

B. No 242 of 1913

Indian Explosives Act (IV of 1884).

Indian Petroleum Act (VII of 1899).

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FOURTEENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA

BEING HIS

Annual Report for the Year ending 31st March 1913.

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THE INDIAN ANNUAL REPORT

FOURTEENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPOSURES

IN INDIA

FOR THE

YEAR 1881-82

PRINTED BY THE GOVERNMENT PRESS, CALCUTTA

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Fourteenth Annual Report of the Chief Inspector of Explosives, India.

No. 837.

FROM

LIEUTENANT-COLONEL C. A. MUSPRATT-WILLIAMS, R. A.,
Chief Inspector of Explosives in India,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
Department of Commerce and Industry.

Simla, the 16th May 1913.

SIR,

I have the honour to submit herewith a report of the work of my Department during the year ending 31st March 1913.

2. During the year under review, I was absent on combined leave out of India from 3rd March till 11th November, and during this period Captain J. F. Tyrrell, R. A., Ordnance Department, officiated for me, and I owe him my thanks for the able manner in which he carried out the duties of the post.

3. During the year 1912, 161 licenses (three more than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 217 or the same as for 1911, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India during the year 1912 is given in Appendix A, and a statement showing the number of magazines and licenses granted during the past ten years is shown in Appendix B.

4. During the year, 399 inspections of magazines were made; a number of magazines being inspected two or three times. Those magazines are inspected most frequently which are situated in the neighbourhood of town or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of its greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more frequently than other explosives. The Roburite Factory at Karachi was also inspected.

5. The magazines generally are in good order, and as usual magazine owners have been found most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

6. The physical condition of all explosives in the different magazines during the year was found to be good, with the exception of the following explosives which were found to have deteriorated or to have become defective, and were destroyed:—

Condition of explosives in magazines.

- (a) 22 coils defective fuze and 88 electrically defective detonators at Messrs. Gillanders, Arbuthnot and Co.'s magazine at Barakar;
- (b) 624 lb. gunpowder, 895 coils fuze and 235 detonators at the Bengal-Nagpur Railway Co.'s magazine at Raneepur;
- (c) 200 detonators at the Raneegunge Coal Association's magazine at Kustore;
- (d) 5 lb. Amberite and 6 lb. Black powder at Messrs. Elahi Bux and Co.'s magazine at Meerut;
- (e) 31 cartridges of dynamite at the Madras and Southern Mahratta Railway Co.'s magazine at Arkonam;
- (f) 10 detonators at the Great Indian Peninsula Railway Co.'s magazine at Mohpani Colliery;
- (g) 7,614 detonators at the Assam-Bengal Railway Co.'s magazine at Haflong;
- (h) 2 lb. 2 oz. Monobel powder at the Bengal Mica Syndicate's magazine at Koderma;
- (i) 2 boxes Schultze gunpowder at the Calcutta Port Commissioner's magazine at Moyapur;
- (j) 198½ coils fuze at the Equitable Coal Co.'s magazine at Deshergarh.
- (k) 210 electric detonators at the Bengal Coal Co.'s magazine at Pahardea;
- (l) 20,000 packets of crackers at Messrs. C. Abboy Chetty and Son's magazine at Tondiarpett. These had got damaged during the floods at Madras.

7. During the year under report two thefts of explosives were reported to this office.

Thefts from magazines.

- (a) The Dharmpur-Hosur Railway extension magazine at Hosur was broken into on the night of the 19th September 1912, and 9 lb. dynamite and 57 detonators were stolen;
- (b) The magazine of the Equitable Coal Co. at Hurriladih, Bengal, was broken into between the 22nd and 24th December 1912, and 10 lb. of dynamite were stolen. The thieves appear to have effected an entrance by breaking the padlock (a strong one) with a crowbar or similar tool. Instructions were given that the magazine should always be efficiently guarded by day and night.

8. Two thousand six hundred and twenty-one tons of explosives were imported into British India during the year 1912, the value being Rs. 27,09,900. Full details showing the different kinds of explosives imported, and the value of each are given in Appendix C. From this Appendix it will be seen that though the value of fireworks imported into Bengal is given, the quantity imported is not shown, as the Collector of Customs states that the quantity imported is not recorded in his office. A comparative statement showing the quantity of explosives imported during the last 10 years is given in Appendix D.

9. A list of explosives at present authorised for importation into British India for general sale has been published in the *Gazette of India*, for information. This list will be found in Appendix E.

Authorised explosives.

10. The draft consolidated rules for the manufacture, possession, sale, transport, and importation of explosives were published for criticism by the Government of India on 13th April 1912, and it is expected that they will be issued shortly. When finally issued, they will be a great improvement on the present rules which are issued in 2 parts, one dealing with manufacture, possession, and sale, and the other with transport and importation. In the new rules, a great deal of superfluous matter which was common to both sets of rules has been removed, and the rules have been brought up to present requirements and well indexed.

Explosives Rules.

Petroleum.

11. During the year under report, 630 licenses for the storage of non-dangerous petroleum, regarding which this Department was concerned or consulted, were granted. This is an increase of 47 as compared with last year. A list of these installations, corrected up to 31st December 1912, and showing the districts in which they are located, is given in Appendix F, and a statement showing the number of licenses granted during the past eight years, is given in Appendix G. In addition to the number of licenses shown in Appendix F, there are, of course, a very large number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District Officers, of which this Department has no cognizance.

Number of petroleum installations.

12. There are also a number of godowns licensed for the storage of dangerous petroleum in non-bulk throughout the country, and the Inspectors of Explosives and I have inspected some of these, when their existence has been brought to our notice, or where they are near non-dangerous petroleum installations or contain more than 500 gallons of petrol.

Dangerous petroleum godowns.

13. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras, Bombay, Karachi, Calcutta, (Budge Budge and Narculdanga) Chittagong and Rangoon, and also the oil fields of Burma and Assam. He in addition inspected a number of minor installations. In all 723 inspections of non-dangerous petroleum premises were made. 156 inspections of dangerous petroleum godowns were also made by this Department.

Inspection of petroleum installations during the year.

14. The large petroleum installations are usually under efficient European supervision, and are in good order and well looked after.

Condition of major installations.

15. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosene oil in combined bulk and non-bulk are stored, and are looked after by Indian Agents, employed by the large oil firms. The oil for these installations is supplied from the major installations at the different ports, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this Department during the last seven years, with the result that their condition is very much improved and the generality of them are in very good order. As a matter of fact when an installation is found not up to the mark at an inspection, it is usually due to the fact that some new Agent has been recently appointed who has not realised what is required of him. The oil companies do not hesitate to change their Agents if several unsatisfactory reports are made of the installations under their charge.

Condition of minor installations.

16. During the year 1912, 77,684,829 gallons of non-dangerous petroleum and 512,333 gallons of dangerous petroleum were imported by sea into British India. The details are given in Appendix H and also the quantity of non-dangerous and dangerous petroleum produced in Assam and Burma during the year, as well as during the past eight years. It will be noticed that there is a great advance in the imports of dangerous petroleum.

Import of petroleum.

Accidents.

17. A list of accidents, with a short account of each, that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1912, and that have been reported to this Department is given in Appendix I. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 48 accidents causing 48 deaths and injuries to 72 persons. Comparative statements given in Appendices J and K show the total number of accidents and the number of persons killed or injured by them during the last seven years. As stated in previous reports, it is very doubtful whether all accidents that occur are duly reported to this Department and, therefore, it is very possible that the statistics given are underestimated. I notice that in some parts of India accidents appear more prevalent than in others; but I am inclined to think that such difference may be occasioned by the local authorities in some places being more careful in carrying out instructions to report accidents than they are in others.
- Number of accidents.
18. There were ten accidents from gunpowder during the year, causing thirteen deaths and injuries to six persons.
- Gunpowder, Class I.
19. Nitro-Compounds were responsible for five accidents, from which five persons were killed and 35 injured.
- Nitro-Compounds, Class III.
- Ammunition.
20. One accident from ammunition (detonator) caused injuries to one person.
21. Twelve accidents from fireworks caused the death of four persons, and injuries to 16 others. It will be noticed from the details of the accidents that a number of these were caused by Sulphur Chlorate mixtures, the use of which is now prohibited, and as stated in my last report, if this prohibition is strictly enforced, there is no doubt the number of accidents from fireworks will be considerably reduced.
- Fireworks, Class VII.
22. There were 17 accidents from petroleum during the year, which were responsible for 25 deaths and injuries to 12 persons. It will be seen from a perusal of the accidents in Appendix I, that carelessness is a prominent feature in most of them. In India the petroleum accidents are caused usually by lights being brought into proximity to oil vapour, to kerosene lamps being upset or falling down and to kerosene being poured on to fires or into lighted lamps.
- Petroleum.
23. There were two accidents from chemicals reported during the year, causing injuries to one person.
- Chemicals.
24. One accident from miscellaneous dangerous articles and substances was responsible for one death and injuries to 1 person.
- Miscellaneous accidents.
25. Three accidents were reported to this Department, whereby eleven persons were killed and three injured.
- Government accidents.

