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LAHORE.

Indian Explosives Act (IV of 1884)  
Indian Petroleum Act (VIII of 1899)

THIRTY-THIRD ANNUAL REPORT  
OF THE  
Chief Inspector of Explosives  
in India

*Being his Annual Report for the year ending 31st March 1932.*

14463

1932



CALCUTTA: GOVERNMENT OF INDIA  
CENTRAL PUBLICATION BRANCH

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# Thirty-third Annual Report of the Chief Inspector of Explosives in India.

No. G.-52.

FROM

DR. N. L. SHELDON, C.I.E., PH.D., F.I.C.,

*Chief Inspector of Explosives in India,*

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,  
DEPARTMENT OF INDUSTRIES AND LABOUR,  
SIMLA.

*Calcutta, 27th April 1932.*

SIR,

I have the honour to submit herewith a report of the work of the Department of Explosives during the year ending 31st March 1932.

2. I was granted an extension of service for one year with effect from the 4th November 1931 on which date I attained the age of 55 years.

Personnel.

The two temporary posts of Inspectors of Explosives on Rs. 450 and Rs. 350 per month held by Dr. M. K. Maitra, Ph.D. (London), A.I.C., A.R.C.S., D.I.C., B.Sc. (London), and Mr. B. N. Pal, M.Sc., respectively were extended from the 4th November 1931 to 31st October 1932.

## Explosives.

3. During the year 1931, 232 licenses were granted in British India under Rule 46 and items 10 and 11 of Schedule II to the Indian Explosives Rules, 1914. The number of magazines licensed was 276 or the same as in 1930, 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 1931 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, 160 inspections of magazines were made, a number of magazines being inspected two or three times. Those magazines are

Inspection of explosives magazines during the year.

inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive which on account of its greater susceptibility to decomposition and possible ignition, it is considered advisable to examine and test more frequently than other explosives.

5. The magazines generally are in good order, and as usual magazine-owners have been found most willing to carry out recommendations even

Condition of magazines.

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 the explosives in the different magazines

Condition of explosives in magazines.

during the year was found to be good with the following exceptions, which were found to have become defective and were destroyed :—

- (a) 890 Electric Detonators from the magazine of Messrs. Tata Iron and Steel Co. Ltd., at Jorapukur, No. 1.
- (b) 23 lbs. Monobel and 556 Electric Detonators from the magazine of Messrs. Tata Iron and Steel Co. Ltd. at Malkera.
- (c) 47 Electric Detonators from the magazine of the Manager, Sendra Coal Co., at Sendra.
- (d) 110 Electric Detonators from the magazine of the Manager, Lodna Colliery Co., at Bhaga.
- (e) 125 Electric Detonators from the magazine of the Eastern Coal Co. Ltd., at Pootkee.
- (f) 22½ lbs. Dynamite, 25 coils Safety Fuse and 180 Detonators No. 3 from the magazine of Mr. Nagar Mal at Bhanakhap.
- (g) 200 lbs. of Gunpowder (damaged by water during the cyclone of November 1930) from the Madras Port Trust's magazine at Madras Harbour.
- (h) 1,791 Electric Detonators from the magazine of Messrs. Tata Sons Ltd., at Kodarma.
- (i) 60 Detonators No. 6 and 48 Electric Detonators from the magazine of the G. I. P. Railway at Dhond.
- (j) 98 Electric Detonators from the magazine of the Eastern Coal Co. Ltd., at Bhowra Colliery.
- (k) 223 lbs. and 11 ozs. of Pranada from the magazine of Messrs. Ellerman's Arracan Rice and Trading Co., Agents, Pranada Syndicate Ltd., at Bansra.
- (l) 856 lbs. of Gunpowder from the E. B. Railway's magazine at Chutiapara.

(m) 210 lbs. of Blasting Gelatine and 234 Detonators from the General Stores of the Northern India Salt Revenue at Khewra.

(n) 18 Cartridges of Gelignite from the magazine of the General Manager, Ballarpur Collieries, at Ghugus.

Thefts. 7. During the year under report no case of theft of explosives was reported to this office.

8. One thousand five hundred and seventy-three tons of explosives were imported into British India during the year 1931, the value being Rs. 22,24,262. Full details showing the

Import of explosives. different kinds of explosives imported, and the value of each are given in Appendix C. 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 was published in the *Gazette of India* for information and is given in Appendix E.

10. Two licenses granted by the Governor General in Council for the Manufacture of explosives. manufacture of gunpowder in the Central Provinces were renewed for the year 1932. A new license for the manufacture of gunpowder in the District of Jhelum in the Punjab was granted for the year 1931 and renewed for the year 1932.

The license granted by the Governor General in Council for the manufacture of liquid oxygen explosives in the whole of British India for demonstration purposes was also renewed for the year 1932 and a new license granted to the Colliery Superintendent, East Indian Railway, Giridih, for the manufacture of liquid oxygen explosives in the District of Hazaribagh in Bihar and Orissa.

### Petroleum.

11. During the year under report, 7,290 licenses for the storage of dangerous and non-dangerous petroleum, regarding which this Department was concerned or consulted, were granted. A list of these premises, corrected up to 31st December 1931 and showing the districts in which they are located, is given in Appendix F.

12. A large number of special licenses was granted under rule 6, Chapter IV, Part II of the Petroleum Rules for the storage of dangerous petroleum in underground tanks fitted with Kerbside pumps.

A large number of depots for the storage of dangerous petroleum in bulk erected to plans approved by this Department has been taken into use.

13. Several combined petrol, kerosene and liquid fuel depots erected to plans approved by this Department have also been taken into use.

14. In all 2,111 inspections of petroleum premises were made.

Inspection of petroleum premises during the year.

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

16. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosene or liquid fuel in combined bulk and non-bulk are stored. 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 with the result that their conditions is very much improved and the vast majority of them are in very good order.

### 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 1931 is given in Appendix G. It will be seen from a perusal of the details that practically all the accidents were caused by gross neglect of ordinary precautions. 38 such accidents resulting in 48 deaths and injuries to 90 persons were reported to this Department. Comparative statements given in Appendices I and J show the total number of accidents and the number of persons killed or injured by them during the last ten 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.

As a rule the only accidents that are entered in Appendix G are those which are non-political and cause loss of life or injuries or are important from some other point of view.

Gunpowder, Class I.

18. There were nine accidents from gunpowder during the year causing sixteen deaths and injuries to thirteen persons.

Nitro-Compounds, Class III.

19. There were three accidents from nitro-compounds causing one death and injuries to four persons.

Chlorate Mixture, Class IV.

20. No accidents from explosives classed as Chlorate mixtures were reported.

Fulminates, Class V.

21. Two accidents from fulminates causing injuries to three persons were reported.

Ammunition, Class VI.

22. There were two accidents from ammunition causing injuries to three persons.

Fireworks, Class VII.

23. Eleven accidents from fireworks caused twelve deaths and injuries to sixty persons.

Liquid Oxygen Explosives.

24. No accident from Liquid Oxygen Explosives was reported during the year.

25. There were ten accidents from petroleum during the year, which were responsible for nineteen deaths and injuries to six persons. It will be seen from a perusal of the accidents in Appendix G that carelessness is a prominent feature

Petroleum.



in most of them. In India the petroleum accidents are caused usually by naked lights being brought into close proximity to oil vapour.

26. A number of fires were reported to this office as having occurred during the year in the Burma Oil Fields.

Chemicals.

27. No accident from chemicals was reported.

Miscellaneous.

28. There was one miscellaneous accident causing injuries to one person.

Government Accident.

29. One accident which was responsible for one death was reported during the year. Detail of this accident is given in Appendix K.

30. On the 12th October 1931 a gas explosion and fire took place at the Burmah Oil Company's refinery at Syriam resulting in the death of 2 persons and injuries to one. Dr. M. K. Maitra, B.Sc., Ph.D. (Lond.), A.I.C., Inspector of Explosives, investigated the cause of the accident at the request of the Government of Burma. His report No. G-4 (7)-86, dated the 23rd October 1931, is given in Appendix L.

31. Two minor explosions and a fire took place at the British Burma Petroleum Company's refinery at Thilawa on the 26th and the 31st October 1931 respectively without causing any loss of lives or injury to persons. An enquiry into the cause of the accidents was made by Mr. B. N. Pal, M.Sc., Inspector of Explosives, at the request of the Government of Burma. His report No. G-4 (7)-87, dated the 19th November 1931, is given in Appendix M.

### General Remarks.

32. Eighteen reports of inspection of these magazines by civil officers have been received in this office, and I have brought to the notice of the officers concerned any irregularities or defects which required remedying. There is no doubt that the introduction of this system of sending these reports to this office has been desirable. I have come across a good many instances of ignorance and want of expert knowledge, which might have caused disasters. High explosives in these magazines had previously never been tested, and I have, in dealing with these reports, recommended always that samples of these explosives should be sent at least once a year to Chemical Examiners for test.

33. Nine Railway magazines were inspected by this Department during the year.

34. Five Salt Range magazines at Khewra were inspected by this Department during the year.

35. Messrs. Gillanders Arbuthnot & Company, Calcutta, obtained from the Commissioner of Police, Calcutta, an import license to clear from the Customs House, Calcutta, 150 cases of Safety Fuze arrived *ex*

S.S. "City of Baroda" and to forward the same to their magazine at Bally. During transhipment on the 3rd April 1931 to destination, the country boat laden with the above consignment met with an accident near the Adamjee

Loss of explosives during transit.

Jute Mills on account of a strong bore in the Hooghly river and 21 cases dropped overboard into the river. The firm were, however, subsequently able to recover 19 cases and the remaining two cases could not be traced.

