

Department of Mines, India.

~~A-2649~~  
S1810

# REPORT

OF THE

## CHIEF INSPECTOR OF MINES IN INDIA

Under the Indian Mines Act (VIII of 1901)

FOR THE

YEAR ENDING 31st DECEMBER 1910

BY

G. F. ADAMS,

*Chief Inspector of Mines in India*



S

X9(D3).2r  
EO  
16010

X9(D3).2r  
D7-  
016010

CALCUTTA  
SUPERINTENDENT GOVERNMENT PRINTING, INDIA  
1911

Department of Mines, India.

Dhananjayrao Gadgil Library

GIPE-PUNE-016010

# REPORT

OF THE

## CHIEF INSPECTOR OF MINES IN INDIA

Under the Indian Mines Act (VIII of 1901)

FOR THE

YEAR ENDING 31st DECEMBER 1910

BY

G. F. ADAMS,

*Chief Inspector of Mines in India*



CALCUTTA  
SUPERINTENDENT GOVERNMENT PRINTING, INDIA  
1911



## CONTENTS.

	Page
<b>INTRODUCTION.</b>	
Relates to administration of the Act . . . . .	1
Other mining statistical publications . . . . .	1
Scheme of report . . . . .	1
<b>SECTION I.—PERSONS EMPLOYED.</b>	
Average figures of labour . . . . .	1
Increase compared with preceding year . . . . .	1
" chiefly in mica, galena and copper mines . . . . .	1
Decrease in coal mines . . . . .	1
Little or no recovery of mines other than coal from preceding year's depression . . . . .	2
Mineral industry in a subdued condition . . . . .	2
No extreme shortage of labour . . . . .	2
Importation of labour for Nagpur manganese mines . . . . .	2
Wages high in Burma and Hazaribagh . . . . .	2
<b>SECTION II.—OUTPUT OF MINERALS.</b>	
Coal, increase compared with preceding year . . . . .	2
" " in Raniganj and smaller coalfields . . . . .	2
" decreases in the Jharra and Giridih coalfields . . . . .	2
" " in the Central Provinces and Assam . . . . .	2
" increases " Panjab and in Baluchistan . . . . .	2
" trade still in the trough of the wave . . . . .	2
Mica, decrease compared with preceding year . . . . .	2
" use of splittings for electrical purposes has an adverse effect on value of stained slab . . . . .	2
" clear and slightly stained slab mica not affected by trade in splittings . . . . .	2
Manganese, increase in . . . . .	2
" market in a depressed condition . . . . .	2
Gems, decrease in . . . . .	3
" output almost entirely from Burma . . . . .	3
" slump in market . . . . .	3
Gold, decrease in . . . . .	3
" mines in Dharwar closed down . . . . .	3
" hopes of better prospects in Anantapur . . . . .	3
Limestones, increases in . . . . .	3
Iron, " " . . . . .	3
Magnesite, " " . . . . .	3
Copper, " " . . . . .	3
Clay, " " . . . . .	3
Galena, " " . . . . .	3
Graphite, " " . . . . .	3
Salt, decreases " " . . . . .	3
Slate, " " . . . . .	3
Wolframite, " " . . . . .	3
Chromite, " " . . . . .	3
Fuller's Earth, " " . . . . .	3
Tin " " . . . . .	3
Steatite, " " . . . . .	3
Bauxite, " " . . . . .	3
<b>SECTION III.—ACCIDENTS.</b>	
General Remarks . . . . .	3
Decrease of accidents . . . . .	3
Increase of deaths . . . . .	3
Death rates . . . . .	3
Deaths in each mineral worked . . . . .	4
" due to want of supervision . . . . .	4
Goafing or pillar getting, advance in operation of . . . . .	4
" " collapse in a Bengal mine during . . . . .	4
Explosions of gas . . . . .	5
Accident at the Equitable Coal Co.'s Dishargarh mine . . . . .	5
" " Saltore Coal Co.'s Saltore mine . . . . .	8
" " Ghusik and Muslia Collieries' Muslia colliery . . . . .	8
" " Assam Railways and Trading Co.'s Namdang mine . . . . .	9
Falls of roof and sides . . . . .	11
Accident at the Budruchak Coal Mining Co.'s Budruchak colliery . . . . .	11
" " Gopalichak Coal Co.'s Gopalichak colliery . . . . .	12
" " East Indian Coal Co.'s Kendwadih colliery . . . . .	12
" " Raniganj Coal Association's Alkusa colliery . . . . .	12
" at Apcar & Co.'s Charanpur colliery . . . . .	12
" at the Bengal Coal Co.'s Sitalpur " . . . . .	12
" " Royal Bengal Coal Co.'s Kusumkavali colliery . . . . .	14
" " New Beerbhun Coal Co.'s Chinchuria colliery . . . . .	14
" " Eastern Coal Co.'s Bhowra colliery . . . . .	15
" at A. Subba Naidu's Inurkurti mica mine . . . . .	15
" at the Eastern Coal Co.'s Kankani colliery . . . . .	15
" " Shivrajpur Syndicate's Shivrajpur manganese mine . . . . .	15
" at Burn & Co.'s Pottery colliery . . . . .	17

	PAGE
In shafts . . . . .	17
Accident at the Equitable Coal Co.'s Bejdih colliery . . . . .	17
" " Katras Jharia Coal Co.'s Sibpur colliery . . . . .	17
" " East Indian Railway Co.'s Serampur colliery . . . . .	18
" " New Beerbhum Coal Co.'s Borrea colliery . . . . .	18
By Explosives . . . . .	18
Accident at the Standard Coal Co.'s Benahir colliery . . . . .	18
Eruptions of water or falling into water . . . . .	18
Accident at the Bengal Coal Co.'s Muralidih colliery . . . . .	18
By Haulage . . . . .	19
Accident at the Nodiha Coal Co.'s Nodiha colliery . . . . .	19
" " Kusunda and Nayadi Collieries' Kusunda colliery . . . . .	19
" " Bilbera Coal Co.'s Baraboni colliery . . . . .	20
" " Bengal Coal Co.'s Sanctoria " . . . . .	20
Accidents not included in the statistics . . . . .	20
Accident at the Kusunda and Nayadi Collieries' Kusunda colliery . . . . .	20
" " British India Coal Co.'s Napara colliery . . . . .	20
<b>SECTION IV.</b>	
Prosecutions and additions to the Act . . . . .	21
Prosecutions . . . . .	21
" , Standard Coal Co.'s Benahir colliery . . . . .	21
" , Tofani Singh's Tarajhopa mica mine . . . . .	21
" , Bengal Coal Co.'s Muralidih colliery . . . . .	21
" " " " Sitalpur " . . . . .	23
<b>SECTION V.</b>	
General remarks . . . . .	23
Health and sanitation . . . . .	23
Jharia coalfields water supply, schemes being drawn up . . . . .	23
Plague at the Central India Mining Co.'s Kachurwahi manganese mine . . . . .	23
" " " " Provinces Prospecting Syndicate's manganese mines . . . . .	23
Malarial fever at the Burma Development Syndicate's Chooling tin mine . . . . .	23
Mosquito operations in force at the Burma ruby mines . . . . .	23
Ambulance work . . . . .	23
Classes organized in the Jharia and Giridih coalfields . . . . .	24
Examination held . . . . .	24
Proposal to form a Central Committee . . . . .	24
" " increase number of classes . . . . .	24
" " arrange for instruction in the vernacular . . . . .	24
" " start a fund . . . . .	24
Mining Education in Bengal . . . . .	24
Diploma examination and result . . . . .	24
Installation of Electric plants at the Civil Engineering College, Sibpur . . . . .	24
Cold weather camp . . . . .	24
Special mining students find difficulty in passing college examinations . . . . .	25
Chief reason for special students joining college . . . . .	25
Report of Mining Instructor, Bengal coalfields . . . . .	26
Return of Mr. Griffiths to England . . . . .	25
True meridian lines in the Bengal coalfields . . . . .	25
" " " " Places where laid down . . . . .	25
Mining and Geological Institute of India . . . . .	26
Indian Mining and Geological Club launched in London . . . . .	26
Board of Examiners . . . . .	26
Chief defects in candidates' preparation . . . . .	27
Mining Board . . . . .	27
Edward medal . . . . .	27
" " Second class bestowed on Ram Lal Bauri . . . . .	27
" " First " " " W. H. Pickering . . . . .	27
Official duties . . . . .	27
<b>APPENDIX I.—STATISTICS OF MINES AND MINERALS.</b>	
TABLE NO. 1.—Number of mines and workers and output of minerals . . . . .	29
" " 2.—Number of mines opened and closed . . . . .	40
" " 3.—List of plans of abandoned and discontinued mines . . . . .	43
" " 4.—Fluctuations in output . . . . .	44
" " 5.—Coal raised and death-rates . . . . .	45
" " 6.—Coal raised per person employed in various countries . . . . .	45
<b>APPENDIX II.</b>	
TABLE NO. 1.—Details of fatal accidents . . . . .	46
" " 2.—Fatal and serious accidents . . . . .	63
" " 3.—Fatal accidents and deaths classified according to age and sex . . . . .	65
" " 4.—" " " " classified according to cause . . . . .	66
<b>APPENDIX III.</b>	
Prosecutions . . . . .	67
<b>APPENDIX IV.—MISCELLANEOUS.</b>	
STATEMENT NO. 1.—List of inspection circles . . . . .	68
" " 2.—" " " " certificate holders . . . . .	69
" " 3.—" " " " Mining Universities . . . . .	70
" " 4.—Sibpur mining classes . . . . .	71
" " 5.—Mining instruction in Bengal . . . . .	73

FROM

G. F. ADAMS, Esq.,  
*Chief Inspector of Mines in India,*

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,  
DEPARTMENT OF COMMERCE AND INDUSTRY.

*Dated Dhanbaid, 12th June 1911.*

SIR,

I have the honour to submit the report upon the inspection of mines in British India for the year ending 31st December 1910.

### EXPLANATORY INTRODUCTION.

It is necessary to explain that this is a report relating entirely to the administration of the Indian Mines Act, 1901, and is not a complete statistical review of Indian Mining and analogous industries.

No official publication embodying such statistics is at present issued for India. A Quinquennial Review of the mineral production of India during the years 1904 to 1908 was published during the year, being Volume XXXIX of the Records of the Geological Survey of India. Figures for Mysore, where most of the Indian gold is raised, are given in the report of the Chief Inspector of that Native State, and mineral statistics may also be found in the administrative reports of the various Presidencies, Provinces and States of India.

It should be remembered in reading the statistics that there must be a considerable output from quarries which are under 20 feet deep; and owing to the exclusion of such places from the scope of the Mines Act these figures should not be regarded as a complete index to the production of the mineral wealth of the country.

The report is divided into five sections, viz. :—

- |         |  |
|---------|--|
| Section | I.—Persons employed.                       |
| „       | II.—Output of mineral.                     |
| „       | III.—Accidents.                            |
| „       | IV.—Prosecutions and additions to the Act. |
| „       | V.—General Remarks.                        |

---

#### Section I.—Persons employed.

During the year 1910 the average number of persons working in and about the mines regulated by the Indian Mines Act, was 144,680 of whom 89,778 worked underground and 54,902 on the surface; 91,713 of the persons were adult males, 47,963 adult females and 5,004 children under 12 years of age. This is an increase of 3,970 workers or 2·7 per cent. as compared with the number of workers in 1909. This increase was in the numbers of those working in mines other than coal mines, for the persons employed in coal mines decreased in number by 4,006.

There appears to have been little or no recovery, as far as mines other than coal mines are concerned, from the depressed conditions set forth in the last Annual Report. These matters are alluded to more fully in the next section.

The district reports show that the mineral industry of India in 1910 remained in a subdued condition. No extreme shortage of labour was reported from any district. For working the manganese mines in the Nagpur district of the Central Provinces local labour was not sufficiently available and labour had to be imported at a higher cost. Wages of miners ruled high throughout Burma, and an increase of wages is also reported in some of the mica splitting factories in the Hazaribagh district of Bengal.

## Section II.—Output of mineral.

### COAL.

There was a slight increase in the output, which was 11,387,716 tons, and which, compared with 11,294,227 tons raised in 1909, is an increase of 0·83 per cent. In 1909 there was a decrease of 7 per cent.

Of the total 10,777,306, tons or 94·64 per cent. were raised in Bengal. This ratio is practically the same as in the previous year. As far as this Province is concerned the coalfields which contributed to the increase were Raniganj and the smaller coalfields with increases of 4·4 and 0·29 per cent. There were decreases of 0·65 and 0·33 per cent. in the Jharia and Giridih coalfields.

In the Central Provinces and Assam there have been decreases of 7·4 and 2·8 per cent., while increases of 32·2 and 7·8 per cent. have to be recorded from the Panjab and Baluchistan. In the last Province the percentage has been arrived at without taking into account the output of some small non-Act mines, which were included in previous reports but which are omitted now and will be omitted in future. The increase in the Panjab appears to be of a temporary character.

The coal trade during the year was still in the trough of the wave, but owing to the closing down of unprofitable mines, there was not such a large accumulation of stocks as in the previous year, and the trade was brought more into line with the change from the abnormal conditions existing in 1908.

### MICA.

The output was 21,375 cwts., compared with 32,011 cwts. in 1909. This is a decrease of 10,636 cwts. or 33 per cent., a decrease of 30 per cent. having been reported last year.

The decrease was general throughout the fields, and applied more to slab mica than to splittings, for the amount of the former commodity received in London appears to have been considerably less than in former years, while the trade in splittings appears to have slightly improved.

Those who have long experience of the mica trade agree that in so far as splittings can be used in the place of stained slab mica for electrical purposes the use of them must have an adverse effect on the value of such mica as is usable for the same purpose. Clear and slightly stained slab mica however does not appear to be affected one way or the other by the trade in splittings.

The London market generally continued to be as dull as in the previous two years. There was a slight improvement in prices in the autumn.

### MANGANESE ORE.

The output of manganese ore was 468,669 tons as compared with 357,205 tons in 1909, making an increase of 111,464 tons, or 31·2 per cent., the first to be recorded since 1907. There was however no material change in the prospects of the industry. The market continued in a depressed condition and the price per unit of ore

was practically unchanged, averaging just under nine pence. Only the larger companies have been able to continue operations and there was no sign of any pronounced improvement in trade during the year.

#### GEMS.

There was a slight decrease in the output of gems, the output being 262,032 carats, while the previous year's output was 265,010 carats. The output is almost entirely from the ruby mines in Burma but a small quantity of diamonds was obtained during 1910 from a mine in the Koornool district of Madras. This however was closed down towards the end of the year, and its output may be disregarded. Red rubies are not in such request as they used to be in Europe and there was a continuous slump in the market throughout the year.

#### GOLD.

Another decrease has to be recorded in gold, the figures being 3,269 oz. in 1910 and 5,615 oz. in 1909. It is with great regret that I have to record that after working for ten years, spending at least half a million pounds and attaining a greatest depth of 1,260 feet, measured on the inclination of the reef, the various companies in the Dharwar gold field have decided to abandon their enterprises and all underground work ceased towards the end of the year. In all ten distinct companies have carried out mining operations on different blocks. In nearly every case the reef for the first few levels gave encouraging results, and in some instances high values, but as further depth was attained the values decreased. The last two levels driven in the deepest mine gave better results than had been obtained for some time. At the present time the mill tailings at this mine are being concentrated and then treated by the cyanide process with agitation, previous efforts to treat them by the ordinary cyanide process having proved unsuccessful. This work should be completed during this year.

Hopes are entertained of better prospects in the Anantapur district of Madras. The venture is still in the prospecting stage but one company has reached a depth of 573 feet and has ten stamps at work. Prospecting is going on over a length of seven miles to the south of this. At the southern end a depth of 480 feet has been reached and payable ground is being opened up at that depth.

#### OTHER MINERALS.

There were increases in limestone, iron, magnesite, copper, Jabalpur clay, galena and graphite, and decreases in salt, slate, wolframite, chromite, Fuller's earth, tin, steatite and bauxite. There is nothing to call for special comment as regards the present condition of the trade in any of these minerals as far as India is concerned.

### Section III.—Accidents.

#### GENERAL REMARKS.

During the year 1910 at mines regulated by the Indian Mines Act, 1901, there were 117 fatal accidents, being a decrease of 9 as compared with the number in 1909, and a decrease of 5 as compared with the average number in the preceding three years.

These accidents involved the loss of 186 lives. This is an increase of 34 upon the number of deaths in 1909. Fifty-five however were the result of 5 accidents, leaving 131 to be accounted for by the remaining 112.

The death rate per thousand persons employed was 1.29, the average of the preceding three years being 1.03. At coal mines only these figures were 1.52 and 1.12, and at mines other than coal .66 and .77.

At coal mines only the death rate per million tons raised was 14·05, the average of the preceding three years being 10·98.

Of the persons killed 155 were males and 31 were females.

The deaths occurring in each mineral worked were as follows :—

160 in coal ; 5 in mica ; 17 in manganese ; 1 in salt, 1 in gems and 2 in gold.

27 persons lost their lives by explosions of firedamp ; 84 by falls of roof and sides ; 20 in shafts ; 8 by explosives ; 6 by irruption of water ; 16 by haulage ; 9 by other accidents underground, and 16 on the surface.

A list of these accidents appears in Appendix II, Table I. In addition to them there were 27 others causing the death of 30 persons. These also appear in Appendix II, Table I, but are listed separately, a reason being given in each case for their exclusion from the statistical tables.

Seventy-one per cent. of the statistical accidents occurred in the Bengal coal mines. In reviewing them generally, and also those which were serious but not fatal, there is evidence that in many cases the cause, in some instances direct and in others indirect, was want of supervision. Reference is here made not so much to personal supervision by the manager, though in many cases that should be more frequently exercised, as to supervision by an adequate and efficient staff of subordinate officials. It is enacted by rule 4 of the rules for the working of coal mines that a competent person shall examine every part of the mine where persons have to work or pass once in every twenty-four hours. This relates to examination of the physical conditions of the mine. But it is not sufficient for the prevention of many kinds of accidents relating directly to such physical conditions, and it is certainly not sufficient for the prevention of accidents arising from the vagaries of the Indian miner, a much more common cause.

There is a steady advance in the operation of goafing or the systematic getting of pillars. This is correct and proper mining, but specific accidents appertain to it, and these are more numerous than they would be if larger pillars were left in the first working. The old system, still in vogue to a certain extent, consisted of making the galleries as wide and the pillars as small as would just keep the mine from caving in—the idea of recovering these pillars was never entertained—and there has been a gradual evolution to the best practice, confined at present to the best managed mines, of driving narrow galleries and leaving substantial pillars. The benefits to be derived from this practice, which in Bengal is essentially modern, will be reaped in the future but meanwhile the work of getting such pillars as have been formed on a somewhat larger scale than as described but still on too small a scale for the achievement of the best results is being attempted. Not only does the getting of these comparatively small pillars with wide galleries involve risk, but from time to time there occur heavy breakdowns, the getting of a certain number of pillars bringing about a collapse, owing to the altered strain on the roof, over an area of pillars still standing, the getting of which such collapse for ever precludes. It is in order to show how, apart from the question of danger, loss results to mine owners, and incidentally to the country, in this way, that I attach to this report a plan, plan F, of a mine in Bengal, where recently the getting of pillars over an area of 28 bighas has resulted in a sudden collapse over an unrecovered area of 18 bighas. It is doubtful whether many, if any, more pillars will be recovered from this mine.

In many cases, probably the majority of cases, there has been considerable shrinkage in the size of the pillars and consequent enlargement of the size of the galleries owing to the prolonged period which has elapsed since they were first formed, a period during which natural weathering and surreptitious pillar robbing have brought about their results, including as they do disintegration and consequent deterioration of the coal left in the pillars. There are however signs that safer and in the long run more economical methods of working are receiving the consideration of mine owners and managers.

Each fatal accident is briefly described in Appendix II, Table I, but the following are reported on at greater length. The numbers refer to the numbers in the Appendix.



## EXPLOSIONS OF GAS.

## No. 1. Equitable Coal Company's Dishargarh coal mine, Nos. 1 and 3 shafts.

Up to now there has been an almost universally prevalent idea that Bengal coal mines are immune from explosions of firedamp except on a minute scale. This idea however must now be definitely abandoned in view of the serious explosion which occurred at this mine in February of last year. Eleven persons lost their lives, and the death roll might easily have been greater than it was.

Before detailing the circumstances attending the explosion itself a brief description of the underground workings and general scheme of ventilation must be given.

The principal seam worked from these shafts is the Sanctoria seam, which has been extensively worked for many years, the workings extending from the shafts 3,000 feet to the south, 1,000 feet to the west and 400 feet to the east. About two years before the explosion the Hatnol seam, which lies 106 feet above the Sanctoria seam, was won by a landing in No. 3 shaft and by a stone drift from the Sanctoria seam.

The workings in the Hatnol seam and the portion of the workings in the Sanctoria seam in the neighbourhood of the shafts are shown on Plan A, and the condition of the workings in the Hatnol seam after the explosion is shown on Plan B.

It will be seen from the plans that the workings in the Hatnol seam consisted of a dip gallery driven down from No. 3 shaft landing, a level driven a short way east, a level joining the dip gallery with the top of the stone drift, a very short rise gallery in continuation of the drift, and a level which had been driven west for a distance of 76 feet. The coal was despatched in tubs down the drift by a self-acting incline, the drum being in the rise gallery. At the bottom of the drift the tubs were pushed by hand along the main shaft level in the Sanctoria seam to No. 3 shaft.

No. 3 shaft was the downcast and No. 1 shaft the upcast, the ventilation of the mine being effected by the heat of the exhaust steam from one pump, two hauling engines and the pipes conveying steam to them. The ventilation of the Sanctoria seam—the main ventilation of the mine—passed the landing in No. 3 shaft to the shaft bottom, thence down the main dip of the Sanctoria seam, round the workings and back to No. 1 shaft. The ventilation of the Hatnol seam split from the main ventilation at the landing in the shaft, passed down the dip gallery and left the seam by the drift. Where the drift takes off the main shaft level in the Sanctoria seam the air joined a small split coming west from No. 3 shaft, scaling through openings left for the purpose at the top of the doors D 1 and D 2. After joining the two splits proceeded to No. 1 shaft, partly over similar openings over the doors D 3, D 4 and D 5, and partly through a hole in the stopping in the first old rise gallery west of the drift and through the pump chamber. The three splits were therefore dependable upon each other and a short-circuiting in one would affect adversely the other two.

Gas has been found from time to time in both seams. The Sanctoria seam was being worked with naked lights, with the exception that safety lamps were occasionally used when driving forward narrow places, but safety lamps were exclusively used in the Hatnol seam.

The management have stated that the amount of air passing through the Hatnol seam averaged 10,000 cubic feet per minute.

Thirty-four days before the explosion the manager found gas in the west level in the Hatnol seam, and withdrew the men from the level. He caused a hand fan and pipes to be placed there about that date, but the use of the fan was abandoned after it had been worked for two days and from that time on no effective attempt was made to remove completely the gas from the west level, in other words to ventilate it and keep it ventilated.

Ten days before the explosion the agent inspected these workings. He found the gas fairly strong about half-way in the level and also hanging about the roof at the top of the drift. He gave orders for hurdle-sheets to be erected to keep the drift clear, these being brattice sheets stretched across the gallery and a certain

height up in order to throw the air up to the roof. These sheets would not affect the west level.