(a) What might have been a very bad accident took place in the Merchants' magazine, George town, Madras, which is under the control of the police, and therefore not inspected by this Department. This Department was called upon to enquire into the cause of the explosion, and this was made the subject of a special report which is given in Appendix L. From this it will be seen that there was a lack of supervision, and that the rules under the Explosive Act were not observed. The Government of Madras have decided that this magazine shall not be rebuilt, and in its place another magazine is being erected by the Port Trust on the sandy accretion to the south of the Madras Harbour, and will be under the jurisdiction of this Department and inspected by it.

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(b) A very sad accident occurred at Delhi Fort on the 24th April 1912, by which Staff Sergeant Friend, Ordnance Department, and 7 lascars, who were emptying 6.3 inch and 40-pr. shells, lost their lives. A court of enquiry was held to ascertain the cause of the explosion. There have been several bad accidents in India during the emptying of live shell and it seems a matter for consideration whether it would not be wiser and safer, though more expensive, to dispose of them by firing them off or by dropping them into the sea or other deep water.

(c) An explosion occurred on the 3rd July 1912 in the vicinity of a Public Works Department magazine at Kopargaon, Pravara Canals District. The magazine had got flooded through heavy rains, and the officer in charge had given orders that the explosives were to be removed out of the magazine and the water baled out. Unfortunately the water had soaked into several boxes of dynamite, liberating the nitro-glycerine from the dynamite and the nitro-glycerine was deposited as an oily liquid on the floor of the magazine amidst the pools of water. Two of the Indians engaged in transferring the explosives and baling out of the water, collected the oily liquid in 2 tins. One of the Indians said that this oily liquid was good for itch and rubbed some on one of the coolies and later on the same Indian, before returning to work after taking some food, thought he would see, if the oil he had collected, would burn. He put a little on a piece of tin and tried to burn it, but nothing happened so then he took about a pint of it and poured it on the forge fire, when, needless to say, a terrific explosion occurred and of 6 Indians standing round the forge, one was killed instantaneously being terribly mutilated, 2 died later of their injuries, and 3 others were seriously injured.

GENERAL REMARKS.

26. As a number of accidents causing considerable loss of life and serious injury still occur in blasting operations in quarries and in railway construction owing to lack of proper supervision and the carelessness of individuals, I give in Appendix M a number of rules for blasting and precautions to be observed, which can be obtained from this office, if desired by any one.

27. As it has come to notice that in some Government magazines in charge of civil officers there has been a lack of proper supervision and ignorance of the conditions in which a magazine should be kept, in consequence of which accidents have occurred, the question of bringing these magazines under the jurisdiction of this Department is now under the consideration of the Government of India.

28. I think it is as well to draw attention to the danger in using petrol for glove cleaning, if sufficient care is not taken only to use it when there are no lights about. The vapour is heavier than air and may travel and catch fire at some distance, flashing back and enveloping the operator. The following case was seen in the "Civil Military Gazette." A lady had cleaned a pair of gloves with petrol early one morning, and then hung them up in the verandah. In the afternoon, when going out, she put on the gloves and was just leaving her drawing-room when she noticed the fire needed attention. She picked up the poker and stirred up the fire with the result that her gloves suddenly burst into flames. She kept her presence of mind and thrust her hands under a heavy rug, but even then she was severely burnt. Though the gloves had been hanging up for several hours, enough petrol was still absorbed in the kid to give off vapour, which got ignited by the fire. While on this subject, I would point out that the Departmental Committee on Petroleum Spirit, which issued its report on the 11th February 1913, have recommended to His Majesty's Secretary of State amongst other recommendations "that the use of petroleum spirit hair-washes in hair-dressing establishments should be prohibited, and it should be made illegal for any hair-dresser to use petroleum spirit or mixtures containing petroleum spirit on the hair of the living subject." I would also take the opportunity of drawing attention to the efficiency of asbestos sheets in stifling and extinguishing spirit fires.

29. During the year, enquiries were made from England as to whether there were any regulations in force in India on the subject of the manufacture, handling, and storage of celluloid. At present in India, as in England, there are no

Celluloid.

special regulations, but owing to a disastrous fire occurring with celluloid in the east end of London last year where a number of poor work girls making celluloid articles at the top of a high building could not get away and were burnt to death, the subject is receiving especial attention and I believe a Departmental Committee was appointed by the Home Office to draw up such regulations as should be found necessary. While I was at home last year, I attended some experiments carried out at St. John's Wood by the British Fire Prevention Committee with a material called "Cellit" which is an unflammable celluloid and which gave apparently satisfactory results. So far the usual difficulty with any unflammable celluloid has been that it has been too brittle for the manufacture of films and other articles and has frayed in storage. As far as I could judge, this difficulty has been got over with "Cellit" and I believe a company has been started to manufacture it in large quantities.

30. The number of inspections done by this Department during the year is again a record one, *vis.*, 1,278 against 1,171 done the previous year. To give some idea of the work and the ground covered, I give the following details.

During the 12 months, 1st April 1912 to March 1913, the Chief Inspector of Explosives was away from Head-Quarters on inspection duty for 172 days and travelled 24,911 miles, the two Inspectors at Calcutta and Bombay were away for 262 days and 296 days and travelled 25,790 and 24,244 miles, respectively. In conclusion I owe my grateful thanks to my Inspectors for the able assistance they have given me, and I cannot speak too highly of their services. In addition to their ordinary work they have been frequently called away in the middle of inspections to examine suspicious packages and to give evidence in court in connection with outrages.

I have the honour to be,

Sir,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R.A.,*

Chief Inspector of Explosives in India.

APPENDIX A.

List of magazines and licenses granted under Rule 17 of the Explosives Rules for the year 1912.

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Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Assam ...	Cachar ...	2	...	2	1	...	1
	Lakhimpur ...	1	...	1	1	...	1
	Total ...	3	...	3	2	...	2
Bengal	Burdwan ...	20	...	20	17	...	17
	Darjeeling ...	3	...	3	3	...	3
	Hooghly ...	4	...	4	1	...	1
	Howrah ...	1	...	1	1	...	1
	24-Parganas ...	2	...	2	1	...	1
	Total ...	30	...	30	23	...	23
Bihar and Orissa ...	Gaya ...	3	...	3	3	...	3
	Hazaribagh ...	12	2	14	11	2	13
	Manbhum ...	19	...	19	16	...	16
	Sambalpur ...	1	...	1	1	...	1
	Singbhum ...	2	...	2	1	...	1
	Total ...	37	2	39	32	2	34
Bombay	Ahmedabad ...	3	...	3	4	...	4
	Bombay ...	21	1	22	13	1	14
	Karachi* ...	5	...	5	3	...	3
	Kolaba ...	1	...	1	1	...	1
	Panch Mahals ...	1	...	1	1	...	1
	Poona ...	4	1	5	2	1	3
	Thana ...	1	...	1	1	...	1
	Total ...	36	2	38	25	2	27

* At Karachi there is in addition a Roburite Factory licensed under Rule 15.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Burma ...	Amherst ...	...	1	1	...	1	1
	Hanthawaddy ...	4	...	4	3	...	3
	Mandalay ...	2	...	2	1	...	1
	Mergui ...	1	...	1	1	...	1
	Pegu ...	1	...	1	1	...	1
	Ruby Mines ...	1	...	1	1	...	1
	Tavoy ...	5	1	6	3	1	4
	Thaton ...	...	2	2	...	1	1
	Total ...	14	4	18	10	3	13
Central Provinces ...	Balaghat ...	1	1	2	1	1	2
	Betul ...	2	...	2	1	...	1
	Bhandara ...	2	...	2	2	...	2
	Bilaspur ...	1	...	1	1	...	1
	Chhindwara ...	8	...	8	6	...	6
	Hoshangabad ...	...	2	2	...	1	1
	Jubbulpur ...	2	2	4	1	1	2
	Nagpur ...	4	1	5	4	1	5
	Narsingpur ...	2	...	2	1	...	1
Raipur ...	3	...	3	4	...	4	
	Total ...	25	6	31	21	4	25
Coorg ...	Mercara ...	...	1	1	...	1	1
	Total ...	...	1	1	...	1	1
Madras	Anantapur ...	4	...	4	2	...	2
	Chingleput ...	2	...	2	2	...	2
	Kistna ...	1	...	1	1	...	1
	Madras ...	21	...	21	6	...	6
	Madura ...	1	...	1	1	...	1
	Nellore ...	6	...	6	3	...	3
	Nilgiris ...	2	...	2	1	...	1
	Salem ...	...	2	2	...	2	2
	South Arcot ...	1	...	1	1	...	1
	Tanjore ...	4	...	4	4	...	4
	Trichinopoly ...	3	1	4	3	1	4
Vizagapatam ...	4	...	4	2	...	2	
	Total ...	49	3	52	26	3	29

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Punjab ...	Rawal Pindi ...	1	...	1	1	...	1
	Total ...	1	...	1	1	...	1
United Provinces ...	Garhwal ...	1	...	1	1	...	1
	Lucknow ...	1	...	1	1	...	1
	Meerut ...	1	...	1	3	...	3
	Shahjahanpur ...	1	...	1	1	...	1
	Total ...	4	...	4	6	...	6

SUMMARY.