36. In his Notification No. 4101-R., dated the 14th July 1931, the Hon'ble the Chief Commissioner of British Indian Explosives Act. Baluchistan has extended the Indian Explosives Act, 1884 (IV of 1884), as subsequently amended, to British Baluchistan.

The Government of the Central Provinces have notified that the term "District Magistrate" shall include for the purposes of the Indian Explosives and Petroleum Acts and the rules framed thereunder, the Additional District Magistrates of Narsinghpur, Seoni, Damoh, Ellichpur, Basim and Khamgaon in respect of the areas within the Narsinghpur, Seoni, Damoh, Ellichpur, Basim and Khamgaon sub-divisions respectively.

37. In their Notification No. 7847-15574, dated the 24th November 1931, the Government of Bombay have amended the Explosive Rules. rules to regulate the transport of explosives within the limits of the Port of Bombay by the substitution of the words "Deputy Conservator" for the words "Port Officer" wherever they occur. The amendment has become necessary in consequence of the withdrawal of the Port Officer and Assistant Port Officer from Bombay and the creation of the post of Deputy Conservator in the Bombay Port Trust.

In their Notification No. 3-Mne., dated the 13th January 1932, the Government of Bengal have amended the rules to regulate the transport and importation of explosives in the Port of Calcutta so as to exclude from the operation of those rules certain kinds of manufactured fireworks provided they are immediately on being landed into the Port of Calcutta removed to the special fireworks godown allotted for their exclusive storage.

38. The period for which the importation into British India by the Agents of Messrs. Nobel's Explosives Company, Limited of Detonators packed in cases with a clear space of not less than one inch, instead of not less than three inches as required by the regulations for package of explosives given in Schedule IV to the Indian Explosives Rules, 1914, was agreed to, as an experimental measure, has been extended up to the 5th June 1932.

39. I have agreed to the importation into British India of the explosives "N. S. Gelatine Dynamite" and "N. S. Gelignite". referred to in the margin conforming to the amended definitions given in the English List of Authorised Explosives.

40. With reference to an enquiry from the Presidency Port Officer, Madras, I have stated that the transport and exportation of Cordite is quite safe provided fires and lights are kept well away from the cases or barrels which should be stored below deck in a temporary magazine made of paulins, which should be well away from the boilers or places where persons may assemble.

41. With reference to an enquiry from the Commissioner of Police, Calcutta, I have recommended that Detonating Caps be not allowed to be imported as they contain a mixture of Chlorate of Potassium and Red Phosphorus which

constitutes a fulminate, Class V, and no explosives of this class are at present authorised for importation into British India.

42. In reply to an enquiry from the Commissioner of Police, Calcutta, regarding classification of Topex Cartridges intended for killing rats and insects, I have stated that the cartridges which contain gunpowder, come within the meaning of "Ammunition" as defined in rule 9 of the Indian Explosives Rules, 1914, and a license is necessary under the rules for their possession and sale.

I have also advised the Postal Department that the cartridges in question are not transmissible by post.

43. With reference to an enquiry from the Commissioner of Police, "Cailloux Stona Munitions de Calcutta, I have suggested that "Cailloux Surete." Stona Munitions de Surete" in which Chlorate of Potassium, Red Phosphorus and traces of Iron and Calcium have been found, be not allowed to be imported as a mixture of Chlorate of Potassium and Red Phosphorus constitutes a fulminate, Class V, and no explosives of this class are at present authorised for importation into British India.

44. In reply to an enquiry from the Commissioner of Police, Calcutta, as to whether Heat Tablet should be treated as an explosive for the purposes of the Indian Explosives Rules, 1914, I have stated that it is "Meta Fuel" and not explosive.

45. In their Notification No. 7847-I, dated 7th April 1931, the Government of Bombay have amended rule 1 of Part I of the rules for the importation, possession and transport of petroleum into the Bombay Presidency by the addition of the definition of Port Officer. They have also amended in their Notification No. 7721, dated the 3rd March 1932, rule 2 of Chapter III of Part II of the rules so as to provide for the renewal of licenses by the Personal Assistant to the Collector and District Magistrate.

In their Notification No. 42, dated 8th December 1931, the Government of Burma have amended rule 15 of Chapter IV of Part II of the Petroleum Rules in force in Burma and license Form N attached thereto so as to provide for the storage of petroleum in non-bulk under the license. They have also amended the heading of license Form P appended to those rules by the substitution of the words "in installations" for the words "in bulk".

In their Notification No. 550-Com., dated 29th January 1932, the Government of Bengal have amended rules 2, 4 and 5 of Part III of the Petroleum Rules in force in the Bengal Presidency, regarding the importation of petroleum at the ports of Calcutta and Chittagong.

In their Notification No. 7724, dated the 4th March 1932, the Government of the Punjab have amended rule 1 (3) of Chapter VI of Part II of the Punjab Petroleum Rules, so as to require a court fee stamp of the value of two annas, instead of eight annas, to be affixed to each application for a license presented to a Magistrate.

The Government of India have sanctioned the amendment of rule 9(1) of Chapter IV of Part II of the Petroleum Rules in force in the various Presidencies and Provinces, except Bengal, on the lines of the Bengal Petroleum Rules, so as to authorise the owner of a motor vehicle to possess dangerous petroleum not exceeding 20 gallons by an endorsement to this effect being

made on his certificate of registration granted under the Motor Vehicles Act, 1914, and to deem such endorsement to be a license within the meaning of the Indian Petroleum Act, 1899.

46. The Government of Bombay have directed that the Test Certificates granted by the Civil Surgeon at Cochin, or, in his absence, the officer carrying on his duties, and the Chemical Examiner at Madras should be accepted for the importation at Marmugao of petroleum which is partly intended for Cochin and partly for Marmugao.

Acceptance of Test Certificates granted by the Civil Surgeon at Cochin and the Chemical Examiner at Madras.

They have also directed that telegraphic test certificate advices from the Collector of Customs, Madras, should be accepted in order to allow a tanker to discharge petrol in the installation at Marmugao to avoid delay but no drawal of petroleum from the installation should be permitted unless and until the test certificate is produced in original.

47. With reference to an enquiry from the Karachi Port Trust, I have stated that in my opinion and in view of the timber decking of the Keamari Ship Wharves, liquid fuel in drums or casks should be landed at the Bulk Oil Pier and suitable facilities provided.

48. I have agreed to the use of compressed air to expedite discharge of petrol lorries provided the compressed air is supplied from cylinders and not from a pump working on the lorry at the time of discharge.

49. In reply to a reference received from the Manager, Bombay Port Trust Docks, I have suggested that the commodities in quantities not exceeding 500 gallons per consignment should be allowed to be landed for delivery over the quays provided removal *ex. Docks* follows immediately upon landing.

50. In their Notification No. 7847-II, dated 7th April 1931, the Government of Bombay amended Part I of the rules to regulate the importation, possession and transport of Carbide of Calcium into and in the Presidency of Bombay by the insertion of a new rule 1 defining "Port Officer".

51. With reference to an enquiry from the Chairman, Karachi Port Trust, I have stated that I have no objection to the landing of Carbide of Calcium at the Ship Wharves into wagons for conveyance to the storage hut in the Mansfield Import Yard provided it is removed as soon as landed.

52. A very large number of enquiries of a varied nature was received during the year from District Officials, private individuals, firms, Port authorities and Railways. These were all dealt with.

53. I was consulted by the Indian Railway Conference Association in connection with numerous amendments and additions to the rules contained in Red Pamphlet No. 10 (Rules and Rates for the conveyance of Explosives and other Dangerous Goods by Rail).

54. The number of inspections done by this Department during the year was 2,285. To give some idea of the work and the ground covered, I give the following details of the work done by the Inspectors of Explosives.

During the 12 months, 1st April 1931 to 31st March 1932, the four Inspectors, *viz.*, two at Calcutta and one each at Poona and Lahore, were away from their headquarters for 149, 148, 188 and 145 days and travelled 27,555, 20,162, 31,935 and 36,377 miles respectively.

The Chief Inspector of Explosives was on tour for 111 days, travelled 19,937 miles and inspected 20 explosives magazines and 144 petroleum premises, and went on inspection duty to the Burma and Punjab Oil Fields and visited the ports of Calcutta, Chittagong, Madras, Bombay and Rangoon.

The ordinary inspection work of the officers of this Department has been considerably interfered with during the year under review owing to the number of times that they have been called away, or summoned to appear in Court, in connection with criminal and other cases.

55. In conclusion, as this is the last report of this Department which I shall submit, I am taking this opportunity of thanking all the various mercantile firms, with whom I have come in contact, for their unfailing courtesy to me during the 12 years' tenure of my appointment and for the willing way in which they have carried out my recommendations which often have involved expenditure of money. I regret to have to sever my official connection with them and shall always have pleasant recollections of my dealings with them.

