which are graphited.

NITROLIT.—A high explosive used by the Germans for filling shell. It is a mixture of ammonium nitrate and trinitro-anisol.

The name was formerly given by C. Lamm of Stockholm to a blasting explosive containing blasting gelatine, ammonium nitrate and other substances.

NITRO LOW-FLAME, NOS. 1 and **2** are American coal-mine explosives on the Permissible List. They are nitroglycerine mixtures.

NOBEL AMMONIA POWDER.—A coal-mine explosive which was on the old Permitted List—

Ammonium nitrate	84
Nitroglycerine	8
Wood meal	8

NOBEL GELATINE DYNAMITE.
NOBEL GELIGNITE. } Under these names explosives were introduced during the War with modified compositions, the potassium nitrate being replaced by sodium nitrate, and the percentage of nitroglycerine being reduced.

NOBELIT is a German blasting explosive containing blasting gelatine, carbonaceous substances, inorganic nitrates and sodium or potassium chloride.

AMMON-NOBELIT contains ammonium nitrate, and the proportion of blasting gelatine is limited to 4 per cent. It may contain sodium or potassium oxalate, and various other substances that are not present in Nobelit.

***NORMAL POWDER.**—A smokeless powder which was said to have been adopted by the Governments of Switzerland, Sweden, Norway, Denmark and Finland. The following analyses were given in "Arms and Explosives," 1917, p. 91—

	Rifle.	Shot-gun Powders.	
Date of Sample . .	1895	1913	1902
Nitrocellulose, insoluble .	93·0	8·8	40·8
,, soluble . .	3·5	89·4	56·1
Resin	2·0	—	—
Moisture	1·5	1·8	2·0

NORMANITE.—A coal-mine explosive which was made by the Cotton Powder Co., and was on the old Permitted List—

Nitroglycerine	33·5
Collodion cotton	1·5
Potassium nitrate	44·5
Wood meal	8
Charcoal	1·5
Ammonium oxalate	11

Explosifs O are the chlorate explosives made in the French State factories. O1, O2, O4 and O5 are Cheddites (q. v.). O3 is a Sprengel explosive, and is dealt with under the heading of Prométhée.

OAKLEY QUARRY POWDER is a blasting explosive consisting of ammonium nitrate and tetryl.

OAKLITE.—A coal-mine explosive made by the Explosives and Chemical Products, Ltd., which was on the old Permitted List—

	No. 1.	No. 2.
Nitroglycerine	25·5	10
Collodion cotton	1	0·5
Potassium nitrate	34·5	—
Ammonium nitrate	—	79·3
Wood meal	38·7	10
Magnesium carbonate . . .	0·3	0·2

ODITE.—A coal-mine explosive which was made by the New Explosives Co., and was on the old Permitted List—

Ammonium nitrate	88
Dinitro-benzene	12

OPHORITE.—A mild but hot explosive consisting of—

Potassium perchlorate	60
Magnesium powder	40

It is used as a bursting charge for incendiary shell, smoke bombs, etc.

ORKANIT is the same as Alkalsit, but may contain sodium chloride and similar salts.

OXYLIQUIT is a blasting explosive consisting of liquid oxygen absorbed in some porous combustile material, such as absorbent cork, soot or kieselguhr mixed with petroleum. It was discovered in 1895 by Prof. F. C. Linde, and was tried on a large scale in 1899 in the construction of the Simplon tunnel. It is very cheap, and is safe in the case of a missfire, because in about half-an-hour the oxygen has all evaporated off and the charge becomes inexplosive. On the other hand, it is necessary to have the air liquefying plant near the scene of operations, and the charge must be fired soon after charging. These disadvantages prevented the adoption of the explosive, but during the War fresh trials were made in Germany in consequence of the scarcity of nitrates.

Liquid oxygen explosives are now used on a considerable scale by the Germans for military, as well as civil blasting operations. The name Oxyliquit, however, seems only to be applied to them when the explosive is made in the manner and with the plant of the Linde Company. See also Marsit.

PANCLASTITE.—A Sprengel explosive made by mixing liquid nitrogen peroxide with carbon bisulphide, nitro-

benzene or nitro-toluene. It was proposed in 1881 by Turpin, and was tried by Germany for filling shell, the two constituents being contained in separate glass containers, which were broken by the shock of discharge. It was not adopted there on account of the inconvenience of dealing with a liquid which gives off poisonous fumes. It is a powerful and violent explosive, and is probably the same as the "Turpinite" about which sensational statements were made in the press early in the War.

PANNONIT.—A blasting explosive made by the A. G. Dynamit Nobel of Austria. It has replaced Progressit in Austria as a coal-mine explosive. Its composition is—

Nitroglycerine	25·5
Collodion cotton	1·5
Ammonium nitrate	37
Dextrin	4
Glycerine	3
Nitro-toluene	5
Sodium or potassium chloride	24

PASTANIL.—A German ammonium nitrate blasting explosive similar to Plastammon.

***P.C./88.**—A Swiss smokeless powder for small-arms consisting of—

Nitrocellulose	82
Trinitro-toluene	18

PERAGON.—A German blasting explosive containing potassium perchlorate, zinc-aluminium alloy, aromatic nitro-compounds and some other constituents.

PERCHLORIT is a German blasting explosive introduced recently. It contains ammonium nitrate, a perchlorate, mono- and dinitro-compounds, meal, charcoal, and not more than 4 per cent. of nitroglycerine.

PERDIT.—An explosive used by the Germans for

mining and demolitions and rifle grenades. It consists of—

Ammonium nitrate	76
Potassium perchlorate	6
Wood meal	2
Dinitro-toluene	16

PERILIT.—A German perchlorate blasting explosive made by the Koeln-Rottweil Pulverfabriken. It contains not more than 65 per cent. of potassium perchlorate, aromatic nitro-compounds, not more than 6 per cent. of dinitro-chlorhydrin, flour, etc., and nitrates (but not more than 10 per cent. of potassium nitrate).

PERKORONIT. See Koronit.

PERMON POWDER.—A coal-mine explosive which was on the Permitted List. It was made by the Carbonite Syndicate in Germany, and imported into Great Britain—

Date of Permit	25–11–13
Nitroglycerine	12
Collodion cotton	0·4
Ammonium nitrate	55
Sodium nitrate	1
Glycerine	4
Potato flour	10·6
Sodium chloride	17
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·57″

The permit was repealed on 21–11–16.