Four days before the explosion the manager found gas in the west level at a distance of forty feet in. The level therefore, both on that day and the day on which the agent inspected, contained gas—strictly speaking an inflammable mixture of gas and air—for a distance of 36 feet back from the face, an accumulation of about 900 cubic feet. He has stated that he then told the assistant to get up brattice and clear out the gas at the Sunday stoppage. He did not specify how it was to be done. The gas was not cleared out on the Sunday, a fact of which the manager was quite aware. All that was done was that on the Sunday, which was the day before the explosion, the European assistant took down brattice cloth and erected it at the mouth of the west level with a view of forcing the air into the mouth of the level. He stated that it extended 15 feet into the level.

He visited the Hatnol seam again about noon the next day.

At about ten o'clock that night, while ten miners were at work in the Hatnol seam, an explosion occurred. From the position of the bodies and from the medical evidence the ten men must have been killed instantaneously. Signs of considerable violence were found on the drift. Timber was scattered in all directions. Three empty iron tubs standing at the top of the drift were damaged beyond repair, the end of one was blown in one direction and a side was blown in the opposite direction. The haulage drum supports of 8" square timber were broken and the 8" x 4" steel roof girders were bent. One of the hauling ropes was torn off the drum and the three tubs at the bottom of the drift which were attached to the rope were blown across the Sanctoria main level. The hand fan was blown six feet from the air pipes laid in the west level. The doors D 1 and D 2 and the brick pillars at the sides of them were blown towards No. 3 shaft, door D 3 with its masonry support was blown towards No. 1 shaft, door D 4 was blown in the same direction and door D 5 was intact.

In the Sanctoria seam the men at No. 3 shaft bottom, who were engaged in putting the tubs from both seams into the cages, were uninjured, but shortly after the explosion they heard a voice on the Sanctoria level and they found an injured man named Shambu Bauri between the shaft and the door D 1. He was taken to the surface and died at 9 A.M., next day, but at 4 A.M. he informed Mr. Leach, the Inspector of Mines for the Circle, to whom the manager had sent news of the accident, that he was a pump khalassi in the Sanctoria seam, that he had passed the bottom of No. 1 shaft and was proceeding along the level towards No. 3 shaft with an open light in his hand and when he had reached the door next to No. 3 shaft he saw flame and heard a rumbling noise. According to the medical evidence this man was in a rational state at the time he made the statement but not capable of much mental effort.

Mr. Leach at about 4-30 A.M. found gas at the mouth of the west level and at the inbye side of the west level towards the haulage drum and faint signs of gas at the junction of the four galleries.

It is impossible to say with certainty what actually caused this explosion. All the lamps in the Hatnol seam were intact with the exception of one, No. 66. This lamp was found in the position indicated on Plan B, the bonnet having been wrenched off the vessel, and the glass missing. Fragments of the glass were found in a ledge, also marked on the plan, in the side of the gallery, showing plainly where the lamp had been placed before the explosion. It has been suggested that the gas came out of the level as far back as this lamp, that it burnt inside the lamp until the gauzes got red hot and that the gas outside the lamp was then fired. There was a mark caused by heating on the top of the outer gauze but it was of a kind that is often seen on gauzes that have been exposed to a high oil flame. The gauzes were in good condition. To support this theory the gas would have had to come back past the brattice sheet at the mouth of the level against the air current, which is unlikely in the extreme. Moreover if the lamp had communicated flame to the outer air in this way, there would have been no reason for it to have been shattered in the way it was. The cubic contents of the inside of a lamp are too small for an explosion of that amount of inflammable mixture to have had such rending power. Mr. James Ashworth, the well-known authority on safety lamps has stated "It is absolutely impossible to dismember any safety lamp by an explosion of gas within the lamp." Another suggestion, that this lamp was

shattered by being struck by the end of the incline rope, a steel wire rope 1" in diameter, is probably correct. For this rope was jerked off the drum by the force with which the three empty tubs attached to it standing at the bottom of the drift were impelled and it is quite conceivable that in its travel the end of the rope might whip the lamp off the ledge.

It is also to be noted that as far as experts have been able to decide by recent experiments it is impossible for a double gauze Marsaut lamp, as this was, to fire gas by means of the gauze in a still atmosphere in which lamp No. 66 undoubtedly was. These lamps have been successfully tested in inflammable mixtures of high velocities, and since this explosion Mr. G. C. Leach, the Inspector of Mines and Mr. J. R. R. Wilson, who was Chief Inspector of Mines when the explosion occurred, have carried out experiments, the former at the Civil Engineering College at Sibpur, and the latter in England, and both have failed after severe tests to ignite gas through the gauzes of a double gauze Marsaut lamp in a still atmosphere.

The most natural theory is that the gas was ignited by the naked light carried by Shambu Bauri. It is probable that such bratticing as the European assistant did put up the day before the explosion disturbed the equilibrium in the west level and that gas was diffusing from it in increased quantity unnoticed on the day of the explosion. As has been stated Mr. Leach found it coming out of the west level six hours after the explosion. It is also possible that either by accidental short-circuiting of the air in the main split in the Sanctoria seam, or, more probably, by the men who handled the tubs on No. 3 shaft level leaving the doors D 1 and D 2 open, the ventilation in the drift was less than usual and less able to dilute gas which would then gradually make its way down the drift to the level and flow towards No. 1 shaft. It would be ignited by Shambu Bauri somewhere between the bottom of the drift and No. 1 shaft, probably quite close to the bottom of the drift. The ignited gas would burn up the drift until it met the large quantity of gas up in the Hatnol seam when a violent explosion would accrue at the top of the drift.

In order to account for the presence of Shambu Bauri at the place where he was found, it is necessary to assume that after the explosion he walked from near the bottom of the drift where he first ignited the gas to where he was found. It was quite possible for him to have done so. Having regard to the condition he was in when he made his statement to Mr. Leach it cannot be considered certain that he had reached the door next to No. 3 shaft before anything happened.

After the explosion a brattice sheet was erected longitudinally up the west level to the face of it. The work took less than a day and cost Rs. 75. The gas was cleared out in a few hours and has not been detected since.

There are few accidents in mines which do not inculcate useful lessons, and it is to be hoped that managers will realise from this fatality the risk run by leaving a volume of gas standing for several days, with a chance of its coming in contact with a naked light, should any derangement of the ventilation or increased feed cause it to move out into the air current. There is risk even with the exclusive use of safety lamps. The safety lamp is the most perfect instrument at present at our disposal as a practical safeguard against explosions of firedamp in mines, but the human element enters largely into its comparative safety both as regards the putting of it together after cleaning and the use of it underground. An Indian miner may not understand that the breaking of a lamp glass or the propping open of a ventilation door or sheet may have the most serious consequences, and hence the exercise of vigilance and the taking of every precaution is all the more necessary in this country.

Apart from all other steps which might have been taken, it is probable that if an inspection of the Hatnol seam workings had been made by a subordinate official early in the evening on which the explosion occurred, it could have been averted.

The responsibility of the manager in this case has been made the subject of an inquiry under Section 18 of the Indian Mines Act and subsequently under Rule 44, made under Section 20 of the Act. In view of certain elements of doubt attending the circumstances of the case, the Government of Bengal accepted the recommendation of the officer appointed under that rule and decided that the manager's certificate should not be suspended.

### No. 2. Saltore Coal Company's Saltore coal mine.

The No. 2 shaft at this mine had reached the Dishargarh seam, which is 16 feet thick, at a depth of 540 feet. No connection had been made to any other shaft but two level galleries had been driven near the bottom of the seam, one going west for 112 feet, and one going east for 166 feet. Seventeen feet away from the shaft on the west side a rise gallery had been driven up for 25 feet and 16 feet from the shaft on the east side a similar gallery had been driven up for 35 feet.

Safety lamps had been used when driving all these galleries. It was stated that no gas had been seen, but that owing to trouble with water and lack of ventilation, the driving of them had been stopped two months before the explosion and that the only persons who had been employed underground since had been engaged in fitting up a new pump in the west level close to the shaft. These men were allowed to use open acetylene lights.

Fences had been erected on the west side at the mouth of the rise gallery and at a point about thirty feet further inbye on the west level, but no daily inspection was made of the mine beyond the pump. A good current of air was forced down the shaft by a Sirocco fan through a column of air pipes 18 inches in diameter, but as the end of the column stopped in the shaft 13 feet above the roof of the west level, there was no circulation of air in the galleries.

At the time of the explosion a European foreman sinker, with a head fitter, another fitter, and three coolies were at work at the pump. They had two acetylene lights, both of which were near the pump. At about 9-45 A.M. an explosion occurred. The foreman sinker and four men ran to the shaft and jumped into the water in the sump. The head fitter came out afterwards but did not jump into the water. He died six hours after. The foreman sinker, the other fitter and one cooly were severely, and the other two coolies were slightly, burnt. The morning after the explosion Mr. R. R. Simpson, the Inspector in charge of the Circle, found, in the west level, 45 feet from the shaft and outbye of the fence, a gas cap in the safety lamp  $1\frac{1}{2}$  inches in height, and in the west rise gallery a cap  $\frac{1}{2}$  inch in height.

It is evident that after the driving of the galleries was stopped, gas slowly accumulated in the west level until it extended as far out as the pump, where it exploded at one of the acetylene lights.

The explosion would not have occurred if proper daily inspection with a safety lamp had been made of these galleries. The fact that work was confined to the pump may have legally absolved the manager from having a daily inspection, as required by rule 4, made at any point inbye. The Dishargarh seam however is known to contain gas, and in this seam, in a virgin field such as Saltore, more than ordinary precautions should have been taken. In view of the fact that naked lights were used and no inspection was made at least once a day with a safety lamp, it cannot be said that any precautions were taken at all.

### No. 3. Ghusik and Muslia Collieries' Muslia coal mine.

A shaft had been sunk 320 feet to the Ghusik seam. It had not been connected to any other shaft and an attempt had been made to ventilate it temporarily by means of a length of 12 inch air pipes in the shaft and a wind cowl. This arrangement had proved inadequate to deal with the large quantity of gas met with in driving short galleries in four directions from the bottom of the shaft. At times it was possible to detect gas in the safety lamp at the top of the shaft, and, owing to the danger of igniting this gas on the surface, fires and lights had been prohibited near the shaft and night work on the surface had been stopped for some months.

No work had been done in the galleries for some weeks previous to the explosion and no one was underground when it occurred.

It had been arranged to replace the wind cowl by a fan, worked by a steam engine, and these had been erected but the fan had not been coupled to the range of air pipes in the shaft.

While two masons and a bucket man were at the top of the shaft engaged in connecting the pipes to the fan by means of brickwork, one of them, wishing to

smoke, put his head and shoulders into the end of the air pipe and struck a match in it. Immediately a considerable flame issued from the mouth of the pipe and all three men were severely burnt. They at once left the spot and had time to go a distance of one hundred feet before there was a loud report, audible more than a mile away, and a large volume of flame issued from the shaft with explosive violence. The damage done at the top of the shaft was considerable. The headgear was lifted bodily to a height of eight inches and debris was scattered to a distance of four hundred feet away.

The range of air pipes which reached down in the shaft to four feet above the roof of the galleries was evidently upcasting and when gas was ignited at the top of the range, the flame travelled down the pipes to the bottom of the shaft where it must have come in contact with a large volume of gas, causing a violent explosion.

The bucket man succumbed to his injuries on the following day.

Three hours before the explosion three men had been employed for about an hour and a half in the bucket in the shaft close to the bottom, attending to the air pipes, and they were again down for a few minutes a quarter of an hour before the explosion. They had no light but worked in daylight penetrating down the shaft. They felt no inconvenience in breathing, although they must have been in an explosive atmosphere. This is not at variance with general experience in such cases.

The whole range of air pipes collapsed inwards and flattened out as the result of the partial vacuum due to the condensation of the steam in the afterdamp and the rapid cooling of the gases which had been burnt within them.

After the explosion the water which was allowed to rise in the shaft was in a state of violent ebullition, which proved that a large quantity of gas was being given off in the galleries.

This accident, the circumstances attending which were most unusual, was due to the imprudence and disobedience of the workman who struck the match. One of the workmen admitted they had been told not to smoke.

The fan has since been connected and set to work, but as even since then considerable trouble has been experienced in ventilating the mine while the necessary connection with another shaft is being made underground, it might be remarked that when a shaft and galleries have to be temporarily ventilated in this way, a suction fan, by means of which any gas met with is drawn into the pipes and carried direct to the fan, is a better expedient than a blowing fan which, blowing the air down the pipes, forces the gas to the surface through the galleries and the shaft, where persons have to work and travel.

#### No. 4. Assam Railways and Trading Company's Namdang coal mine.

This accident consisted of a series of four explosions which occurred over a period of ten hours.

The mine is worked on the principle of driving main ways for a certain distance and then working the coal back in a series of chambers. As soon as a chamber is finished it is dammed off, the present workings being separated by the dams from the old workings or "deads" in which fire is always more or less present.

The coal is 106 feet thick, with several partings. The main seams worked are known as top coal (27 feet thick), middle coal (16 feet thick) and bottom coal (32 feet thick).

There are three districts in the mine and the accident occurred in the bottom coal seam in No. 1 district which is the district outbye of the other two.

The workings of this district are shown on Plan C. The seams dip at an angle of 56 degrees, so that, with the exception of cross measure roads, all roads in a north-west and south-east direction are highly inclined, the roads at right angles to them being practically level.

All dams shown in red upon the plan have been built since the accident with the exception that the new dam at A in the rise workings was being built when the first explosion occurred and those at D and E in the next levels below were being built when the fourth explosion occurred.

On the morning of the 26th November, the assistant foreman of No. 1 district noticed "firestink" in the main return airway. On proceeding further into the mine he noticed the old dam at A smoking. He had it plastered and sent for the manager who at 11 o'clock in the day instructed him to build another dam 5 feet away from the first and fill up the intervening space with sand.

At about 2 P.M. the manager who had gone out of the mine received a verbal message from the assistant foreman stating that the smoke had been stopped and that the work was progressing satisfactorily. The manager then left for Margherita about three miles away, where his superiors, the agent and general manager and the colliery superintendent, reside.

At about 2 P.M. an explosion occurred in the deads behind the dam. There was it appears a loud report, both the old and the new dams were blown out and a sirdar was slightly burnt.

The assistant foreman sent a written report of this occurrence to the manager who received it at Margherita at about half-past five. The assistant foreman however did not state in this report that any one had been burnt. He merely stated there had been a blast, that the smoke was coming out again dense and hot and that he was about to erect brattice (for ventilation).

After sending the report the assistant foreman returned to the vicinity of the dam and about an hour after the first explosion a second occurred, and he and ten coolies were burnt. The former has recovered, after being many weeks in hospital, but five of the coolies, who were all taken to hospital, have died.

As these men were retreating an hour afterwards a third explosion occurred. They were far enough away for the effects to be restricted to a rush of wind from behind them.

When the manager received the report of the first explosion he went straight back to the mine taking with him two other assistant foremen. On arrival he was told that the assistant foreman of No. 1 district and several other coolies had been burnt. He went to the hospital and saw the latter but without seeing the former who had gone to his bungalow, a little way off, he rushed into the mine with the two other assistant foremen and several more coolies. They all proceeded to the vicinity of the dam and again proceeded to restore the ventilation by building dams at D and E. Just before midnight a fourth explosion occurred burning one of the assistant foremen and twelve coolies. The former and eight of the latter have died in hospital. Three coolies close to dam E were uninjured.

The total death roll was therefore one European and thirteen coolies.

The manager then retreated with his men and proceeded to dam off the whole district at F. He sent for his superiors, who arrived at 2 A.M., and strong dams were erected at F, K, L, and M to completely isolate the whole district.

This was the condition when I arrived at the mine and after consultation it was arranged to still further strengthen these four dams with others at P, Q, R, S, and T on the outbye side of them.

These fatalities could have been prevented if prudence and caution had been exercised, and if it had been realised by the assistant foreman, who holds a first class certificate, that after the first explosion had occurred the occurrence of another was quite possible, and if therefore, after the first explosion he had withdrawn his men to a place of safety and had there commenced to dam off this portion of the mine. In reviewing his responsibility it must also be noted that it is a general instruction that each European assistant foreman shall inspect his dams every day, as, long before actual smoke comes through, black damp can be detected in the safety lamp. In this case he admitted that he had not seen the dam at A since the 23rd November as he had fever. He did not inform the manager on the intervening days that he was unable to see this dam.

The question of carrying on the necessary operations in a place of safety applies equally, if not with more force, to the manager. He stated that when he entered the mine he did not realise that there had been more than one explosion, the one reported to him in writing. This report did not state that anyone had been burnt. He saw however in the hospital the coolies who had been burnt and he was informed that the assistant foreman had been burnt also, and he might have realised that the report could not have been written by a man who had been burnt, if he had gone from the hospital to the assistant foreman's bungalow,

and had seen how badly this man had been burnt, his subsequent movements and plans would probably have been very different from what they were. Over and over again it has been pointed out in reports on serious accidents how additional lives have been sacrificed by blindly rushing underground without proper consultation and full knowledge of all the facts.

There was no breach of any regulation of the Indian Mines Act.

The manager is the holder of a second class certificate under the English Coal Mines Regulation Act and he was managing this mine under a temporary authorization granted by the Chief Inspector of Mines in India under Rule 49 made under Section 20 of the Indian Mines Act. This authorization has been withdrawn.

In regard to the immediate cause of these explosions either explosive gas was ignited by fire in the old workings, or else heavy falls drove the flame out.

There have been two similar occurrences in India. On page 13 of the Report of the Chief Inspector of Mines in India for 1907 an underground fire at Messrs. Apar and Company's Charanpur coal mine, and on page 4 of the Report for 1909 an accident, classed as an explosion for reasons stated, at the Assam Railway and Trading Company's Tikak coal mine, adjoining Namdang, were reported.

In the last case it was pointed out that gas had never been seen in the mine and that naked lights only were used, that it was very unlikely that generated carbon monoxide reached the explosive point and became ignited, and that the explanation was probably the simpler one that a heavy fall took place in the burning goaf.

In the first case it is stated that "a heavy fall took place and the air blast demolished the scaffolds." This occurrence was afterwards discussed by the members of the Mining and Geological Institute of India, Messrs. W. H. Pickering and R. R. Simpson, who were both actively engaged in combating the fire, having contributed a paper on the circumstances attending it. The authors inclined to the theory that there was no explosion and that the air blast was caused by a heavy fall of roof or coal in the fire area. This theory was not universally held at the time of the discussion and since then, the fire having been put out, Mr. Simpson has been able to make an inspection in a portion of the actual area. He found that no extensive fall had taken place, and now holds that the occurrence was an explosion. As at Tikak, no gas has ever been seen at Charanpur, and the shallowness of the workings precluded the probability of any ever being seen, but the fact that the theory of explosion is now forced on us in the Charanpur case leads me to believe now that both at Tikak and Namdang actual explosions took place, and that, although in most of the coal seams in India, firedamp may not be detected in ordinary working circumstances, yet when these seams are on fire explosions of gas, the exact composition of which cannot be ascertained, are liable to occur. Every care therefore should be taken when dealing with such cases.

There are two other reasons which support the theory that the occurrences at Namdang were explosions of gas. Eighteen days afterwards an undoubted explosion of gas took place at a dam in Tikak mine, the gas being ignited by a naked light. One European and five coolies were slightly burnt. As before stated, Tikak and Namdang adjoin each other, and as the old workings of both mines are interconnected, the presence of gas at Tikak points to gas being present also at Namdang. The second reason is as follows:—To the rise of Namdang mine there is a level driven in on the outcrop from which there is a road leading to the Namdang old workings. In this road near the level there is a ventilation brick stopping. The morning after the accident this stopping was found to have been partially blown inwards, towards the old workings. Although not conclusive, I consider that this is more likely to have happened in the case of an explosion of gas in the old workings than in that of a heavy fall.

#### FALLS OF ROOF AND SIDES.

##### No. 8. Budruchak Coal Mining Company's Budruchak coal mine.

A gallery previously driven narrow was being increased in width. This had been done for a length of 26 feet. In the first 14 feet three bars had been set owing to a distinct slip in the roof running up the centre of the gallery. For the remaining 12 feet however no timber had been set, and a piece of the roof

7'-3" × 7'-0" × 6" suddenly fell and killed a miner. The manager said he had seen the place the day before and intended to put bars up every 6 feet, and that a bar would have been put up the following day. This is not a sufficient precaution in a roof of this nature. Had temporary props been set the accident would have been averted.

No. 10. Gopalichak Coal Company's Gopalichak coal mine.

An original pillar had been split leaving 2'-6" of roof coal, and while a miner was at work on one of the half pillars roof coal 12' × 3' × 2'-6" fell on him and killed him. Roof coal in pillar getting cannot be relied on to the same extent as that in galleries, and timber should always be set in such cases as a precaution. A contributory cause of this accident was the fact that too many pillars were being got at the same time. This must lead to general instability of the strata, and consequently to liability to accidents of this nature.

No. 17. East Indian Coal Company's Kenwadih coal mine.

By this accident four persons were killed by a fall of roof about 25 feet square by 2'-6" thick. This unusually wide place was fenced off on the side nearest the main level. The gang however were sent to work at a place beyond it and between this place and the roof which fell there was no fence. Rule 7 lays down that the entrance to any place which is not in actual use or course of working and extension shall be fenced. In order to properly comply with this rule, when miners are put to work in a part of the mine not regularly worked, a complete cordon of fences must separate their working places and travelling road from the unused workings.

No. 21. Raniganj Coal Association's Alkusa coal mine.

The manager had just given orders for a piece of overhanging roof coal to be removed at a place where a small pillar was being got, and when he was a few feet away a miner passed under the place and roof coal 13' × 4' × 1'-6" came down and killed him. In this case there was only one prop under one end of the portion which fell. The area unsupported was far too great and the miners who had worked there last had worked under dangerous conditions for which the subordinate officials were to blame. The small pillar or knob was one of 60 which had been cut up out of 15 original pillars. This is not the way to remove pillars with safety. The original pillars should be removed one or two at a time leaving the others intact to support the altered strain on the roof.

No. 25. Messrs. Apar & Company's Charanpur coal mine.

In this case a woman was killed by a fall of a ton of roof coal. The miners cutting this roof coal had practically no experience of such work and there was apparently little or no supervision over them. They were allowed to cut roof coal when and where they liked. A narrow dyke running parallel with one side of the gallery had made the coal softer than usual, which would have been detected had the supervision been adequate.

No. 33. Bengal Coal Company's Sitalpur coal mine.

No less than twelve persons were killed by this fall of roof and the circumstances attending it are of a very unusual character.

Pillars were being got in the Dishargarh seam which is 20 feet thick and lies at a depth of 300 feet. Immediately above the coal is a band of shaley sandstone 4 feet thick and above this is coarse-grained, hard, massive sandstone up to the surface. Owing to the tender nature of the former about 5 feet of coal is left under it as a precautionary measure of support wherever the seam is won. In



goafing operations it is found that the shaley sandstone, with its coal support, falls almost immediately after the withdrawal of the timber; its collapse may be delayed a few hours, but the delay never exceeds two days according to a statement made by the manager. It appears, therefore, that this roof is supported more or less by timber during the period of goafing. With the hard sandstone or main roof this is not the case. Large areas of coal may be extracted before its condition is affected.