I have the honour to be,

SIR,

Your most obedient Servant,

N. L. SHELDON,

*Chief Inspector of Explosives in India.*



## APPENDIX A.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1931.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Assam	Lakhimpur	8	...	8	8	...	8
	Naga Hills	1	...	1	1	...	1
	TOTAL	9	...	9	9	...	9
Bengal	Burdwan	14	...	14	11	...	11
	Darjeeling	2	...	2	2	...	2
	Hooghly	4	...	4	1	...	1
	24 Parganas	2	...	2	1	...	1
	TOTAL	22	...	22	15	...	15
Bihar and Orissa	Gaya	3	...	3	3	...	3
	Hazaribagh	19	...	19	15	...	15
	Manbhum	29	2	31	26	2	28
	Sambalpur	1	...	1	1	...	1
	Santal Parganas	2	...	2	2	...	2
	Singhbhum	10	...	10	8	...	8
	TOTAL	64	2	66	55	2	57

## APPENDIX A—contd.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1931—contd.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Bombay	Aden . . .	5	...	5	4	...	4
	Ahmedabad . .	4	...	4	4	...	4
	Bombay . . .	10	...	10	6	...	6
	Bombay Suburban.	7	...	7	6	...	6
	Broach . . .	1	...	1	1	...	1
	Dharwar . . .	...	1	1	...	1	1
	Kanara . . .	1	...	1	1	...	1
	Karachi . . .	5	...	5	3	...	3
	Kolaba . . .	1	...	1	1	...	1
	Panch Mahals . .	3	...	3	3	...	3
	Poona . . .	1	...	1	1	...	1
	Ratnagiri . . .	1	...	1	1	...	1
	Surat . . .	2	...	2	2	...	2
West Khandesh .	1	...	1	1	...	1	
	TOTAL	42	1	43	34	1	35
Barma	Amherst . . .	1	...	1	1	...	1
	Bassciu . . .	2	...	2	2	...	2
	Hanthawaddy . .	4	...	4	2	...	2
	Kaukse . . .	...	1	1	...	1	1
	Magwe . . .	1	...	1	1	...	1
	Mandalay . . .	1	...	1	1	...	1
	Myitkyina . . .	1	...	1	1	...	1
	Northern Shan States.	9	...	9	5	...	5
Pegu . . .	1	...	1	1	...	1	
	Carried over	20	1	21	14	1	15



## APPENDIX A—contd.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1931—contd.

Presidency or Province.	District.	MAGAZINES.			LICENSES		
		Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Burma . . . . .	Brought forward	20	1	21	14	1	15
	Tavoy . . . . .	6	...	6	4	...	4
	Thaton . . . . .	7	...	7	6	...	6
	Toungoo . . . . .	1	...	1	1	...	1
	TOTAL . . . . .	34	1	35	25	1	26
Central Provinces . . . . .	Auraoti . . . . .	1	...	1	1	...	1
	Ealaglat . . . . .	3	...	3	3	...	3
	Bhandara . . . . .	2	...	2	2	...	2
	Bilaspur . . . . .	1	...	1	1	...	1
	Chanda . . . . .	6	...	6	5	...	5
	Chhindwara . . . . .	5	1	6	5	1	6
	Jubbulpur . . . . .	2	...	2	2	...	2
	Nagpur . . . . .	6	...	6	6	...	6
	Raipur . . . . .	3	...	3	4	...	4
TOTAL . . . . .	29	1	30	29	1	30	
Coorg . . . . .	Mercara . . . . .	1	...	1	1	...	1
	TOTAL . . . . .	1	...	1	1	...	1

## APPENDIX A—concl'd.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1931—concl'd.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Madras	Chingleput	2	...	2	2	...	2
	Chittoor	2	...	2	2	...	2
	Coimbatore	1	...	1	1	...	1
	Godavari West	1	...	1	1	...	1
	Guntur	1	1	2	1	1	2
	Madras	15	...	15	8	...	8
	Madura	2	1	3	2	1	3
	Nellore	4	...	4	2	...	2
	North Arcot	2	...	2	2	...	2
	Ramnad	1	...	1	1	...	1
	South Arcot	3	...	3	3	...	3
	Tanjore	15	...	15	15	...	15
	Tinnevely	1	...	1	1	...	1
	Trichinopoly	5	...	5	5	...	5
Vizagapatam	4	...	4	3	...	3	
	TOTAL	69	2	61	49	2	51
Punjab	Attock	4	...	4	2	...	2
	Jhelum	...	2	2	...	2	2
	Mianwali	1	...	1	1	...	1
	TOTAL	5	2	7	3	2	5
United Provinces	Meerut	1	...	1	2	...	2
	Shahjahanpur	1	...	1	1	...	1
	TOTAL	2	...	2	3	...	3

## SUMMARY.

Presidency or Province.	MAGAZINES.			LICENSES.		
	Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Assam . . . . .	9	...	9	9	...	9
Bengal . . . . .	22	...	22	15	...	15
Bihar and Orissa . . . . .	64	2	66	55	2	57
Bombay . . . . .	42	1	43	34	1	35
Burma . . . . .	34	1	35	25	1	26
Central Provinces . . . . .	20	1	30	29	1	30
Ccorg . . . . .	1	...	1	1	...	1
Madras . . . . .	59	2	61	49	2	51
Punjab . . . . .	5	2	7	3	2	5
United Provinces . . . . .	2	...	2	3	...	3
TOTAL . . . . .	267	9	276	223	9	232

## APPENDIX B.

*Summary of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II for the 10 years ending 1931.*

YEAR.	MAGAZINES.			LICENSES.		
	Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
1922 . . . . .	237	20	257	190	19	209
1923 . . . . .	245	13	258	199	13	212
1924 . . . . .	247	31	278	204	28	232
1925 . . . . .	263	16	279	218	14	232
1926 . . . . .	265	19	284	218	18	236
1927 . . . . .	247	13	260	207	13	220
1928 . . . . .	258	19	277	217	16	233
1929 . . . . .	264	14	278	221	14	235
1930 . . . . .	268	8	276	226	8	234
1931 . . . . .	267	9	276	223	9	232

## APPENDIX C,

Statement showing the imports of explosives by sea into British India from other countries in the year 1931.

Explosives.	Bengal.	Bombay.	Sind.	Burma.	Madras.	TOTAL.
<i>Quantity.</i>						
Gunpowder, black . lbs.	18,775	25,950	19,600	750	6,675	71,750
"    smokeless.	10,330	325	5,000	—	700	16,355
Dynamite . . . . .	125,000	20,000	—	41,000	40,000	226,000
Blasting gelatine . . .	50	39,300	—	20,000	337,500	393,850
Gelignite or gelatine dynamite.	535,200	132,500	—	164,506	256,500	1,088,706
Other nitro compound explosives.	135,000	2,400	—	—	5,000	142,400
Detonators . . . . . No.	2,022,000	628,610	12	589,024	2,156,900	5,395,945
Fireworks . . . . . lbs.	166,509	809,680	32,880	54,133	139,881	1,203,083
TOTAL . . . . .	990,864	1,030,155	57,480	280,389	786,256	3,115,144
TOTAL No.	2,022,000	628,610	12	589,024	2,156,900	5,395,946
<i>Value in rupees.</i>						
Gunpowder, black . . . . .	19,718	19,447	10,482	919	4,382	54,946
"    smokeless . . . . .	20,646	1,361	3,686	—	426	26,119
Dynamite . . . . .	90,388	14,655	—	58,709	28,894	1,92,706
Blasting gelatine . . . . .	43	31,619	—	21,137	2,85,713	3,38,512
Gelignits or gelatine dynamite.	3,84,552	97,146	—	1,97,835	1,87,739	8,67,272
Other nitro-compound explosives.	77,593	182	—	—	3,120	80,895
Detonators . . . . .	1,00,568	20,889	191	32,327	40,803	1,94,578
Fireworks . . . . .	1,06,005	2,05,475	23,938	22,087	51,729	4,69,234
TOTAL . . . . .	7,99,811	4,50,774	33,297	3,33,074	6,02,306	22,24,262

## APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India from other countries for the ten years ending 1931.

Explosives.	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
Gunpowder, black . . . lbs.	125,975	124,659	340,886	361,255	299,440	173,550	164,100	111,680	127,875	71,750
„ smokeless . . . „	18,436	15,176	39,407	17,437	23,250	21,238	11,567	15,950	14,888	16,355
Dynamite . . . . „	275,000	361,250	398,122	500,700	315,200	364,750	451,550	495,750	386,050	226,300
Blasting gelatine . . . „	530,100	649,250	486,900	457,995	316,050	271,500	410,800	492,800	245,500	396,850
Gelignite or gelatine dynamite . „	498,500	411,025	494,800	1,096,200	663,500	924,001	1,126,700	1,082,000	920,050	1,088,706
Other nitro-compound explosives „	141,272	160,577	...	80,350	75,250	150,025	130,000	221,500	203,000	142,400
Detonators . . . . No.	3,655,057	3,796,390	4,115,050	6,881,024	6,242,556	6,910,498	8,872,023	8,022,326	6,446,558	5,395,946
Fireworks . . . . lbs.	3,838,853	3,391,838	3,800,633	3,397,572	4,970,986	3,819,378	4,422,887	4,940,692	2,244,621	1,203,083
TOTAL . . .	5,428,136	5,113,775	5,560,748	5,911,509	6,668,676	5,729,742	6,717,604	7,360,372	4,141,984	3,145,144
TOTAL . No.	3,655,057	3,796,390	4,115,050	6,881,024	6,242,556	6,910,498	8,872,023	8,022,326	6,446,558	5,395,946

## APPENDIX E.

## DEPARTMENT OF EXPLOSIVES.

## NOTIFICATION.

Calcutta, the 15th March 1932.