Assam ...	...	...	3	...	3	2	...	2
Bengal ...	...	...	30	...	30	23	...	23
Bihar and Orissa ...	...	...	37	2	39	32	2	34
Bombay ...	...	...	36	2	38	25	2	27
Burma ...	...	...	14	4	18	10	3	13
Central Provinces ...	...	...	25	6	31	21	4	25
Coorg ...	...	...	...	1	1	...	1	1
Madras	49	3	52	26	3	29
Punjab	1	...	1	1	...	1
United Provinces	4	...	4	6	...	6
	Total	199	18	217	146	15	161

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APPENDIX B.

Summary of magazines and licenses granted under Rule 17 for the ten years ending 1912.

					MAGAZINES.			LICENSES.		
					Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
1903	...	...	...	...	129	17	146	87	14	101
1904	...	...	...	...	138	12	150	96	9	105
1905	...	...	...	...	139	15	154	95	13	108
1906	...	...	...	...	150	19	169	105	15	120
1907	...	...	...	...	164	9	173	118	8	126
1908	...	...	...	...	167	19	186	119	15	134
1909	...	...	...	...	178	29	207	128	21	149
1910	...	...	...	...	189	13	202	135	13	148
1911	...	...	...	...	190	27	217	139	19	158
1912	...	...	...	...	199	18	217	146	15	161

APPENDIX C.

Statement showing the imports of explosives by sea into British India from other countries in the year 1912.

			Bengal.	Bombay.	Sind.	Burma.	Madras.	Total.
<i>Quantity.</i>								
Gunpowder, black	...	lb.	70,183	152,325	27,575	92,775	42,025	384,883
„ smokeless	...	„	8,000	6,575	2,250	375	425	17,625
Ammonal	...	„	...	...	...	...	...	...
Dynamite	...	„	50,400	55,000	...	95,900	79,600	280,900
Blasting gelatine	...	„	13,328	16,000	...	11,000	800,000	840,328
Gelignite or gelatine dynamite	...	„	99,344	133,000	4,000	69,500	8,500	314,344
Monobel powder	...	„	...	...	...	...	...	...
Other nitro-compound explosives	...	„	45,910	100	672	...	177,743	224,425
Detonators	...	No.	765,000	484,110	12,000	222,400	2,165,500	3,649,010
Fireworks	...	lb.	...	2,669,021	84,018	304,248	124,124	3,181,411
	Total	„	287,165	3,032,021	118,515	573,798	1,232,417	5,243,916
	Total	No.	765,000	484,110	12,000	222,400	2,165,500	3,649,010
<i>Value in rupees.</i>								
Gunpowder, black	...	...	65,938	68,407	18,534	36,556	21,685	211,120
„ smokeless	...	...	23,274	11,928	6,171	1,355	1,480	44,208
Ammonal	...	...	...	...	...	...	...	...
Dynamite	...	...	32,208	43,525	...	91,588	62,568	229,889
Blasting gelatine	...	...	9,915	15,092	...	13,839	752,940	791,786
Gelignite or gelatine dynamite	...	...	63,762	105,254	3,178	67,107	6,710	246,011
Monobel powder	...	...	...	...	...	...	...	...
Other nitro-compound explosives	...	...	42,361	64	745	...	136,655	179,825
Detonators	...	...	9,573	12,097	330	4,970	37,755	64,725
Fireworks	...	...	137,232	630,069	48,383	89,463	37,189	942,336
	Total	...	384,263	886,436	77,341	304,878	1,056,982	2,709,900

APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India from other countries for the ten years ending 1912.

	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
Gunpowder, black . lb	272,423	473,925	202,751	168,353	170,299	256,753	213,854	242,702	229,069	384,883
„ smokeless „	31,004	48,246	45,125½	39,745	29,317	37,615	39,412	38,176	29,611	17,625
Ammonal . „	...	...	...	...	...	250	...	...	7,800	...
Dynamite . „	416,480	149,968	249,968	352,207	262,495	350,474	453,016	360,636	389,577	280,500
Blasting gelatine . „	843,432	895,040	558,200	906,400	1,085,050	726,796	805,080	676,458	750,242	840,328
Gelignite or gelatine dynamite . „	22,096	55,048	123,048	132,594	175,040	165,208	132,032	178,968	226,934	314,344
Monobel powder . „	...	...	...	2,000	...	...	...	...	...	...
Other nitro-compound explosives . „	222,104	130,811	109,475	72,921	89,256	77,616	48,016	96,736	43,456	224,425
Detonators . No.	4,388,400	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789	3,649,010
Fireworks . lb	1,971,317½	2,264,162	1,661,229	2,410,388	2,446,428	1,504,896	1,339,733	3,410,741	3,540,825	3,181,411
Total . lb	3,778,856½	4,017,200	2,949,796½	4,084,608	4,257,885	3,119,608	3,031,143	5,004,417	5,216,614	5,243,916
Total . No.	4,388,400	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789	3,649,010

APPENDIX E.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Simla, the 18th April 1913.

No. 640.—With reference to Notification No. 4555—4, dated the 31st May 1907, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the transport and importation of explosives, the following list of "authorized explosives" referred to in Rule 9 (1) of the above rules, is published for general information :—

LIST OF AUTHORISED EXPLOSIVES.

The following explosives are at present authorised for importation into British India, for general sale :—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

CHILWORTH SPECIAL POWDER.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification No. 4555—4, dated the 31st May 1907, referred to above.

Division 1.

ARDEER GELIGNITE.

BALLISTITE.

BLASTING GELATINE.

CAMBRITE.

CARBONITE.

CELTITE.

CHILWORTH SMOKELESS POWDER, No. 2.

CORDITE.

CORDITE, M. D.

DYNAMITE.

FARMER'S DYNAMITE.

GELATINE DYNAMITE.

GELIGNITE.

MONOBEL POWDER.

PHENIX POWDER.

SAMSONITE.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE, No. 2.

CHILWORTH SMOKELESS POWDER.

CHILWORTH SMOKELESS SPORTING POWDER.

E. C. SPORTING POWDER.

EMPIRE POWDER.

GUNCOTTON.

HENRITE.

IDEAL POWDER.

IMPERIAL SCHULTZE GUNPOWDER.

NEGRO POWDER.

NEONITE.

NOBEL'S SPECIAL POWDER OR IDEAL POWDER.

N. S. SMOKELESS.

PICRIC ACID.

PICRIC POWDER.
 PRIMROSE SMOKELESS.
 RENDITE.
 ROBURITE.

RUBY POWDER.
 SCHULTZE CUBE POWDER.
 SCHULTZE GUNPOWDER.
 SMOKELESS DIAMOND.

TONITE OR COTTON POWDER.
 Class 4.—CHLORATE MIXTURE.
Nil.

Class 5.—FULMINATE.
Nil.

Class 6.—AMMUNITION.
Division 1.

NOBEL'S SAFETY ELECTRIC TIME FUZE.
 PERCUSSION CAPS.
 RAILWAY FOG SIGNALS.
 SAFETY CARTRIDGES.
 SAFETY FUZES FOR BLASTING.
 SAFETY ELECTRIC FUZES.

Division 2.

CARTRIDGES FOR CANON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
 CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.