Goafing, or pillar getting, had been going on for eighteen months and an area of 17 bighas had been goafed. The main roof had not fallen in any part of this area, but the roof coal and shaley sandstone had fallen completely. It was the sudden collapse of this lower roof over a small area that caused the accident, which is illustrated by Plan D.

The accident occurred about 7 P.M. on Saturday the 15th October. On Friday morning the manager and deputy chief mining engineer made an inspection of the goaf and found miners reducing a stook, or small pillar of coal, marked B on the plan, under cover of timber set in the area edged with pink. Instructions were left with the assistant in charge of the work to further reduce the stook and then to withdraw the timber. It was reduced accordingly until it was only about 3 feet long by 1½ feet wide and by Friday evening all the timber in this area was withdrawn. Crush on the stook was noticeable at this time shewing that the roof was being strained. No further work was done that night.

Early the next morning, Saturday, the assistant drew off the timber, around another stook of coal, marked A on the plan in the area shewn by crosses, though with difficulty, owing to the props having jammed, and immediately afterwards the roof collapsed in the whole of the area shewn hatched.

An hour later the manager arrived on the scene to see what the effect of the collapse had been and he found that a considerable area of the roof, from under which timber had been drawn the day before, was still standing and, except for a little bad roof near the crushed stook B, was sound, and furthermore that a quantity of roof coal and stone had been precipitated under it from the recent collapse. The amount of coal lying on the ground did not exceed 25 or 30 tubs or about 15 tons, but this the manager decided to secure. He thereupon issued orders for the area enclosed thus — — — on the plan to be retimbered with the object of recovering it. Propping was commenced soon afterwards and at 5-30 P.M. the assistant reported to the manager that the place had been retimbered. About twenty-four miners reached the place just before 7 P.M. and commenced to load up coal under the supervision of a sirdar. At 7-15 the roof suddenly collapsed, without warning, over the area coloured pink on the plan killing the sirdar and 11 miners and injuring two others. Only those carrying coal to the tubs escaped. The collapse extinguished all the lights and caused the eight props shewn on the plan lying on the ground to be dislodged by falling coal and stone.

In the course of the evening the manager had written to the assistant to visit the miners after dinner to see how they were going on and he had just reached the shaft bottom to carry out the order when the disaster occurred.

This wholesale sacrifice of human life arose out of a desire to get 15 tons of coal quickly regardless of the obvious danger incurred. Not only were the miners admitted to work in a goaf at night, a practice hitherto prohibited, but they were admitted into an area from which the timber had once been withdrawn. The resetting of the timber must have been carried out under conditions of danger and this course of action was pursued in spite of the experience possessed by the manager of the treacherous nature of the roof, for he says "it follows the withdrawal of the timber almost immediately, within an hour or so, and at the most never hangs more than two days." In this case the timber was withdrawn by 6-30 P.M. on Friday and the collapse occurred at 7-15 P.M. on the following day. There is no proof of the number of props which were reset as the fall buried whatever there may have been. It is quite possible, nevertheless, that a good number of props were reset as the operation had taken many hours. The assistant stated that if the "fall" could be cleared probably 15 props would be found. If the props had been demolished by the weight vertically applied the creaking and cracking of the timber would have given ample warning of impending danger to the miners and particularly to the sirdar who was there solely for the purpose of listening. But there appears to have been no warning and it is to be inferred that what happened was that owing to the slope of the previous fall, it was

impossible to set timber right to the goaf edge in consequence of which the unprotected roof heeled over and the timbers were in this way knocked out.

The question of whether a violation of Rule 3 made under Section 20 of the Indian Mines Act could be proved against the manager was considered. This rule reads "The roof and sides of all travelling roads and working places shall be made and kept secure." He gave instructions that the place was to be retimbered and was satisfied that his instructions had been carried out although he did not go underground to see for himself. That he was not quite easy in his own mind as to the conditions under which these men were to work is shown by the fact that he wrote in the evening to the European assistant to make a special night visit to them. It could not however be proved that the timber was not set in sufficient quantity to satisfy normal conditions or even in excess of the requirements of such conditions, and in the absence of such proof it was considered that a clear case could not be made out.

The case was also considered by the District Magistrate as to whether a case against the manager should be taken under Section 304A of the Indian Penal Code. After the Inspector of Mines in India who investigated the accident had given evidence before him, the Magistrate passed orders as detailed in Section IV of this Report.

The manager holds a second class certificate of service under the Indian Mines Act. He was managing this mine under a temporary authorisation, first granted by the Chief Inspector of Mines in India from the 6th July 1910 to the 30th September 1910 and afterwards extended to the 30th November 1910. It was withdrawn on the 15th November 1910.

#### No. 37. Royal Bengal Coal Company's Kusumkanali coal mine.

This accident, which is illustrated by Plan E, was caused by a piece of sandstone, measuring 12' x 8½' x 1'-4" average thickness, falling from the roof of a gallery upon five miners who were engaged in cutting floor coal. Three of them were killed outright and the others were injured.

The gallery in question had been driven sometime ago and was really a travelling road to the places where the deceased were accustomed to work. As they were proceeding to these places on the day of the accident in company with the sirdar, it appears from the latter's evidence that they drew his attention to the existence of some floor coal and inquired from him if they could cut it. Before giving his consent he claims to have tested the roof which subsequently fell with the aid of an iron-shod stick, and also asked the permission of the manager, who was near the pump some distance away at the moment, to allow the men to work. The manager, it is alleged, enquired as to the condition of the place, and being assured by the sirdar that it was safe, gave his permission. Accordingly the men were allowed to work there. This was about 10 A.M.

At 2 P.M. the sirdar says he again inspected the place and found the roof safe. At 4 P.M. the roof fell.

There were no signs that pillar cutting had been done at this place, that any shots had been fired, or that anything else had been done to weaken the roof which was therefore in all probability weak and ready to fall when these miners were set to work under it. The excessive width of the galleries and the small size of the pillars, shown on the plan, could have conduced to such weakening. There was a natural break, which could have been seen before the accident, in the stone which fell.

It was considered that proper steps had not been taken to support this roof and it was also observed by the Inspector of Mines who investigated the accident that unused galleries in the mine were unfenced. Such necessary support and fencing are required by rule and prosecutions were instituted against the owner and agent of the mine. These cases are still pending and a detailed account of them will be given in Section IV of the next Annual Report.

#### No. 44. New Beerbhumi Coal Company's Chinchuria coal mine.

Two miners had undercut the coal to a depth of 2'-6" along the side of a gallery which was being widened, when a mass 12' long fell, and one woman was caught

by a large block of coal. The coal had been undercut for too great a length, without being spragged. It is best in such cases to see that coal is undercut in short lengths only and taken down before fresh undercutting is commenced.

No. 46. Eastern Coal Company's Bhowra coal mine.

A fall of side coal 27' high  $\times$  10' wide  $\times$  1'-6" thick fell from a pillar which was 34 feet high, killing two miners. There was a strong suspicion that they had been robbing this pillar. It was certainly evident that they had worked in places other than their proper working places. There was not however a single company's official of any description underground at the time, which was the middle of the day, when the mine was at full work. The sirdar admitted that miners took advantage of his absence to rob pillars, and this was confirmed by the European assistant. If the supervising staff is so attenuated that the miners can be left without a single official in the mine, accidents are bound to occur. I would also draw attention to the height of this gallery which was 34 feet. It is almost impossible for a manager to see that rule 3, to the effect that roof and sides shall be kept secure, is complied with in galleries as high as this. The system of working in such cases is the usually prevalent one of driving a gallery from ten to twelve feet high in the top of the seam and then cutting floor coal down through the full thickness of the seam. It is difficult to avoid accidents from falls of side when floor coal is cut in thick seams. For this operation, which at first sight appears a simple one, is attended with danger unless the most careful examination of the sides is made, as, owing to slips in the coal in the pillars, large masses of the sides are apt to become loose. Before the floor coal is cut these sides are locked by it at their base and when this support is withdrawn they naturally fall. In high galleries not only is the danger greater, but the necessary examination of the sides is rendered more difficult. Since this accident the management have worked the seam in two sections. This system has lately been tried at some mines. Its general adoption in seams of extra thickness would bring about a reduction of accidents and would be rewarded by the ultimate extraction of more coal from the seam. One manager who has adopted it has assured me that nothing would induce him to revert to the old method.

No. 47. A. Subba Naidu's Inurkurti mica mine.

Twelve persons were working in a quarry 80'  $\times$  60'  $\times$  25' deep. An overhanging mass fell from the south wall consisting of decomposed pegmatite, sloping 10 degrees from the vertical, causing injuries to three men, two of whom succumbed. The accident was due to the neglect to slope at a safe angle the side of the quarry or to cut it in steps. Both the manager and the subordinate officials appear to have been negligent and incompetent. The manager had no experience of mining and had only been about mines for two years. The head mistry was suspended from duty after the accident and the assistant mistry was reduced to the ranks.

No. 52. Eastern Coal Company's Kankani coal mine.

Three men were cutting floor coal against orders in an old gallery twenty-five feet high when 20 tons of coal fell from the corner of the pillar on to them, injuring one so severely that he died next day. These men had been previously sent away from this place. At the time when the accident occurred however not a single company's official was underground. Since this accident the management have worked the seam in two sections.

No. 55. The Shivrajpur Syndicate's Shivrajpur manganese mine.

Hitherto the record of manganese mining in India has been free from any serious calamity, but unhappily this record has been impaired by an accident which occurred at the Shivrajpur mine about the close of the year. While twenty-seven persons were working at the bottom of a quarry a sudden collapse of overhanging

side took place which involved the death of twelve persons and injuries to three others. Four days elapsed before all the bodies were recovered owing to the restricted area of the place and the large amount of rock which fell.

The deposit of manganese that was being worked outcrops along the top of a hill ridge situated about 200 feet above the plain and is so intensely folded that a complete anticlinal and synclinal fold occurs about every 150 feet. It lies at an angle of  $34^\circ$  from the horizontal and varies from 6 to 10 feet in width. The enclosing walls are of quartzite.

Development has proceeded from the outcrop to the dip by open working, the waste being cast forward down the slope of the hill. Only so much of the barren rock necessary for the extraction of the ore has been removed with the result that masses of folded rock have been left overhanging the workers. Being of strong quartzite this rock does not readily decompose having in fact been exposed for some years without undergoing any perceptible change. Occasionally isolated pieces, breaking off with a conchoidal fracture, shew signs of falling and these are dressed; but there is no record of an extensive fall having occurred in the history of the mine. This immunity from falls has undoubtedly led the management to be less suspicious of this danger than would otherwise be the case where frequent falls proclaim the treacherous nature of rock.

At the time of the accident the persons were working in a synclinal fold at a point situated 45 feet below the top of the quarry with the fold of the foot wall projecting over them. Without any warning, according to the evidence of the survivors, a shell of rock 50 feet long, 30 feet high and 2 feet 6 inches thick fell upon them from the folded side above.

This shell was probably a stratified bed of rock before metamorphism and contortion had altered it.

The whole mine is under the control of a manager and it is divided into two sections, each supervised by a European assistant. The assistants are expected to make a daily inspection, but some time prior to the accident this work had devolved upon one assistant as the other had gone up-country to recruit labour. On the day of the accident, although the event occurred at 3-45 P.M., the place had not been inspected by any one. The assistant stated that he was on his way to inspect it at 11-30 A.M., but returned to supervise the loading, a duty which kept him employed until the accident happened. The manager had not visited the mine that day so that the miners had been working practically the whole day without any supervision whatsoever.

The place where the accident occurred was last inspected about 4 P.M. the previous day by the assistant who stated that he was then satisfied with its safe appearance. From this time onwards nothing unusual had happened. About 5 lbs. of country gunpowder had been fired at noon beneath the side which fell, but the detonation is not likely to have affected the stone, as similarly placed shots have been a feature of the daily routine of work for a long time past.

The probable explanation for the sudden collapse may be found in the unsuspected tendency of the quartzite to weather after long exposure along the original lines of stratification and gradually draw away from the main body. This action would be assisted by the strained condition of the rock consequent upon the folding to which it had been subjected.

That overhanging stone in such an unsound condition should escape detection by the officials is a condemnation of the system of inspection in force. Both the manager and his assistants appear to have been satisfied with judging the condition of the stone by the eye, and have regarded it as unsound and dangerous only where cracks in the stone shewed themselves. Detection has been followed by quick remedy in the past and it may be conceded in this case that the management were unaware the miners were working in any danger. The danger was not ignored, it was simply not recognised.

Relying solely upon a sight inspection was a mistake. "Sounding" would have been much more trustworthy. In all probability the dangerous condition of the stone would have been revealed days before if this simple expedient had been used.

Under the new rules that are about to be promulgated for manganese mines it will be incumbent on the manager to see "that the sides of open workings shall be

sloped, stepped or secured in such a manner as to prevent danger from falls of material." If this rule had been in force the manager would have had to see that the systematic caution which this rule demands was exercised.

In the meantime the management have given an assurance that persons shall not be allowed to work beneath overhanging side, that all such side shall be dressed back to a safe slope before work is resumed, that the present method of examining the working places by sight shall be supplemented by "Sounding", that a daily inspection of the mine shall be made by a competent person, and that when the mine has been unworked for more than twelve hours this inspection shall be made within two hours before any person is allowed to enter the mine.

#### No. 56. Burn and Company's Pottery coal mine.

A young girl was injured by a piece of coal falling on her, she sustained compound fractures of her right leg and arm from the effects of which she died. The accident in itself does not call for special remark, but the Inspector drew attention in his report to the fact that the girl had been sent to the surface, doubled up in a bucket, without the fractured limbs being supported in any way. Her injuries were probably aggravated thereby. The Inspectors are of opinion that many lives might possibly be saved if the stretcher, splints and bandages which are required by the law to be kept at every mine were brought into use before the injured person is removed from the scene of the accident. In most of the Bengal coal mines the physical difficulties are not such that the colliery doctor could not proceed underground and make the injured person's journey to the surface as easy as possible under the circumstances.

#### IN SHAFTS.

#### No. 61. Equitable Coal Company's Bejdih coal mine.

A shaft had been sunk to a depth of 358 feet and had been allowed to fill with water. A few days before the accident a running trolley had been placed on the top of the pit. Between this trolley and the side of the shaft was an opening thirteen inches wide. This side of the pit was unfenced. At about 7 P.M., when it was dark, a banksman carrying coal to a pit bank fire caught his foot against a beam and fell into the shaft through the opening. His body was recovered in the sump next morning.

It was alleged by the manager that deceased was intoxicated, but the Inspector of Mines who investigated the accident was satisfied from the evidence at his inquiry that this was not so.

The side of the pit should have been securely fenced.

#### No. 66. Katras Jharia Coal Company's Sibpur coal mine.

As deceased, with three others, was descending the shaft in a cage, he fell out. Why he fell and the exact point in the shaft, which is 242 feet deep, at which he fell, could not be definitely ascertained, but he appears to have fallen out before the cage had reached a point 60 feet down. He would not have fallen at all if the cage had been fitted with fence gates, which it was not. During last year several more managers adopted this precaution, and it is to be hoped that before long this simple appliance will be considered as necessary an adjunct to a cage as a handle bar. It is always more desirable that such an improvement in mining methods should come about by the initiative of the mining community than that it should be forced upon them by a rule. The class of labour employed and the fact that mine owners in India have the unusual benefit of being permitted to employ women underground render it imperative that in their journeys up and down shafts the work people should be safeguarded as far as possible. It is a common complaint that it is difficult to attract miners to shafts, and that they much prefer to work in inclines, where they can walk down to their work. The number of shafts is yearly being increased, and an increase in depth which necessitates more rapid winding

is accompanying the increase in number. It should not therefore require much persuasion to induce managers to adopt an appliance which should tend to overcome the reluctance of miners to descend shafts.

No. 68. East Indian Railway Company's Serampur coal mine.

A small piece of coal fell from a loaded tub which was being withdrawn from the cage on the surface and struck deceased, the onsetter, who was pushing an empty tub out of the cage at the shaft bottom. The distance between the protection beam and the cage was 16 inches. This is too great a distance for safety as this accident proves. Six inches is ample. In this case the reason given for the wide space was that owing to the top of the inset arch being low it was not possible otherwise to draw long timber out of the cage. In such a case a hinged or moveable protection board could be adopted. Since this accident the protection beams have been put 6 inches from the cage.

No. 70. New Beerbhum Coal Company's Borrea coal mine.

The cage with a loaded tub was let down on to the keps at the surface with a bump and a piece of coal, weighing  $1\frac{1}{2}$  lbs., fell down the shaft and struck deceased, a miner, who was crossing the shaft bottom at the time. It was against standing orders for him to have crossed in this way and there was a proper travelling road round the shaft. The chief point however to be noted in connection with this accident is that there was a space of 8 inches between the end of the cage and the edge of the pit bank on the surface. To have a space of this width is both dangerous and unnecessary. Two inches clearance is ample.

BY EXPLOSIVES.

No. 73. The Standard Coal Company's Benahir coal mine.

Three men and a boy were in a hut, and one of the men was engaged in making country powder into cartridges, when probably from a spark the powder exploded. The man who was making the cartridges escaped and at once left the mine, but the other three were burnt so severely that they all died. One of the deceased, before he died, told the manager how the accident occurred. The Sub-Divisional Officer of Dhanbaid initiated proceedings against the manager under the Explosives Act and under the Indian Penal Code. These proceedings are referred to in Section IV of this Report.

IRRUPTIONS OF WATER OR FALLING INTO WATER.

No. 78. Bengal Coal Company's Murulidih coal mine.

The circumstances attending this accident by which six persons were drowned will be understood from an examination of Plan G. The galleries shown cross shaded had been driven some months before down to a dyke and they subsequently became filled with water. The haulage road and other roads to the east of it had been driven through the dyke and on the west side of it a level had been driven from a point just below the dyke so as to connect into the dip gallery from which the inrush came. This gallery had been driven a few feet through the dyke but its position was shown on the colliery plan to be further than was actually the case. Consequently the level gallery failed to connect with it and a gallery was set away to the rise to make the holing. No boring was done, but it was the intention of the officials to put a bore-hole through with a crowbar as soon as percolating water gave warning of the proximity of the galleries.

Whilst three men were at work in the gallery the pressure of the accumulated water burst the thin partition of coal remaining, and water burst through, gradually enlarging the hole until it was 2' high by 2'-6" wide. The men working in the gallery and four others in the level gallery were knocked down by the rush of water, but contrived to escape, though with difficulty. Four men were at work

in the main dip and three others in a cross-cut gallery a little east of them. Of these men only one was successful in withstanding the rush of water. He escaped by clinging on to the timbers and the edges of the coal pillars. The bodies of the other six were found five days afterwards at the places indicated on the plan. It is probable that in the darkness they mistook the small dead end rise gallery where they were found for the connected gallery further east by which they might have escaped. They had only worked two or three days at the mine and would have only a partial knowledge of the galleries other than their working places.

It is somewhat remarkable that, as far as can be gathered from the evidence, no percolation of water attracted attention until the inrush came. This may have been due to the fact that the dyke at this particular point is combined with small faults which throw the coal down in the direction of the dip. This enabled the working gallery to be driven to a point beneath the floor of the water-logged gallery. The floor was probably covered with a layer of silt which prevented percolation.

The manager of the mine was aware of the accumulation of water and when he visited the level gallery two days prior to the accident he found that the face of it had reached a point beyond the presumed position of the gallery into which a holding was to be made. He stated that he told the assistant to put in a bore hole with a crowbar at once. The latter stated that his instructions were to commence boring as soon as percolation became evident.

The agent of the mine made an inspection of the mine in company with the manager four days before the accident and visited the vicinity of the gallery which holed into the water.

As it was evident that no bore holes had been made in advance as required by rule a prosecution was instituted against the agent and the manager of the mine, as referred to in Section IV of this Report.

#### BY HAULAGE.

##### No. 79. Nodiha Coal Company's Nodiha coal mine.

Five loaded tubs ran wild down a haulage incline, and killed a woman standing in the incline at a landing 200 feet down. There was a printed notice at the mouth of the incline forbidding persons to travel on it while the set is in motion. But with main rope haulage it is impossible for a person entering the incline from a landing to know that a set is in motion if it is at a point outbye of the landing. Movable fences at such places which would fence them off from the incline when the set is in motion would greatly minimise haulage accidents. Five of the haulage fatalities last year would have probably been avoided had such fences been in use.

The tubs ran wild owing to a defective weld in one of the coupling chains. These were specially imported from Europe on purpose to reduce the heavy cost of repairing tubs which were damaged through the breaking of those formerly used, which were made locally, so that the management should be given credit for doing their best to provide sound coupling chains. It is most important that both on haulage roads, especially on those which are steep, and in shafts, they should be of the best material. It is also important that they should be periodically annealed.

##### No. 80. Kusunda and Nayadi Collieries' Kusunda coal mine.

The hookman had either omitted to couple the three front tubs of an empty set to the back three, or had coupled them improperly, and when he pushed the set over the brow three tubs ran wild. Two women were in the incline waiting for their tubs, and both were injured, one dying some days afterwards. The primary cause of this accident was gross negligence on the part of the hookman, who absconded, but my remarks on accident No. 79 as to movable fences apply in this case also, and I wish to draw attention also to another defect. The provision of a second stop block or runaway point between the stop block at the top of the brow and a convenient point down the incline is now recognised by managers

as an absolute necessity for the prevention of runaway sets from the surface, and there is, I trust, to-day no haulage incline on which one is not provided. In this case a runaway point was fixed 195 feet down, on a gradient of 1 in 9. This distance is much too great, firstly, because a runaway set would be travelling so rapidly by the time it reached thus far that the setting over of the point would not prevent the tubs being hurled down the incline, and secondly because it cannot conveniently be actuated from the surface. In this case another man was stationed down at the point and on receiving a shout from the hookman would set the point over. In conversation with this person it was found that the practice was just what would be expected. The hookman shouted as he was proceeding to push the tubs over, the man below set the point over, and ran to the nearest manhole.

The correct distance for the contrivance is just sufficiently far down to allow the whole set to be on the gradient and the rope to be taut and it is essential for effective use that whatever is provided should be actuated from the surface. A second stop block to which a cooly has to walk down each time it has to be opened or closed is generally found to be left open more or less continually.

#### No. 81. Bilbera Coal Company's Baraboni coal mine.

A woman who was carrying coal from a west level to a landing east of the haulage incline attempted to cross the incline between the tubs and while she was doing so the tubs were drawn off. She was knocked down receiving injuries from which she died a week later. She could have gone round the tubs. It is however a dangerous practice, and a bad arrangement, for loading coolies to have to cross and recross a main haulage road. The same remark applies to the practice, which is not so common as it once was, of coolies loading on the straight incline while the tubs are travelling up and down the incline outbye of them. It does not require great skill to avoid both arrangements and to lay out the system of haulage so that the coal is loaded at suitably placed landings on either side of the main incline.

#### No. 86. Bengal Coal Company's Sanctoria coal mine.

A tub which was blown over the brow of an incline by a storm killed a man who had taken refuge from the storm underground. There was no second stop block or runaway point on this incline.