**No. E-11 (1).**—With reference to the following Notifications publishing rules to regulate the manufacture, possession, sale, transport and importation of explosives, the following list of "Authorised Explosives" referred to in the rule mentioned against each Notification is published for general information:—

- Rule 4 (3) of Notification No. 4013—33, dated the 6th June 1914, of the Government of India, Department of Commerce and Industry.
- Rule 4 (3) of Notification No. 1183, dated the 11th November 1914, of the Chief Commissioner, Central Provinces applicable to Berar.
- Rule 4 (3) of Notification No. 14, dated the 23rd April 1915, of the Resident in Mysore applicable to the Civil and Military Station of Bangalore and on the Railways in Mysore under British Jurisdiction.
- |   |   |
|---|---|
| Rule 4 (3) of Notification No. 67-J., dated the 28th August 1914, | } of the Resident at Hyderabad applicable to the Cantonments of Secunderabad and Aurangabad, the Hyderabad Residency Bazars and the Railway lands in the Hyderabad State. |
| Rule 4 (3) of Notification No. 34-J., dated the 20th April 1915,  |   |
- Rule 3 (3) of Notification No. 99, dated the 19th July 1916, as amended by Notification No. 41, dated the 30th July 1928, of the Government of Burma applicable to the Federated Shan States.
- Rule 3 (3) of Notification No. 5313, dated the 29th October 1918, of the Agent to the Governor General in Rajputana.
- Rule 3 (3) of Notification No. 1812-B., dated the 10th November 1919, of the Agent to Governor General in Central India, applicable to Railway lands in Central India, specified in the Notification of the Government of India in the Foreign Department No. 261-I. B., dated 10th February 1913.

## LIST OF AUTHORISED EXPLOSIVES.

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

## CLASS 1.—GUNPOWDER.

*The term "gunpowder" means gunpowder ordinarily so called.*

## GUNPOWDER.

## CLASS 2.—NITRATE MIXTURE.

*The term "nitrate mixture" means any preparation, other than gunpowder ordinarily so called, formed by the mechanical mixture of a nitrate with any form of carbon or with any carbonaceous substance not possessed of explosive properties, whether sulphur be or be not added to such preparation, and whether such preparation be or be not mechanically mixed with any other non-explosive substance, and includes any explosive containing a perchlorate and not being a chlorate-mixture, fulminate or nitro-compound as defined in Rule 4 of the Indian Explosives Rules, 1914.*

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM OR CHLORIDE OF SODIUM ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MELTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

## BOBBINITE.

## Cardox Composition.

M Powder.	}
Pranada.	
Q Powder.	

## CLASS 3.—NITRO-COMPOUND.

*The term "nitro-compound" means any chemical compound possessed of explosive properties, or capable of combining with metals to form an explosive compound, which is produced by the chemical action of nitric acid (whether mixed or not with sulphuric acid) or of a nitrate mixed with sulphuric acid upon any carbonaceous substance, whether such compound is mechanically mixed with other substances or not.*

*The nitro-compound class has two divisions.*

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 GOVERNMENT OF INDIA, DEPARTMENT OF COMMERCE AND INDUSTRY, NOTIFICATION No. 4013—33, DATED THE 6TH JUNE 1914, REFERRED TO ABOVE.

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM, CHLORIDE OF SODIUM OR NITRO-GLYCOL ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MELTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

## DIVISION 1.

*Division 1 comprises the following explosives and any chemical compound or mechanically mixed preparation which consists either wholly or partly of nitro-glycerine or of some other liquid nitro-compound:—*

Amazonite.	}	Cordite, M. D.	}
Brocalite Gelatine.		Du Pont Dynamite, 75	
Detonita.	}	per cent. Strength.	}
Gelignite K. 34 per cent.,		Dynamit.	
N. G.	}	Dynamite.	}
Glycerita.		Dynamite No. 1.	
L. G. Gelatine.	}	Red Star Dynamite, 75	}
25 per cent. Ligdyn.		per cent. Strength.	
Ardeer Gelignite.	}	Dynobel No. 2.	}
Arkite.		Dynobel No. 3. }	
Samsonita.	}	Dynobel No. 4. }	}
Samsonite.		Farmers' Dynamite.	
A. 2 Monobel.	}	Gelatine Dynamite.	}
Viking Powder No. 1.		Gelignite.	
Viking Powder No. 2.	}	Monobel No. 1.	}
Ballistite.		N. S. Gelatine Dynamite.	
Blasting Gelatine.	}	N. S. Gelignite.	}
Cambrite.		Quarry Monobel.	
Chilworth Smokeless Powder No. 2.	}	Rockite.	}
Nacota Powder.		Stonobel.	
Cordite.	}	Victor Powder No. 2.	}

PROVIDED THAT EVERY EXPLOSIVE IN THIS DIVISION SHALL BE OF SUCH CHARACTER AND CONSISTENCY AS NOT TO BE LIABLE TO LIQUEFACTION OR EXUDATION.

PROVIDED ALSO THAT AN EXPLOSIVE WHICH IS REQUIRED BY DEFINITION TO BE ISSUED IN WATERPROOF INNER PACKAGES MAY BE EXEMPTED FROM SUCH REQUIREMENT BY SPECIAL AUTHORITY, WHEN AND SO LONG AS THE CONDITIONS OF SUCH AUTHORITY ARE OBSERVED.

## DIVISION 2.

*Division 2 comprises the following explosives and any nitro-compound as before defined which is not comprised in division 1:—*

Alumatol.	}	Guncotton.	}
Ammonal.		Negro Powder No. 2.	
Amberite, No. 2.	}	N. S. Smokeless.	}
Di-nitro-phenol.		Picric Acid.	
Economic Smokeless Sporting Powder.	}	Picric Powder.	}
E. C. Sporting Powder.		Roburite No. 4.	
Eley Smokeless Sporting Powder.	}	Ruby Powder.	}
Empire Powder.		Schultze Gunpowder.	
Ideal Powder.	}	Smokeless Diamond.	}
Light Load Smokeless.		Tonite or Cotton Powder.	
Nobel's Special Powder.	}	Tri-nitro-toluol.	}



## CLASS 4.—CHLORATE MIXTURE.

The term "chlorate mixture" means any explosive containing a chlorate.

The chlorate mixture class has two divisions.

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 GOVERNMENT OF INDIA, DEPARTMENT OF COMMERCE AND INDUSTRY, NOTIFICATION No. 4013—33, DATED THE 6TH JUNE 1914, REFERRED TO ABOVE.

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM OR CHLORIDE OF SODIUM ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MELTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

## DIVISION 1.

Division 1 comprises any chlorate preparation which consists partly of nitro-glycerine or of some other liquid nitro-compound.

Nil.

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.

Division 2 comprises any chlorate mixture as hereinbefore defined, which is not comprised in Division 1.

Nil.

## CLASS 5.—FULMINATE.

The term "fulminate" means any chemical compound or mechanical mixture, whether included in the foregoing classes or not, which, from its great susceptibility to detonation, is suitable for employment in percussion caps or any other appliances for developing detonation, or which, from its extreme sensibility to explosion, and from its great instability (that is to say, readiness to undergo decomposition from very slight exciting causes), is especially dangerous.

This class consists of two divisions.

## DIVISION 1.

Division 1 comprises such compounds as the fulminates of silver and of mercury, and preparations of those substances, such as are used in percussion caps; and any preparation consisting of a mixture of a chlorate with phosphorus or certain descriptions of compounds of phosphorus, with or without the addition of carbonaceous matter, and any preparation consisting of a mixture of a chlorate with sulphur, or with a sulphuret, with or without carbonaceous matter.

Nil.

## DIVISION 2.

*Division 2 comprises such substances as the chloride and the iodide of nitrogen, fulminating gold and silver, diazobenzol, and the nitrate of diazobenzol.*

*Nil.*

## CLASS 6.—AMMUNITION.

*The term "ammunition" means any explosive of any of the foregoing classes when the same is enclosed in any case or contrivance, or is otherwise adapted or prepared so as to form a cartridge or charge for small-arms, cannon or any other weapon, or for blasting or to form any safety or other fuze for blasting or for shells, or to form any tube for firing explosives or to form a percussion cap, detonator, fog-signal, shell, torpedo, war-rocket, or any other contrivance other than a firework.*

*The term "percussion cap" does not include a detonator.\**

*The term "detonator" means a capsule or case which is of such strength and construction and contains fulminate in such quantity, that the explosion of one capsule or case would communicate the explosion to other like capsule or cases.*

*The term "safety fuze" means a fuze for blasting which burns and does not explode and which does not contain its own means of ignition, and which is of such strength and construction and contains an explosive in such quantity that the burning of such fuze will not communicate laterally with other like fuzes.*

*The ammunition class has three divisions.*

## DIVISION 1.

Nobel's Safety Electric	}	Safety Cartridges.
Time Fuzes.		Safety Fuzes for blasting.
Percussion Caps.		Safety Electric Fuzes.
Railway Fog-Signals.		

\* In consequence of the results of experiments carried out, it has been decided that a percussion cap can only be properly classed as such if it contains less than 0.6 grain of a composition of the 1st Division of the fifth (Fulminate) class of which not more than 25 per cent. consists of fulminate of mercury or less than 0.5 grain of any other explosive of the 1st Division of the 5th (Fulminate) Class; and it has been further decided that percussion caps shall not be classed as such when they contain anvils or have their composition unprotected by tin foil or other suitable substance, as under those circumstances they are liable to explode *en masse*.

## DIVISION 2.

*Division 2 comprises any ammunition as hereinbefore defined, which does not contain its own means of ignition, and is not included in Division 1.*

Cartridges for Blasting or other like purposes.

Cartridges for Small Arms which are not Safety Cartridges.

Cordeau Bickford.

Electric Fuzes.

Electric Primers.

Fuze Lighters.

Instantaneous Fuze.

Port Fires.

Tubes for firing Explosives.

Quick Match.

## DIVISION 3.

*Division 3 comprises any ammunition as hereinbefore defined which contains its own means of ignition, and is not included in Division 1.*

Cartridges for Small Arms which are not Safety Cartridges.

Detonators.

Electric Detonators.

Friction Tubes.

Nobel's Electric Delay Action Detonators.

Percussion Primers.

Tubes for firing Explosives.