PERMONITE.—A potassium perchlorate explosive made by the Carbonite Syndicate at Schlebusch in Germany. A number of mixtures have been placed on the market, but they do not differ from one another very much. One which was on the old British Permitted List was—

Potassium perchlorate	32·2
Ammonium nitrate	41
Nitroglycerine	3·5
Collodion cotton	0·3
Trinitro-toluene	12
Starch	8
Wood meal	3

See also Gesteins Leonit.

PERRUMPIT.—A German coal-mine explosive containing ammonium nitrate, sodium nitrate, vegetable meal, fatty oils, graphite and aluminium, cooling agents such as ammonium oxalate or sodium chloride, and not more than 15 per cent. of trinitro-toluene.

PERSALIT is a German perchlorate explosive made by the Westfälisch-Anhaltische Sprengstoff A.-G. It contains not more than 77 per cent. of an alkali or alkali earth perchlorate, organic matter such as hydrocarbons, resins, meal or nitrated hydrocarbons (with the proviso that if the percentage of perchlorate exceed 70, there must not be more than 10 per cent. of trinitro-toluene). There must also be not less than 4 per cent. of ammonium nitrate, and there may be an addition of sodium nitrate or other salt that does not increase the sensitiveness.

WETTER-PERSALIT is a similar explosive, but has been modified to make it more suitable for use in coal mines. It contains not more than 35 per cent. of potassium perchlorate, not more than 25 per cent. of ammonium nitrate, aromatic nitro-compounds of which not more than 20 per cent. must be trinitro-toluene, vegetable meal, not more than 6 per cent. of nitroglycerine, sodium nitrate, and neutral salts. It is similar to Neu-Leonit.

PETROKLASTIT or **HALOKLASTIT** is a modified gunpowder mixture used in Germany in potash mines and stone quarries. It contains sodium nitrate, sulphur, coal-tar pitch, potassium nitrate, not more than 1 per cent. of potas-

sium bichromate, and may have up to 10 per cent. of charcoal, as, for instance—

Sodium nitrate	69
Potassium nitrate	5
Sulphur	10
Coal-tar pitch	15
Potassium bichromate	1

It is more powerful than ordinary blasting powder, and somewhat less sensitive to blows. This explosive is also made in Switzerland.

PETROLIT is a German chlorate explosive introduced during the War. It contains not more than 88 per cent. of potassium chlorate, nitro-compounds, kerosene, and neutral salts. (This is rather a dangerous mixture.—A.M.)

PFALZIT.—A German blasting explosive containing ammonium nitrate, sodium nitrate, not more than 18 per cent. of trinitro-toluene, not more than 1 per cent. of collodion cotton, meal, sodium chloride, etc.

PHŒNIX POWDER.—A German coal-mine explosive made by Dr. R. Nahnsen and Co., of Hamburg. It passed the Woolwich Test and was on the old Permitted List.

Nitroglycerine	29·5
Collodion cotton	0·5
Potassium nitrate	32
Wood meal	38

PICROL.—See Shellite.

PIERRITE.—A form of Cheddite which was made at Gamsee, near Brig, for excavating the Simplon tunnel—

Potassium chlorate	80
Nitro-naphthalene	11·5
Picric acid	2
Castor oil	6·5

PIT-ITE was a coal-mine explosive of the Carbonite type, made by the New Explosives Co., Ltd. The composition, which was on the old Permitted List, was—

Nitroglycerine	26
Barium nitrate	33
Wood meal	41

and a little sodium or calcium carbonate.

In order to pass the Rotherham Test, the composition was modified to the following, No. 2, which was formerly on the Permitted List—

Date of Permit	1–9–13
Nitroglycerine	24
Potassium nitrate	30
Wood meal	38
Ammonium oxalate	8
Limit charge	over 32 oz.
Power (swing of ballistic pendulum)	2·15″

PITSEA POWDER NO. 2 was a coal-mine explosive on the Permitted List, made by the British Explosives Syndicate, Ltd.—

Date of Permit	25–11–13
Nitroglycerine	6·5
Ammonium nitrate	55
Potassium nitrate	10
Wood meal	10
Ammonium oxalate	18·5
Limit charge	8 oz.
Power (swing of ballistic pendulum	2·64″

The permit has been repealed.

Gesteins-**PLASTAMMON**.—A German blasting explosive containing not less than 70 per cent. of ammonium nitrate, glycerine, not more than 15 per cent. of nitro-toluene or other nitro-compounds, and not more than 4 per cent. of nitro-semicellulose.

Steinkohlen-**PLASTAMMON** is a variation of this, con-

taining not more than 25 per cent. of potassium nitrate, and intended for use in coal mines.

***PLASTOMENIT** was an early German shot-gun powder which possessed no great merits. The following was the composition of a sample examined in 1893, and given in "Arms and Explosives," 1917, p. 90—

Nitrocellulose, insoluble	32·7
,, soluble	19·3
Metallic nitrates	21·0
Dinitro-toluene (solvent)	26·0
Moisture	1·0

PLASTROTYL.—A German high explosive for filling shell. It consists of a partially liquid mixture of trinitro- and dinitro-toluene gelatinised by means of not more than 0·5 per cent. of collodion cotton, and mixed with a small quantity of turpentine or soft resin. It does not appear to be in use now.

PLESSIT is a blasting explosive that was introduced in Germany during the War. It consists of potassium chlorate, not more than 9·5 per cent. of kerosene and 0·5 per cent. of albumen. Wetter-Plessit III. contains sodium chloride as well.

PNIOWIT.—A German blasting explosive containing ammonium nitrate, trinitro-toluene, wood meal and a small percentage of potassium perchlorate.

Nobel **POLARITE** is a blasting explosive made by Nobel's Explosives Co., Ltd. It consists of potassium perchlorate, and nitroglycerine mixed with a nitro-compound and gelatinised with collodion cotton, and absorbed in wood meal.

Poudres **B, J, M, S, T.** See under respective letters.

PRAEPOSIT is a modified gunpowder—

Potassium (or sodium) nitrate	70
Sulphur	18
Charcoal	6
Hipposin	6

the last constituent being a fine powdery substance obtained from dried horse dung. It is slower than ordinary blasting powder and more expensive. It has a tendency to blow out, and opinions as to its value vary. Formerly it was supplied in the form of a fine powder, but it is now granulated or made into compressed cartridges.