CORDEAU BICKFORD.
 ELECTRIC FUZES.
 FILLED SHELLS.
 FUZE LIGHTERS.
 FUZES FOR SHELLS.
 TUBES FOR FIRING EXPLOSIVES.
 WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.

DETONATORS.
 ELECTRIC DETONATORS.
 FRICTION TUBES.
 FUZES FOR SHELLS.
 NOBEL'S ELECTRIC DETONATOR TIME FUZE.
 QUICK FIRING AMMUNITION.
 TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2. Manufactured Fireworks.

MANUFACTURED FIREWORKS.

ALUMINIUM TORCHES.
 AMORCES.
 CHINESE CRACKERS.
 ELECTRIC SPARKLERS.
 MAGNESIUM TORCHES.
 PYROTECHNIC MATCHES.
 ROCKETS.
 SIGNAL LIGHTS.

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R. A.,*
Chief Inspector of Explosives in India.

APPENDIX F.

List* of non-dangerous petroleum installations licensed during the year 1912.

Province.	District.	No.	Province.	District.	No.
Ajmer-Merwara ...	Ajmer ...	4	Bihar and Orissa (concl'd.)	Mozufferpur ...	5
	Total ...	4		Patna ...	5
	Kamrup ...	1		Purnea ...	6
Assam ...	Lakhimpur ...	2		Ranchi ...	2
	Total ...	3		Sambalpur ...	7
				Saran ...	3
				Shahabad ...	3
				Sontal Parganas ...	6
Baluchistan ...	Quetta ...	2		Total ...	67
	Total ...	2			
	Backergunge ...	1	Ahmedabad ...	5	
	Bankura ...	1	Ahmednagar ...	3	
	Bogra ...	3	Belgaum ...	4	
	Birbhum ...	1	Pijapur ...	6	
	Burdwan ...	7	Bombay ...	7	
	Calcutta ...	6	Broach ...	7	
	Chittagong ...	5	Dharwar ...	12	
	Darjeeling ...	3	Hyderabad (Sind) ...	1	
	Dinajpur ...	3	Karachi ...	6	
Bengal ...	Howrah ...	3	East Khandesh ...	4	
	Jalpaiguri ...	2	West Khandesh ...	6	
	Khulna ...	1	Nasik ...	6	
	Midnapur ...	2	Poona ...	3	
	Murshedabad ...	1	Satara ...	3	
	Nadia ...	8	Sholapur ...	3	
	Pabna ...	3	Surat ...	6	
	Rajshaye ...	3	Thana ...	4	
	Rangpur ...	6	Total ...	86	
	24-Parganas ...	10			
	Total ...	69	Hanthawaddy ...	7	
	Balasure ...	3	Magwe ...	10	
	Bhagulpur ...	5	Mandalay ...	5	
	Champaran ...	4	Minbu ...	6	
Bihar and Orissa ...	Cuttack ...	4	Mingyin ...	2	
	Darbhanga ...	3	Pokoku ...	7	
	Gaya ...	4	Prome ...	3	
	Manbhum ...	4	Thayetmyo ...	1	
	Monghyr ...	3	Total ...	41	

*This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

Province.	District.	No.	Province.	District.	No.
Central Provinces ...	Akola ...	6	Madras—(concl'd.) ...	Kurnool ...	2
	Amraoti ...	9		Madras ...	6
	Ehandara ...	8		Madura ...	6
	Bilaspur ...	4		Malabar ...	10
	Buldana	9		Nellore ...	3
	Chanda ...	3		North Arcot ...	9
	Hoshangabad ...	5		Ramnad ...	4
	Jubbulpore ...	6		Salem ...	3
	Nagpur ...	5		South Arcot ...	13
	Narsingpore ...	3		South Canara ...	1
	Nimar (Khandwa) ...	5		Tanjore ...	17
	Raipur ...	3		Tinnevelly ...	6
	Saugor ...	3		Trichinopoly ...	5
Seoni ...	3	Vizagapatam ...	8		
Wardha ...	9	Total ...	138		
Total ...	81	Mysore ...	Bangalore ...	10	
Hyderabad ...	Hyderabad ...	9	Total ...	10	
	Secunderabad ...	3	North-West Frontier Province. {	Hazara ...	3
	Total ...	12		Peshawar ...	4
Madras ...	Anantapur ...	4		Total ...	7
	Eellary ...	4	Punjab ...	Ambala ...	8
	Chingleput ...	7		Amritsar ...	4
	Coimbatore ...	7		Delhi ...	5
	Cuddapah ...	2		Gurdaspur ...	1
	Ganjam ...	4		Jullundur ...	3
	Godavari ...	5		Lahore ...	6
	Guntur ...	5		Ludhiana ...	3
Kistna ...	7				

Province.	District.	No.	Province.	District.	No.
Punjab—(concl'd.)	Multan ...	1	United Provinces— (concl'd.)	Benares ...	4
	Rawal Pindi ...	3		Cawnpur ...	3
	Shahpur ...	1		Dehra Dun ...	1
	Sialkot ...	4		Etawah ...	3
	Total ...	39		Fyzabad ...	3
United Provinces	Agra ...	4		Ghazipur ...	1
	Aligarh ...	2		Gonda ...	2
	Allahabad ...	5		Gorakhpur ...	3
	Azamgarh ...	2		Jaunpur ...	1
	Bahraich ...	1		Jhansi ...	3
	Ballia ...	1		Lucknow ...	3
	Bara Banki ...	3		Meerut ...	4
	Bareilly ...	4		Moradabad ...	3
	Basti ...	7		Muttra ...	1
				Saharanpur ...	4
			Shahjahanpur ...	3	
			Total ...	71	

SUMMARY.

	No.
Ajmer-Merwara ...	4
Assam ...	3
Baluchistan ...	2
Bengal ...	69
Bihar and Orissa ...	67
Bombay ...	86
Burma ...	41
Central Provinces ...	81
Hyderabad ...	12
Madras ...	138
Mysore ...	10
North-West Frontier Province ...	7
Punjab ...	39
United Provinces ...	71

Total ... 630

APPENDIX G.

Summary of non-dangerous petroleum installations and godowns licensed for the eight years ending 1912.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
Ajmer-Merwara ...	3	3	3	4	4	4	4	4
Assam ...	...	...	...	...	...	...	...	3
Baluchistan ...	...	...	1	1	1	1	2	2
Bengal ...	67	74	74	79	89	96	101	69
Bihar and Orissa ...	...	...	...	...	...	...	...	67
Bombay ...	65	64	76	82	79	84	83	86
Burma ...	10	11	12	17	19	33	35	41
Central Provinces ...	49	49	67	66	69	71	74	81
Eastern Bengal and Assam ...	11	14	16	21	24	31	28	...
Hyderabad ...	...	...	...	...	...	2	11	12
Madras ...	49	57	89	97	95	114	129	138
Mysore ...	...	...	...	...	8	10	10	10
North-West Frontier Province	1	3	3	3	3	3	6	7
Punjab ...	9	12	23	26	28	30	35	39
United Provinces ...	44	44	47	48	59	61	65	71
Total ...	308	331	411	444	478	540	583	630

APPENDIX H.

Statement showing the quantity of petroleum imported by sea into British India, during the eight years ending 1912.

NON-DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong ...	3,970,269	1,822,051	5,547,944	6,308,806	8,825,895	6,977,078	7,959,321	9,250,508
Calcutta ...	10,000	26,200	...	...	...	...	...	...
Chandernagore ...	367,500	405,000	270,200	206,150	208,200	259,000	227,400	256,800
Cochin ...	27,144,014	20,342,078	27,342,923	33,379,196	26,599,239	18,642,248	27,089,471	26,468,283
Madras ...	22,099,928	17,402,913	22,439,071	24,759,034	24,955,563	24,730,978	27,604,430	22,790,825
Bombay ...	5,157,947	5,007,932	7,171,933	10,448,574	9,719,214	8,295,644	9,689,900	7,274,695
Calcutta ...	9,765,384	6,956,459	8,942,869	13,018,601	13,720,767	10,006,706	15,113,287	10,625,192
Madras ...	1,595,209	1,156,179	1,828,973	2,514,834	1,119,719	1,197,661	1,283,641	1,018,526
Total ...	70,110,251	53,118,812	73,543,913	90,626,195	85,148,597	70,109,315	88,967,450	77,684,829

DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Calcutta ...	14,500	...	12,270	20,018	42,965	44,708	83,800	32,080
Bombay ...	66,017	184,243	92,258	110,390	84,793	79,661	106,000	469,522
Chandernagore ...	622	9,795	2,733	25,801	1,844	28,043	3,827	6,185
Madras ...	7,828	38,104	25,400	53,756	15,280	6,459	2,400	4,120
Calcutta ...	5	...	...	...	55	580	206	426
Total ...	88,972	232,142	132,661	209,995	144,937	159,451	196,233	512,333

Statement showing the quantity of petroleum produced in Burma and transported into British India, during the four years ending 1912.