## CLASS 7.—FIREWORK.

*The term "firework" comprises firework composition and manufactured fireworks.*

## DIVISION 1.—FIREWORK COMPOSITION.

*The term "firework composition" means any chemical compound or mechanically mixed preparation of an explosive or inflammable nature, which is used for the purpose of making manufactured fireworks, and is not included in the former classes of explosives, and also any star and any coloured fire composition subject to the proviso to the definition of manufactured fireworks.*

*Nil.*

## DIVISION 2.—MANUFACTURED FIREWORKS.

**MANUFACTURED FIREWORKS**, consisting of any explosive of the classes 1, 2, 3, 4 and 6 and any firework composition, when such explosive or composition is enclosed in any case or contrivance or is otherwise manufactured so as to form a squib, cracker including Chinese crackers, toy cap or amorce, serpent, rocket (other than a war-rocket), maroon, lance, wheel, Chinese fire, Roman candle, or other article specially adapted for the production of pyrotechnic effects, or pyrotechnic signals or sound signals.

Provided that a substantially constructed and hermetically closed metal case, containing not more than one pound of coloured fire composition of such a nature as not to be liable to spontaneous ignition shall be deemed to be a "manufactured firework" and not a "firework composition".

Aluminium Torches. }

Electric Sparklers. }

Magnesium Torches. }

Amorces.

Chinese Crackers.

Light Signals.

Manufactured Fireworks.

Pyrotechnic Matches.

Rockets.

Sparklers.

N. L. SHELDON,

Chief Inspector of Explosives in India.

## APPENDIX F.

\*List of petroleum premises licensed during the year 1931.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Ajmer-Merwara .	Ajmer . . . . .	27	Bengal --contd.	Brought forward . . . . .	680
	TOTAL . . . . .	27		Hooghly . . . . .	29
Assam . . . . .	Cachar . . . . .	17		Howrah . . . . .	59
	Darrang . . . . .	14		Jalpaiguri . . . . .	30
	Goalpara . . . . .	22		Jessore . . . . .	19
	Kamrup . . . . .	31		Khulna . . . . .	25
	Khasi and Jaintia Hills, Lakhimpur . . . . .	3		Malda . . . . .	7
	Naga Hills . . . . .	6		Midnapur . . . . .	73
	Nowgong . . . . .	9		Murshidabad . . . . .	30
	Sibsagar . . . . .	30		Mymensingh . . . . .	47
Sylhet . . . . .	80	Nadia . . . . .		38	
TOTAL . . . . .	237	Noakhali . . . . .		11	
Baluchistan . . . . .	Quetta . . . . .	25		Pabna . . . . .	19
	Loralai . . . . .	3		Rajahahi . . . . .	31
	Sibi . . . . .	10		Rangpur . . . . .	65
	Zhob . . . . .	6		Tippera . . . . .	54
	TOTAL . . . . .	44		24-Parganas . . . . .	79
Bengal . . . . .	Backerganj . . . . .	39		TOTAL . . . . .	1,246
	Bankura . . . . .	19		Angul . . . . .	3
	Birbhum . . . . .	14		Balasore . . . . .	15
	Bogra . . . . .	30		Bhagalpur . . . . .	43
	Burdwan . . . . .	81		Champaran . . . . .	27
	Calcutta . . . . .	243		Cuttack . . . . .	17
	Chittagong . . . . .	34		Darbhanga . . . . .	40
	Dacca . . . . .	67	Gaya . . . . .	46	
	Darjeeling . . . . .	45	Hazaribagh . . . . .	33	
	Dinajpur . . . . .	9	Manbhum . . . . .	77	
Faridpur . . . . .	49	Moughyr . . . . .	32		
Carried over . . . . .	680	Muzaffarpur . . . . .	35		
			Carried over . . . . .	368	

\*This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

## APPENDIX F—contd.

\* List of petroleum premises licensed during the year 1931—contd.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
	Brought forward .	368		Brought forward .	771
Bihar and Orissa —contd.	Palamau . . . .	16	Bombay—contd.	Larkana . . . .	5
	Patna . . . . .	80		Nasik . . . . .	61
	Puri . . . . .	16		Panch Mahals . . . .	11
	Purnea . . . . .	32		Poona . . . . .	64
	Ranchi . . . . .	30		Ratnagiri . . . . .	82
	Sambalpur . . . .	20		Satara . . . . .	38
	Saran . . . . .	33		Sholapur . . . . .	40
	Shahabad . . . .	49		Sukkur . . . . .	10
	Singbhan . . . . .	47		Surat . . . . .	34
	Sonthal Parganas .	29		Thana . . . . .	35
TOTAL	720		TOTAL	1,151	
Bombay	Aden . . . . .	32	Burma . . . . .	Amherst . . . . .	15
	Ahmedabad . . . .	65		Bessein . . . . .	4
	Ahmednagar . . . .	24		Bhamo . . . . .	3
	Belgaum . . . . .	57		Hanthawaddy . . . .	8
	Bijapur . . . . .	11		Insein . . . . .	3
	Bombay . . . . .	234		Katha . . . . .	3
	Broach . . . . .	19		Kyankse . . . . .	1
	Dharwar . . . . .	83		Lower Chindwin . . .	8
	Hyderabad (Sind) .	13		Magwe . . . . .	52
	Kaira . . . . .	44		Mandalay . . . . .	14
	Karachi . . . . .	78		Maubin . . . . .	7
	East Khandesh . . .	55		Meiktila . . . . .	9
	West Khandesh . . .	24		Mergui . . . . .	11
	Kolaba . . . . .	27		Minbu . . . . .	21
Kolhapur . . . . .	5	Myaungmya . . . . .	12		
Carried over . . . .	771		Myingyan . . . . .	6	
			Carried over . . . .	177	

\* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

## APPENDIX F—contd.

\* List of petroleum premises licensed during the year 1931—contd.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Barma—contd.	Brought forward . . .	177	Central Provinces—contd.	Brought forward . . .	328
	Myitkyina . . .	9		Damoh . . .	6
	Northern Shan States . . .	15		Drug . . .	14
	Pakoku . . .	18		Hoshangabad . . .	33
	Pegu . . .	20		Jubbulpore . . .	30
	Prome . . .	10		Mandla . . .	3
	Rangoon . . .	56		Nagpur . . .	49
	Sagaing . . .	2		Narsingpur . . .	5
	Sandoway . . .	3		Nimar (Khandwa) . . .	21
	Southern Shan States . . .	10		Raipur . . .	34
	Tavoy . . .	13		Saugor . . .	10
	Tharrawaddy . . .	3		Seoni . . .	6
	Thaton . . .	7		Wardha . . .	24
	Thayetmyo . . .	13		Yeotmal . . .	56
	Upper Chindwin . . .	3		TOTAL . . .	619
Yamethin . . .	7	Coorg . . .	Coorg . . .	12	
TOTAL . . .	363	TOTAL . . .	TOTAL . . .	12	
Central India . . .	Bhopal (Ry. land) . . .	5	Delhi . . .	Delhi . . .	50
	TOTAL . . .	5	TOTAL . . .	TOTAL . . .	50
	Akola . . .	70	Hyderabad . . .	Hyderabad . . .	42
Amraoti . . .	69	Secunderabad . . .		43	
Balaghat . . .	13	TOTAL . . .		85	
Central Provinces.	Betul . . .	10	Madras . . .	Anantapur . . .	30
	Bhandara . . .	32		Bellary . . .	24
	Bilaspur . . .	34		Chingleput . . .	35
	Buldana . . .	55		Chittoor . . .	30
	Chanda . . .	26		Coimbatore . . .	100
	Chhindwara . . .	19		Cuddapah . . .	12
	Carried over . . .	328		Carried over . . .	231

\* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

## APPENDIX F—contd.

\* List of petroleum premises licensed during the year 1931—contd.

Presidency or Provinces.	District.	No.	Presidency or Province.	District.	No.
Madras—contd.	Brought forward	231	Punjab.	Ambala	40
	Ganjam	33		Amritsar	17
	East Godavari	52		Attock	14
	West Godavari	37		Dera Ghazi Khan	6
	Guntur	43		Ferozepore	15
	Kistna	50		Gujranwala	17
	Kurnool	31		Gujrat	19
	Madras	54		Gurdasur	33
	Madura	71		Gurgaon	17
	Malabar	101		Hisar	15
	Nellore	33		Hoshiarpur	9
	North Arcot	75		Jhelum	11
	The Nilgiris	38		Jullundur	19
	Ramnad	80		Kangra	4
	Salem	42		Karnal	22
	South Arcot	54		Lahore	55
	South Canara	54		Ludhiana	20
	Tanjore	85		Lyalpur	24
	Tinnevely	36		Mian Wali	3
	Trichinopoly	51		Multan	8
Vizagapatam	54	Muzaffargarh	5		
TOTAL	1,305	Patiala	5		
Mysore	Bangalore	44	Rawalpindi	39	
	TOTAL	44	Shahpur	13	
North-West Frontier Pro- vince.	Bannu	3	Sheikhupura	9	
	Dera Ismail Khan	3	Sialkot	17	
	Hazara	23	Simla	2	
	Kohat	8			
	Peshawar	39			
TOTAL	76	TOTAL	458		

\* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.