#### NOT INCLUDED IN STATISTICS.

#### No. 5. Kusunda and Nayadi Collieries' Kusunda coal mine.

As six loaded tubs were being drawn up through a cross measure drift a coupling broke and four tubs ran wild killing a child a year old who was being carried by his sister aged eight. As far as the occurrence itself was concerned it was accidental, but these children were allowed to remain out on the haulage road, while their parents worked in a gallery inbye, the reason being that this gallery was a wet one. It has always been urged as the greatest argument in favour of young children being allowed to go underground that they are safer there with their parents than being left by themselves on the surface. But the argument goes altogether if instead of being kept with their parents they are allowed to wander about in what is an exceedingly dangerous part of a mine. I am pleased to report that the present manager of this mine, who was appointed on a date subsequent to that on which the accident occurred, stated that he intended by degrees to stop all children going underground. This is done at some mines, and does not appear to have caused discontent.

#### No. 25. British India Coal Company's Napara coal mine.

In this case a child of five was returning home in the twilight and fell into a feed water tank containing 4'-9" of water. Artificial respiration was tried for half an hour but without avail and the child died from drowning.



The top of the wall protecting this tank was only 18 inches above the level of the ground.

During the last six years there have been several deaths from drowning in unprotected or insufficiently protected feed water tanks. In the majority of cases the persons drowned have been young children. These tanks are therefore dangerous and should be walled or fenced to a height of at least 3 feet above the ground. What frequently occurs is that when they are first built they are finished off with a wall. Earth and ashes are then allowed to accumulate gradually until they are flush with the top of the wall, after which the tank is of course no longer protected.

#### Section IV.—Prosecutions and additions to the Act.

##### PROSECUTIONS.

The following prosecutions which have been completed were instituted during the year or were instituted after inspections made during the year.

Arising out of the fatal accident by explosives at Benahir coal mine on the 11th February, which is described on page 18 of this Report, proceedings were taken by the Magistrate against the manager of the mine under Rules 10-35 under the Explosives Act and under Sections 286 and 304(a) of the Indian Penal Code. The cases were dismissed, the Court holding there was no evidence in support of the circumstances as originally reported and that all the evidence went to show that the gunpowder was made into cartridges in the proper place.

The owner of the Tarajhopa mica mine was prosecuted under Section 22(2)(b) of the Indian Mines Act read with Rule 8 under Notification No. 11793-103, dated the 30th December 1908, made under Section 20 of the Act, for failing to report the occurrence of a fatal accident. He was ordered to pay a fine of Rs. 20 or to undergo rigorous imprisonment for one month.

The agent and manager of Murulidih coal mine were each prosecuted under Section 22(e) of the Indian Mines Act read with Rule 6 made under Section 20 of the Act. This prosecution arose out of the fatal accident by an inundation of water which is described on page 18 of this Report. By rule 6 it is enacted that "where a place is likely to contain a dangerous accumulation of water, there shall be constantly kept at a sufficient distance, not being less than 10 feet in advance, at least one bore-hole near the centre of the working, and sufficient bore-holes on each side, and, where necessary, above or below."

In the case against the manager, the facts were admitted but two lines of defence were taken (1) that he had taken all reasonable means by instructing the underground assistant to make bore holes and (2) that to the best of his knowledge he supposed the accumulation of water to be not dangerous because he thought a dyke of 14 feet of stone intervened between the water and the old workings.

The Court did not accept either of these pleas. The accused was ordered to pay a fine of Rs. 300 or to undergo rigorous imprisonment for one month.

In the case against the agent, the facts were admitted but the accused laid stress on the fact that he was not the agent and, apart from the Annual Returns, had always signed himself as Chief Mining Engineer. The judgment is an important one and the following extracts are made from it:—

"The facts and causes of this accident are admitted by the accused . . . . and the manager of the mine was tried and convicted.

"In this case however the prosecution state that the accused as agent of the company also is guilty under Section 14 of the Mines Act. There are two points for consideration—

"(1) Was the accused at the time of the accident agent of the Bengal Coal Company ?

"(2) If so, had he taken all reasonable means to prevent the contravention of the rules ?

"(1) I hold that the accused was an agent of the Company. The term agent is defined in Section 3(a) of the Mines Act which runs as follows :—' Agent ' when used in relation to a mine, means any person appointed as the representative of the owner in respect of the management of the mine or any part thereof, and as such superior to a manager under this Act.

"The accused contends that he is not the agent as he is under the orders of the managing agents and has to get sanction from them for expenditure proposed. This may be but he is still a representative of the owner in respect of the management of the mine and as such superior to the manager. The evidence of Mr. Kirk (prosecution witness 1) shows this clearly. The witness states ' His (the accused's) duty was to give me instructions in any work I had to do. I had to follow his instructions.' The definition of ' agent ' in the Mines Act differs from that in the English Coal Mines Regulation Act, 1887, so that ' managing agents ' should not be included in it. There is nothing to show that the ' agent ' must necessarily have a free hand.

"As this is a criminal, not a civil case, I have considered only whether the work done by the accused makes him an ' agent ' as defined in the Act without reference to the manner in which the accused signed himself in the Annual Returns, etc., though both parties laid stress on the fact that the accused signed himself at times ' Agent ' and at other times ' Chief Engineer ' of the Bengal Coal Company.

"(2) I hold that the accused had taken all reasonable means to prevent the contravention of the rules. . . . . The accused knew nothing of this rise gallery or of the intention to drive it up to the old higher workings. . . . . Admitted that the accused was in the mine four days before the accident. It cannot however be held to be the duty of the agent to examine every part of the workings of a mine. His duty is more that of general supervision and he cannot be held responsible for contravention of the rules by a competent manager appointed to work under him unless it is shown that he knew or ought to have known of the intended contravention. . . . . The accused is acquitted."

In connection with the fatal accident at Sitalpur coal mine described on page 12 of this Report, the responsibility of the manager was considered by the District Magistrate under Section 304A of the Indian Penal Code. After examining Mr. G. C. Leach, the Inspector of Mines who investigated the accident, the Magistrate passed the following orders :—

"I have examined Mr. Leach, Inspector of Mines, and am satisfied that there is not sufficient evidence to bring home a case under Section 304A against the manager.

"Mr. Leach's statement is important in many ways. He allows that the props said to have been used were sufficient to meet the vertical pressure of the portion of the roof which fell. He considers that the props gave way owing to lateral pressure caused by the props not being set near enough to the goaf edge.

"This is his opinion but he has not sufficient data to enable him to say for certain that this actually was the case.

"His statement shows that, although goafing had been going on for some time, say about one year, in that part of the mine, the main roof had not yet followed the removal of the pillars. There is, it is true, no certainty when the main roof will fall. Still the manager may have considered that there was little probability of the main roof coming down when he decided to reset the props. And as Mr. Leach observes it was quite possible to set props to take the weight of the shaley sandstone which actually fell. The manager, therefore, although in my opinion he took an extraordinary risk for a very small amount of coal had some grounds

(if propping was properly done) for believing that he had taken sufficient measures to ensure the safety of the workers sent to remove the coal. For the portion of the roof (which actually did fall) could in Mr. Leach's opinion have been propped up if the props had been properly set.

"The setting of the props was left to the assistant manager. Unfortunately the debris cannot be removed and it is impossible to say with certainty how many props were set and whether they were properly set. The fall of the roof clearly indicates that the props were either insufficient or improperly placed. This, however, is not sufficient for a criminal prosecution.

"To me it appears to have been most dangerous to attempt to reprop the roof after the supports had once been withdrawn. The portion of the roof which actually came down after the props were set might have come down at any time while the props were being put in position. The manager had no right to take this risk. The accident, however, did not occur at this stage of the proceedings and consequently Section 304A does not apply to this part of the manager's proceedings. No doubt had the propping been done efficiently the accident might have been avoided. As matters stand it is impossible on the evidence to make either the manager or assistant criminally liable for the manner in which the roof was propped.

"It would be difficult if the evidence showed that the main roof usually fell in within a few hours. For it would be impossible to support the main roof. The manager, I take it, acted on the assumption that the main roof would behave as it had done in the places near by where goafing operations had been going on. His anticipation proved correct.

"The manager's action in deciding to reset the props and take out the coal, a very small quantity, was quite unjustifiable and did as a matter of fact cause twelve deaths. I do not think, however, a case under Section 304A will stand. The proceedings are dropped."

## Section V.—General Remarks.

### HEALTH AND SANITATION.

There was no great epidemic in the Bengal coalfields in 1910. The total rainfall at Sitarampur in the Raniganj coalfield was 51.09 inches. Rain fell on 99 days and only on two days exceeded two inches. The Sanitary Engineer of Bengal has been engaged in drawing up schemes for a water supply to the Jharia coalfield and his proposals and plans will shortly be laid before the Committee, appointed by the Government of Bengal in January last to consider them. Mr. H. J. McIntosh, Commissioner of the Chota Nagpur Division, is the Chairman of this Committee.

There was an outbreak of plague at the Kachurwahi manganese mine of the Central India Mining Company and at almost all the mines of the Central Provinces Prospecting Syndicate. But the managers of the companies took rigorous measures to stamp it out immediately with the result that the health of the camps was soon restored. The water supply to the coolies at these mines is well looked after.

The persons employed in the Burma Development Syndicate's Chooling tin mine in the Mergui District suffered a good deal from Malarial fever and several of them died from it in the hospital at Victoria Point.

Mosquito operations are in force at the Burma ruby mines and a considerable amount of draining has been done.

### AMBULANCE WORK.

It is gratifying to report that the ambulance movement last year has shown considerable vitality. Classes in "First Aid to the Injured" were held in the early part of the year in the Raniganj coalfield at Dishargarh and the success which attended them led Mr. G. C. Leach, Inspector of Mines in India (who

promoted them) to organize classes in the latter part of the year in the Jharia and Giridih coalfields.

Altogether seven classes have been held, *viz.* two at Dishargarh, two at Kusunda, two at Sijua and one at Giridih. Instruction is still in progress at the last named place where there is an attendance of 30 members.

At the other places 231 members joined the classes out of whom 86 sat for examination and all passed with credit. A label was obtained by one candidate, medallions by three, a voucher by one and certificates by the rest.

Dr. W. P. O'Connor, Chief Medical Officer, Equitable Coal Company, Limited, Dr. F. T. Simpson, Chief Medical Officer, Indian Collieries Syndicate, Limited, Dr. W. D. Williams, Medical Officer, Indian Mining Association, and Babu Sirish Chandra Bose, Assistant Surgeon, East Indian Railway Collieries, gratuitously delivered the lectures. Dr. O'Connor and Dr. Simpson voluntarily conducted the examinations and expressed themselves highly satisfied with the skill shewn by the candidates. The mining community must feel deeply indebted to the above named gentlemen for the pains they have taken to lessen suffering amongst the miners.

There are now at least 150 persons actively engaged in mining in the coal fields who are competent to stop bleeding, fix splints, tie bandages, dress wounds and carefully transport injured persons.

There is a proposal on foot to band together the whole of the coal mining industry under the direction of a Central Committee controlling local centres in each district, the object being to greatly increase the number of classes, to arrange for instruction in the vernacular and to start a fund for placing the movement on a sound financial basis.

Ambulance work should spread and become a real force in the coalfields, because it is to the advantage of the industry. The labour will have greater confidence in the management and the management will find that the unproductive period after an accident will be appreciably diminished.

#### MINING EDUCATION IN BENGAL.

Mr. E. H. Robertson, the Professor of Mining Education at Sibpur College, has reported that at the diploma examination held in 1910 six candidates were successful, and of these five have since entered on appointments in mines. Owing to the depression in the coal market the demand for passed students was not so great as previously, but this condition is probably of a temporary nature, and the demand will once more be apparent as mines now closed down are reopened.

One old student was successful in gaining a first class certificate of competency in 1910, and several are sitting this year at the examination for certificates of competency.

The wider spread of the use of electricity in the mines, several new and up-to-date plants having recently been installed, should encourage a certain number of the students, after they have gained their diplomas, to remain for a further year in the college in order to pass through the electrical department. The special knowledge thus gained, and the sense of responsibility developed in working the college electrical plant (which includes both three phase and continuous current and also a large battery of accumulator cells) should fit such students in a special manner for employment at these up-to-date mines.

The cold weather mining camp was pitched at Bhaga during November and December 1910. Surveys were made of portions of the Lodna and Standard Coal Company's mines, and visits of inspection paid to many collieries, including Sudamdih, Jamadoba, Kenwadih, Bhaga, and the mines of the Raniganj Coal Association, Limited. The above collieries are laying down or are working electrical plant and supplying power for pumping, hauling or other machinery. Among other plants and workings seen were sinking operations at Kankani, pillar drawing at Bhaga and Barari, steep seam workings at Bhulanbarari and Sudamdih, screening plants at Kustore and Jorapurkur, bye-product coke ovens and electrical and other plants at the East Indian Railway Company's collieries at Giridih. Field

geology work was carried on at Bhowra. Much of the success of the mining camp is due to the extreme kindness and courtesy of the mine managers, who are always ready to afford the Professor of Mining and his students every facility.

It is found that several of the "special" mining students (who must have had at least two years' practical experience in mines before joining the college) find considerable difficulty in passing the college examinations in the subjects other than mining (*e.g.*, mathematics, mechanics, physics, and chemistry). Such special students are allowed to join the college on a lower standard of admission than that required from the regular students entering the third year. It would not be advisable to raise the standard of admission, for then very few candidates (especially from among the Europeans) would be sufficiently advanced to be eligible. On the other hand the standard of the diploma should not be lowered. Its present standard is comparable with that of the best mining colleges of England and America, and it should certainly remain so.

The chief reason for special mining students joining the college is the fact that from their previous work in the mines they are more fit to benefit from and appreciate the education they receive in mining and allied sciences, and in the college workshops; so that after passing out again they may apply to the fullest extent what they have learnt to their practical duties in the mines. Such students constitute a very valuable type, and whether they fail or not in so far as the diploma is concerned, the industry must ultimately benefit from the knowledge they absorb while at the college. In the case of failure to gain the diploma a certificate showing the subjects in which the student is successful might be issued, so as to give them every encouragement.

Mr. W. T. Griffiths, the Mining Instructor in the Bengal coalfields, has reported that the total number of names on the registers for the session 1909-1910 was 325. The average number of students who attended the courses was very nearly 20 per lecture, and 74 students (15 Europeans and 59 Indians) made 50 per cent. or more of the possible number of attendances, and thus became eligible candidates for the sessional examinations. These were held on the 13th of June 1910. Of the 74 eligible candidates, 28 presented themselves and 18 were successful in obtaining the necessary number of marks to qualify for certificates.

At the close of the session Mr. Griffiths, whose agreement with the Government of India has terminated, returned to England. His lectures, which were carefully thought out and well delivered, have benefited a large number of colliery officials and mining students. The experiment is now being tried of carrying on his work by means of lectures which are given by colliery managers at the same centres, where lecture halls have been built. It is to be hoped that this scheme will prove a success for it is capable of being extended to other centres where the need of mining instruction becomes apparent.

#### TRUE MERIDIAN LINES IN BENGAL COALFIELDS.

At the instance of Mr. J. J. Turnbull, Superintendent of the East Indian Coal Company's collieries, and by the kind permission of Colonel S. G. Burrard, R.E., F.R.S., Surveyor General of India, true meridian lines have recently been laid down at the following six places:—

Place.	Situation.	Magnetic declination.	
Jharia coal-field.	Dhanbaid . . . . .	On uncultivated land 200 paces north-west of Magistrate's bungalow.	1° 6' 4" E.
	Jorapokur . . . . .	On high ground about midway between the Bengal Nagpur Railway line and the Jharia-Pathardih road.	0° 59' 39" E.

Place.		Situation.	Magnetic declination.
Jharia coal-field.— <i>contd.</i>	Jogta . . .	Two furlongs south of manager's office, Jogta colliery.	0° 56' 15" E.
	Dishargarh . . .	On the old Bengal-Nagpur Railway embankment north of the Damuda river and south-west of No. 3 Pit, Dishargarh colliery..	0° 57' 0" E.
Raniganj coalfield.	Dhadka . . .	West of office of Superintendent, New Beerbhum Coal Company.	0° 59' 0" E.
	Nandi . . .	Near Sibpur-Raniganj road, west of bungalow of manager, Adjai Coal Company.	1° 1' 0" E.

Full information may be obtained at the offices of the Chief Inspector of Mines in India; the Superintendent, New Beerbhum Coal Company; and the managers of the Jealgora, Jogta, Dishargarh and Nandi collieries. Greater accuracy in the making of colliery plans will naturally result if instruments are checked periodically, and it is to be hoped that every advantage will be taken of the facilities now afforded.

#### MINING AND GEOLOGICAL INSTITUTE OF INDIA.

The total membership is now over 300 of which 251 are ordinary members. Three meetings were held during the year and at each of them much that was instructive was brought to light.

The influence of the Institute has been marked and if it continues to meet with loyal support from all classes of its members, its work in the direction of solving the peculiar problems and difficulties which confront those engaged in mining in this country will become more and more of value.

The Indian Mining and Geological Club in London is now fairly launched and is installed at 30, Furnival Street, E.C., and I would emphasize the desire expressed in the last Annual Report that members of the Institute proceeding to England should communicate with the Honorary Secretary at that address. Those who are guiding the destinies of the Club are prepared to assist firms and employers, who wish to engage professional-men in England for mining or geological work in India, to secure the right person for the particular work for which he is wanted.

#### BOARD OF EXAMINERS.

The non-official members of the Board were, as in the previous year, Messrs. J. J. Turnbull and S. Heslop. Four meetings were held.

One first class certificate of service was granted and out of eight applicants holding foreign certificates eight were granted similar Indian certificates.

An examination for certificates of competency as colliery managers was held at Asansol on the 16th and 17th February 1910. There were 19 candidates for first class certificates of which 3 passed, and 22 candidates for second class certificates of which 5 passed,

It is now four years since these examinations were instituted. The examiners have found that the chief defects in the candidates' preparation are that, firstly, they are insufficiently acquainted with surveying, of which they have to give in the oral examination practical proof of their knowledge, secondly, they rely too much on text books and too little on what passes daily under their notice at the mines at which they are employed and, thirdly, their arithmetic is weak.

#### MINING BOARD.

Two meetings of the Mining Board were held during the year. The subject under consideration was the draft rules for mica, limestone and manganese mines.

#### EDWARD MEDAL.

In the last Annual Report in connection with an accident at the Panchgatchia coal mine in Bengal, attention was drawn to the personal bravery of a pilot engine khalassi named Ram Lal Bauri who saved two children from being run over by a wagon.

Ram Lal's name was submitted to His Majesty, the King-Emperor, who bestowed upon him the Edward Medal of the second class. The award was notified in the *London Gazette* on the 25th October 1910, and the medal was presented to him at Howrah Station on the 15th January 1911 by His Excellency the Viceroy.

This is the first occasion upon which this honour has been bestowed upon any person in connection with mining in India, but it should be noted that the Edward Medal of the first class was last year bestowed upon Mr. W. H. Pickering, late Chief Inspector of Mines in India, and now Superintending Inspector of the York and North Midland district in England. The bottom of a sinking shaft collapsed and a sinker was pinned between a heavy scaffold and the side of the shaft. Mr. Pickering descended the shaft and remained with him as long as he lived, running imminent risk of his own life from falling stones and bricks while doing so. More than one of his fellow-rescuers were severely injured.

#### OFFICIAL DUTIES.

Mr. J. R. R. Wilson was Chief Inspector of Mines in India until the 12th December, after which he resumed his service as a senior Inspector under the Home Office in England. He had two months and nine days' privilege leave from the 5th October to the 12th December.

Mr. Wilson's administration has left its mark for good on mining in India. His long experience and high professional attainments were always at the disposal of his staff and of the many who sought his advice, and those who consulted him seldom did so without having their knowledge enhanced thereby.

Mr. G. F. Adams was Inspector of Mines for No. 1 Circle until the 8th November. From the 9th November to the 12th December he officiated as Chief Inspector of Mines in India, being confirmed on and from the 13th December. He had three months' privilege leave combined with three months and seven days' furlough from the 3rd May to the 8th November.

Mr. R. R. Simpson was Inspector of Mines for No. 3 Circle until the 4th October and from the 3rd of May until the 4th October he took charge of No. 2 Circle in addition to his own duties. From the 5th October he was Inspector of Mines for No. 1 Circle, and from that date till the 8th November he officiated as Chief Inspector of Mines in India in addition to his own duties. He had one month's privilege leave from the 3rd April.

Mr. G. C. Leach was Inspector of Mines for No. 2 Circle. From the 3rd of May to the 4th October he had charge of No. 1 Circle. From the 5th October he had charge of No. 3 Circle in addition to his own duties.

I have the honour to be,  
SIR,

Your most obedient servant,

G. F. ADAMS,  
*Chief Inspector of Mines in India.*



Mr. G. C. Leach was Inspector of Mines for No. 2 Circle. From the 3rd of May to the 4th October he had charge of No. 1 Circle. From the 5th October he had charge of No. 3 Circle in addition to his own duties.

I have the honour to be,

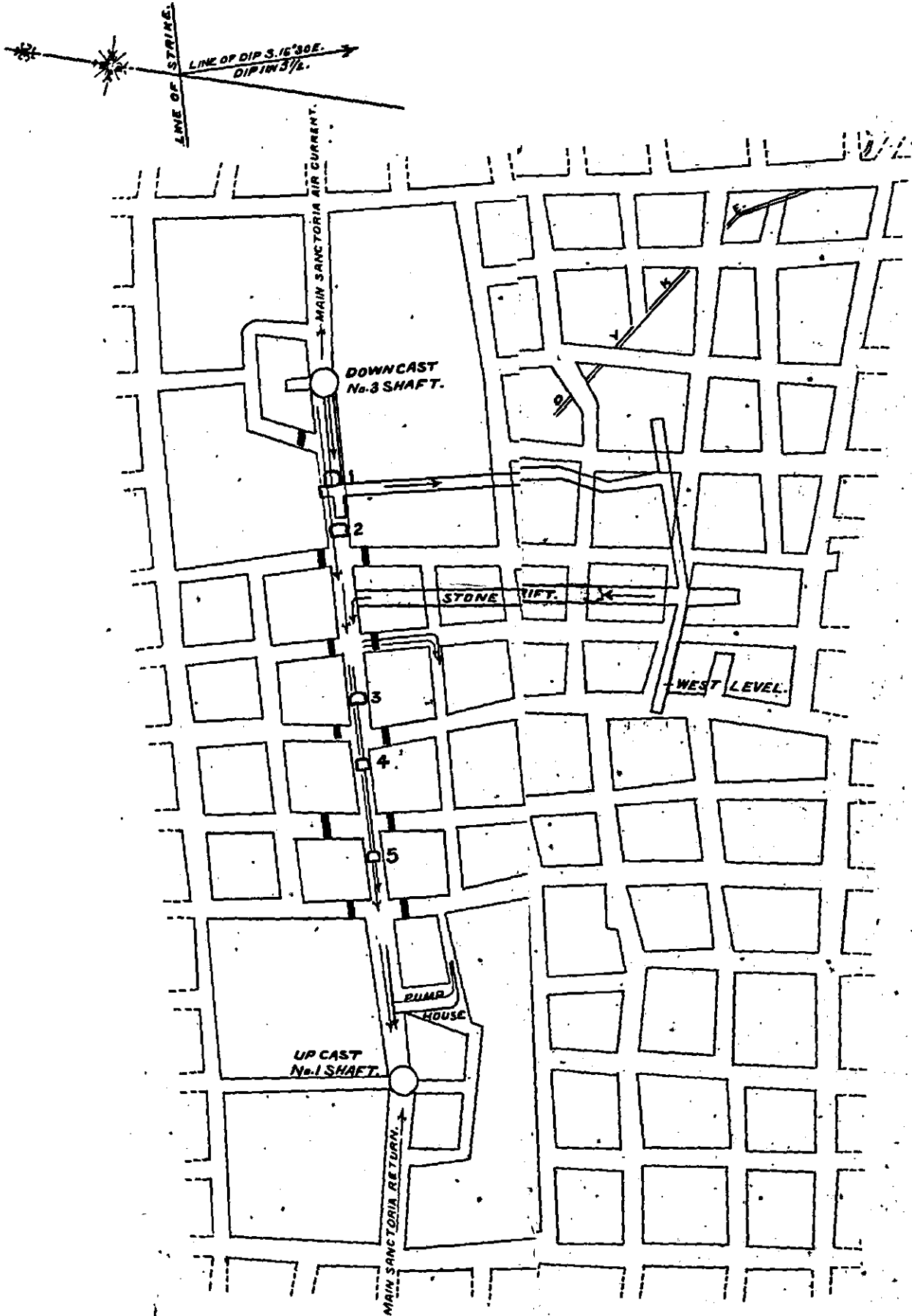
SIR,

Your most obedient servant,

G. F. ADAMS,

*Chief Inspector of Mines in India.*

**PLAN ILLUSTRATING  
DESHARGARH EXPLOSION**  
Showing workings in Hatnol Seam and portion of the Sanctoria Seam  
Scale 1 Inch = 100 Feet



REFERENCES

- Doors shewn thus..... D
- Stoppings shewn thus.....
- Course of ventilation..... →
- Hatnol seam workings shewn in black.
- Sanctoria seam workings shewn in red.