	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.
Non-dangerous petroleum ...	83,299,134	85,356,057	100,758,865	100,152,787
Dangerous petroleum ...	648,878	922,481	1,619,527	1,392,616

Statement showing the quantity of petroleum produced in Assam and Burma, during the eight years ending 1912.

NON-DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam ...	1,543,212	1,890,942	1,975,094	2,016,978	2,144,093	2,933,772	2,142,349	1,905,955
Burma ...	67,062,170	95,848,500	75,397,762	78,044,435	134,080,703	143,387,116	148,874,019	161,250,234
Total ...	68,605,382	97,739,442	77,372,856	80,061,413	156,224,796	145,420,888	151,016,368	163,156,189

DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam ...	21,014	21,855	48,017	67,256	36,588	56,736	80,534	120,930
Burma ...	11,588,220	11,670,200	15,043,700	18,055,500	18,479,394	18,245,501	21,228,403	23,109,393
Total ...	12,009,234	11,692,055	15,091,717	18,122,756	18,515,982	18,302,237	21,308,937	23,230,323

APPENDIX I.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1912 to 31st December 1912.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
Explosives.						
1	18th February 1912.	Gunpowder ...	Kalianur, Salem	The District Magistrate reported that a pot containing gunpowder for adirvedis was kept within 6 yards of the firing machine, and when an adirvedi was set fire to, some sparks fell into the pot which caused an explosion fatally injuring a boy who was about 2 feet away from the gunpowder pot.	1	...
2	21st February 1912.	" ...	Salem ...	A man was holding blasting powder in one hand and fire for lighting it in the other, when a spark fell into a pot containing powder which was close by and ignited the powder causing fatal injuries to the man.	1	...
3	2nd March 1912	" ...	" ...	While adirvedis containing gunpowder were being fired, it is presumed a spark fell on some powder in an earthen pot near by which caused the powder to explode and injure two men.	...	2
4	7th April 1912	" ...	Tanjore ...	The Magistrate reported that a man was firing "adirvedis" during a religious festival. He had a lighted coir tied to a pole in his hand and kept the gunpowder in a palm leaf basket. In his hurry to thrust stones and mud into the tube, he unfortunately placed the basket of powder over the lighted coir, when an explosion occurred fatally injuring him.	1	...
5	28th April 1912	" ...	Salem ...	An Indian after putting a charge of powder in a bore hole for blasting, placed clay on it and was striking it with an iron rod when the charge exploded fatally injuring him.	1	...
6	19th July 1912	" ...	Madura ...	Two women were pounding hard grains of gunpowder while a third was separating the soft powder from the hard by means of a sieve. The mortar was of stone and the pestles used were of wood. The whole mass of powder suddenly exploded fatally injuring the three women. The cause of the explosion was probably due to grit in the mortar.	3	...
7	3rd September 1912.	" ...	Tuticorin ...	An Indian was pounding country gunpowder in a stone mortar with a wooden pestle when the powder exploded owing to presence of grit. The man and a boy near by were killed. His son who was also near by was injured.	2	1
8	1st November 1912.	" ...	Yeleswaram, Godaveri.	An Indian woman was preparing gunpowder for crackers when a spark from a cigar which another woman near by was smoking fell and caused an explosion, fatally injuring the woman preparing the powder and injuring the other one.	1	1
9	5th November 1912.	" ...	Rajahmundry...	Four women were engaged in tying up crackers and some gunpowder was near by when all of a sudden an explosion occurred injuring the women, two of whom died. It is presumed that one of the women who went out to smoke, brought in a spark of fire in her clothes without her knowledge, which set fire to the powder.	2	2

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.

Explosives—contd.

10	19th December 1912.	Gunpowder ...	Salem ...	A man was engaged in firing Adirvedi. The gunpowder was deposited in iron receptacles, but as no shots were fired he applied more gunpowder in the already heated receptacle when some gunpowder in a mud pot in his hand caught fire which resulted in an explosion fatally injuring the man.	1	...
TOTAL ...					13	6
11	8th June 1912...	Dynamite ...	Taungzun ...	While some coolies were removing rubble one of the coolies while levering a rock set off an unexploded charge which had remained unnoticed under the rock. It appears 12 blasting charges were placed in the quarry and only eleven of them exploded, the non-explosion of the 12th one being undetected.	1	11
12	9th August 1912	Gelignite ...	Khandala ...	While blasting operations were being carried on in the tunnel of the Tata Hydro Electric Works some operators started boring in old blasting holes where missfire charges remained. An explosion occurred whereby two Pathans were killed and 12 other persons injured.	2	12
13	4th September 1912.	Dynamite ...	Southern Shan States.	A Jemadar placed a charge of dynamite in a bore hole and while tamping the charge it exploded, seriously injuring the man. The explosion was probably caused by grit coming in contact with the charges.	...	1
14	2nd October 1912.	Gelignite ...	Khandala ...	About midnight an explosion took place in the tunnel being constructed by the Tata Hydro Electric Company at Khandala. The explosion was due apparently to a relief working party not being aware that a missfire cartridge had been left by the party which had just previously been working in the tunnel. When fresh drilling commenced the missfire cartridge exploded.	1	8
15	15th November 1912.	Dynamite ...	Hosur ...	While some workmen were engaged in drilling blasting holes in a cutting, one of them was killed and three injured, owing to the explosion of a charge of dynamite remaining in an unexploded hole.	1	3
TOTAL ...					5	35
16	24th August 1912.	Detonator ...	Calcutta ...	A fireman on board ship picked up a detonator and began prodding it through with a piece of wire when it exploded causing serious injuries to his hand.	...	1
TOTAL ...					...	1
17	21st January 1912.	Firework mixture, chlorate of potash, presumably in admixture with a sulphide.	Madura ...	An Indian was unlawfully grinding chlorate of potash and some other ingredient in his house, when an explosion occurred, fatally injuring the man.	1	...
18	25th January 1912.	Fireworks, Ven-gayavedis.	Tanjore ...	An Indian was bringing some fireworks made with chlorate of potash and sulphate of arsenic in his hand to the street when he slipped on the brick pavement. The fireworks exploded and the man was severely injured. He was prosecuted for being in possession of these fireworks without a license and fined.	...	1

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.

Explosives—concl'd.

19	27th April 1912	Fireworks ...	Dindigul ...	The Magistrate reported that while adirvedis were being fired an Indian stood at a distance of 50 feet from the place of firing with a small basket containing 1½ lbs. of gunpowder. Sparks fell into the basket and ignited the powder, which fatally injured the man.	1	...
20	May 1912 ...	Fireworks consisting of charcoal, sulphur, saltpetre, and steel filings.	Amalapuram, Godavari District.	The Magistrate reported that an Indian was ramming powder placed in a cloth covered with tar into the hollow of a bamboo with a wooden rod, when an explosion occurred. It is presumed the explosion was caused by the presence of grit.	...	4/
21	31st May 1912	Fireworks ...	Mogulserai ...	While some railway gaugers were digging under an overbridge stairs on the Mogulserai platform a man's <i>phaora</i> struck a firework cracker concealed in the accumulation of sweepings under the bridge and exploded it, injuring 2 men. Later on another cracker was found. It is presumed these crackers were concealed by members of a wedding party travelling by train in order to avoid detection or they were left lying about the platform and swept into the rubbish.	...	2
22	2nd August 1912.	" ...	Baliaghata ...	The Commissioner of Police, Calcutta, reported that a man placed a mixture of chlorate of potash and red sulphide of arsenic in a piece of paper and tried to wrap it tightly with rags to shape it into a small ball when it exploded causing injuries to him.	...	1
23	13th October 1912.	Firework composition consisting of chlorate of Potash and sulphide of arsenic.	Alamuru, Godavari.	Two boys mixed the two ingredients on a wooden board and while afterwards placing the mixture into a coconut shell, the shell fell on the board on which there was some of the powder and this exploded at once injuring both the boys.	...	2
24	1st November 1912.	Fireworks consisting of chlorate of potash and saltpetre.	Tanjore ...	An Indian lad purchased a small quantity of the firework composition without the knowledge of his parents. The father, with the object of throwing away the packet, took it out of a box when it exploded owing, it is said, to the slight pressure exerted on it. The man's left hand was severely injured and his left eye affected.	...	1
25	3rd November 1912.	Firework, Vengayavedi, consisting of chlorate of potash and red arsenic.	Madura ...	A cooly brought home a Vengayavedi and kept it near a fire sitting close to it with his children, when it suddenly exploded causing his death and injuries to the three children.	1	3
26	3rd November 1912.	Firework composition consisting of chlorate of potash and orpiment.	Achempeta, Godavari.	An Indian was mixing the two ingredients together in an earthen basin when an explosion occurred injuring him.	...	1
27	8th November 1912.	Firework composition consisting of potassium chlorate and realgar.	Irusumandu, Godavari.	An Indian lad was mixing the ingredients with a pestle when an explosion occurred injuring the lad and another one who was near by.	...	2
28	11th November 1912.	Fireworks ...	Calcutta ...	Three Indians were preparing Tubris by filling earthen pots with a mixture of charcoal, powdered iron, sulphur and saltpetre. While so engaged a hawai (rocket) fell over the place and some sparks from the same fell on the powder lying close by and caused an explosion fatally injuring one man.	1	2
TOTAL ...					4	16

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.