## APPENDIX F—concl'd.

\* List of petroleum premises licensed during the year 1931—concl'd.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
				Brought forward . . .	443
	Agra . . . . .	17		Gonda . . . . .	18
	Aligarh . . . . .	33		Gorakhpur . . . . .	26
	Allahabad . . . . .	44		Hamirpur . . . . .	8
	Almora . . . . .	2		Jalaun . . . . .	5
	Azamgarh . . . . .	19		Jaunpur . . . . .	1
	Bahraich . . . . .	11		Jhansi . . . . .	27
	Ballia . . . . .	9		Kheri . . . . .	18
	Banda . . . . .	11		Lucknow . . . . .	49
	Bara Banki . . . . .	23		Mainpuri . . . . .	21
	Barcilly . . . . .	22		Meerut . . . . .	38
	Basti . . . . .	28		Mirzapur . . . . .	24
	Benares . . . . .	41	United Provin-	Moradabad . . . . .	3
	Bijnor . . . . .	9	ces—cont'd.	Muttra . . . . .	18
	Budaun . . . . .	7		Muzaffarnagar . . . . .	17
	Bulandshahr . . . . .	18		Naini Tal . . . . .	14
	Cawnpore . . . . .	43		Parthagarh . . . . .	18
	Dehra Dun . . . . .	30		Pilibhit . . . . .	3
	Etah . . . . .	7		Rae Bareilly . . . . .	12
	Etawah . . . . .	12		Saharanpur . . . . .	33
	Farrukhabad . . . . .	24		Shahjahanpur . . . . .	7
	Fatehpur . . . . .	8		Sitapur . . . . .	19
	Fyzabad . . . . .	14		Sultanpur . . . . .	14
	Garhwal . . . . .	6		Unao . . . . .	9
	Ghazipur . . . . .	5			
	Carried over . . . . .	443		TOTAL . . . . .	845

\* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

## SUMMARY

Presidency or Province.	No.
Ajmer-Merwara . . . . .	27
Assam . . . . .	237
Baluchistan . . . . .	44
Bengal . . . . .	1,246
Bihar and Orissa . . . . .	730
Bombay . . . . .	1,151
Burma . . . . .	366
Central India . . . . .	5
Central Provinces . . . . .	619
Coorg . . . . .	12
Delhi . . . . .	50
Hyderabad . . . . .	85
Madras . . . . .	1,305
Mysore . . . . .	44
North-West Frontier Province . . . . .	76
Punjab . . . . .	458
United Provinces . . . . .	845
TOTAL . . . . .	7,290

## APPENDIX G.

*Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931.*

## EXPLOSIVES.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
1	22nd Jan. 1931.	Gunpowder	Papanasam, Tinnevelly District.	During blasting operations in connection with the construction of additional mills by the Madura Mills Co. a big stone struck the right arm of a boy sitting at a distance of about 120' from the blast. He died the same day, as a result of the injury.	1	...
2	28th Jan. 1931.	Gunpowder	Between Bally and Belur, Howrah District.	During blasting operations on Bridge No. 13 demolition work while a person was charging a hole with gunpowder an explosion occurred as a result of which he and another person were injured. The cause of the explosion was not definitely known but was believed to be a spark caused by the grating of the tamping rod on the vitrified bricks of which the masonry was found to be composed when the hole was afterwards broken up by hand.	...	2
3	2nd Feb. 1931.	Gunpowder	Vyasarpadi, Madras.	Two persons were grinding a mixture of saltpetre and charcoal in stone mortars with wooden pestles in a licensed depôt and another was removing the powdered mixture when the mixture exploded and all of them were scorched one of whom died two days later. The explosion was probably due to grit getting into the mixture.	1	2
4	17th Feb. 1931.	Gun powder	Ningah, Burdwan District.	Some 21 lbs. of gunpowder was issued by the Assistant Store keeper of Messrs. Lodna Colliery Co. Ltd., Ningah Coal Mines, to four shot-firers, placed in a wooden box and taken by one of the shot-firers into a godown for placing in tin canisters preparatory to its being taken underground. During the temporary absence	13	3

## APPENDIX G—contd.

*Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—contd.*

## EXPLOSIVES—contd.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
5	4th Apl. 1931.	Gunpowder	Peddapoliem, Chittoor District.	<p>of the shot-firers the gunpowder was ignited and sixteen persons who during heavy rain had taken shelter in the godown were severely burnt. 13 of them succumbed to their injuries. It was presumed that some one had been smoking and had set fire to the powder.</p> <p>A bridge was under construction at mile 178-5 Bombay Trunk Road. In excavating the foundation for the fourth pier a sheet of rock was met with in the river bed. Six holes were bored and filled with gunpowder and clay, but the operation could not be carried out the same day as the water rose above the rock. The next morning one of the coolies thinking that the gunpowder was wet and would not explode, removed the clay in part from one of the holes and in order to expedite the removal he held a jumber in his hands in the hole and had it hammered by another coolie. An explosion occurred causing serious injuries to the former.</p>	...	1
6	6th June 1931.	Gunpowder	Sultanji Gunta Stone Quarry, Bangalore.	<p>A workman was loading a bore hole in a rock in Sultanji Gunta Stone Quarry with gunpowder for blasting next morning and another was seated near him when the powder suddenly exploded injuring both of them. The explosion was probably due to the presence of grit.</p>	...	3

## APPENDIX G—contd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—contd.

## EXPLOSIVES—contd.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
7	16th June 1931.	Gunpowder	Umarkhed, Yeotmal District.	Two persons were engaged in blasting a well. One of them bored a hole in the stone and the other was ramming it with clay after gunpowder had been put in, when smoke was seen coming out of the hole. They poured water on it but there was an explosion as a result of which both of them were seriously injured, one of whom died the same evening.	1	1
8	30th September 1931.	Do.	Golanki Hill, Bombay.	A boy was engaged in filling bore holes in rocks at the Stone quarries with gunpowder and was smoking a <i>bidi</i> . He was asked by the Overseer and two other men who were employed there, to throw it away. He took no notice of it and a spark from the <i>bidi</i> dropped into the tin of gunpowder and it exploded causing injuries to his hands and chest.	...	1
9	12th Oct. 1931.	Do.	Kayathar, Tinnevely District.	A person was slightly injured owing to the ignition of gunpowder kept by him for blasting stones in a well, by a spark, which fell from a <i>bidi</i> , which his son was smoking.	...	1
TOTAL					16	13
10	12th Jan. 1931.	Dynamite	Khuria, Bilaspur District.	A labourer unauthorisably attempted to redrill a hole which had only partially exploded before when the portion of the charge remaining in the hole exploded and cause serious injuries to his right hand.	...	1
11	14th Aug. 1931.	Gelignite	Namtu	While barring out No. 1 furnace in the Factory of the Burma Corporation Limited a charge of gelignite was used to break up frozen slag. The charge	...	1

## APPEFDIX G—contd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—  
contd.

## EXPLOSIVES—contd.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
				failed to explode. A coolie was removing the mud used for tamping preparatory to again firing the hole when the charge exploded and the coolie was seriously injured.		
12	17th Aug. 1931.	Dynamite	Chatiapara	Three coolies were clearing holes in a rock for blasting. One of them put a chisel in position and another struck it with a hammer when a stick of Dynamite, left unnoticed under the heap of stones previously blasted, exploded as a result of which the latter coolie was thrown about 50 feet which caused his instantaneous death and serious injuries to the others.	1	2
TOTAL					1	4
13	3rd Feb. 1931.	Fulminate	Sirupulpettai, Chingleput District.	Two boys put some yellow arsenic and sulphur in a small tin for making country crackers. They could not open the tin easily and so they hammered it. The result was that the mixture exploded and injured both of them.	...	2
14	29th Apl. 1931.	Do.	Rander, Dt. Surat.	A boy mixed sulphur; Chlorate of Potash and Charcoal and put the mixture in a small tin having an opening about the size of a rupee. He then placed the charged tin in a small bucket containing water and applied a match to the mixture. It gave out smoke, followed by a loud explosion which injured him.	...	1
TOTAL					...	3

## APPENDIX G—contd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—contd.

## EXPLOSIVES—contd.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
15	25th Sep. 1931.	Ammunition (Detonator).	Lanywa, Pakokun District.	A blasting Jamadar of a stone contractor of the I. B. P. Co., Ltd., went out on the morning of the 25th September 1931 for duty and lost one Detonator which he could not again find. The same evening a coolie found it, but owing to rough handling it exploded and caused very bad injuries to him and slight injuries to another coolie.	...	2
16	9th Nov. 1931.	Ammunition.	Chandanwadi Sonapur Lane, Bombay.	A corpse-bearer found a .22 bore cartridge near the gate of the compound of the Tower of Silence at Khambella Hill, picked it up and took it home. While he was breaking the cartridge with a stone the bullet flew out and struck his left thigh causing a wound about an inch deep.	...	1
TOTAL					...	3
17	3rd Apl. 1931.	Fireworks	Bapat Galli, Belgaum City.	Three children, two boys and a girl, were playing at the back of their house when suddenly there was an explosion causing injuries to both the boys one of whom died later. It appeared that the children found a firework known as <i>Dabbies</i> in the house and were playing with it when it exploded.	1	1
18	28th Apl. 1931.	Do.	Palamcottah, Tinnevely District.	A holder of a license in form A of the Indian Explosives Rules, 1914, his father and another person were engaged in manufacturing fireworks. The first two were cutting bamboo tubes under a tree about 25 feet to the north-west of the licensed shop and the third was loading the bamboo tubes with gunpowder in the verandah of the shop. There were some coloured torches and country gunpowder	1	...