Mr. G. C. Leach was Inspector of Mines for No. 2 Circle. From the 3rd of May to the 4th October he had charge of No. 1 Circle. From the 5th October he had charge of No. 3 Circle in addition to his own duties.

I have the honour to be,

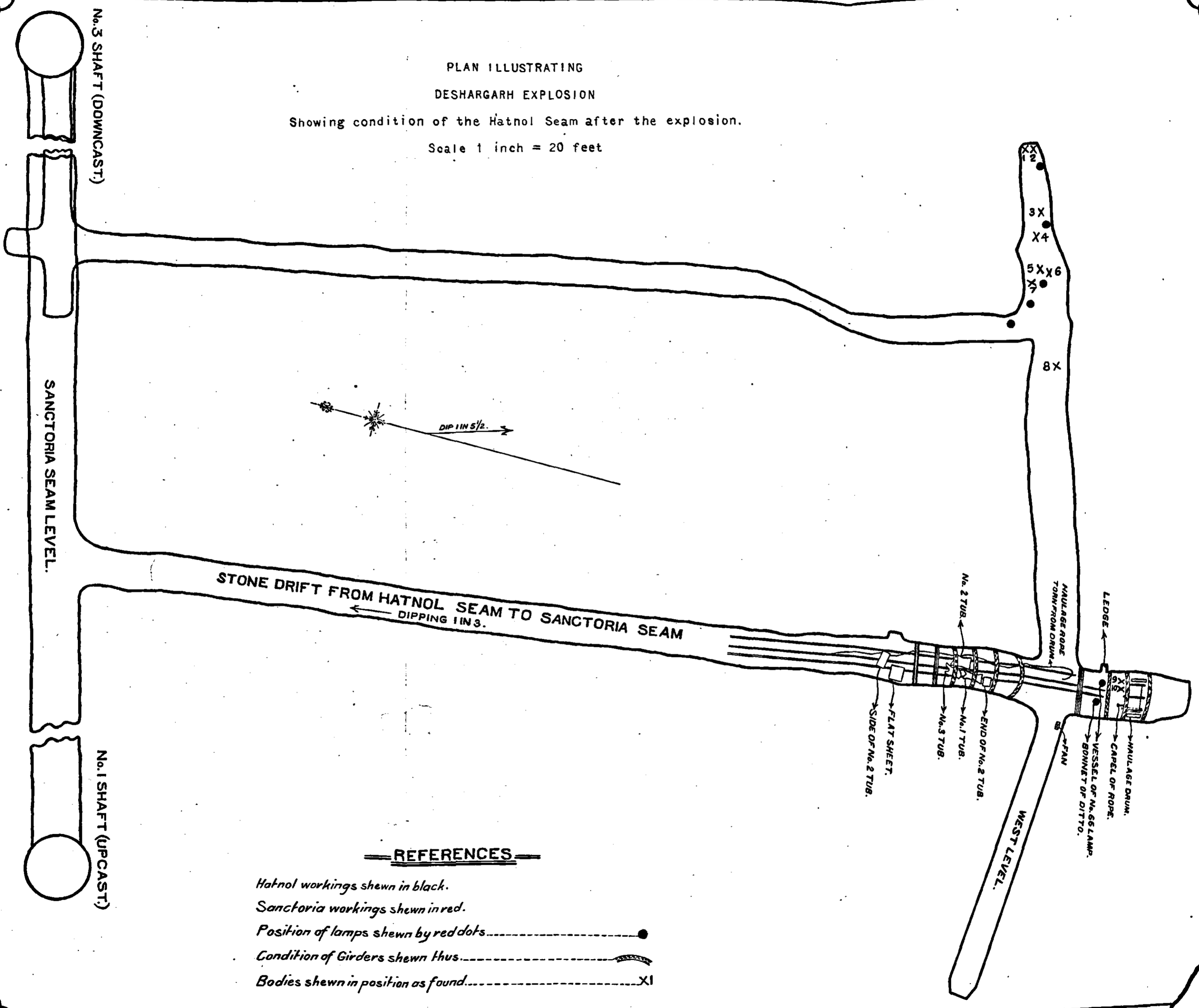
SIR,

Your most obedient servant,

G. F. ADAMS,

*Chief Inspector of Mines in India.*

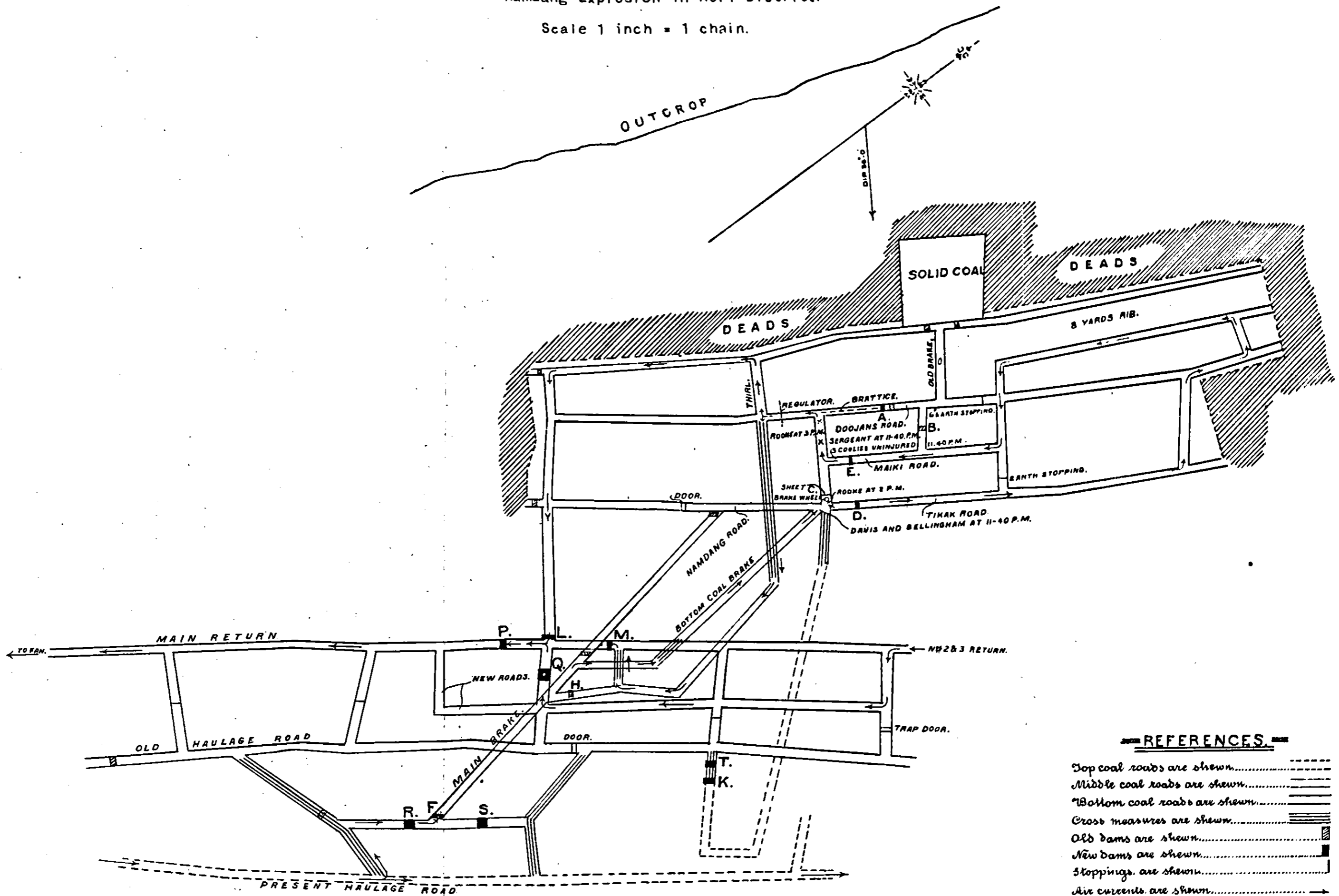
PLAN ILLUSTRATING  
 DESHARGARH EXPLOSION  
 Showing condition of the Hatnol Seam after the explosion.  
 Scale 1 inch = 20 feet



REFERENCES

- Hatnol workings shewn in black.*
- Sanctoria workings shewn in red.*
- Position of lamps shewn by red dots.....●*
- Condition of Girders shewn thus.....—*
- Bodies shewn in position as found.....X*

PLAN ILLUSTRATING  
 Namdang Explosion in No. 1 District.  
 Scale 1 inch = 1 chain.



- REFERENCES.**
- Top coal roads are shown.....
  - Middle coal roads are shown.....
  - Bottom coal roads are shown.....
  - Cross measures are shown.....
  - Old dams are shown.....
  - New dams are shown.....
  - Stoppings are shown.....
  - Air currents are shown.....

PLAN ILLUSTRATING  
ACCIDENT BY FALL OF ROOF

by which 12 persons were killed

at

the Bengal Coal Company Limited's Sitalpur Coal Mine

Scale 1 Inch = 20 Feet

— REFERENCES. —

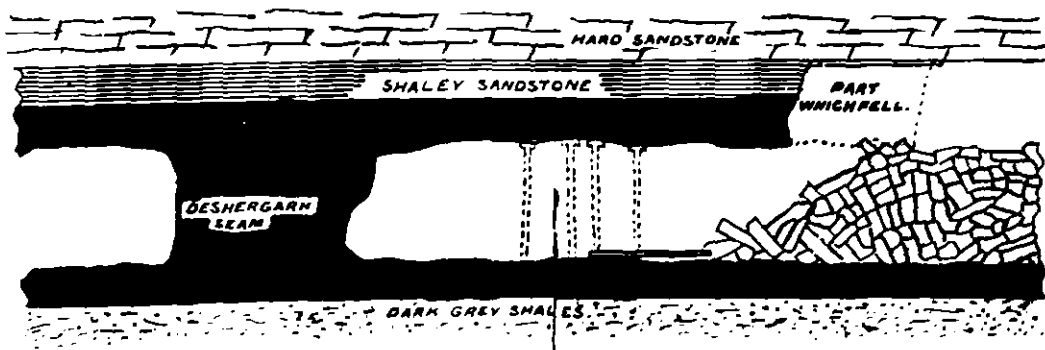
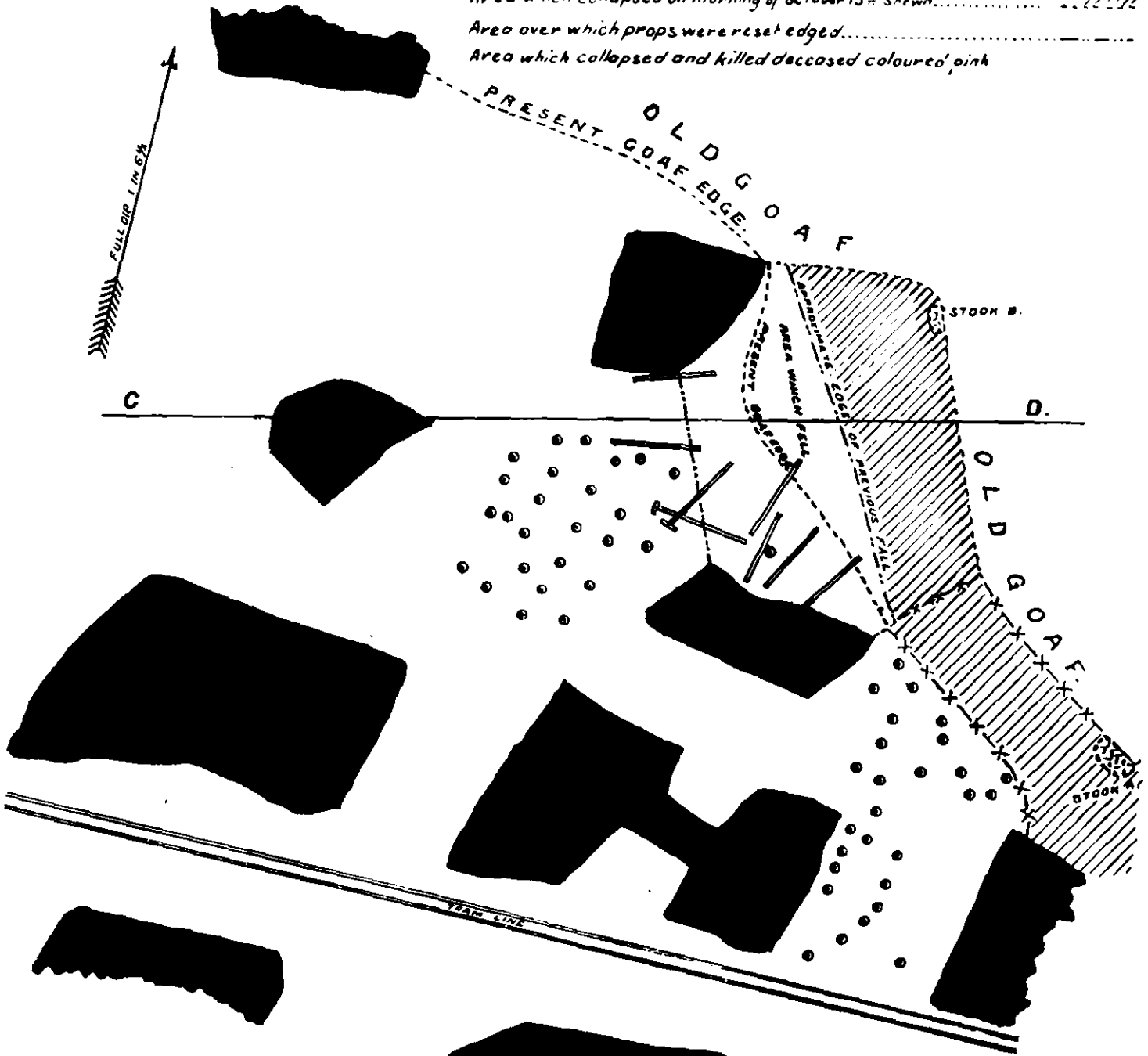
Area from which props were drawn on evening of October 14<sup>th</sup> edged with pink

Area from which props were drawn on morning of October 15<sup>th</sup> edged..... x-x-x-x

Area which collapsed on morning of October 15<sup>th</sup> shown.....

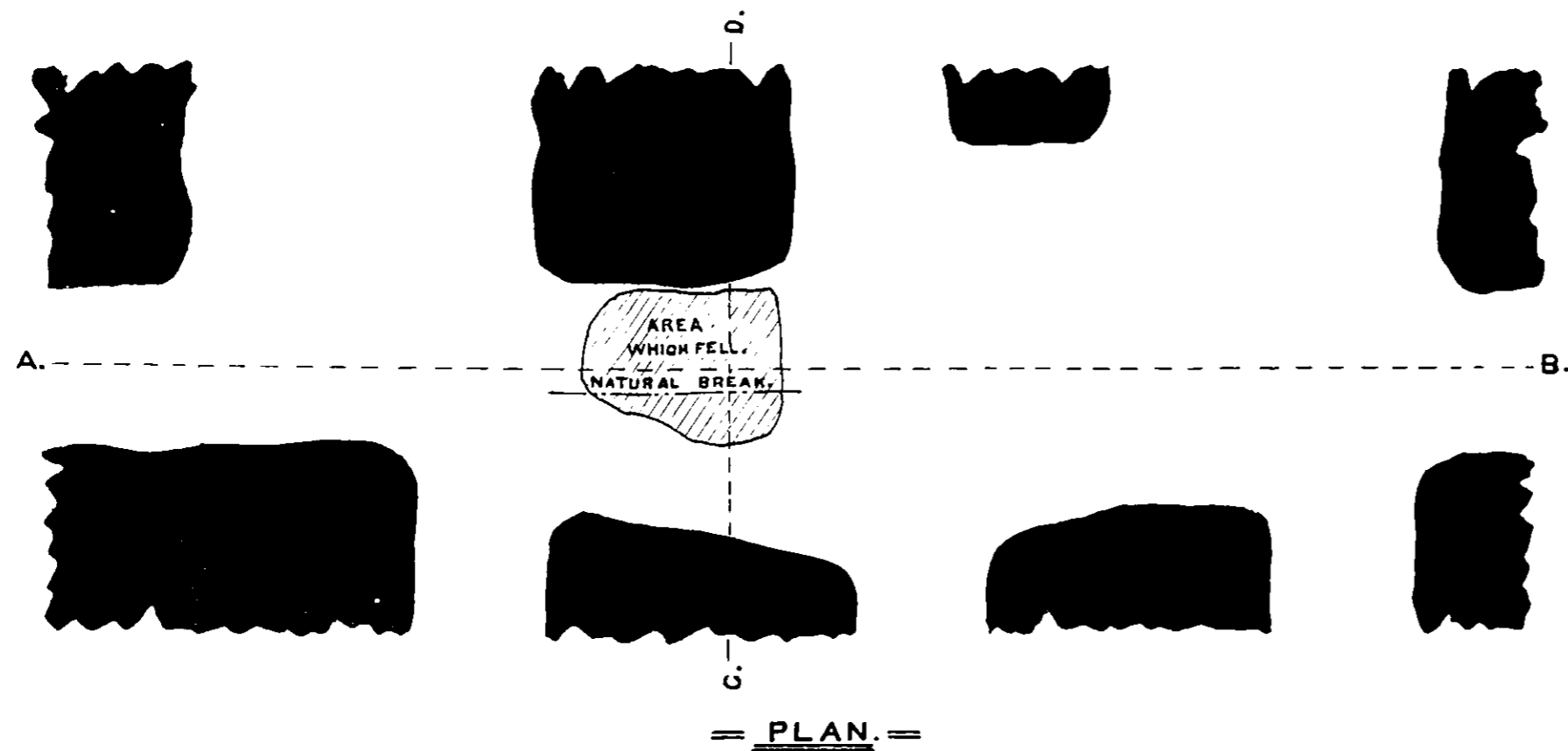
Area over which props were reset edged.....

Area which collapsed and killed deceased coloured pink

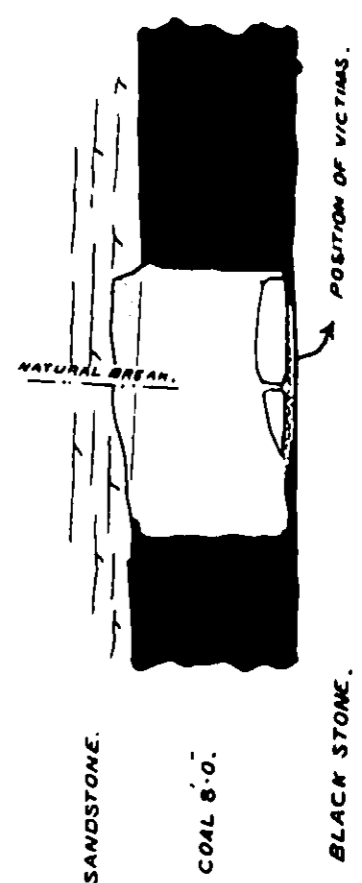


SECTION ON C.D.