***PRIMROSE SMOKELESS** is an inexpensive 42-grain bulk powder for shot-guns made by the New Explosives Co.

PROGRESSIT was an explosive formerly used in Austrian coal mines—

Ammonium nitrate	94	89
Aniline hydrochloride	6	5
Ammonium sulphate	—	6

It was superseded in 1913 by Pannonit.

PROMÉTHÉE or **PROMETHEUS** is a Sprengel explosive made by the French Government, by whom it is also called Explosif O3. It consists of a porous oxygen carrier and a liquid combustible, which are supplied separately, and the one is dipped in the other shortly before use—

	a	*b*	*c*	
Potassium chlorate	95	90	80	Oxygen carrier, 92 to 87 %
Manganese dioxide	5	10	20	

	1	2	
Nitro-benzene	50	60	Combustible, 8 to 13 %
Turpentine	20	15	
Naphtha	30	25	

Any combination of *a*, *b* or *c* with 1 or 2 may be used. The amount of liquid combustible taken up may vary from

8 to 13 per cent.: this irregularity is a serious defect, and may cause incomplete detonation. This explosive is also made in Italy.

PROSPERIT is a German ammonium nitrate explosive, containing also vegetable meal, nitro-compounds and other constituents. It may contain up to 4 per cent. of blasting gelatine.

Gelatine-Prosperit contains also up to 20 per cent. of dinitro-chlorhydrin gelatinised with collodion cotton.

PULVÉRIN.—An ungranulated black powder made in France for use in fireworks, etc.

PULVÉRITE.—A Belgian coal-mine explosive containing perchlorate—

Ammonium nitrate	30·5
Potassium perchlorate	24
Nitroglycerine	6
Collodion cotton	0·5
Trinitro-toluene	7
Flour	5
Sodium chloride	18
Ammonium sulphate	7
Barium sulphate	2

The "charge limite" is 850 grammes, equivalent to 504 grammes of Dynamite No. 1.

PYROCOLLODION is a nitrocotton almost entirely soluble in ether-alcohol, and of comparatively high nitration. It contains about 12·5 to 12·7 per cent. of nitrogen, and consequently has about enough oxygen to oxidise all its hydrogen to water, and its carbon to the monoxide. It was first prepared by Mendeléeff for the Russian smokeless powder, and was afterwards adopted by the United States for their present powder.

PYROXILINE was a name formerly given to nitrocellulose.

RACK-A-ROCK is a Sprengel explosive which has been used extensively in America, and also in Siberia and China. It consists of cartridges of potassium chlorate mixed sometimes with oxide of iron, which are dipped shortly before use into a liquid. The latter is nitro-benzene or "dead oil," a heavy hydrocarbon oil obtained from coal-tar, or a mixture of the two. The chlorate cartridges are enclosed in small cotton bags, and are placed in a wire basket suspended from a spring balance. They are dipped into a vessel containing the liquid until a quarter or a third of the weight of the chlorate has been taken up.

RASCHIT is a blasting explosive consisting entirely of salts readily soluble in water, invented by F. Raschig. The incorporation is carried out by dissolving the constituents in water, and evaporating the solution rapidly on a rotating steam-heated drum. The oxidising substance is ammonium or sodium nitrate, and the combustible is the sodium salt of an organic sulphonate or the residue obtained from the manufacture of wood cellulose.

	II.	III.	IV.	V.	VI.
Ammonium nitrate	—	84	87	60	85
Sodium nitrate	70	—	—	—	—
Ammonium nitro-cresol sulphonate .	—	16	—	—	—
Sodium cresol sulphonate . . .	30	—	13	10	—
Cellulose residue	—	—	—	—	15
Sodium sulphate	—	—	—	30	—

No. II. is the only one made at present.

R.D.B. (Research Department B). See **CORDITE.**

RED CROSS explosives are American dynamites containing some nitro-toluene or other substance to make the nitroglycerine low-freezing.

RED H, Nos. 1 to 7 are American coal-mine explosives on the Permissible List. They are ammonium nitrate mixtures.

***RED STAR** is a 33-grain bulk smokeless powder for shot-guns, introduced in 1906 by the New Explosives Co. According to an analysis given in "Arms and Explosives," 1917, p. 76, its composition is—

Nitrocellulose, insoluble	52·2
,, soluble	25·5
Metallic nitrates	10·5
Nitro-compounds	7·0
Vaseline	3·0
Moisture	1·8

RENDROCK.—A brand of American dynamite.

REX POWDER is a coal-mine explosive made by the Cotton Powder Co. It is on the Permitted List, and is used to a considerable extent—

Date of Permit	16–8–15
Nitroglycerine	12
Ammonium nitrate	60
Wood meal	8·5
Sodium chloride	19·5
Limit charge	20 oz.
Power (swing of ballistic pendulum)	2·61″

REXITE.—A coal-mine explosive made by the New Explosives Co., which was on the old Permitted List. It is no longer "permitted."

Nitroglycerine	7·5
Ammonium nitrate	66
Sodium nitrate	14·5
Trinitro-toluene	7·5
Wood meal	4·5

REXOL.—A high explosive containing ammonium perchlorate, zinc dust, resin and mineral oil.

R.F.G. (Rifled Fine Grain)
R.L.G. (Rifled Large Grain)
} black powders made for rifles and rifled ordnance respectively.

RHENANIT.—A German blasting explosive containing ammonium nitrate, not more than 4 per cent. of blasting gelatine, and combustibles such as charcoal and naphthalene.

Wetter-Rhenanit is for use in coal mines, and contains also sodium chloride.

Rhenanit V., which has been introduced recently, contains up to 10 per cent. of potassium perchlorate, and is similar to Astralit V.

RHEXIT.—An Austrian dynamite.

	II.	III.	IV.	V.
Nitroglycerine . .	50	35	24	15
Sodium nitrate . .	32·6	37	56·2	62·9
Wood meal . . .	17	27·5	19	21·2
Sodium carbonate .	0·4	0·5	0·8	0·9

***RIFLEITE** was a completely gelatinised smokeless powder which was made by the Smokeless Powder Co.; it was in the form of flakes. A variety was also introduced for use in shot-guns and was called Shot-Gun Rifleite; this was a 37-grain gelatinised dense powder.

	Shot-gun Rifleite.	For ·303 Rifle.
Date of Introduction . . .	1894	1890
Nitrocellulose, insoluble . .	76·0	1·7
„ soluble . . .	18·9	82·5
Nitro-compound . . .	3·5	14·8
Moisture	1·6	1·0

The nitrocellulose was made from lignin. These analyses were given in "Arms and Explosives," 1917, p. 77.