## APPENDIX G—contd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—contd.

## EXPLOSIVES—contd.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
				left to dry in the open space in front of the building. At about 2-30 P. M. a blaze was seen, which spread to the verandah where the third person was loading the bamboo tubes. The result was that the loaded rocket tubes which were lying near him caught fire and exploded causing extensive burns. He died in the hospital the same day. The actual cause of the accident could not be determined but it was stated that the articles that were left to dry in the sun caught fire owing to the extreme heat.		
19	12th June 1931.	Fireworks	Pettai, Tinnevely District.	There was a great display of fireworks in connection with a marriage procession. When the firework called <i>Kimbam</i> was being displayed, an iron tube about 9" long and 3" in diameter loaded with 3 lbs. of gunpowder escaped from its frame work when it was alight, dashed against the crowd and injured 15 persons, two of whom died as the result of injuries sustained.	2	13
20	9th Nov. 1931.	Do.	20, Nandan Road, Calcutta.	A person was setting fire to a <i>Tubri</i> when it burst causing him slight injuries.	...	1
21	9th Nov. 1931.	Do.	4, Tarak Mitter Lane, Calcutta.	A person was preparing fireworks in a room when an ignited firework came into the room through the window and fell on the fireworks and materials and ignited them, as a result of which he sustained injuries.	...	1
22	9th Nov. 1931.	Do.	161-1, Harrison Road, Calcutta.	A person was preparing crackers with a mixture of Chlorate of Potash and Arsenic Sulphide when some of the crackers accidentally fell from his hands and exploded causing injuries.	...	1



## APPENDIX G—contd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—contd.

## EXPLOSIVES—concl'd.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
23	9th Nov. 1931.	Fireworks	13, Ram Bagan Lane, Calcutta.	While a person was firing Pattakas (throw-downs) his cloth accidentally caught fire, as a result of which he sustained injuries.	...	1
24	9th Nov. 1931.	Ditto	8, Collin Street, Calcutta.	While a boy was preparing <i>Tubris</i> (Fireworks) in a room of his house an explosion occurred resulting in his instantaneous death. The cause of the explosion could not be ascertained.	1	...
25	9th Nov. 1931.	Ditto	Calcutta. 9, Ranee Branch Road.	Two boys were preparing crackers with a mixture of Chlorate of Potash and Sulphide of arsenic for the Kalipuja festival. One of them prepared a cracker and placed it on the ground when it suddenly exploded. Other crackers and mixture of Chlorate of Potash and Sulphide of arsenic which were kept there also caught fire and exploded causing injuries to both of the boys.	...	2
26	11th Nov. 1931.	Ditto	Khargpur	While fireworks were being displayed in the compound of the Indian Institute on account of Dewali festival some sparks fell from a rocket into the basket containing fireworks which ignited them and there was an explosion as a result of which 46 persons were injured, seven of whom succumbed to their injuries.	7	39
27	25th Dec. 1931.	Ditto	25, Beg Bagan Lane, Calcutta.	While a boy was mixing chlorate of potash and sulphur in a Hamel Dista (iron pestle and mortar) for preparing pattakas for the Sobehrat festival the mixture suddenly exploded causing him serious injuries.	...	1
TOTAL					12	60

## APPENDIX G—contd.

*Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—contd.*

## PETROLEUM.

No	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
1	22nd Jan. 1931.	Petroleum	Seikkyi	The Irrawaddy Flotilla Co.'s oil laden flat No. 249 was lying alongside the Indo-Burma Petroleum Co.'s jetty. On the morning of the 22nd January 1931 a Khalasi went down into a tank of the flat which was empty and another was about to descend into the tank when an explosion occurred. The latter was badly burnt about the face and body. He ran along the flat and got on to the bank. The former came running up the ladder in a mass of flame and was assisted by the Serang of the flat out of the hold. He then jumped into the river and was never seen again. The explosion was probably due to one of the Khalasies lighting a match.	1	1
2	2nd April 1931.	Petrol	Sewree Bunder, Bombay.	Padaw "Laxmi Prasad" was chartered by the Indo-Burma Petroleum Company Limited, Bombay, to ship 3,000 tins of petroleum spirit and 20 cases of candles on their behalf for Veraval. The loading was completed at 5.30 p.m. on the 1st April 1931 and the Padaw was waiting alongside Sewree Bunder for the morning tide (high tide) to enable her to sail. The crew consisting of the Tindal and 4 Lascars were apparently asleep on board and were awakened at about 5 A.M. by a loud explosion, immediately afterwards the cargo caught fire. The fire continued to burn until 12.30 p.m. when it was finally extinguished. The Padaw and its contents were a total loss. One of the crew sustained burns when the fire broke out and subsequently succumbed to his	1	...

## APPENDIX G—contd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—contd.

## PETROLEUM—contd.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
3	12th May 1931.	Petrol	Paratwada, Amraoti District.	injuries. No definite cause of the fire could be ascertained but it was assumed to be due to some one smoking on board. On the evening of the 12th May 1931 a licensee gave one of his servants the key of his petrol godown. He accompanied by another servant went to the petrol godown and both proceeded to fill tins of petrol from barrels in the godown. In order to see whether or not the tins were full one of the servants lighted a match which ignited the petrol and both of them were so badly burnt that they died next morning.	2	—
4	24th May 1931.	Petrol	Radhan	A wagon containing 391 petrol cans caught fire while being unloaded. The cause of the fire is not known but possibly the hand signal lamp of the Van Guard with which he was showing the porters the different marks on the cans, was accidentally dropped and set fire to the petrol. It resulted in injuries to one porter.	—	1
5	21st June 1931.	Petrol	Beach Madras	A rolling stock fitter of the Madras Beach Railway Station got into a petrol tank without the knowledge of any body with a view to take petrol and was asphyxiated.	1	...
6	16th Sept. 1931.	Crude Oil.	Chauk oilfield	A gang was pulling the tubing in the Burmah Oil Company's well No. 172 in the vicinity of which there was a highly explosive mixture of gas and air. When they had pulled the tubing about 20' an explosion occurred which resulted in the death of 8 persons. The explosion was probably due to some person smoking.	8	...

## APPENDIX G—contd.

*Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—contd.*

## PETROLEUM—concl'd.

No.	Date of accident.	Nature of Oil.	Where accident occurred,	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
7	12th Oct. 1931.	Crude Oil	Syriam .	A report on this accident is given in Appendix L.	2	1
8	26th and 31st Oct. 1931.	Do.	Thilawa .	A report on the accidents is given in Appendix M.	...	...
9	29th Nov. 1931.	Do.	Well No. 1506, Yenaung-aung.	The tubing in the Burmah Oil Company's Well No. 1506 was being pulled by means of a tractor winch. After the seventeenth stand of the tubing had been stood back oil flowed from the tubing remaining in the well and sprayed over the tractor which was about 40' from the well head and was ignited by coming into contact with the exhaust pipe of the tractor. The fire resulted in the death of 3 persons and injuries to one.	3	1
10	30th Dec. 1931.	Petrol .	Syriam .	Two men were cleaning with benzine the motors and floor of the pump house adjacent to substation "C" situated within the Burmah Oil Company's Tank Farm Area when the benzine was ignited as a result of which both the men sustained injuries. Another man who was outside the pump house and went inside to the assistance of others was most severely burnt and died in the hospital the same evening. The fire was apparently due to one of the men smoking.	1	2
Total					19	6

## APPENDIX G—concl'd.

*Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931—concl'd.*

## MISCELLANEOUS.

No.	Date of accident.	Nature of Substance.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
1	14th Sept. 1931.	Matches	Bombay	31 cases of Bengal Matches were being loaded in a lorry at No. 10 Alexandra Docks when a coolie suddenly threw one of the cases into the lorry with the result that the cases were ignited and there was a blaze. The coolie received slight burns on both his legs.	...	1
Total					...	1

## APPENDIX H.

Summary of accidents during the year 1931.

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.		
<i>Explosives.</i>					
Gunpowder . . .	9	16	13	...	9
Nitro-compounds . . .	3	1	4	...	3
Chlorate Mixture . . .	...	...	...	...	...
Fulminates . . .	2	...	3	...	2
Ammunition . . .	3	...	3	...	2
Fireworks . . .	11	12	60	...	11
Liquid Oxygen . . .	...	...	...	...	...
TOTAL . . .	27	29	83	...	27
<i>Petroleum.</i>					
Petroleum generally . . .	9	19	6	1	10
TOTAL . . .	9	19	6	1	10
Chemicals . . .	...	...	...	...	...
TOTAL . . .	...	...	...	...	...
Miscellaneous . . .	1	...	1	...	1
TOTAL . . .	1	...	1	...	1
GRAND TOTAL	37	48	90	1	38

APPENDIX I.

Detailed statement showing the number of accidents and persons killed and injured during the ten years ending 1931.

Year.	GUNPOWDER.			DYNAMITE AND OTHER NITRO-COMPOUND BLASTING EXPLOSIVES.			CHLORATE MIXTURE.			FULMINATE.			AMMUNITION.			FIREWORKS.			LIQUID OXYGEN EXPLOSIVES.		
	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.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1922 . . . . .	4	7	7	...	...	...	1	1	...	3	2	5	1	...	1	1	...	1	...	...	...
1923 . . . . .	17	36	19	...	...	...	...	...	...	5	9	16	6	...	7	6	18	15	...	...	...
1924 . . . . .	7	27	11	1	1	...	...	...	...	7	4	7	...	...	...	17	14	12	...	...	...
1925 . . . . .	9	19	11	3	2	11	...	...	...	6	...	10	3	...	17	13	9	9	...	...	...
1926 . . . . .	9	27	36	1	...	2	...	...	...	12	5	23	2	...	7	16	20	34	...	...	...
1927 . . . . .	8	5	7	2	8	18	...	...	...	6	1	22	3	1	4	23	16	20	...	...	...
1928 . . . . .	14	12	17	3	1	10	...	...	...	5	...	5	3	...	3	10	7	63	...	...	...
1929 . . . . .	6	21	4	1	1	...	...	...	...	2	1	1	1	...	1	6	11	13	1	3	...
1930 . . . . .	4	7	1	2	1	6	...	...	...	4	...	7	3	1	8	30	42	36	...	...	...
1931 . . . . .	9	16	13	3	1	4	...	...	...	2	...	3	2	...	3	11	12	60	...	...	...
TOTAL	87	177	126	16	15	51	1	1	...	54	22	99	24	2	51	133	149	263	1	3	...
AVERAGE	9	18	13	2	1	5	1	1	...	5	2	10	2	1	5	13	15	26	1	1	...