Petroleum.

29	13th January 1912.	Kerosine ...	Bombay ...	A Hindu woman was carrying a kerosine oil lamp and let it drop, setting her clothes on fire. She was fatally burnt.	1	...
30	20th January 1912.	Oil fuel ...	Beme Reserve, Burma.	The Warden reported that a fire broke out in Receiving tank No. 3 of the British Burma Petroleum Company. The fuel tank caught fire. No damage was done to property but unfortunately the durwan in charge was so badly burned that he died. It was evident that he lighted a match to see the depth of the oil in the receiving tank.	1	...
31	24th January 1912.	Liquid fuel ...	Twingon Reserve	A fire occurred at the Indo-Burma Petroleum Company's fuel tank No. 4 and burned for about 15 minutes. It was either caused by a blow back from the boiler fed by this fuel tank or by the carelessness of the boiler man in letting the tank overflow. No damage was done to property but unfortunately the boiler man died from burns received probably in trying to extinguish his boiler when the fire started.	1	...
32	28th January 1912.	Kerosine ...	Bombay ...	A Hindu boy while playing with a lighted kerosine oil lamp accidentally set his clothes on fire, his body being severely burnt.	...	1
33	1st February 1912.	" ...	" ...	A woman was cooking her food when her sari caught fire in the flame of an open kerosine oil lamp, which was burning by her side and she was severely burnt.	...	1
34	8th February 1912.	" ...	" ...	A woman got burnt by a kerosine oil lamp accidentally setting her clothes on fire.	...	1
35	10th March 1912	" ...	" ...	The Commissioner of Police reported that a woman was sitting on the floor of a house when the chimney of a lamp fell on her and she suddenly jumped up and upset the lamp above her when the oil caught fire and set her clothes on fire. Her husband ran to her rescue and got burnt also.	...	2
36	16th March 1912	Benzine ...	" ...	An Indian had just emptied on to a table some gloves which had been soaking in benzine all night to be cleaned and was leaving the room to get more petrol when he saw a flame on the floor under the table. It is presumed the fire was caused by a cooly smoking and throwing the end of the "biddy" into the cleaning room.	...	...
37	27th March 1912.	Paraffin ...	Karachi ...	A barrel of paraffin slipped out of a sling, fell down and the end of the barrel burst, the oil running into a water tank in which 12 coolies were engaged scaling its sides. Each of the coolies had a lighted candle and the oil caught fire with the result that one European received seven burns and the 12 coolies were suffocated from the fumes.	12	1
38	28th March 1912.	Kerosine ...	Bombay ...	A Hindu girl was cooking some food seated near a naked kerosine oil lamp when her clothes accidentally went over the flame of the lamp and got alight and she was severely burnt.	...	1

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No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.

PETROLEUM—concl'd.

39	16th April 1912	Crude petroleum.	petro-	Yenangyoung	It was reported that coolies were "pulling rods" in well No. 363 of the Burma Oil Company, when a fire broke out. The fire may have been caused by the friction between the pumping rod and the tubing in which it moves. Four men were injured, three of whom died in hospital. It was an accidental occurrence and no one can be blamed for it.	3	1
40	9th August 1912	Kerosine	...	Salem	... A Washington light was brought for hire for the use of a drama intended to be enacted. The light reached its destination before the appointed time and an Indian who carried it placed it on the floor and was standing by its side. Another boy was also near the light looking at what was taking place. All of a sudden the light became brighter, flames arose and the kerosine oil began to trickle on the cistern, and the burner and chimney were filled with flames. Eventually the cistern burst and fell on the two Indians standing by and fatally burned them.	2	...
41	16th September 1912.	Petroleum	...	Yenangyat	... At about 6-15 A. M. a tank containing about 120,000 gallons of oil caught fire and it was reported that it was struck by lightning, but of this there is some considerable doubt. No one was injured.	...	...
42	25th September 1912.	Petrol	...	Jalarpet	... During transshipping operations a fire suddenly broke out in an iron railway wagon containing 375 tins of Benzine and Petrol. The fire spread to an adjoining wagon containing 40 bags of gram and rice and to some sheets and rope on the ground opposite the wagon and to a country cart standing close by. Four of the bags of gram were burnt, as well as all the sheets and rope and the country cart. The fire was presumably due to a naked light being brought near or by some one smoking in the vicinity.	...	...
43	18th October 1912.	Kerosine	...	Bankura	... Two Indians were pouring some kerosine oil from a bottle into a lamp, presumably lighted, when the whole lot took fire and both of them were burnt, one of them succumbing to the injuries received.	1	1
44	26th October 1912.	Petrol	...	Syriam, Burma	During the loading of Petrol in the "Summer tank" (Tween decks) of the S. S. "Conch", one drum of petrol exploded. The explosion caused no damage to the vessel or to other cargo, but it unhappily resulted in the instantaneous death of one of the coolies in the tank and caused severe injuries to five others who were taken to hospital and of these three subsequently died. The cause of the accident could not definitely be stated, but the subsequent discovery of a half-burnt native cheroot in the tank left little doubt as to the source of ignition.	4	2
45	30th November 1912.	Kerosine	...	Bombay	... A Goanese was lighting a fire and to get it to burn quickly poured on some kerosine oil from a bottle. The fire suddenly flared up and set his clothes on fire and he was badly burnt.	...	1
TOTAL ..						25	12

No.	Date of accident.	Nature of chemical.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.

Chemicals.

46	27th April 1912	Nitric acid ...	Central Station, Madras.	A cooly took a case of nitric acid for despatch, but as it was not properly packed he was told it could not be accepted. Instead of removing the case, the cooly disappeared. In the meantime, another cooly brought a parcel and to make room for the parcel he brought, the case of nitric acid was removed from its original place when it burst open and the cooly was slightly injured.	...	1
47	6th May 1912...	Nitric acid ...	Dandupur ...	A brake-van of a mail train containing betel leaves, fresh fruit, a bundle containing the foetus of an animal and also a wooden box containing nitric acid suddenly burst into flames and it is presumed the fire occurred through bottles containing the nitric acid having broken.	...	...
TOTAL ...					...	1

Miscellaneous.

48	27th February 1912.	Acetylene ...	Karachi ...	The Karachi Port Trust reported that an Oxy-acetylene apparatus which had not hitherto given satisfactory results was being experimented with under the direction of an Engineer of the S. S. "Bassano" who was supposed to have expert knowledge. On the failure of the apparatus to do what was required, this officer directed the removal of the safety valve. This was done after which an explosion occurred on again working the apparatus, resulting in the death of the supervising engineer and in injuries to the Port Trust Superintendent of Machinery.	1	1
TOTAL ...					1	1

Summary of accidents during the year 1912.

Explosives or dangerous and inflammable substances.						ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
						Number of accidents.	NUMBER OF PERSONS			
							Killed.	Injured.		
EXPLOSIVES.										
Gunpowder	...	...	...	...	10	13	6	...	10
Nitro-compounds	...	...	...	...	5	5	35	...	5
Ammunition	...	...	...	...	1	...	1	...	1
Fireworks	...	...	...	...	12	4	16	...	12
TOTAL					28	22	58	...	28	
PETROLEUM.										
Petroleum generally	...	...	...	...	14	25	12	3	17
TOTAL					14	25	12	3	17	
Chemicals	...	...	...	...	1	...	1	1	2
TOTAL					1	...	1	1	2	
Miscellaneous	...	...	...	...	1	1	1	...	1
TOTAL					1	1	1	...	1	
GRAND TOTAL					44	48	72	4	48	

APPENDIX J.