RIPPING AMMONAL. See **AMMONAL.**

RIPPITE is an explosive made by Curtis's and Harvey, which was on the old Permitted List—

Nitroglycerine	61
Collodion cotton	4
Potassium nitrate	19
Castor oil	1
Wood meal	5
Ammonium oxalate	10

It is no longer "permitted" for use in dangerous coal mines, but is still used for general purposes.

SUPER-RIPPITE is a modification of this, which has passed the Rotherham Test and is on the Permitted List—

Date of Permit	29-8-14
Nitroglycerine	52
Collodion cotton	3
Potassium nitrate	14·5
Borax	22·5
Potassium chloride	8
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·53"

RIVALIT is a German blasting explosive containing ammonium nitrate, vegetable meal, nitro-compounds, and may also contain up to 3 per cent. of blasting gelatine.

Rivalit P, which has been introduced recently, contains up to 10 per cent. of potassium perchlorate, and is practically the same as Astralit V.

Chlorat-Rivalit is an explosive of the Cheddite type, introduced in Germany during the War—

Potassium chlorate	88·5
Paraffin	11·5

ROBURITE is a coal-mine explosive of the Grisounite class. In Germany many different mixtures have been made, but in general they are within the following limits—

Ammonium nitrate	70 to 80
Potassium nitrate	5 ,, 10
Trinitro-toluene	12 ,, 15
Flour	6
Sodium chloride	5 to 6
Potassium permanganate	0·1 ,, 0·5

but some are outside them.

The explosive has also been made in England by the Roburite Explosives Co., Ltd., now incorporated in Roburite

and Ammonal, Ltd., who had the following on the old Permitted List—

	No. 3
Ammonium nitrate	88
Dinitro-benzene	11
Chlor-naphthalene	1

The following has passed the Rotherham Test and is now on the Permitted List—

	No. 4
Date of Permit	13-5-14
Ammonium nitrate	61
Trinitro-toluene	16
Sodium chloride	23
Limit charge	18 oz.
Power (swing of ballistic pendulum)	2·86″

ROCKITE is an explosive made by Curtis's and Harvey for quarry work, etc.

ROMPERIT.—A German blasting explosive containing ammonium nitrate, potassium nitrate, trinitro-toluene, flour and resin. It may also contain up to 4 per cent. of blasting gelatine.

Wetter-Romperit contains also sodium chloride, ammonium chloride or magnesite, and is used in coal mines.

Gelatine-Romperit contains gelatinised nitroglycerine, glycerine, potato meal, etc., and nitrates, and may also contain aromatic nitro-compounds and alkali nitrates.

Romperit G, which has been introduced recently, contains up to 10 per cent. of potassium perchlorate, and is similar to Astralit V.

ROSLIN GIANT BLASTING POWDER is a perchlorate explosive made by Curtis's and Harvey.

***ROTTWEIL SMOKELESS POWDERS.**—These were pushed energetically in England in 1913. They comprised a gelatinised rifle powder, and a 37-grain gelatinised dense shot-

gun powder. Analyses were given in "Arms and Explosives," 1917, p. 90—

	Shot-gun.	Rifle.
Nitrocellulose, insoluble	72·3	72·8
,, soluble	24·5	25·0
Metallic nitrates	0·7	—
Camphor and diphenylamine	1·0	1·0
Moisture	1·5	1·2

***RUBY POWDER.**—A 42-grain bulk smokeless powder, for shot-guns, introduced in 1899 by Curtis's and Harvey. The following analysis was given in "Arms and Explosives," 1917—

Nitrocellulose, insoluble	46·6
,, soluble	4·0
Metallic nitrates	34·0
Nitro-compound	8·2
Starch	5·5
Moisture	1·7

It is an inexpensive powder made without solvents.

RUSSELITE.—A coal-mine explosive which was made by the Forcite Co. in Belgium. It was on the old British Permitted List—

Nitroglycerine	40·5
Collodion cotton	2·3
Potassium nitrate	24·5
Trinitro-toluene	5·5
Wood meal	4
Ammonium oxalate	23
Calcium carbonate	0·2

*Poudre **S** is a shot-gun powder made by the French Government. It consists of—

Guncotton	37
Soluble nitrocotton	28
Potassium nitrate	6
Barium nitrate	29
Moisture	2

The ingredients are incorporated together under light edge runners, dried and partially gelatinised with 35 per cent. of ether-alcohol. The dough, which is not very coherent, is formed into grains by simply passing it through a sieve. The grains are dried, sifted, hardened if necessary with ether-alcohol, and again dried and sifted.

SABULITE is a blasting explosive containing ammonium nitrate, trinitro-toluene and calcium silicide. The last constituent increases the heat of explosion and renders the mixture more sensitive both to detonation and to blows; it plays the same part as the aluminium powder in Ammonal.

Ammonium nitrate	78
Trinitro-toluene	8
Calcium silicide	14

This composition was modified by the Belgian Sabulite Co. to render it suitable for use in coal mines: by introducing some potassium nitrate and ammonium chloride it was able to pass the tests, and obtain a place on the list of "explosifs S.G.P."—

	Sabulite antigrisouteuse A.
Ammonium nitrate	54
Potassium nitrate	22
Ammonium chloride	18
Trinitro-toluene	6
Calcium silicide	5

Sabulite has been used as a military high explosive.

SAFETY BLASTING POWDER. See **CAHUECIT.**

SALIT or Wittenberger Wetterdynamit is a German coal-mine explosive. The following is an analysis—

Ammonium nitrate	58·6
Nitroglycerine	11·8
Collodion cotton	0·5
Dinitro-toluene	8·5
Dextrin	2·5
Sodium chloride	23·1

SAMSONITE.—A coal-mine explosive made by Nobel's Explosives Co., Ltd. It was on the old Permitted List. It is now no longer permitted for use in dangerous coal mines but is still used for general purposes.

Nitroglycerine	58·5
Collodion cotton	3·5
Potassium nitrate	18
Wood meal	6·5
Ammonium oxalate	13·5

During the War potassium nitrate was replaced by sodium nitrate, and the nitroglycerine was reduced to 50 per cent.