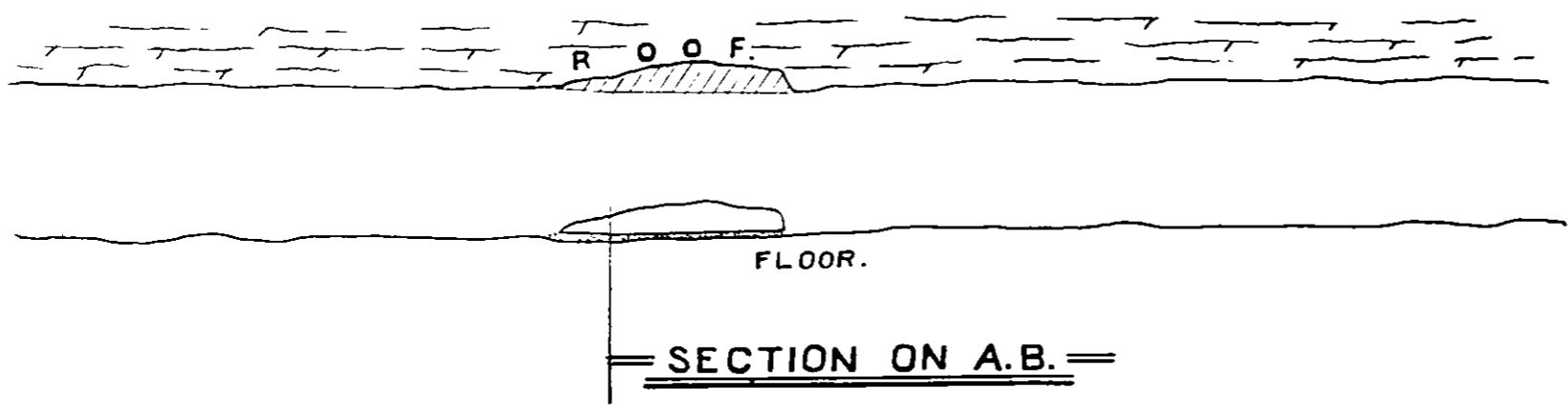
PLAN ILLUSTRATING  
FATAL ACCIDENT BY FALL OF ROOF  
at  
Royal Bengal Coal Company's Kusumkanali Coal Mine.  
Scale 1 inch = 10 feet



= PLAN. =



= SECTION ON C.D. =

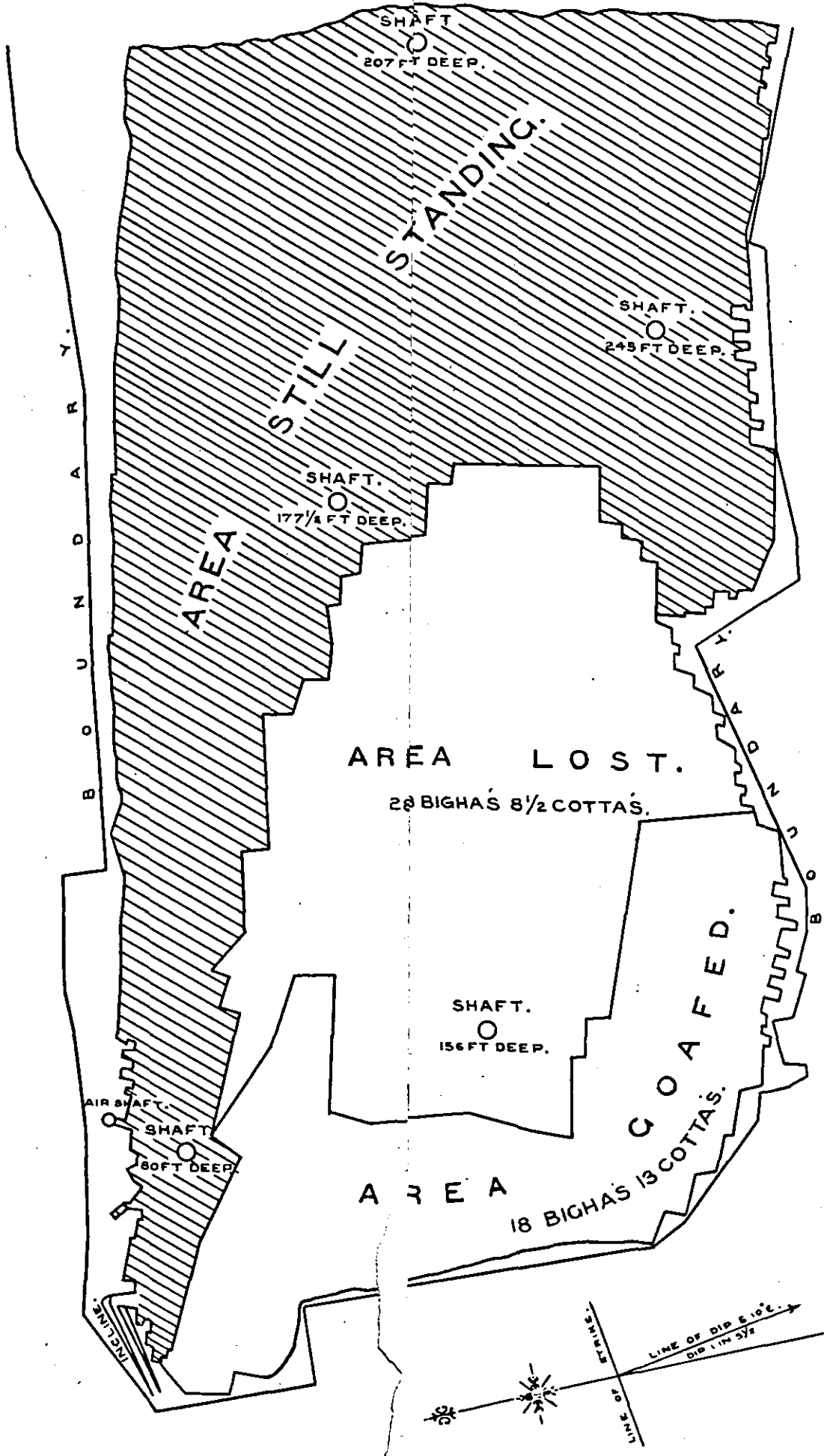


= SECTION ON A.B. =

# MINE PLAN

Showing area goafed and area lost where pillars have been left small and galleries have been made wide.

Scale 1 inch = 200 feet.

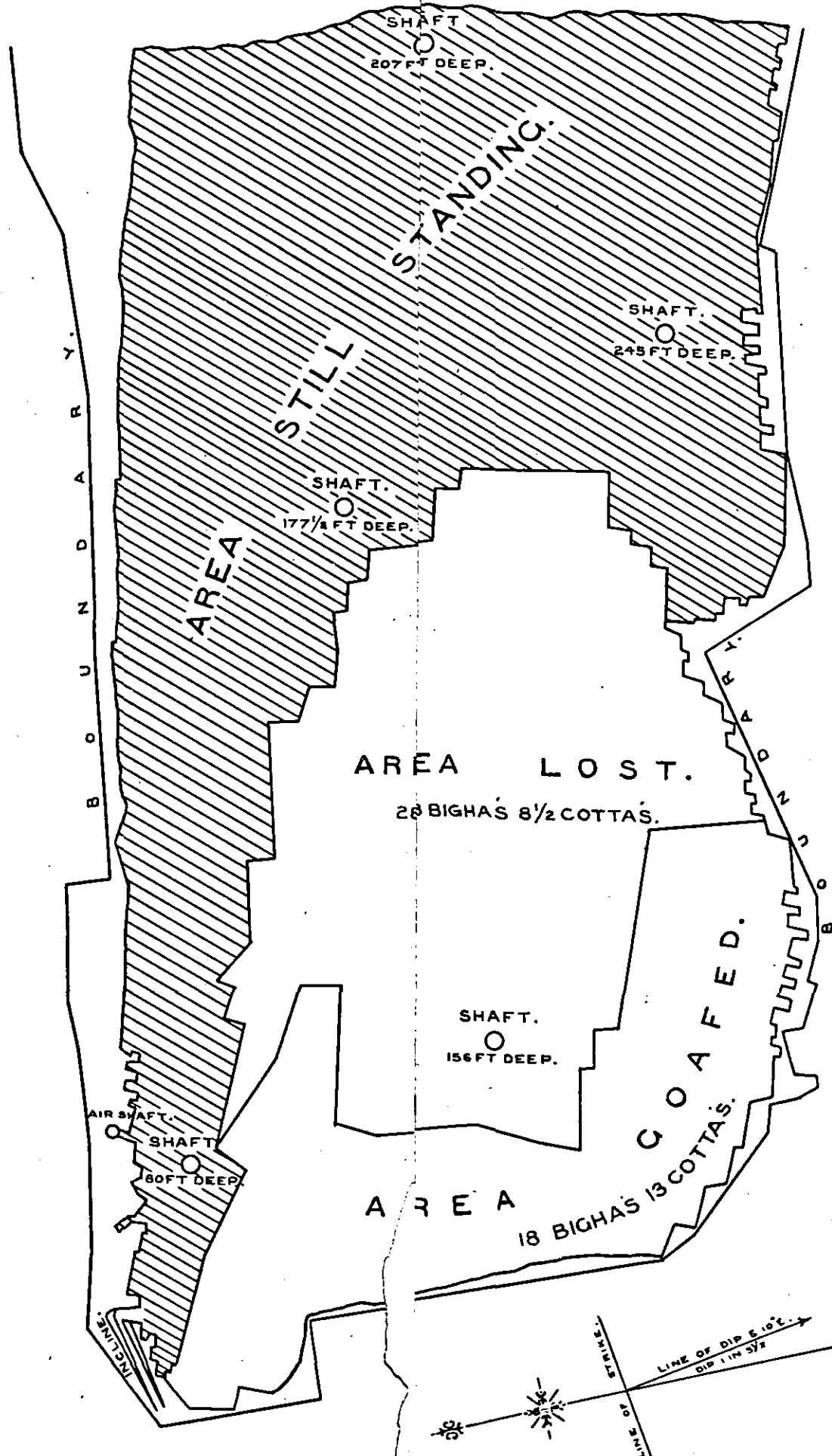




MINE PLAN

Showing area goafed and area lost where pillars have been left small and galleries have been made wide.

Scale 1 inch = 200 feet.



**APPENDIX I.**  
**STATISTICS OF MINES AND MINERALS.**

Table No. 1.

Number of mines regulated by the Indian Mines Act, 1901, number of workers and output of minerals, during the year 1910.

PROVINCE.	District and mineral field.	Number of mines under the scope of the Act.	NUMBER OF MINES.		NUMBER OF MINES INSPECTED DURING THE YEAR.		TOTAL OUTPUT.	AVERAGE NUMBER OF PERSONS EMPLOYED DAILY IN AND ABOUT THE MINES.								Grand total below ground and above ground.
			Worked by mechanical power.	Not worked by mechanical power.	Number of mines inspected.	Number of inspections.		BELOW GROUND.				ABOVE GROUND.				
								Adult males.	Adult females.	Children (under 12).	Total below ground.	Adult males.	Adult females.	Children (under 12).	Total above ground.	
							<b>A.—COAL.</b>									
							Tons.									
	Hazaribagh {															
	Bokaro-Ramgarh	4	...	4	...	...	2,166	36	43	1	80	7	8	...	15	95
	Giridih	8	8	...	4	12	678,304	8,035	1,118	24	4,177	1,656	869	60	2,585	6,762
	Bokaro-Jharis	2	...	2	...	...	82	18	4	...	22	8	22	...	30	52
	Maubhum {															
	Jharis	198	118	80	118	241	5,794,534	17,834	18,650	390	31,874	12,494	5,633	977	19,104	50,978
	Raniganj	49	12	37	31	51	478,332	2,488	990	9	3,487	1,158	517	39	1,714	5,201
	Bankura	1	...	1	1	1	4,098	19	16	...	35	1	2	...	8	38
	Sonthal Parganas {															
	Raniganj	2	...	2	1	1	1,952	8	4	...	12	4	2	...	6	18
	Rajmahal	2	...	2	...	...	2,788	18	4	...	17	4	8	...	12	29
	Palamu, Daltonganj	1	1	...	1	3	84,998	162	160	14	386	184	36	41	261	597
	Birbhum, Raniganj	1	...	1	...	...	1,664	8	6	...	14	6	2	...	8	22
	Burdwan	154	188	16	127	236	8,731,560	15,510	6,959	139	22,608	7,580	3,776	298	11,854	34,262
	Sambalpur, Hingir-Rampur	1	1	...	...	...	830	54	...	...	54	160	...	...	160	214
	<b>TOTAL</b>	<b>416</b>	<b>278</b>	<b>145</b>	<b>278</b>	<b>545</b>	<b>10,777,306</b>	<b>39,185</b>	<b>22,954</b>	<b>577</b>	<b>62,716</b>	<b>23,262</b>	<b>10,875</b>	<b>1,415</b>	<b>35,552</b>	<b>98,268</b>

APPENDIX I—contd.

STATISTICS OF MINES AND MINERALS—contd.

Table No. I—contd.

Number of mines regulated by the Indian Mines Act, 1901, number of workers and output of minerals, during the year 1910.

PROVINCE.	District and mineral field.	Number of mines under the scope of the Act.	NUMBER OF MINES.		NUMBER OF MINES INSPECTED DURING THE YEAR.		TOTAL OUTPUT.	AVERAGE NUMBER OF PERSONS EMPLOYED DAILY IN AND ABOUT THE MINES.									
			Worked by mechanical power.	Not worked by mechanical power.	Number of mines inspected.	Number of inspections.		BELOW GROUND.				ABOVE GROUND.				Grand total below ground and above ground.	
								Adult males.	Adult females.	Children (under 12).	Total below ground.	Adult males.	Adult females.	Children (under 12).	Total above ground.		
Central Provinces	Chhindwara, Pench Valley	2	2	...	3	3	87,677	402	246	12	660	65	29	11	105	765	
		Narsinghpur, Mohpani	1	1	...	1	1	39,484	398	170	...	568	340	68	...	398	966
		Chanda, Ballarpur	1	1	...	1	4	93,276	536	...	...	536	152	...	...	152	688
	TOTAL	4	4	...	5	8	220,437	1,336	416	12	1,764	557	87	11	655	2,419	
Panjab	Jhelum	7	...	7	...	...	46,655	753	...	...	753	461	...	10	471	1,334	
		Sialpur	1	...	1	...	...	650	319	...	319	83	...	...	83	402	
		Mianwali	2	...	2	...	...	1,884	94	...	94	61	1	...	62	156	
	TOTAL	10	...	10	...	...	49,189	1,166	...	..	1,166	605	1	10	616	1,782	
Eastern Bengal and Assam	Lakhimpur	6	5	1	4	6	297,094	918	284	...	1,202	423	240	37	709	1,911	

Baluchistan.	Sibi . . . . .	8	1	2	8	16	43,428	566	...	...	566	299	...	26	325	891
	Loralai . . . . .	1	..	1	...	...	172	6	...	...	6	3	...	...	3	9
	TOTAL . . . . .	4	1	3	3	16	43,600	572	..	...	572	302	...	26	328	900
North-West Frontier Province.	Hazara . . . . .	1	...	1	...	...	90	5	...	...	5	...	...	...	...	5
GRAND TOTAL (COAL) FOR 1910.		443	283	160	290	575	11,387,716	43,182	23,654	589	67,425	25,149	11,212	1,499	37,860	105,385
	" " OF PRECEDING YEAR.	511	214	297	371	712	11,294,227	44,549	24,660	685	69,894	25,460	12,311	1,628	39,397	109,291
	DIFFERENCE . . . . .	-68	+69	-137	-81	-137	+93,489	-1,367	-1,006	-96	-2,469	-311	-1,099	-127	-1,537	-4,006
Bengal . . . . .	B.—MICA. Cwts.															
	Monghyr . . . . .	5	...	5	3	3	543	75	90	22	187	16	55	42	118	300
	Hazaribagh . . . . .	136	...	136	78	77	12,917	3,599	1,454	62	5,115	1,331	1,519	1,093	3,943	9,058
	Gaya . . . . .	27	...	27	16	16	4,366	508	242	70	820	103	137	163	403	1,223
	TOTAL . . . . .	168	...	168	92	96	17,826	4,182	1,786	154	6,122	1,450	1,711	1,298	4,459	10,581
Madras . . . . .	Nellore . . . . .	52	7	45	42	42	3,336	945	725	93	1,763	310	315	332	957	2,720
Rajputana . . . . .	Ajmer-Merwara . . . . .	7	...	7	...	...	213	80	3	...	88	68	40	9	117	200
GRAND TOTAL (MICA) FOR 1910.		227	7	220	134	138	21,375	5,207	2,514	247	7,968	1,828	2,066	1,639	5,533	13,501
	" " OF PRECEDING YEAR.	172	...	172	72	80	32,011	3,723	2,114	272	6,109	1,274	1,381	1,101	3,756	9,865
	DIFFERENCE . . . . .	+55	+7	+48	+62	+58	-10,636	+1,484	+400	-25	+1,859	+554	+685	+538	+1,777	+3,636

APPENDIX I—contd.

STATISTICS OF MINES AND MINERALS—contd.

Table No. 1—contd.

Number of mines regulated by the Indian Mines Act, 1901, number of workers and output of minerals, during the year 1910.

PROVINCE.	District and mineral field.	Number of mines under the scope of the Act.	NUMBER OF MINES.		NUMBER OF MINES INSPECTED DURING THE YEAR.		TOTAL OUTPUT.	AVERAGE NUMBER OF PERSONS EMPLOYED DAILY IN AND ABOUT THE MINES.								Grand total below ground and above ground.	
			Worked by mechanical power.	Not worked by mechanical power.	Number of mines inspected.	Number of inspections.		BELOW GROUND.				ABOVE GROUND.					
								Adult males.	Adult females.	Children (under 12).	Total below ground.	Adult males.	Adult females.	Children (under 12).	Total above ground.		
Central Provinces	<b>C.—MANGANESE.</b>																
	Tons.																
	Nagpur . . . . .	15	2	13	...	...	162,850	1,628	1,206	...	2,829	442	202	10	654	3,483	
	Bhandara . . . . .	4	...	4	...	...	79,611	252	142	...	394	683	494	10	1,187	1,581	
	Balaghat . . . . .	6	...	6	...	...	131,776	1,493	482	53	2,028	294	119	18	431	2,459	
Chhindwara . . . . .	4	1	3	...	...	19,531	184	120	...	254	209	103	...	312	566		
	TOTAL	29	3	26	...	...	393,768	3,502	1,950	53	5,505	1,628	918	38	2,584	8,089	
Madras . . . . .	Vizagapatam . . . . .	8	2	6	2	3	43,980	1,074	669	...	1,743	311	186	85	582	2,325	
Bombay . . . . .	Panch Mahals . . . . .	3	2	1	2	5	30,396	219	92	23	336	350	126	41	517	853	
	Ratnagiri . . . . .	1	...	1	...	...	525	8	9	...	17	22	31	10	63	80	
	GRAND TOTAL (MANGANESE) FOR 1910.	41	7	34	4	8	468,669	4,803	2,720	78	7,601	2,311	1,261	174	3,746	11,347	
	" " OF PRECEDING YEAR.	37	1	36	10	12	357,205	5,012	2,891	83	7,886	1,705	964	140	2,809	10,795	
	DIFFERENCE . . . . .	+4	+6	-2	-6	-4	+111,464	-209	-171	-5	-385	+606	+297	+34	+937	+552	

		D.—LIMESTONE.														
		Tons.														
Central Provinces	Jabalpur, Katni	18	1	17	...	...	80,658	694	818	33	1,545	290	537	48	875	2,420
Panjab	Hoshiarpur	1	...	1	...	...	600	40	...	...	40	50	...	...	50	90
	GRAND TOTAL (LIMESTONE) FOR 1910.	19	1	18	...	...	81,258	734	818	33	1,585	340	537	48	925	2,510
	" OF PRECEDING YEAR.	21	...	21	16	23	56,502	1,075	1,413	64	2,552	610	562	75	1,247	3,799
	DIFFERENCE	-2	+1	-3	-16	-23	+24,756	-341	-595	-31	-967	-270	-25	-27	-322	-1,289
		E.—SALT.														
		Tons.														
Panjab	Shahpur	1	...	1	...	...	6,151	32	35	5	72	...	...	...	...	72
	Jhelum	2	...	2	...	...	102,263	381	354	54	789	31	...	...	31	820
	Mianwali	1	...	1	...	...	11,453	66	...	...	66	...	...	...	...	66
	GRAND TOTAL (SALT) FOR 1910.	4	...	4	...	...	119,867	479	389	59	927	31	...	...	31	958
	" OF PRECEDING YEAR	4	...	4	2	4	126,987	524	432	64	1,020	41	...	...	41	1,061
	DIFFERENCE	...	...	...	-2	-4	-7,120	-45	-43	-5	-93	-10	...	...	-10	-103

APPENDIX I—contd.

STATISTICS OF MINES AND MINERALS—contd.

Table No. 1—contd.

Number of mines regulated by the Indian Mines Act, 1901, number of workers and output of minerals, during the year 1910.

PROVINCE.	District and mineral field.	Number of mines under the scope of the Act.	NUMBER OF MINES.		NUMBER OF MINES INSPECTED DURING THE YEAR.		TOTAL OUTPUT.	AVERAGE NUMBER OF PERSONS EMPLOYED DAILY IN AND ABOUT THE MINES.								
			Worked by mechanical power.	Not worked by mechanical power.	Number of mines inspected.	Number of inspections.		BELOW GROUND.				ABOVE GROUND.				Grand total below ground and above ground.
								Adult males.	Adult females.	Children (under 12).	Total below ground.	Adult males.	Adult females.	Children (under 12).	Total above ground.	
<b>F.—GEMS.</b>																
Carats.																
Burma . . . . .	Mogok (Rubies, etc.) . . . . .	5	5	...	1	1	262,019	626	...	...	626	837	...	...	837	1,463
Madras . . . . .	Kurnool (Diamonds) . . . . .	2	...	2	...	...	18	11	4	...	15	5	12	7	24	39
	<b>GRAND TOTAL (GEMS) FOR 1910.</b>	7	5	2	1	1	262,032	637	4	...	641	842	12	7	861	1,502
	„ OF PRECEDING YEAR	1	1	...	...	...	265,010	652	...	...	652	733	...	...	733	1,385
	<b>DIFFERENCE</b>	+6	+4	+2	+1	+1	-2,978	-15	+4	...	-11	+109	+12	+7	+128	+117

		G.—SLATE.															
							Tons.										
							1,800										
Bengal . . . . .	Monghyr . . . . .	6	...	6	4	8	1,800	68	49	...	117	46	7	...	69	170	
Panjab . . . . .	Kangra . . . . .	2	...	2	2	2	3,750	85	...	...	85	125	27	38	190	275	
	Gurgaon . . . . .	8	...	8	2	2	1,857	39	...	26	65	100	...	7	107	172	
TOTAL . . . . .		5	...	5	4	4	5,607	124	...	26	150	235	27	45	297	447	
GRAND TOTAL (SLATE) FOR 1910 . . . . .		11	...	11	8	12	6,907	192	49	26	267	271	34	45	350	617	
" " OF PRECEDING YEAR . . . . .		11	...	11	14	14	7,054	263	73	30	366	278	30	48	356	722	
DIFFERENCE . . . . .		...	...	...	-6	-2	-147	-71	-24	-4	-99	-7	+4	-3	-6	-105	
		H.—GOLD.															
							Troy ozs.										
							737										
Bombay . . . . .	Dharwar . . . . .	1	1	...	...	...	737	18	...	...	18	256	68	...	324	337	
Madras . . . . .	Anantapur . . . . .	3	3	...	3	3	2,532	623	...	...	623	447	79	87	609	1,186	
GRAND TOTAL (GOLD) FOR 1910 . . . . .		4	4	...	3	3	3,269	636	...	...	636	703	147	37	937	1,523	
" " OF PRECEDING YEAR . . . . .		8	8	...	8	14	5,615	1,454	...	1	1,455	711	105	76	894	2,349	
DIFFERENCE . . . . .		-4	-4	...	-5	-11	-2,346	-818	...	-1	-819	-8	+42	-41	-7	-826	
		I.—IRON.															
							Tons.										
							17,646										
Bengal . . . . .	Singhbhum . . . . .	6	...	6	...	...	17,646	110	210	...	320	110	211	...	321	641	
TOTAL of preceding year . . . . .		6	...	5	...	...	15,214	...	...	...	...	190	363	...	553	553	
DIFFERENCE . . . . .		+1	...	+1	...	...	+2,432	+110	+210	...	+320	-80	-152	...	-222	+88	

CO-2



APPENDIXI—contd.

STATISTICS OF MINES AND MINERALS—contd.

Table No. 1—contd.

Number of mines regulated by the Indian Mines Act, 1901, number of workers and output of minerals, during the year 1910.