Detailed statement showing the number of accidents and persons killed and injured during the seven years 1906 to 1912.

Year.	GUNPOWDER.			DYNAMITE AND OTHER NITRO-COMPOUND BLASTING EXPLOSIVES.			AMMUNITION.			FIREWORKS.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1906 ...	13	21	28	2	1	2	...	...	...	11	4	14
1907 ...	11	18	20	4	...	6	3	...	4	19	12	20
1908 ...	19	27	64	4	1	4	1	...	1	22	26	23
1909 ...	15	19	26	4	1	5	2	...	2	19	21	41
1910 ...	9	10	11	4	1	4	...	...	...	21	30	58
1911 ...	9	14	8	4	4	29	...	...	...	17	13	24
1912 ...	10	13	6	5	5	35	1	...	1	12	4	16
TOTAL ...	86	122	163	27	13	85	7	...	8	121	110	196
AVERAGE ...	12	17	23	4	2	12	1	...	1	17	16	28

Year.	PETROLEUM.			CHEMICALS.			MISCELLANEOUS.					
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.			
1906	10	9	3	...	...	...	3	1	1
1907	15	9	8	...	...	...	6	7	2
1908	41	37	6	6	...	6	5	2	8
1909	23	17	25	3	6	6	5	4	13
1910	19	29	19	2	2	1	8	5	9
1911	30	21	35	2	1	1	6	299	27
1912	17	25	12	2	...	1	1	1	1
TOTAL	155	147	108	15	9	15	34	319	61
AVERAGE	22	21	15	2	1	2	5	45	9

APPENDIX K.

Comparative statement showing the number of accidents and persons killed and injured during the seven years 1906 to 1912.

Year.						ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.	
						Number of accidents.	NUMBER OF PERSONS				
							Killed.	Injured.			
1906	...	...	...	...	...	34	36	48	5	39
1907	...	...	...	...	...	50	46	60	8	58
1908	...	...	...	...	...	75	93	112	23	98
1909	...	...	...	...	...	70	68	118	1	71
1910	...	...	...	...	...	55	77	102	8	63
1911	...	...	...	...	...	64	352	124	4	68
1912	...	...	...	...	...	44	48	72	4	48
TOTAL						...	392	720	636	53	445
AVERAGE						...	56	103	91	8	64

APPENDIX L.

Report.

No. 78, dated the 3rd June 1912.

From—CAPTAIN J. S. RUSH, Inspector of Explosives, Bombay,

To—The Officiating Chief Inspector of Explosives with the Government of India.

I have the honour to report that in compliance with telegram No. 53, dated 28th May, from the Commissioner of Police, I proceeded to Madras to enquire into the cause of the explosion that occurred on the 25th idem in the magazine in which the merchants' explosives are stored.

2. I arrived there on the morning of the 31st May and interviewed Inspectors North and Hughes of the Madras Police.

3. Inspector North stated that Sub-Inspector Hughes, who is in charge of the magazine, is under his orders and that in the absence of Mr. Hughes he is in charge. He last visited the magazine at 8 A. M. on Monday, 20th May, when he issued some explosives to Messrs. Oakes and Company, and Messrs. P. Orr and Sons. He did not notice anything wrong at that time, except that the heat in the magazine seemed abnormal. At about 4-35 P. M. on the 25th May he was informed that the magazine was on fire, and, on arriving at the place, some ten minutes later, he heard two explosions and noticed that some of the wooden cases in the magazine were on fire. The fire was quickly extinguished by some pots of water being thrown on to it and by the steam fire engine which arrived just then. He was of the opinion that the explosion was caused by the spontaneous combustion of some of the explosives, owing to the excessive heat which had been experienced in Madras during the month of May.

4. Mr. Hughes, Sub-Inspector of the Reserve Police, stated that he was in charge of the magazine in Wall Tax Road. It is always kept locked and he keeps the key. The magazine is under a police guard of one head constable and three constables. He last visited the magazine at 7-45 A. M. on Friday, 24th May, to issue some gunpowder to Chelva Pillai Chetti. He did not then notice anything wrong except that the heat inside the magazine was abnormal. He locked up the magazine and no one entered it again before the explosion occurred, at which time the key was in his possession. He attributes the explosion to the spontaneous combustion of one of the explosives, owing to the excessive heat.

5. Constable Abdool Gaffeer mounted sentry on the magazine at 4 P. M. that day. At 4-15 he was on the earthen embankment which surrounds the building when he heard an explosion and saw the walls collapse and pieces of tins blown into the air. He ran down the embankment. Altogether he heard three explosions. After five minutes he went up the embankment again and saw a fire smouldering in one corner of the building. The door of the magazine was locked and there was no one near.

6. Constable Murugesan stated that he was on sentry when Mr. Hughes opened the magazine, and that from that time until 4 P. M. when he was relieved the door was not unlocked nor did any one approach the magazine. He was in the guard-room when the explosion occurred, and on running out he saw no one near the magazine except the sentry.

7. At 11 A. M. I proceeded to the magazine accompanied by Inspectors North and Hughes. It is situated at the north-west end of Wall Tax Road and is about 200 feet off the road, from which it is shielded by traverses of earth some 15 feet high. It is bounded on the north by a cocoanut tree tope, on the east by vacant ground, on the west by the Municipal cart depôt, and on the south by Wall Tax Road and some huts about 200 feet distant. The walls and roof are of brick and chunam and there is no wood-work about it, except the doors and windows. The main magazine measures 39' 8" x 14' 9" and there is a lobby 14' 9" x 6'. The building had almost entirely collapsed, the wall on the west side had fallen outwards while that on the north had fallen partly outwards and

partly inwards, those on the east and south sides were badly cracked and shaken, and the roof had fallen in. The explosion could not have been very violent, as no debris was blown about and no one injured.

8. This building has been regarded as a Government magazine in police charge. It has not been licensed, and consequently was not subject to inspection by our department. Inspector North informed me that nitro-powders stored in this magazine are not tested on arrival in India, nor were any periodical tests taken.

9. Statement A attached shows the stock of the various explosives belonging to the different firms that was in the magazine at the time when the explosion occurred. It will be noticed that amongst the nitro-powders belonging to Messrs. P. Orr and Sons are Neonite, Primrose, and Normal. These powders are not authorised for importation into British India and should not have been landed at Madras. The statement also shows the dates on which the nitro-powders were imported, from which it will be seen that the Normal powder had been stored in this magazine since August 1906. The stock belonging to Messrs. Oakes and Company was stored on the east side, that of Messrs. P. Orr and Sons in the centre, while the black powder belonging to Messrs. Chelva Pillai Chetti and Company was on the west side.

10. The tins and cases which had not exploded were mixed up with the debris, and as these were exposed to the intense heat of the midday sun, and loose powder was lying about, I gave instructions that the magazine should be flooded before any attempt was made to recover them from the ruins. The police fire engine was accordingly brought up and played on the debris for two hours or so.

11. In the meantime, I went to the business premises of Messrs. Oakes and Company and Messrs. P. Orr and Sons and took samples of the following Nitro-powders from the stock they had there.

Messrs. Oakes and Company.

AMBERITE.

DIAMOND, SMOKELESS.

BALLISTITE.

EMPIRE.

SCHULTZ, CUBE.

„ ORDINARY.

E. C. No. 3.

Messrs. P. Orr and Sons.

E. C. No. 3.

NEONITE.

DIAMOND, SMOKELESS.

PRIMROSE.

EMPIRE.

There was no stock of Normal at their shop, so I was unable to obtain a sample of this powder. I took these twelve samples to the Chemical Analyser, Madras, who tested them in accordance with the regulations, and informed me that they had passed.

12. At 5 P. M., I returned to the magazine where I was met by Mr. Parankusam Naidu, Deputy Commissioner, Northern Circle. The debris and powder had been thoroughly flooded with water and I gave instructions to the police officers to remove the debris and recover what remained of the explosives, packages, etc. Those that were recovered were stored for the night in an empty guard-room under police guard, but as this place was not large enough to sort out the different descriptions of powder, the police pitched a double fly tent on Saturday in an

isolated position and the explosives were removed there from the guard-room, while others were brought there as they were recovered from the debris. On account of the precautions that had to be taken in removing the debris it necessarily took a long time, and this work was not finished until 6 P. M. on Saturday. Before starting work on Saturday morning, I had the place again saturated with water.