Nos. 2 and 3 have passed the Rotherham Test and are on the Permitted List—

	No. 2.	No. 3.
Date of Permit	25-1-19	25-1-19
Nitroglycerine	51·5	51·5
Collodion cotton	3	3
Amide compound	0·2	0·3
Potassium perchlorate	11	—
Sodium nitrate	—	10
Borax	23·3	25·2
Potassium chloride	10	—
Sodium chloride	—	10
Moisture	1	—
Limit charge	26	24 oz.
Power (swing of ballistic pendulum)	2·49	2·42″

SAXONITE was the predecessor of Samsonite on the old Permitted List. It has practically the same composition, but wide limits are allowed. It also is used for general purposes. During the War potassium nitrate was replaced by sodium nitrate.

Ammon-**SCHLESIT** or Kohlen-**SCHLESIT** is a German coal-mine explosive containing ammonium nitrate and other nitrates, nitro-compounds, starch, neutral salts, not more than 4 per cent. of blasting gelatine, and not more than 2 per cent. of potassium perchlorate.

SCHNEIDERITE is a high explosive used by the French for filling shell. Its composition is the same as the Favier explosive N_1c.

***SCHULTZE POWDER** was the first successful smokeless powder made. It was invented by Capt. E. Schultze of the Prussian Artillery, who appears at first simply to have impregnated little grains of wood with saltpetre (Eng. Pat. 900 of 1864). But later the wood cellulose was purified and nitrated, and then mixed with nitrates. The powder has remained the same as this until the present day, although the methods of manufacture have been developed and, indeed, revolutionised more than once. In "Arms and Explosives," 1917, p. 75, the following analyses of different brands were given—

	Sawdust.	Schultze.	Imperial.	Cube.	Lightning.
Date introduced . .	1869	1883	1902	1908	1913
Charge for 12-bore, grns. .	42	42	33	30	33
	Fibrous.	Fibrous.	Fibrous.	Gelatinised.	Fibrous.
Nitrocellulose, insoluble	64·8	25·0	63·7	62·1	55·0
,, soluble		40·0	18·9	27·0	27·0
Metallic nitrates . .	33·0	29·0	8·0	5·0	11·2
Vaseline . . .	—	4·0	7·6	4·0	5·0
Moisture . . .	2·2	2·0	1·8	1·9	1·8

The nitrocellulose in all cases has been made from wood cellulose. All the powders are of the bulk type.

Schultze powder is also made in America as a 36-grain fibrous bulk powder—

Nitrocellulose, insoluble	4·9
,, soluble	78·5
Metallic nitrates	10·5
Vaseline	3·7
Moisture	2·4

SEAMEX is a coal-mine explosive on the Permitted List made by Explosives and Chemical Products, Ltd.—

Nitroglycerine	10
Ammonium nitrate	58
Wheat flour	20
Sodium chloride	12
Limit charge	36 oz.
Power (swing of ballistic pendulum) . .	2·54″

SEBOMITE is a French chlorate explosive resembling Cheddite, but containing tallow instead of castor oil.

SECURITE was one of the first coal-mine explosives. It contained ammonium nitrate and dinitro-benzene, and was therefore similar to Bellite and Roburite.

SECUROPHORE.—A Belgian coal-mine explosive containing nitroglycerine, nitrates, flour and other constituents.

SENGITE is a variety of Tonite introduced in South Africa as a substitute for Gelignite in consequence of the scarcity of glycerine due to the War. It contains guncotton and sodium nitrate, and sufficient moisture to render it safe to handle without diminishing its strength. The first four letters of its name stand for *s*ubstitute *e*xplosive *n*o *g*lycerine. It requires a priming cartridge of gelignite or similar explosive. It is more expensive than gelignite, and consequently is not likely to be used when the scarcity of glycerine has been relieved.

SHELLITE.—A high explosive consisting of picric acid and dinitro-phenol, used for filling shells. The mixture possesses the advantage over straight picric acid that it melts at a lower temperature. It was for a time called Picrol.

SHEPPEY POWDER.—A coal-mine explosive made by the Cotton Powder Co. which was on the Permitted List for a short time, but was removed in 1914—

Date of Permit	25-11-13
Nitroglycerine	27
Potassium nitrate	31
Wood meal	36
Ammonium oxalate	6
Limit charge	10 oz.
Power (swing of ballistic pendulum) . .	2·10″

SIEGENIT.—A German blasting explosive containing ammonium nitrate, flour, and not more than 15 per cent. of dinitro-toluene. For use in coal mines, sodium chloride and magnesium sulphate are added as diluents, and nitro-glycerine to increase the sensitiveness.

SILESIA is a German blasting explosive consisting of potassium chlorate, the particles of which are coated with resin or oxidised resin. The latter is made by treating ground colophony, mixed with 10 per cent. of starch, with nitric acid. After washing and drying this is incorporated with the chlorate with the aid of alcohol, in which it is soluble. For use in coal mines sodium chloride is sometimes added. The following are examples—

	4.	4*a*.	IV. 22.
Potassium chlorate . .	80	80	70
Resin	20	16	8
,, oxidised . . .	—	4	
Sodium chloride . . .	—	—	22

It is practically the same as Steelite.

***S.K., S.R., S.S., S.V.** were partially gelatinised fibrous smokeless powders, introduced by the Smokeless Powder Co. about 1889. They are no longer made. The following analyses were given in "Arms and Explosives," 1917, p. 77—

	S.R.	S.S.
Nitrocellulose, insoluble . .	45·2	53·0
,, soluble . . .	25·5	13·0
Metallic nitrates	18·5	18·0
Nitro-compound	—	10·0
Vaseline	—	4·6
Starch	8·0	—
Moisture	2·8	1·4

The nitrocellulose was made from lignin. S.S. was a 38-grain bulk powder; S.R. was a fibrous powder for rifles; S.K. a similar powder for small rifles, and S.V. for revolvers.

***SMOKELESS DIAMOND** is a 33-grain bulk smokeless powder for shot-guns, introduced in 1903 by Curtis's and Harvey. According to an analysis in "Arms and Explosives," 1917, p. 78, its composition is—

Nitrocellulose, insoluble	69·0
,, soluble	6·6
Metallic nitrates	15·0
Vaseline	2·5
Charcoal	5·6
Moisture	1·3

***SOLENITE.**—A smokeless powder introduced in Italy in 1896 for use in rifles—

Nitroglycerine	34
Nitrocotton, soluble	63
Mineral jelly	3

It is gelatinised with the aid of acetone, and is made in the form of translucent short tubes of a light brown colour.

SPRENGCHLORAT. See Hassia-Chlorat.