PROVINCE.	District and mineral field.	Number of mines under the scope of the Act.	NUMBER OF MINES.		NUMBER OF MINES INSPECTED DURING THE YEAR.		TOTAL OUTPUT.	AVERAGE NUMBER OF PERSONS EMPLOYED DAILY IN AND ABOUT THE MINES.								
			Worked by mechanical power.	Not worked by mechanical power.	Number of mines inspected.	Number of inspections.		BELOW GROUND.				ABOVE GROUND.				Grand total below ground and above ground.
								Adult males.	Adult females.	Children (under 13).	Total below ground.	Adult males.	Adult females.	Children (under 13).	Total above ground.	
Central Provinces . . .	Nagpur . . . . .	1	...	1	...	...	18	41	25	...	66	11	16	...	27	93
	TOTAL of preceding year . . .	2	...	2	...	...	144	40	8	...	48	30	7	...	37	85
	DIFFERENCE . . . . .	-1	...	-1	...	...	-126	+1	+17	...	+18	-19	+9	...	-10	+8
Madras . . . . .	Salem . . . . .	1	...	1	1	1	Tons. 5,182	250	200	350	800	50	...	50	100	900
	TOTAL of preceding year . . .	1	...	1	...	...	737	23	19	26	68	26	20	35	81	149
	DIFFERENCE . . . . .	...	...	...	+1	+1	+4,445	+227	+181	+324	+732	+24	-20	+15	19	+751
Baluchistan . . . . .	Quetta-Pishin . . . . .	4	1	3	...	...	Cwts. 6,440	8	...	...	8	...	...	...	...	8
	TOTAL of preceding year . . .	2	...	2	...	...	10,122	6	...	...	6	10	...	...	10	16
	DIFFERENCE . . . . .	+2	+1	+1	...	...	-3,682	+2	...	...	+2	-10	...	...	-10	-8

		M.—COPPER ORE.														
		Tons.														
Bengal . . . . .	Singhbhum . . . . .	1	1	...	...	...	864	80	...	...	80	1,600	1,040	180	2,760	2,840
	TOTAL of preceding year . . . . .	2	2	...	1	1	7	180	...	...	180	118	53	10	175	355
	DIFFERENCE . . . . .	-1	-1	...	-1	-1	+857	-100	...	...	-100	+1,487	+988	+110	+2,585	2,485
		N.—FULLER'S EARTH.														
		Tons.														
Central Provinces . . . . .	Jabalpur . . . . .	1	...	1	...	...	84	...	...	...	...	...	...	...	...	...
	TOTAL of preceding year . . . . .	1	...	1	1	1	97	...	...	...	...	...	...	...	...	...
	DIFFERENCE . . . . .	...	...	...	-1	-1	-13	...	...	...	...	...	...	...	...	...
		O.—CLAY.														
		Tons.														
Central Provinces . . . . .	Jabalpur . . . . .	8	...	8	...	...	15,223	29	57	...	86	20	6	...	26	119
	TOTAL of preceding year . . . . .	1	...	1	...	...	10,214	16	36	...	52	24	8	...	32	84
	DIFFERENCE . . . . .	+2	...	+2	...	...	+5,009	+13	+21	...	+34	-4	-2	...	-6	+28
		P.—GALENA.														
		Tons.														
Burma . . . . .	Mandalay . . . . .	1	...	1	...	...	23	1,270	...	...	1,270	635	716	...	1,851	2,621
	TOTAL of preceding year . . . . .	1	...	1	...	...	2	4	...	...	4	4	...	...	4	8
	DIFFERENCE . . . . .	...	...	...	...	...	+21	+1,266	...	...	+1,266	+631	+716	...	+1,847	+2,613

\* Figures included with that of Limestone.

APPENDIX I—*contd.*

STATISTICS OF MINES AND MINERALS—*concl'd.*

Table No. 1—*concl'd.*

Number of mines regulated by the Indian Mines Act, 1901, number of workers and output of minerals, during the year 1910.

PROVINCE.	District and mineral field.	Number of mines under the scope of the Act.	NUMBER OF MINES.		NUMBER OF MINES INSPECTED DURING THE YEAR.		TOTAL OUTPUT.	AVERAGE NUMBER OF PERSONS EMPLOYED DAILY IN AND ABOUT THE MINES.								
			Worked by mechanical power.	Not worked by mechanical power.	Number of mines inspected.	Number of inspections.		BELOW GROUND.				ABOVE GROUND.				Grand total below ground and above ground.
								Adult males.	Adult females.	Children (under 12).	Total below ground.	Adult males.	Adult females.	Children (under 12).	Total above ground.	
Bengal . . . . .	Hazaribagh . . . . .	1	...	1	...	...	Q.—TIN. Cwts. 3	7	...	...	7	4	...	...	4	11
Burma . . . . .	Maliwan . . . . .	1	1	...	...	...	1,100	20	...	...	20	40	...	...	40	60
	TOTAL (TIN) for 1910 . . . . .	2	1	1	...	...	1,103	27	...	...	27	44	...	...	44	71
	TOTAL of preceding year . . . . .	1	...	1	...	...	1,620	47	...	...	47	40	...	...	40	87
	DIFFERENCE . . . . .	+1	+1	...	...	...	-417	-20	...	...	-20	+4	...	...	+4	-16
Central Provinces . . . . .	Jabalpur . . . . .	3	...	3	...	...	R.—STEATITE. Cwts. 3,068	32	17	...	49	31	30	...	61	110
Madras . . . . .	Kurnool . . . . .	1	...	1	1	1	400	4	8	...	7	...	...	3	3	10
	TOTAL (STEATITE) for 1910 . . . . .	4	...	4	1	1	3,468	36	20	...	56	31	30	3	64	120
	TOTAL of preceding year . . . . .	3	...	3	...	...	11,296	25	15	...	40	28	18	...	46	86
	DIFFERENCE . . . . .	+1	...	+1	+1	+1	-7,828	+11	+5	...	+16	+3	+12	+3	+18	+34

		S.—GRAPHITE.														
Madras . . . . .	Vizagapatam . . . . .	1	...	1	...	...	Cwts. 5,171	11	4	...	15	5	11	...	16	31
	TOTAL of preceding year . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	DIFFERENCE . . . . .	+1	...	+1	...	...	+5,171	+11	+4	...	+15	+5	+11	...	+16	+31
Central Provinces . . . . .	Jabalpur . . . . .	...	...	...	...	...	T.—BAUXITE.	...	...	...	...	...	...	...	...	...
	TOTAL of preceding year . . . . .	1	...	1	...	...	Tons. 32	11	5	...	16	4	...	...	4	20
	DIFFERENCE . . . . .	-1	...	-1	...	...	-32	-11	-5	...	-16	-4	...	...	-4	-20
GRAND TOTAL (ALL MINERALS).		781	310	471	442	739	Tons. 12,103,439 Cwts. 37,575 Ounces. 8,269 Carats. 262,032	57,732	30,664	1,382	89,778	33,981	17,299	3,623	54,902	144,680
GRAND TOTAL OF PRECEDING YEAR.		785	226	559	495		Tons. 11,868,278 Cwts. 55,093 Ounces. 5,815 Carats. 265,010	57,604	31,666	1,225	90,495	31,281	15,821	3,113	50,215	140,710
DIFFERENCE . . . . .		-4	+84	-88	-53	-122	Tons. +235,161 Cwts. -17,518 Ounces. -2,346 Carats. -2,978	+128	-1,002	+157	-717	+2,700	+1,478	+509	+4,687	+3,970

## APPENDIX I—contd.

Table No. 2.

Number of mines opened and closed during the year ending 31st  
December 1910.

Province.	District.	Number of mines opened.	Number of mines closed.	
<b>A.—COAL.</b>				
BENGAL . . . . .	Hazaribagh {	Bokaro-Ramgarh . . . . .	1	8
		Giridih . . . . .	...	8
	Manbhum {	Jharia . . . . .	11	14
		Raniganj . . . . .	7	10
	Burdwan, Raniganj . . . . .	6	17	
	Bankura " . . . . .	1	...	
	Sonthal Parganas, Raniganj . . . . .	...	1	
TOTAL . . . . .		26	48	
PANJAB . . . . .	{	Jhelum . . . . .	8	2
		Mianwali . . . . .	1	1
TOTAL . . . . .		4	3	
BALUCHISTAN . . . . .	Sibi, Khost . . . . .	2	...	
BURMA . . . . .	Chhindwin . . . . .	...	1	
TOTAL (COAL) . . . . .		82	62	
<b>B.—MICA.</b>				
BENGAL . . . . .	Hazaribagh . . . . .	80	68	
MADRAS . . . . .	Nellore . . . . .	6	30	
RAJPUTANA . . . . .	Ajmer-Merwara . . . . .	1	2	
TOTAL (MICA) . . . . .		87	95	
<b>C.—MANGANESE.</b>				
BOMBAY . . . . .	Ratnagiri . . . . .	1	1	
CENTRAL PROVINCES . . . . .	{	Nagpur . . . . .	1	1
		Chhindwara . . . . .	1	...
TOTAL . . . . .		2	1	
MADRAS . . . . .	Vizagapatam . . . . .	1	...	
TOTAL (MANGANESE) . . . . .		4	2	

APPENDIX I—*contd.*Table No. 2—*contd.*

Number of mines opened and closed during the year ending 31st  
December 1910.

Province.	District.	Number of mines opened.	Number of mines closed.
<b>D.—LIMESTONE.</b>			
CENTRAL PROVINCES . . . . .	Jabalpur . . . . .	4	1
PANJAB . . . . .	Hoshiarpur . . . . .	1	1
TOTAL (LIMESTONE) . . . . .		5	2
<b>E.—SALT.</b>			
PANJAB . . . . .	Jhelum . . . . .	1	..
<b>F.—GEMS.</b>			
MADRAS . . . . .	Kurnool . . . . .	2	2
<b>G.—TIN.</b>			
BENGAL . . . . .	Hazaribagh . . . . .	1	1
<b>H.—STEATITE.</b>			
CENTRAL PROVINCES . . . . .	Jabalpur . . . . .	1	1
MADRAS . . . . .	Kurnool . . . . .	1	1
TOTAL (STEATITE) . . . . .		2	2
<b>I.—GRAPHITE.</b>			
MADRAS . . . . .	Visagapatam . . . . .	1	..
GRAND TOTAL . . . . .		135	156

## APPENDIX I—contd.

Table No. 3.

List of plans of abandoned and discontinued mines received during the year 1910.

Registered number.	Name and situation of mine.	Name and number of seam.	Name of mineral worked.	Name of owner.	Date of abandonment or discontinuance.
81	Chota Dhemu Mine, Dishargarh P. O.	Dishargarh Seam . . .	Coal	Chota Dhemu Coal Co. . .	October 1908.
82	Loyabad Mine, Bansjora P. O.	No. 17 Seam . . .	Coal	Barakar Coal Co., Ltd. . .	20th March 1909.
88	Pandakanali Mine, Bansjora P. O.	No. 17 Seam . . .	Coal	Pandakanali Coal Co., Ltd. . .	5th August 1909.
84	South Bhuputdih Mine, Katrasgarh P. O.	No. 10 Seam . . .	Coal	Katras Bhuputdih Coal Co. . .	9th May 1909.
85	Koniapur Mine, Sitarampur P. O.	Dishargarh Seam . . .	Coal	Lutchipur Coal Co., Ltd. . .	15th November 1909.
86	Mugma Mine, Nirshaohatti P. O.	.....	Coal	I. N. Chandra and Sons . . .	1st November 1909.
87	No. 2, Pathordih Shaft and Dandidih Incline, Serampur Colliery, Giridih P. O.	Kurhurbari Lower Seam . . .	Coal	East Indian Railway Co. . .	31st March 1909.
88	Sunpur Mine, Chora P. O.	Sunpur Seam . . .	Coal	Ondal Coal Co., Ltd. . .	June 1909.
89	Bowlah Mine, Chora P. O.	Bowlah Seam . . .	Coal	Ondal Coal Co., Ltd. . .	April 1909.
90	Ghusik Mine, Kalipahari P. O.	Ghusik Seam . . .	Coal	Ghusik and Muslin Collieries, Ltd. . .	June 1909.
91	Egarcoor Quarry, Barakar P. O.	Seam unknown	Coal	Ahmed Yusuf . . .	July 1908.
92	Ketherdih Quarry, Mugma P. O.	Ketherdih Seam . . .	Coal	Kunja Behari Ghosh . . .	January 1909.
93	Chandore Mine, Katrasgarh P. O.	Nos. 8 and 7 Seams . . .	Coal	Chandore Coal Co. . . .	15th August 1909.
94	Angarpatra Mine, Katrasgarh P. O.	No. 13 Seam . . .	Coal	Trigunait Brothers . . .	27th January 1909.
95	Hariladih Mine, Jharia P. O.	No. 16 Seam . . .	Coal	Standard Coal Co., Ltd. . .	25th October 1909.
96	Sijua Mine, Sijua P. O.	No. 16 Seam . . .	Coal	Sijua Coal Co., Ltd. . .	15th December 1909.
97	Pipratand Mine, Katrasgarh P. O.	Top, Middle and Lower of Murulidih Basin.	Coal	Pipratand Coal Co., Ltd. . .	26th November 1909.
98	Mandra Khas Mine, Nowagarh P. O.	...	Coal	Gour Mohun Singh . . .	...
99	Mandra Mine, Nowagarh P. O.	...	Coal	Mouji Jiva . . .	...
100	Basantipur Mine, Chowkidanga.	Mamudpur Seam . . .	Coal	Basanti Oakdene Coal Co. . .	8th December 1909.
101	Jogta Mine, Sijua P. O.	No. 13 Seam . . .	Coal	Agabeg Brothers . . .	13th March 1910.
102	Nuniapool Mine, Kalipahari P. O.	Dobalia Seam . . .	Coal	Meyer Coal Co. . . .	15th June 1909.
103	Jubilee Mine, Kalipahari P. O.	Bhutdoba Top Seam . . .	Coal	Meyer Coal Co. . . .	19th June 1909.
104	Nudkharuki Mine, Nos. 11, 12, 13 and 14 Inclines, Nos. 8, 9 and 10 Inclines, Nowagarh P. O.	No. 8 Seam. No. 10 Seam.	Coal	Nudkharuki Coal Co. . .	January 1910.

## APPENDIX I—contd.

Table No. 3—contd.

List of plans of abandoned and discontinued mines received during the year 1910.

Registered number.	Name and situation of mine.	Name and number of seam.	Name of mineral worked.	Name of owner.	Date of abandonment or discontinuance.
105	Sanctoria Mine, Dishargarh P. O.	Sanctoria Seam	Coal	Bengal Coal Co., Ltd.	1st April 1910.
106	Gondodih Mine, Kusunda P. O.	Nos. 8, 9, and 10 Seams	Coal	Baniganj Coal Association, Ltd.	1st June 1909.
107	Busserya Mine, Kusunda P. O.	Nos. 10 and 11 Seams	Coal	Busserya Coal Co., Ltd.	21st March 1909.
108	Koolustore Mine, Chowkidanga P. O.	Toposi Seam	Coal	Koolustore Coal Co., Ltd.	3rd May 1910.
109	Katras Mine, Katrasgarh P. O.	No. 11 Seam	Coal	Nowagarh Coal Co., Ltd.	20th March 1909.
110	Kessabganj Mine, Kalipahari P. O.	Kessabganj Seam	Coal	G. M. Agreeable Coal Co.	6th June 1909.
111	Banksimulla Mine, Charanpur P. O.	Sibpur Seam	Coal	Bengal Coal Co., Ltd.	26th June 1910.
112	Mudidih Mine, Sijua P. O.	Nos. 10, 11, and 12 Seams	Coal	Reliance Coal Co., Ltd.	No. 0 Seam—Unknown. No. 11 Seam—March 1909. No. 12 Seam—April 1910.
113	Upper Kandra Mine, Bhujudih P. O.	Nos. 11 and 12 Seams	Coal	South Jharia Coal Co.	...
114	Domohani Mine, Kurhbari Colliery, Giridih P. O.	Kurhbari Lower Seam	Coal	East Indian Railway Co.	December 1909.
115	Egarcoor Mine, Chirkunda P. O.	Egarcoor Lower Seam	Coal	Egarcoor Coal Association	February 1910.
116	Nimtala Mine, Kurhbari Colliery, Giridih P. O.	Kurhbari Bottom Seam	Coal	East Indian Railway Co.	March 1909.
117	Ramnadih Mine, Kurhbari Colliery, Giridih P. O.	Kurhbari Lower Seam	Coal	East Indian Railway Co.	October 1909.
118	New Chandore Mine, Katrasgarh P. O.	Nos. 6 and 7 Seams	Coal	S. Trigunait	March 1909.
119	Koradih Mine, Katrasgarh P. O.	Seam unknown	Coal	C. M. & Co.	July 1909.
120	No. 2 Incline Mine, Kurhbari Colliery, Giridih P. O.	Kurhbari Lower Seam	Coal	East Indian Railway Co.	November 1909.
121	Morishkotta Mine, Sitarampur P. O.	Dishargarh Seam	Coal	Sudihi Coal Co., Ltd.	April 1910.
122	Bamundiha Mine, Sitarampur P. O.	Dishargarh Seam	Coal	Damuda Coal Co., Ltd.	30th June 1910.
123	Bandarhoca Mine, Nirshachatti P. O.	Bandarhoca Top and Bottom Seams.	Coal	Friends Coal Co.	22nd October 1909.
124	Titulmuri Mine, Sijua P. O.	No. 10 Seam	Coal	Titulmuri Coal Co., Ltd.	31st May 1909.
125	Ekra Khas Mine, Bansjora P. O.	Nos. 11 and 15 Seams	Coal	Maharaja M. C. Nandi	June 1910.
126	Kankani Mine, Bansjora P. O.	No. 16 Seam	Coal	Eastern Coal Co., Ltd.	February 1910.
127	Baraboni Mine, Asansol P. O.	Bottom Seam (Sanctoria P)	Coal	Baraboni Coal Concern, Ltd.	21st June 1910.



APPENDIX I—*contd.*Table No. 3—*concl'd.*

List of plans of abandoned and discontinued mines received during the year 1910.

Registered number.	Name and situation of mine.	Name and number of seam.	Name of mineral worked.	Name of owner.	Date of abandonment or discontinuance.
128	Vanora Mine, Charanpur P. O.	Top Seam	Coal	Maharaja M. C. Nandi	17th August 1909.
129	Egarcoor Mine, Chirkunda P. O.	Egarcoor Seam	Coal	New Chirkunda Coal Co.	May 1910.
180	Gangutia Mine, Dishargarh P. O.	Hatnoi Seam	Coal	Bengal Nagpur Coal Co., Ld.	April 1909.
181	Jamgram Mine, Panuria P. O.	33 feet Seam	Coal	Barakar Coal Co., Ld.	December 1909.

Table No. 4.

The following table shows the fluctuations in the output of the principal minerals raised from mines classed under the Indian Mines Act, 1901. The other minerals raised are gems, slate, gold, iron ore, magnesite, chromite, copper ore, tin, steatite, graphite, fuller's earth, clay, galena and wolframite.

YEAR.	Coal.	Manganese.	Mica.	Limestone.	Salt.
	Tons.	Tons.	Cwts.	Tons.	Tons.
1901 . . . . .	6,251,522	162,057	19,900	28,000	90,242
1902 . . . . .	6,790,507	144,037	21,360	30,091	87,361
1903 . . . . .	6,812,725	171,223	20,100	35,238	90,667
1904 . . . . .	7,561,338	138,733	21,320	50,847	107,413
1905 . . . . .	7,770,471	204,194	25,548	93,170	94,078
1906 . . . . .	9,112,663	436,442	50,438	48,836	118,023
1907 . . . . .	10,526,468	642,082	44,919	73,222	101,703
1908 . . . . .	12,149,020	494,942	46,208	101,569	93,779
1909 . . . . .	11,294,227	357,205	32,011	56,502	126,987
1910 . . . . .	11,387,716	468,669	21,375	81,258	119,867

APPENDIX I—*contd.*

Table No. 5.

The following table shows the amount of coal raised, the average number of persons working daily and the death-rates during the years 1901 to 1910 in respect of coal mines under the Indian Mines Act, 1901.

YEAR.	Amount of coal raised.	Average number of persons working daily below and above ground.	Number of deaths below and above ground.	DEATH-RATES.	
				Per 1,000,000 tons raised.	Per 1,000 persons working daily below and above ground.
1901 . . . . .	6,251,522	85,861	58	9.28	.67
1902 . . . . .	6,790,507	89,503	59	8.69	.66
1903 . . . . .	6,812,725	79,561	67	9.83	.84
1904 . . . . .	7,561,338	82,002	55	7.27	.67
1905 . . . . .	7,770,471	79,506	58	7.46	.72
1906 . . . . .	9,112,663	90,159	80	8.78	.89
1907 . . . . .	10,526,468	102,689	89	8.45	.86
1908 . . . . .	12,149,020	120,107	164	13.49	1.36
1909 . . . . .	11,294,227	109,291	119	10.53	1.08
1910 . . . . .	11,387,716	105,285	160	14.05	1.52

Table No. 6.

Statement showing the output of coal, the number of persons employed and the number of tons of coal raised per person employed in and about the coal mines of the principal coal-producing countries of the world.

YEAR.	Country.	Tons of coal raised.	Persons employed.	Tons raised per person employed.
1909	United Kingdom . . . . .	263,774,312	997,708	264
1908	United States . . . . .	369,158,773	690,438	534
"	Germany . . . . .	195,307,776	667,420	292
"	Austria . . . . .	44,757,835	131,821	339
"	France . . . . .	33,283,207	194,980	170
"	Belgium . . . . .	21,371,726	145,277	147
"	Nova Scotia . . . . .	6,299,282	12,933	487
"	British Columbia . . . . .	2,109,387	6,073	347
"	Australia . . . . .	10,193,135	20,225	503
"	Natal . . . . .	1,669,774	8,962	186
"	Transvaal . . . . .	2,689,904	7,325	343
"	Japan . . . . .	13,447,567	126,999	105
"	New Zealand . . . . .	1,860,975	3,894	477
1907	Russia . . . . .	23,587,610	164,819	143
	Totals and average . . . . .	989,511,263	3,179,374	311
1910	British India . . . . .	11,387,716	105,285	108

**APPENDIX II.**  
**ACCIDENTS IN MINES.**

Table No. 1.

List of Fatal Accidents in mines regulated by the Indian Mines Act, 1901, during the year 1910.

Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Cause of accident and remarks.
<b>EXPLOSIONS OF FIRE-DAMP—(27 deaths).</b>						
1	7th February, 10 P.M.	Dishargarh Mine, Dishargarh P. O.	Equitable Coal Co., Ltd.	Lilu Roy, (m.), 33, Bidesi Roy, (m.), 36, Aklu Roy, (m.), 36, Kodu Roy, (m.), 32, Balchand Roy, (m.), 48, Keharia Chamar, (m.), 40, Talebor Kumar, (m.), 32, Churu Naia, (m.), 28, Rewa Turi, (m.), 38, Nathu Roy, (m.), 36, <i>Coal-cutters.</i> Sambhu Bauri, (m.), 18, <i>Pump khalassi.</i>	Coal	While ten men were working with safety lamps in the Hatnol seam which was connected with the Sanctoria seam by an inclined drift, and while one man was passing with an open light in the Sanctoria seam near the drift an explosion occurred. The ten men in the Hatnol seam were apparently killed outright and the man in the Sanctoria seam died about twelve hours afterwards. <i>See Report, page 5.</i> Inspection and inquiry made.
2	29th June, 9-45 A.M.	Saltore Mine, Dishargarh P. O.	Saltore Coal Co., Ltd.	Ramdhari Singh, (m.), 33, <i>Head filter.</i>	Coal	Deceased and others were working at a pump within 20 feet of the shaft bottom and were using open acetylene lamps. An ignition of fire-damp took place and they were all more or less severely burnt. Ramdhari died six hours later. <i>See Report, page 8.</i> Inspection and inquiry made.
3	27th July, 11-15 A.M.	Muslia Mine, Asansol P. O.	Ghusik and Muslia Collieries, Ltd.	Babu Lal Dome, (m.), 42, <i>Bucket-man.</i>	Coal	Deceased and others were working at the shaft top and one of them struck a match in the open end of an air pipe which was about to be connected with a fan. Fire-damp was ignited and they were severely burnt. Babu Lal died on the following day. The ignition was followed by a sharp explosion which wrecked the head-gear and surface machinery. <i>See Report, page 8.</i> Inspection and inquiry made.
4	28th November, 3-30 P.M.	Namdang Mine, Margherita P. O.	Assam Railways and Trading Co., Ltd.	R. W. Sergeant, (m.), 32, <i>Asst. Foreman.</i> Mungru Tali, (m.), 29, Bokru Gore, (m.), 37, <i>Sirdars.</i> Ram Kumar, (m.), 25, <i>Basket-filler.</i> Lachman Kurmi, (m.), 28, <i>Opening man.</i> Godadhor Gore, (m.), 31, <i>Basket-filler.</i> Khudia, (m.), 19, <i>Brick mistry.</i> Sriram Kabbar, (m.), 29, <i>Basket-filler.</i>	Coal	Four explosions occurred during the day from fire in the old workings. At the second five persons and at the fourth nine persons received injuries causing death, while at each of these two explosions four persons were seriously injured. <i>See Report, page 9.</i> Inspection and inquiry made.