## APPENDIX I—concl'd.

Detailed statement showing the number of accidents and persons killed and injured during the ten years ending 1931—concl'd.

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.
1922 . . . . .	10	8	2	...	...	...	2	2	4
1923 . . . . .	8	5	11	...	...	...	2	1	1
1924 . . . . .	8	6	8	2	3	5	1	3	...
1925 . . . . .	8	8	15	2	...	10	3	...	1
1926 . . . . .	6	5	18	...	...	...	3	...	8
1927 . . . . .	9	5	8	2	...	9	1	...	...
1928 . . . . .	9	61	26	1	...	3	2	2	1
1929 . . . . .	16	26	28	...	...	...	4	1	5
1930 . . . . .	8	2	11	...	...	...	1	...	1
1931 . . . . .	10	19	6	...	...	...	1	...	1
TOTAL . . . . .	92	145	133	7	3	27	20	9	22
AVERAGE . . . . .	9	14	13	1	1	3	2	1	2

## APPENDIX J.

Comparative statement showing the number of accidents and persons killed and injured during ten years ending 1931.

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.		
1922 . . . . .	21	20	20	1	22
1923 . . . . .	39	69	69	5	44
1924 . . . . .	40	58	43	3	43
1925 . . . . .	45	38	84	4	49
1926 . . . . .	49	57	128	...	49
1927 . . . . .	49	36	83	5	54
1928 . . . . .	46	83	128	1	47
1929 . . . . .	37	64	53	4	41
1930 . . . . .	52	53	70	...	52
1931 . . . . .	37	48	90	1	38
TOTAL . . . . .	415	526	772	24	439
AVERAGE . . . . .	41	53	77	2	44



## APPENDIX K.

*Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1931 to 31st December 1931.*

## GOVERNMENT ACCIDENTS.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
1	13th May 1931.	Gunpowder	Sangor	Lieutenant R. F. Mellor, R. E., Instructor at the Equitation School was ordered to blow up 50 lbs. of gunpowder which was about a year old and small quantities of broken packages of other explosives. He took them to the exercise area near the Hunter Course in a cart. He first placed all the explosives except the gunpowder in a small nullah and fired them with a detonator and a length of safety fuse. He then took out the gunpowder in its canvas bag from the barrel, tipped it out of the bag in the nullah, inserted two lengths of about 18 in. of safety fuse into the pile of gunpowder and was lighting the fuse when the gunpowder exploded and he was blown to a distance of about 20 yds. and instantaneously killed.	1	...
TOTAL					1	...

## APPENDIX L.

LETTER No. G—4(7)-86, DATED 23RD OCTOBER 1931, FROM DR. M. K. MAITRA, B.Sc., Ph.D. (LONDON), A.I.C., INSPECTOR OF EXPLOSIVES, CAMP RANGOON, TO THE DISTRICT MAGISTRATE, HANTHAWADDY.

SUBJECT:—Gas explosion & fire at B. O. Co.'s Refinery at Syriam.

I visited the Pressure Distillation plant at the Burmah Oil Company's Refinery, Syriam, in company of yourself and Mr. Buchanan, Officiating Works Manager to the Refineries Department of the Burmah Oil Company on the 21st October 1931 and I also attended your Court of enquiry on that day.

2. At the time of my visit the debris had already been cleared away, the surroundings of the P. D. re-run unit plant cleared up and the articles inside the store adjoining the plant removed. Hence my conclusions are, necessarily, chiefly based on the examination of the report of the Officiating Works Manager, B. O. C. Refinery, which fortunately is very clear and detailed, and on his and other witnesses' evidences in the Court of Enquiry.

3. The night on which the explosion occurred was particularly still and there is no doubt that there was an accumulation of the heavy petroleum vapour on the ground in the vicinity of the plant which must have formed an explosive mixture with the air. But it is not possible to say definitely what actually started the explosion of the gas-air mixture. Both the Works Manager and the Control Chemist of the Distillation Department have, perhaps wisely, refrained from mentioning any likely reason.

4. It seems, however, very probable that one of the following factors was responsible for the disaster:—

- (1) Spontaneous ignition of cotton waste or gunny which had become contaminated with oil.
- (2) Tool of the Viceman causing a spark either by a fall on to the floor or during a repair of some kind on the plant.
- (3) Nails on the shoes of one of the deceased persons producing a spark by rubbing against the hard floor or one of the iron tubes in the P. D. plant.

5. There is evidence, that a certain quantity of cotton waste was found in the store room. It was smouldering when it was seen very shortly after the explosion. As the store room was absolutely undamaged by the explosion, it does not seem probable that the explosion was started there by the spontaneous ignition of the cotton waste. Also, according to the report of Mr. Buchanan this cotton waste was not contaminated with oil. But it is possible that there was a quantity of the same substance in the Plant area which came in contact with oil and spontaneously ignited. Moreover, some pieces of gunny were observed to be burning after the explosion in the space between the worm-end and the condenser tanks. These pieces were, presumably, used for wiping out oil. Although it is known that the danger of

APPENDIX L—*contd.*

spontaneous ignition is appreciable only when cotton waste, gunny or rag is kept in a confined place and is contaminated with a slow drying oil such as linseed oil, yet the possibility of such a spontaneous ignition of these substances occurring in the present instance cannot be ruled out.

It is recommended that there should be a strict order that combustible articles such as rags, cotton waste, etc., should on no account be left lying in the danger areas where smoking for instance, is now prohibited.

6. There is no proof at all that any repair work was carried on at the plant at the time the explosion took place. But there is evidence that both the Viceman Rambelli and his assistant were within the area of the P. D. plant at the time of the explosion and that Rambelli had his tools with him. It is quite likely that they came over to the P. D. plant only to have a chat with the men on duty there. But they may have been playing the fool with their tools. Margaroo, the Viceman's assistant said in his evidence that he came to the P. D. plant because he was told that there may be some work. In course of his examination in your Court Rambelli made certain statements which showed his ignorance as to the danger inherent in the production of a spark by sharp impact of his tools against a hard substance.

It is strongly recommended that all workmen and employees be particularly instructed to learn and to beware of this source of danger.

7. There is evidence that the deceased Tindal Muklas Rahman had shoes on his feet at the time of the accident and that his feet were not burnt. The shoes, however, could not be traced. In case they were iron shod, or had exposed iron nails on them, it is possible that a small spark was produced when they rubbed against the hard floor or when they came in sharp contact with one of the low lying pipes on the plant area and had thus been the cause of his death.

In order to avoid possible risk in the future it is recommended that the employees in the danger area should take the precaution of wearing rubber soled shoes without nails.

8. The possibility of the formation of Pyrophoric Iron is in my opinion very remote in the present instance. As the air in Syriam is generally very damp and it is well known that the amount of sulphur present in Burma oil is extremely small.

9. The Works Manager had, after the accident, all the prominent points of buildings and plant tested and found the resistances to earth very small. Electrical fittings were also all found to be in good order, hence, we may in this instance, I think, absolve the atmosphere from having a part in the disaster.

10. I am convinced with the Works Manager that there was no smoking in the vicinity of the scene of accident.

## APPENDIX M.

LETTER NO. G.-4(7)—87, DATED THE 19TH NOVEMBER, 1931, FROM MR. B. N. PAL, M.Sc., INSPECTOR OF EXPLOSIVES, CAMP RANGOON, TO THE DISTRICT MAGISTRATE, HANTHAWADDY.

*Subject* :—Gas explosion and fire at B. B. P. C. Refinery at Thilawa.

I visited and inspected the scene of accident in Company of Mr. A. P. Faickney, Works Manager, British Burma Petroleum Co.'s Thilawa Refinery on the 18th November 1931. I also attended the Court of enquiry held by you on that day at Thilawa.

2. I found that the explosions had taken place in an Acid Washing Tank and in two Soda Washing Tanks.

The explosions were not of a violent character as in all these explosions only a portion of the tank roofs was torn off. The first two explosions which occurred on the 26th October 1931 were accompanied by little fire. In the third explosion which occurred on the 31st October 1931, 4 rivets of the tank were blown off allowing the oil to escape and catch fire.

3. I was able to examine all the controls of the Washing Tanks. I examined thoroughly the Works Manager and other officers of the Refinery.

4. I am convinced that the Washing Tanks were in thorough working order and utmost precautions against fire and explosion were taken by the Refinery Officers.

5. The earth connections of the tanks had been properly tested by the firm's Engineer on the 23rd October and found satisfactory.

6. I am convinced that the explosions were not caused by any outside agency.

7. To arrive at the cause of an accident of this kind with any degree of certainty is a matter of extreme difficulty. One can really suggest.

8. The Washing Tanks in each case contained explosive mixtures of hydrocarbons and air. The ignition of the explosive mixture was caused by either static charges, bound charges, stray currents or pyrophoric iron sulphur compounds—some of which are always present. It is most probable that the explosions which occurred on the 26th October and that which occurred on the 31st October 1931 had similar origins.

9. Such explosions and fire are known to occur in various containers used in oil refining industry in spite of taking all known precautions against fire and explosions.