SPRENGEL EXPLOSIVES were patented in 1871 by Dr. Hermann Sprengel, F.R.S., the inventor of the mercury vacuum pump. They are made by mixing an oxidising substance with a combustible one, the essential features being that one or both of the substances must be liquid, and the mixing takes place shortly before the explosive is required. The mixture is exploded by means of a fulminate detonator. As oxidising agents, Sprengel mentioned amongst others nitric acid and potassium chlorate; nitrogen peroxide has also been used; as combustibles, a large number of substances including nitro-benzene, nitro-naphthalene, carbon bisulphide, petroleum and picric acid. For most purposes nitric acid is an inconvenient material to use. Porous cartridges of potassium chlorate constitute the oxidiser generally employed, the combustibles being hydrocarbon oils and nitro-benzene. This possesses considerable advantages, as

there is no danger of a premature explosion until the constituents have been mixed. Under the British Explosives Act, however, this mixing constitutes "manufacture," and can only be carried out in a properly licensed factory. Consequently Sprengel explosives have not been used in Great Britain, but they have been employed on a considerable scale in the United States, France, Italy and other countries.

For examples of Sprengel explosives *see* Panclastite, Prométhée, Rack-a-Rock.

SPRENGGELATINE is the German for Blasting Gelatine.

SPRENGSALPETER is a cheap German blasting powder made from sodium nitrate, sulphur and brown coal. It is used in the potash mines.

STABILITE is a name that has been given to trinitroanisole. It has been tried as a constituent of a smokeless powder, but it belies its title as it is readily hydrolysed with the formation of picric acid. It has also been used by the Germans as a filling for bombs.

STANFORD POWDER.—A coal-mine explosive of the Favier class which was on the Permitted List for a short time in 1913.

STEELITE was practically the same as Silesia. Colliery Steelite was a coal-mine explosive on the old Permitted List, and made by Steelite Explosives, Ltd. It contained—

Potassium chlorate	74
Oxidised resin	25
Castor oil	1

Steelite is no longer authorised for manufacture or import into the United Kingdom.

ST. HELEN'S POWDER.—A coal-mine explosive of

the Ammonal type made by the Roburite Explosives Co., which was on the old Permitted List—

Ammonium nitrate	93·5
Aluminium powder	2·5
Trinitro-toluene	4

STOMONAL is a coal-mine explosive made by the New Explosives Co., Ltd. It was on the old Permitted List. In order to pass the Rotherham Test and obtain places on the new Permitted List, No. 1 and No. 2 have had salts added as cooling agents—

Date of Permit		No. 1. 22–6–14	No. 2. 9–5–17
Nitroglycerine	8	10	10
Ammonium nitrate	84·5	56[1]	60·5
Sodium nitrate	—	6	—
Wood meal	7·5	—	6·5
Wheat flour	—	8·5	—
Sodium chloride	—	19·5	17
Ammonium oxalate	—	—	6
Limit charge	—	20	30 oz.
Power (swing of ballistic pendulum)	—	2·68	2·57"

STONAX is a low-freezing Gelignite containing a small percentage of a nitro-compound.

STOW-ITE.—A coal-mine explosive made by the New Explosives Co., Ltd. It was on the old Permitted List—

Nitroglycerine	59
Collodion cotton	4·7
Potassium nitrate	18·3
Wood meal	6
Ammonium oxalate	12

***STOWMARKET SMOKELESS** is a 33-grain bulk powder for shot-guns made by the New Explosives Co. It is a comparatively inexpensive powder.

SUNDERITE was a coal-mine explosive made by Nobel's Explosives Co., Ltd., at one time on the Permitted List—

[1] Including not more than 2 per cent. magnesium carbonate.

Date of Permit	25–11–13
Nitroglycerine	9
Ammonium nitrate	53·2
Potassium perchlorate	9
Wood meal	8·8
Ammonium oxalate	20
Limit charge	16 oz.
Power (swing of ballistic pendulum)	2·66″

SUPER-CLIFFITE. See **CLIFFITE.**

SUPER-CURTISITE. See **CURTISITE.**

SUPER-EXCELLITE. See **EXCELLITE.**

SUPERITE.—A coal-mine explosive which was made by the Carbonite Company in Germany, and formerly on the Permitted List—

Date of Permit	1–9–13
Nitroglycerine	4
Ammonium nitrate	82
Potassium nitrate	10
Starch	4
Limit charge	10 oz.
Power (swing of ballistic pendulum)	2·53″

The Permit was repealed on 21–11–16.

SUPER-KOLAX. See **KOLAX.**

SUPER-RIPPITE. See **RIPPITE.**

SWALE POWDER was a coal-mine explosive on the Permitted List made by the Cotton Powder Co., Ltd.—

Date of Permit	10–2–14
Nitroglycerine	19
Collodion cotton	1
Trinitro-toluene	4
Potassium perchlorate	88
Wood meal	10
Ammonium oxalate	28
Limit charge	20 oz.
Power (swing of ballistic pendulum)	2·50″

The permit has been repealed.

SWALITE.—A coal-mine explosive made by the Cotton Powder Co., Ltd. It was on the old Permitted List—

Nitroglycerine	59·5
Collodion cotton	4
Potassium nitrate	17
Wood meal	6
Ammonium oxalate	13·5

SYNDITE.—A coal-mine explosive formerly on the Permitted List. It was made by the Carbonite Syndicate in Germany—

Nitroglycerine	11
Collodion cotton	0·2
Ammonium nitrate	46·3
Sodium nitrate	8
Glycerine	3·5
Starch	4
Sodium chloride	27
Limit charge	over 40 oz.
Power (swing of ballistic pendulum)	2·22″

The permit was repealed on 21-9-16.

*Poudre **T** is a condensed smokeless shot-gun powder manufactured by the French Government. It is made from guncotton, CP_1, to which 2 per cent. of saltpetre is added, gelatinised with acetone. The dough is pressed into strips which are rolled down to a thickness of 0·15 mm. and cut into small squares of 1·5 mm. side. The powder is then steeped in water to dissolve out the greater part of the potassium nitrate, dried, and finally drummed with a little gum and graphite to make it more progressive. This powder is superior to the other French sporting-powders, but is more expensive. The charge for a 16-bore cartridge is 1·9 grammes.

TELSIT A is a blasting explosive made at the Nobel Works in Switzerland. It consists of ammonium nitrate, nitrated toluene and aluminium powder.