13. Statement B attached gives the quantities of the various descriptions of explosives that were recovered. A comparison of these figures with those in statement A, shows that the following explosives were destroyed by the explosion:—

Messrs. Oakes and Company.

Nil.

Messrs. P. Orr and Sons.

	lb.
E. C., No. 3	55
NEONITE	25
PRIMROSE	1
EMPIRE	30
NORMAL	55
CURTIS AND HARVEY'S NO. 6 (BLACK POWDER)	42
CURTIS AND HARVEY'S FFF (BLACK POWDER)	5

It will be noticed that 39 lb. of smokeless diamond in 1 lb. tins belonging to Messrs. P. Orr and Sons were recovered, whereas this firm had only 26 lb. on their books.

Messrs. Chelva Pillai Chetti and Company.

	lb.
BLACK POWDER, 4 25 lb. BARRELS	100
" " IN FLASKS	49½

making a total of 362½ lb. of explosives

14. The portions of the stock belonging to Messrs. P. Orr and Sons and Messrs. Chelva Pillai Chetti and Company that were recovered were thrown by the shock of the explosion on to those of Messrs. Oakes and Company, and I attribute the salvaging of these explosives and those of Messrs. Oakes and Company to the prompt action of Inspector J. W. North and those under his command in playing water on the pile of burning cases until the fire was extinguished. This doubtless prevented a further explosion and possible damage to life and property.

15. After carefully considering all the evidence and points in the case, I am of the opinion that the explosion was due to the spontaneous combustion of the Normal powder belonging to Messrs. P. Orr and Sons which is not authorised for importation into British India and which had been stored in this magazine for nearly six years without being tested. None of this powder was left. It will be noted that the explosion occurred at 4-15 P. M. when the temperature inside the magazine would be at its highest. The fire was evidently communicated to some of the other Nitro powders stored in the same stack as the Normal powder, and also to the 100 lb. of black powder belonging to Messrs. Chelva Pillai Chetti and Company, which was packed in four barrels and stored near the west wall of the magazine. These exploded and blew down this and the north wall, causing the roof to fall.

16. The powders which were salvaged are at present stored in a double fly tent under police guard, as I did not consider it advisable, after they had been subjected to such extreme heat, that they should be removed without being

tested to the magazines at Korukupett, where temporary arrangements have been made by the Commissioner of Police with Messrs. Best and Company to store the merchants' powder.

17. I gave instructions that the stock of Neonite and Primrose at present in the shop of Messrs. P. Orr and Sons should be removed to the tent and that three samples of each Nitro powder, except these two should be taken from different tins and sent to the Chemical Analyser for test. If they are satisfactory, the stock of these powders might be stored in the magazine and issued to the merchants as required. The flasks of black powder might be removed to the magazine without test.

18. Two photographs of the magazine taken after the explosion are herewith attached.

19. I would make the following recommendations:—

- (a) That steps should be taken to prevent any explosives, except those which are authorised for importation into British India, from being landed at Madras.
- (b) That immediately on the importation of Nitro powders, samples should be taken and forwarded to the Chemical Analyser for test in accordance with regulations.
- (c) That samples of all Nitro powders should be tested at least twice a year, as soon after the 1st April and 1st October as possible.
- (d) That some system be adopted at once to prevent the new stock of any one description of powder being issued from the magazine, until the old stock of that powder is exhausted.
- (e) That a maximum and minimum thermometer be kept in the magazine and the temperature recorded in a book.
- (f) That when the new magazine is built, it should be provided with an outer shed to protect it from the direct rays of the sun.
- (g) That the stock of Neonite and Primrose powders be destroyed, by being emptied from the tins into deep sea water.

STATEMENT A.

Showing the description and quantity of explosives in the magazine at the time of the explosion, compiled from the books of the Firms.


Explosives.	Oakes & Co.	P. Orr & Sons.	Chelva Pillai Chetti & Co.	Manufacturers.	Date of importation.	REMARKS.
	lb.	lb.	lb.			
<i>Nitro Powders.</i>						
Amberite	15	...	...	Curtis and Harvey.	4th September 1911.	
Diamond, smokeless ...	45	26	...	Ditto ...	4th September 1911.	
Ballistite	25	...	...	Nobel ...	23rd October 1911.	
Empire	40	30	...	Do. ...	4th September 1911, and 23rd October 1911.	
Schultz, cube	40	...	...	...	4th September 1911.	
„ ordinary	110	...	...	...	4th September 1911.	
E. C., No. 3	67	105	...	E. C. Powder Co.	4th September 1911.	
Neonite ... ..	...	50	...	New Explosive Co.	4th September 1911.	These powders are not authorised for importation into British India.
Primrose ... ..	...	1	...	Ditto ...	4th September 1911.	
Normal ... ..	...	55	...	Normal Powder and Ammunition Co.	August 1906 ...	
<i>Black Powder.</i>						
F. F. F.	68	102	...	Curtis and Harvey.	...	
No. 4	65	...	...	Ditto ...	...
No. 6	50	42	...	Ditto ...	...
4 barrels (probably English blasting powder).	...	...	100	...	...
2 and a piece case containing sporting powder in flasks.	...	...	53	Chilworth ...	...

APPENDIX M.

Rules for blasting.

I. The jamadar in charge hereafter mentioned as the jamadar must show that he is thoroughly acquainted with all blasting operations, that he understands the rules herewith laid down and that he will be held responsible for any accident that may occur.

II. Bore holes must be of such a size that the cartridge can easily pass down them.

III. The position of all holes to be drilled must be marked out with white paint thus  and the jamadar must take particular note of these positions.

IV. The drilling operations being finished, the jamadar must make a second inspection and satisfy himself that the bore holes marked out by him have been drilled.

V. The jamadar himself must prepare all charges necessary for the bore holes.

VI. Only ten holes may be loaded and fired at one time, and the charges should be fired, as far as practicable, successively and not simultaneously. Bore holes must be cleared of all debris before a cartridge is inserted.


The loading is to be done by the jamadar himself and the position of the charge holes carefully noted. Wooden tamping rods only to be used in charging holes (not pointed but cylindrical throughout); one cartridge at a time must be inserted and gently pressed home with the tamping rod.

VII. Immediately before firing a blast, due warning must be given and the jamadar must see that all the coolies have retired to safety.

VIII. The safety fuses of the ten charged holes are to be lighted in presence of the jamadar who must see that the fuses of the ten holes charged have properly ignited.

IX. Careful count must be kept by the jamadar and others of each blast as it explodes.

X. After the blast, the jamadar must carefully inspect the work and satisfy himself that all ten holes have exploded.

XI. In case of a miss-fired hole, the jamadar must first examine the same and at once mark a red cross over the hole thus .

XII. None of the drillers are to work near this hole until one of the two following operations has been done by the jamadar.

XIII. Either the jamadar should very carefully (when the tamping is of damp clay) extract the tamping with a wooden scraper and withdraw the fuse with primer and detonator attached, after which a fresh primer and detonator with fuse should be placed in the miss-fired hole and fired.

Or the hole may be cleared of one foot of tamping, and the direction then be ascertained by placing a stick in the miss-fire hole. Another hole may then be drilled 6" from the miss-fired hole and parallel to it, this hole to be then charged and fired, when the miss-fired hole should explode at the same time.

XIV. Before leaving his work, the jamadar should inform the jamadar of the next shift relieving him of any case of miss-fire and should point out the position of the red cross denoting same, also stating what action, if any, he has taken in the matter.

XV. The jamadar should also at once report at the office all cases of miss-fire, the cause of same, and what steps were taken in connection therewith.

XVI. The jamadar's name at night and day shift must be sent in daily to the office.

XVII. If practicable, no one should approach a miss-fire for at least half an hour.

—————
Precautions against miss-fire.

1. The safety fuse should be cut in an oblique direction.
2. All saw-dust must be cleared from the inside of the detonator, this can be done by blowing down the detonator and tapping the open end. No instrument must be inserted into the detonator for this purpose.
3. After inserting the fuse in the detonator, it should be fixed by means of the nippers.
4. If there is water present, or if the bore hole be damp, the junction of the fuse and detonator must be made water-tight by means of tough grease, or other suitable material.
5. The detonator should be inserted into the cartridge, so that about one-third of the copper tube is left exposed outside the explosive. The safety fuse just above the detonator should be securely tied in position in the cartridge. Water-proof fuse only to be used in damp bore holes, or when water is present in the bore hole.
6. If a miss-fire has been found to be due to defective fuse, detonators or dynamite, the whole quantity or box from which the defective article was taken must be returned to the office for inspection.