Gelatine-Telsit contains ammonium nitrate, blasting

gelatine and liquid trinitro-toluene, also gelatinised with collodion cotton.

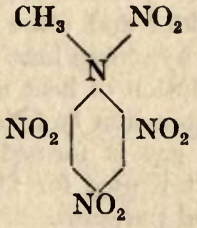
Special-Gelatine-Telsit differs from this in having part of the ammonium nitrate replaced by sodium nitrate.

TERRIT is a plastic blasting explosive made in Sweden, and consisting of ammonium perchlorate, sodium nitrate and liquid dinitro-toluene, gelatinised with collodion cotton—

Ammonium perchlorate	43
Sodium nitrate	28
Dinitro-toluene (liquid)	27·8
Collodion cotton	1·2

It is difficult to detonate.

TETRYL is the name usually given to tetranitro-methyl-aniline, the strictly scientific designation of which is trinitro-phenyl-methyl-nitramine—



It is used extensively as an intermediate detonating agent for high-explosive shell, as it is somewhat more sensitive than most of the explosives used, and can consequently be detonated by a small charge of fulminate. It is also called C. E.

Grisou-**TETRILITE.** See Favier Powder.

TEUTONIT is a German Favier explosive containing not less than 70 per cent. of ammonium nitrate, not more than 5 per cent. of flour or potato meal, and not more than 15 per cent. of aromatic nitro- and dinitro-compounds. It may also contain neutral salts.

TEUTONITE was a name given occasionally to White Gunpowder (q. v.).

THAMES POWDER is a coal-mine explosive on the Permitted List made by the British Explosives Syndicate, Ltd.—

		No. 2.
Date of Permit	22–6–14	28–1–15
Nitroglycerine	6·5	10
Ammonium nitrate	55	59[1]
Potassium nitrate	10	—
Wood meal	4·5	10
Starch	5	—
Ammonium oxalate	19	—
Sodium chloride	—	21
Limit charge	32	22
Power (swing of ballistic pendulum)	2·78	2·59

THERMIT is not an explosive, although in some respects it resembles one. It generally consists of a mixture of about three parts oxide of iron with one part of aluminium powder, but other oxides and other metals are sometimes used. When initiated by strong heat in one place a reaction sets in with great evolution of heat and the formation of a white-hot mass of molten iron and slag. It differs from an explosive in that no gas is formed and the reaction is comparatively slow. It is used for filling incendiary bombs and for many industrial purposes.

THORNIT.—A German blasting explosive consisting of ammonium nitrate and vegetable meal. It may also contain animal or vegetable fats.

TITANITE.—A coal-mine explosive manufactured in Hungary. A variety of it was on the old British Permitted List—

Ammonium nitrate	87
Trinitro-toluene	7
Curcuma charcoal	6

Other varieties containing a smaller percentage of ammonium nitrate have been used for general blasting.

[1] Including not more than 2 per cent. of magnesium carbonate.

T.N.T. stands for trinitro-toluene or trotyl.

TOLITE stands for trinitro-toluene.

TONITE, or Cotton Powder, is a blasting explosive which was much used at one time. It consists of gun-cotton mixed with a nitrate and compressed into blocks or cylinders, but a small percentage of a nitro-compound has sometimes been added. A Belgian Tonite had the composition—

Guncotton	53·0
Barium nitrate	37·6
Sodium nitrate	9·4

That made by the Cotton Powder Co. consists of—

Guncotton	50
Barium nitrate	50

TOXOL is a high explosive, a mixture of trinitro-xylene and trinitro-toluene.

TREMONIT is a German coal-mine explosive containing gelatinised dinitro-glycerine, *e. g.*—

Tremonit S II.

Dinitro-glycerine	33
Collodion cotton	1
Trinitro-toluene	2·5
Ammonium nitrate	26·5
Pea flour	12
Sodium chloride	25

Ammon-Tremonit or Gesteins-Tremonit contains a considerable proportion of ammonium nitrate.

Gesteins-Tremonit V. contains also up to 10 per cent. of potassium perchlorate, and is similar to Astralit V.

TRINOL.—A name for trinitro-toluene.

TRIPLASTIT was a plastic high explosive obtained by gelatinising a liquid or semi-liquid mixture of nitro-

toluenes with collodion cotton and mixing it with lead nitrates, *e. g.*—

Nitro-toluenes	70
Collodion cotton	1·2
Lead nitrate	28·8

It was intended for filling shell, etc.

***TROISDORF SMOKELESS POWDER** became prominent in England in 1897 in connection with Mannlicher cartridges for the Bisley long-range competitions. It was occasionally recorded as Pigou Wilkes Powder, as that firm were agents for it. The following are analyses of samples taken in 1898 (" Arms and Explosives," 1917, p. 90)—

	Shot-gun Powder.	Rifle Powder.
Nitrocellulose, insoluble . .	24·9	1·5
,, soluble . . .	61·7	96·5
Starch, agar and dye . . .	11·5	—
Moisture	1·9	2·0

The shot-gun powder was a fibrous bulk powder, and the charge for a 12-bore cartridge was 33 grains. The rifle powder was gelatinised.

TROJAN COAL POWDER is an American coal-mine explosive on the Permissible List. It contains nitro-starch.

TROTYL is a name for trinitro-toluene.

TUNNELIT is a German safety explosive containing ammonium nitrate, sodium nitrate, not more than 10 per cent. of trinitro-toluene (or not more than 6 per cent. together with not more than 2 per cent. of neutral liquid trinitro-toluene), not more than 20 per cent. of dinitro-chlorhydrin, not more than 5 per cent. of nitroglycerine, not more than 1 per cent. of collodion cotton, and carbohydrates.

TUNNELITE is an American coal-mine explosive on the Permissible List. Brands AA, B and C are ammonium

nitrate explosives, whereas numbers 3 to 8, 6LF and 8LF are nitroglycerine explosives.

TURPINITE. See **PANCLASTITE.**

TUTOL.—A coal-mine explosive made by the Westphalia Anhalt Explosives Co. in Germany. It was on the old Permitted List. A variation of it, No. 2, was for a time on the new List, but it was repealed in Nov. 1916.

		No. 2.
Nitroglycerine	25	25
Potassium nitrate	33	—
Barium nitrate	2	—
Sodium nitrate	—	29
Wood meal	39·8	36·3
Sodium chloride	—	9·5
Sodium bicarbonate	0·2	0·2
Limit charge	—	22 oz.
Power (swing of ballistic pendulum)	—	2·11″

UPLEES POWDER.—A coal-mine explosive of the Grisounite type made by the Cotton Powder Co. It was for a time on the Permitted List but was repealed in 1914.

VELOX GELATINE.—A blasting explosive for hard rock made by the British South African Explosives Co. It contains less nitroglycerine than blasting gelatine, and is intended to husband stocks of glycerine ("Arms and Explosives," 1916, p. 81).

Gelatine **VENDER** is a Swiss explosive consisting of dinitro-acetin gelatinised with a little collodion cotton and mixed with ammonium nitrate.

VICTOR POWDER was a coal-mine explosive made by Nobel's Explosives Co. There were two varieties at one time on the Permitted List—

Date of Permit	13–5–14	No. 2. 15–1–15
Ammonium nitrate	68	67
Potassium chloride	14·5	—
Sodium chloride	—	15
Nitroglycerine	8·5	9
Wood meal	9	9
Limit charge	18	16
Power (swing of ballistic pendulum)	2·96″	2·63″

VICTORITE.—A coal-mine explosive of the Carbonite type made by Nobel's Explosives Co. It was on the old Permitted List.

VIEILLE POWDER. See Poudre **B.**

VIGORIT. See **MONACHIT.**

VIGORITE is a name that has been given to several explosives in the past. One of these, manufactured in California in the 'seventies of the last century, contained potassium chlorate and nitroglycerine, and consequently was decidedly dangerous. It gave rise to a serious accident on the Grand Trunk Railway.

The Atlas Powder Co. in America manufacture a series of coal-mine explosives under this name. They are nitroglycerine explosives.

VIKING POWDER is a coal-mine explosive made by Nobel's Explosives Co. There are two varieties on the Permitted List—

Date of Permit	No. 1. 15–1–15	No. 2. 15–1–15
Ammonium nitrate	59	67
Nitroglycerine	10	8·5
Wood meal	10	8·5
Sodium chloride	20	15
Magnesium carbonate	1	1
Limit charge	26	18 oz.
Power (swing of ballistic pendulum)	2·44″	2·59″

This explosive is used extensively.

VIRITE.—A coal-mine explosive made by the Nitrate Explosives Co. which was on the old Permitted List—

Ammonium nitrate	38
Potassium nitrate	35·5
Sulphur	4·5
Charcoal	11·5
Ammonium oxalate	10·5

There have been other explosives of the same name.

VULCAN POWDER is a brand of American dynamite.

W.A. See Lafflin and Rand.

WALLONITE.—A Belgian blasting and coal-mine explosive—

		II.	III.
Ammonium nitrate	90	70	70
Sodium nitrate	—	20	25
Nitrated resin	10	10	5
Charge limite	50	125	600 g.

***WALSRODE SHOT-GUN POWDER** was a gelatinised 28-grain dense powder, which the German makers endeavoured to introduce into England in the 'nineties, but it gave high pressures. A powder of this name is still used in Germany, however, but it is a 35-grain powder in the form of small grains, greyish white and greyish green in colour.

WALSRODE SICHERHEITS-SPRENGSTOFF is a German coal-mine explosive containing ammonium nitrate, trinitro-toluene, flour, and a little guncotton and sometimes sodium chloride.

Wetter-Walsrode is also an ammonium nitrate explosive. It contains no guncotton but may contain potassium nitrate, sodium chloride, naphthalene, and various other substances.

WESTFALITE is a coal-mine explosive which is made in Germany and England. The German explosives vary much in composition, and some of them are intended for ordinary blasting. Some of those recently introduced contain up to 10 per cent. of potassium perchlorate. Originally Westfalite was made by milling ammonium nitrate with an alcoholic solution of gum lac, but later the use of the gum was abandoned.

British Westfalite, Ltd., had two mixtures on the old Permitted List—

	No. 1.	No. 2.
Ammonium nitrate	93	91
Potassium nitrate	—	4
Resin	5	5

That formerly on the Permitted List differed considerably from the above—

	Westfalite No. 3.
Date of Permit	1-9-13
Ammonium nitrate	60
Potassium nitrate	14
Trinitro-toluene	5
Ammonium chloride	21
Limit charge	12 oz.
Power (swing of ballistic pendulum)	2·55″

WETTERDYNAMIT is a name that has been given in Germany to various coal-mine explosives containing nitroglycerine.

WETTER-DYNAMMON. See **DYNAMMON.**

***WETTEREN.**—A gelatinised rifle smokeless powder made by the Cooppal Co. of Belgium. The following analyses were given in "Arms and Explosives," 1917, p. 91—

Date of Sample	1892	1893
Nitrocellulose, insoluble	16·0	57·3
,, soluble	46·2	37·6
Nitroglycerine	27·3	—
Shellac	—	3·5
Charcoal	9·0	—
Moisture	1·5	1·6

WHITE GUNPOWDER is a mixture of—

Potassium chlorate	50
Potassium ferrocyanide	25
Sugar	25

It is not produced commercially, and, indeed, is too sensitive, but it is sometimes made in the laboratory. It has also been called Angendre's powder, White German powder, American powder, and Baron and Cauvet's powder.

WILHELMIT is a German blasting explosive of the Cheddite type. It consists of sodium or potassium chlorate hydrocarbon oil with a flash point not below 30° C., and carbohydrates. For use in coal mines neutral salts are added. It was introduced during the War.

WITHNELL POWDER.—A coal-mine explosive of the Grisounite type made by the Lancashire Explosives Co., which was on the old Permitted List—

Ammonium nitrate	89·5
Trinitro-toluene	5
Flour	5·5

WITTENBERGER WETTERDYNAMIT. See **SALIT.**

XPDITE is an American coal-mine explosive on the Permissible List. It is made by the Hercules Powder Co., and contains nitroglycerine.

YONCKITE.—A Belgian ammonium perchlorate explosive. The composition has been varied somewhat, and

one formula, No. 10, is on the list of Explosifs S.G.P., and consequently is permitted for use in Belgian coal mines. No. 1 is a more powerful explosive used for general blasting.

	No. 10.	I.
Ammonium perchlorate	25	20
Ammonium nitrate	30	27
Sodium nitrate	15	27
Barium nitrate	—	6
Trinitro-toluene	10	20
Sodium chloride	20	—
Charge limite	900 g.	

ZELTIT. See Celtite.

INDEX OF CONSTITUENTS

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