Hiralal Lohar, (m.), 28,  
*Plate layer.*  
 Mahadeo Kole, (m.), 28,  
*Opening man.*  
 Sankar Keot, (m.), 31,  
*Timber man.*  
 Lalarock Kurmi, (m.), 19,  
*Basket-filler.*  
 Dhoneswar Gore, (m.), 28,  
*Plate layer.*  
 Choiton Koiborto, (m.), 26,  
*Basket-filler.*

FALLS OF ROOF AND SIDES—(84 deaths).

(a) Falls of roof—(52 deaths).

5	3rd January, 2 A.M.	Hatgaroie Mine, Sitarampur P. O.	Lutchipur Coal Co., Ltd.	Bhaglu Kole, (m.), 14, <i>Coal-carrier.</i>	Coal .	Deceased was lying asleep on a sleeper when a pane of roof 15' x 8' x 4" thick fell upon him, injuring him internally, from the effects of which he died eight hours later. Inspection and inquiry made.
6	6th January, 3 A.M.	Baraboni Mine, Asansol P. O.	Baraboni Coal Concern, Ltd.	Ram Majhi, (m.), 46, <i>Sirdar.</i>	Coal .	Deceased was robbing coal from the roof of a gallery when a fall of coal and roof stone came away and killed him. He was not a miner and should neither have been getting coal nor been in the mine at this time. Eight months before he was severely injured whilst robbing coal in a similar manner. Inspection and inquiry made.
7	7th January, 1-30 P.M.	Laikdih Mine, Barakar P. O.	Bengal Coal Co., Ltd.	Souti Bauri, (m.), 27, <i>Miner.</i>	Coal .	Deceased entered the mine when he knew the superior officials would be absent and deliberately went alone into a fenced gallery to cut coal. Some roof coal fell upon him while he was at work and injured him so severely that he died two days later. Inspection and inquiry made.
8	2nd February, 11-30 P.M.	Budruchak Mine, Sijua P. O.	Budruchak Coal Mining Co., Ltd.	Bhican Koiri, (m.), 36, <i>Miner.</i>	Coal .	Deceased was enlarging a gallery and released some roof stone 7' 3" x 6' 6" x 6", which fell on him and killed him outright. <i>See Report, page 11.</i> Inspection and inquiry made.
9	3rd February, 11-30 A.M.	South Kustote Mine, Kusunda P. O.	Raniganj Coal Association, Ltd.	Gambhiri Shaw Dhobi, (m.), 23, <i>Miner.</i>	Coal .	Deceased was cutting side to enlarge a dip gallery which had been driven narrow, when a piece of roof 24' long by 5' 6" to 0" wide by 2' thick fell from between two slips and killed him on the spot. Inspection and inquiry made.
10	5th February, 12 Noon.	Gopalichak Mine, Jharia P. O.	Gopalichak Coal Co., Ltd.	Lillu Meah, (m.), 35, <i>Miner.</i>	Coal .	Deceased was cutting coal at a pillar when two tons of coal suddenly fell, killing him instantaneously. <i>See Report, page 12.</i> Inspection and inquiry made.
11	18th February, 4-50 A.M.	Tikak Mine, Margherita P. O.	Assam Railways and Trad- ing Co., Ltd.	Bhagirathi Tanti, (m.), 29, <i>Basket-filler.</i>	Coal .	Deceased was lifting a full basket when some top coal and roof dislodged to the right. The man being engaged with the basket could not get clear in time and the fall struck him with full force. He died soon after reaching the hospital. Inquiry made.
12	20th February, 2 P.M.	Chanach Mine, Barakar P. O.	Bengal Coal Co., Ltd.	Jainti Bauri, (m.), 28, <i>Miner.</i>	Coal .	While the sirdar was on the surface deceased went with two women through a fence into a disused gallery to rob a pillar. He had cut only three baskets full of coal when a portion of the roof measuring 32' long x 16' wide fell and crushed him to death, seriously injuring one of the women. Inspection and inquiry made.
13	25th February, 4 A.M.	Tirap Mine, Margherita P. O.	Assam Railways and Trad- ing Co., Ltd.	Budhu Goal, (m.), 29, <i>Coal-cutter.</i>	Coal .	Two men were cutting a road to commence a new coal opening when a piece of coal weighing about 2 maunds came away from a soft parting at a height of 8' and fell on deceased. He died on the 13th March after amputation of the leg. Inquiry made.
14	25th February, 11 A.M.	Namdang Mine, Margherita P. O.	Assam Railways and Trad- ing Co., Ltd.	Gulgharie Kole, (m.), 27, <i>Opening man.</i>	Coal .	Two cwts. of coal fell off a slip, rolling on to deceased. He died before being got out of the mine. He had been warned by another miner that the place sounded hollow. Inquiry made.

## APPENDIX II—contd.

## Fatal Accidents, 1910—contd.

Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Cause of accident and remarks.
<b>FALLS OF ROOF AND SIDES—contd.</b>						
<b>(a) Falls of roof—contd.</b>						
15	9th March, 12 Noon.	Namdang Mine, Margherita P. O.	Assam Railways and Trading Co., Ltd.	Keshu Garait, (m.), 22 <i>Basket-filler.</i>	Coal .	Deceased was clearing down some loose coal near the bolt hole, when a small piece of coal, weighing about 7 lbs., fell from the roof from a height of 14 feet. He died on the 4th April from spinal fracture. Inquiry made.
16	10th March, 10-30 A.M.	Bulliar Mine, Kusunda P. O.	East Indian Coal Co., Ltd.	Gobind, (m.), 30, <i>Miner.</i>	Coal .	While taking down roof coal a portion of jhama roof fell from a pothole and injured deceased so severely that he died the same day. Inspection and inquiry made.
17	10th March, 12-30 A.M.	Kendwadih Mine, Kusunda P. O.	East Indian Coal Co., Ltd.	Jitu Turi, (m.), 35, Jiblal Turi, (m.), 30, <i>Miners.</i> Bidki Turin, (f.), 22, Patrika Turin, (f.), 25, <i>Carriers.</i>	Coal .	Deceased were illegally getting off side from a pillar when an area of roof coal 30' to 15' by .26' by 3' 6" thick fell suddenly from alipe and killed them. See Report, page 12. Inspection and inquiry made.
18	23rd March, 10-20 A.M.	Nandi Mine, Nandi P. O.	Adjai Coal Co., Ltd.	Suku Kurmi, (m.), 40, <i>Coal-cutter.</i>	Coal .	Deceased and another were engaged in getting roof coal in an old gallery and had fired a shot. While drilling a hole for a second shot about five tons of coal and stone fell from a height of 13 feet. Suku was killed on the spot and the other slightly injured. Inspection and inquiry made.
19	7th April, 8 P.M.	West Ledo Valley Mine, Margherita P. O.	Assam Railways and Trading Co., Ltd.	Charam Ghatwal, (m.), 27, <i>Basket-filler.</i>	Coal .	Deceased was filling a basket when a piece of coal, weighing about 6 cwts., fell from a height of 9 feet. It came from a slip at the side of an opening measuring 6 yards by 5 yards. He died in five minutes. Inquiry made.
20	11th April, 11-45 P.M.	Aldih Mine, Sitarampur P. O.	Aldih Coal Co., Ltd.	Sibhu Bauri, (m.), 40, <i>Miner.</i>	Coal .	After being turned out once by the sirdar deceased again went over a fence into a dangerous gallery and was engaged in cutting roof coal when a heavy piece of it fell upon his leg and broke it. He died from the effects three days later. Inspection and inquiry made.
21	15th April, 10 A.M.	Alkusa Mine, Kusunda P. O.	Baniganj Coal Association, Ltd.	Nanku Meah, (m.), 35, <i>Coal-cutter.</i>	Coal .	The manager had just given orders to have a dangerous piece of overhanging coal at a pillar removed, and when he was standing 8 feet away talking to the sirdars, deceased came up from his working place, presumably to speak to them, and as he passed under this piece, coal 13' x 4' x 1' 6" fell from a height of 6' 6" killing him instantaneously. See Report, page 12. Inspection and inquiry made.
22	29th April, 8-30 A.M.	Salanpur Mine, Sitarampur P. O.	Borrea Coal Co., Ltd.	Chamea Passin, (f.), 38, <i>Coal-carrier.</i>	Coal .	A piece of roof within a fence was found by the deputy overman to be unsafe. Deceased and several others were standing on the other side of the fence and were warned not to pass it. Immediately the official turned his back deceased passed the fence to pick up her basket when the roof fell and knocked her down. She died from the effects of the injuries at 9 o'clock the next morning. Inspection and inquiry made.

23	9th May, 8 P.M.	Sudhi Mine, Sitarampur P. O.	Baraboni Coal Concern, Ld.	Falar Majhi, (m.), 40, <i>Miner.</i>	Coal .	Instead of working at the coal face, deceased was cutting floor coal beyond a fence when a portion of the roof fell from between two slips and killed him. Inspection and inquiry made.
24	13th May, 3-30 P.M.	Burbia Mine, Kodarma P. O.	T. H. Wards and Har Nath Singh.	Genda Gope, (m.), 14, <i>Miner.</i>	Mica .	Deceased was working with several others in a small open mica mine, clearing away debris to prepare for re-starting the mine when a tree 32' 6" high growing on the edge of the excavation, was blown over in a gale of wind causing a large mass of loose quartz to fall into the mine and bury him. His death was caused by suffocation. Inspection and inquiry made.
25	18th May, 11 A.M.	Charanpur Mine, Charanpur P. O.	Apcar & Co.	Sooke Kora, (f.), 17, <i>Coal-carrier.</i>	Coal .	Deceased was filling a basket with coal in a gallery beneath roof coal which was being taken down. About a ton of coal fell on her, killing her on the spot. <i>See Report, page 12.</i> Inspection and inquiry made.
26	2nd July, 6 A.M.	Dandot Mine, Dandot P. O.	North Western Railway .	Sahib Dad, (m.), 30, <i>Miner.</i>	Coal .	A stone fell from the roof on to him and caused a fracture of the spine about its middle. He died on the 25th September through the injuries received.
27	28th July, 1 A.M.	Nadir Khan Mine, Khost Colliery, Khost P. O.	North Western Railway .	Dostal, (m.), 28, <i>Miner.</i>	Coal .	Deceased was lying full length on his back waiting for a bar to be set in his working face when a piece of shale roof, weighing about 30 lbs., fell from between two bars upon his stomach and injured him so severely that he died within five minutes. The place was well timbered. Inspection and inquiry made.
28	9th August, 8-30 P.M.	Ledo Valley, New East Mine, Margherita P. O.	Assam Railways and Trading Co., Ld.	Akloo, (m.), 30, <i>Basket-filler.</i>	Coal .	Deceased was filling a basket when a small piece of coal rolled over from a height of 5 feet, knocking him down. As a sirdar was helping him up, another piece came and fell on his head. Total weight of fall was 5 cwts. He was killed on the spot. Inquiry made.
29	25th September, 1-30 P.M.	Dishargarh Mine, Dishargarh P. O.	Equitable Coal Co., Ld. .	Mohini Baurin, (f.), 16, <i>Carrier.</i>	Coal .	Whilst a gang of six men and six women were clearing stone at a fall of roof, about half a ton of stone fell from the cavity left by the original fall. Mohini was killed; Luka Bauri and the European assistant in charge were severely injured. Two others were slightly hurt. Inspection and inquiry made.
30	1st October, 8-30 P.M.	Dandot Mine, Dandot P. O.	North Western Railway .	Bhagat Ram, (m.), 18, <i>Miner.</i>	Coal .	Deceased was cutting coal at the face when the roof fell in and buried him, killing him instantaneously.
31	2nd October, 2-30 P.M.	Nodiha Mine, Dishargarh P. O.	Nodiha Coal Co., Ld. .	Chepia Manjhin, (f.), 15, <i>Loading woman.</i>	Coal .	Deceased was about to lift a basket full of coal when a piece of roof coal, 3' 6" x 2' 3" x 1' 3" upon which her father had been working a few moments before, fell and broke her leg. She died from the effects of the injury ten days later. Inspection and inquiry made.
32	8th October, 8 P.M.	Alkusa Mine, Kusunda P. O.	Raniganj Coal Association, Ld.	Niru Barwi, (m.), 35, <i>Prepping mistry.</i>	Coal .	Deceased was assisting in the withdrawal of timber from an area from which the coal had been extracted, and in attempting to recover a wedge from beneath roof from which the timber supports had been taken out, he was caught by a fall of roof coal, which was 8' thick and fell over an area 6' square, and was killed on the spot. Inspection and inquiry made.
33	15th October, 7-15 P.M.	Sitalpur Mine, Dishargarh P. O.	Bongal Coal Co., Ld. .	Bachu Lodh, (m.), 25, Debi Gararia, (m.), 30, Mathu Passi, (m.), 30, Sukhi Passi, (m.), 28, Ramdin Passi, (m.), 27, Kabardar Passi, (m.), 23, Nani Passi, (m.), 32, Dooli Passi, (m.), 28, Nathu Passi, (m.), 35, Mahabir Ahir, (m.), 28, <i>Miners.</i> Bamsurah Gope, (m.), 23, <i>Stone-cutter.</i> Kohil Singh, (m.), 25, <i>Sirdar.</i>	Coal .	A pillar had been goafed and the timber had been withdrawn. In order to secure a little coal that had come down with the goafed roof the manager had the timber reset. While the twelve deceased were picking up this coal the roof collapsed over the timber and completely buried them. <i>See Report, page 12.</i> Inspection and inquiry made.

-APPENDIX-H-*contd.*

Fatal Accidents, 1910-*contd.*

Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Cause of accident and remarks.
<b>FALLS OF ROOF AND SIDES—<i>contd.</i></b>						
<b>(a) Falls of roof—<i>concl'd.</i></b>						
34	27th October, 11 P.M.	Aldih Mine, Sitarampur P. O.	Aldih Coal Co., Ltd.	Tribhanga Bauri, (m.), 25, <i>Miner.</i>	Coal .	Deceased left his proper working place on the plea of getting a drink of water. About an hour later a heavy fall took place and several miners were directed to the place by his cries. They found him under a piece of coal, measuring 5½' x 5' x 2½' which had fallen from the corner of a pillar. A hammer and wedge were lying by his side. The place was a disused gallery properly fenced. Inspection and inquiry made.
35	17th November, 12-30 P.M.	West Ledo Valley Mine, Margherita P. O.	Assam Railways and Trading Co., Ltd.	Persadio, (m.), 30, <i>Basket-filler.</i>	Coal .	Deceased was walking away dragging his <i>kodali</i> when about 6 cwts. of coal fell without warning out of the middle of an opening and caught him. It knocked him on to the <i>kodali</i> smashing his thigh. A European assistant inspected the place ten minutes before and all was safe. Deceased died on reaching hospital. Inquiry made.
36	17th November, 3 P.M.	South Gobindpur Mine, Katrasgarh P. O.	South Gobindpur Colliery, Ltd.	Saoni Kohlin, (f.), 13, <i>Coal-carrier.</i>	Coal .	Deceased went with her father to rob coal from old workings. Whilst doing so she was struck on the head by a fall of coal and sustained injuries from which she died shortly after. Inspection and inquiry made.
37	30th November, 4 P.M.	Kusumkajali Mine, Barakar P. O.	Royal Bengal Coal Co.	Matu Singh, (m.), 25, Rajabali, (m.), 27, Jodu Mahato, (m.), 30, <i>Miners.</i>	Coal .	Five persons were cutting floor coal in a gallery when a piece of stone measuring 12' x 6' 6" x 1' 4" fell upon them, killing three on the spot and injuring the other two. See Report, page 14. Inspection and inquiry made.
38	8th December, 11 P.M.	West Gopalichak Mine, Kusunda P. O.	Gopalichak Coal Co., Ltd.	Sirem Bauri, (m.), 38, <i>Coal-cutter.</i>	Coal .	Whilst deceased was taking down roof coal a fall came away and struck him. He sustained a fracture of the arm and other injuries from the effects of which he died a few days later. The fall was 5' x 4' x 1½" thick. Inspection and inquiry made.
39	14th December, 2 A.M.	Barkui Mine, Pench Valley P. O.	Pench Valley Coal Co., Ltd.	Parbutia Bania, (f.), 25, <i>Coal-carrier.</i>	Coal .	A hewer, who was pillar-cutting, gave the signal to two women that the roof was "working" and deceased in her excited state ran in the direction of the goaf and was just caught by the edge of the fall. She sustained a fracture of the skull.
40	19th December, 12-30 A.M.	Bhagaband Mine, Jharis P. O.	Borrea Coal Co., Ltd.	Nuni Muni Ghatwarin, (f.), 25, <i>Coal-carrier.</i>	Coal .	Deceased was struck by the fall of a slab of roof shale measuring 4' x 7' 6" x 3" thick. Inspection and inquiry made.
<b>Falls of sides—(32 deaths).</b>						
41	16th February, 3 P.M.	Namdang Mine, Margherita P. O.	Assam Railways and Trading Co., Ltd.	Jagatdhari Gond, (m.), 26, Khedu Majhi, (m.), 29, <i>Basket-fillers.</i>	Coal .	Three tons of coal fell from a slip on the top side of an opening, killing Jagatdhari Gond on the spot. Khedu Majhi died on the 18th February. Inquiry made.
	4th May, 5 P.M.	Tarajhopa Mine, Kodarna P. O.	Tofani Singh . . .	Gondo Chassier, (m.), 40, Jitna, (m.), 35, <i>Mica petty contractors.</i>	Mica .	Deceased entered a discontinued mine to get mica to sell to the owner of the mine and were buried by a fall of side 15' high by 12' wide by 1½' thick. Inspection and inquiry made.

43	23rd May, 1-30 P.M.	Chowrahi Mine, Dishargarh P. O.	Equitable Coal Co., Ltd.	Bhagbol Majhi, (m.), 30, <i>Coal-cutter.</i>	Coal .	Deceased went through a fence and whilst robbing a pillar was killed by a fall of about three tons of coal from the side. Inspection and inquiry made.
44	31st May, 6 A.M.	Chinchuria Mine, Aansol P. O.	New Beerbhun Coal Co., Ltd.	Pio Majhain, (f.), 14, <i>Coal-carrier.</i>	Coal .	Deceased was filling a basket with coal at a point where a gallery was being widened when about 10 tons of side coal fell over. She was pinned down and received injuries from which she died about an hour afterwards. See Report, page 14. Inspection and inquiry made.
45	6th July, 10 A.M.	Old East Ledo Mine, Margherita P. O.	Assam Railways and Trading Co., Ltd.	Mahadeb, (m.), 30, <i>Opening-man.</i>	Coal .	About 20 tons of coal rolled off the side of an opening which was very steep and 21' by 24' by 20' high in size. There were three escape roads and deceased would easily have got clear but unfortunately fell. He was killed on the spot. Inquiry made.
46	7th July, 1-30 A.M.	Bhowra Mine, Jharis P. O.	Eastern Coal Co., Ltd.	Bara Darbari Syne, (m.), 40, <i>Miner.</i> Chota Darbari Syne, (m.), 12, <i>Coal-carrier.</i>	Coal .	In the absence of the official in charge of the mine both deceased started to cut coal in their carrying road, which was 34 feet high. After working for a short time they sat down to smoke when suddenly and without warning a slab of side coal 27' high by 10' wide by 1½' thick on which they had been working fell and buried them. See Report, page 15. Inspection and inquiry made.
47	14th July, Midday.	Inurkurti or D Mine, Sydapuram P. O.	A. Subba Naidu	Uta Chinna Vadu, (m.), 22, Goripati Papadu, (m.), 25, <i>Drilling coolies.</i>	Mica .	An overhanging mass of decomposed pegmatite fell on deceased from the side of the quarry. See Report, page 15. Inspection and inquiry made.
48	24th July, 4-30 A.M.	Murulidih Mine, Mohoda P. O.	Bengal Coal Co., Ltd.	Dayal Turi, (m.), 25, <i>Miner.</i>	Coal .	Deceased was found buried beneath coal that had fallen from the corner of a pillar in some old workings. It is surmised that he entered to get some easy coal as his pick was lying by his side. The fall was 7' 10" high by 4½' wide by 2' thick. Inspection and inquiry made.
49	20th August, 10 A.M.	Bhalgora Mine, Jharis P. O.	Bhalgora Coal Co., Ltd.	Jagu Bhuia, (m.), 50, <i>Miner.</i>	Coal .	Deceased left his working place and commenced to dress back the corner of a pillar with the object of getting some easy coal to complete the loading of his tub. After a few blows from his pick, coal 7' high by 3' wide by 1½' thick, fell from the corner and broke his thigh. He died from shock 17 hours later. Inspection and inquiry made.
50	1st September, 4 P.M.	Dobari Mine, Jharis P. O.	Dobari Coal Co.	Mangru Bhuia, (m.), 25, <i>Miner.</i> Helib Bhuia, (f.), 21, <i>Coal-carrier.</i>	Coal .	A miner and his wife were working in a temporarily disused part of a quarry when portion of the overburden, 18' long by 4½' high by 1½' thick, consisting of made ground, fell and buried them. Inspection and inquiry made.
51	26th September, 11-30 P.M.	Salanpur Mine, Sitarampur P. O.	Borraa Coal Co., Ltd.	Sona Majhi, (m.), 26, <i>Coal-cutter.</i>	Coal .	Deceased went through a fence and was cutting coal from the side of a pillar when about three tons of coal fell on him and killed him on the spot. Inspection and inquiry made.
52	30th September, 2 P.M.	Kankani Mine, Sijua P. O.	Eastern Coal Co., Ltd.	Rudu Meah, (m.), 35, <i>Coal-cutter.</i>	Coal .	Deceased was one of three men who were unlawfully cutting floor coal in an old gallery 25 feet high where such work had been stopped a fortnight before owing to danger of a fall. About 20 tons of coal fell on him from the corner of a pillar and he received injuries from which he died the same day. There were no officials in the mine at the time. See Report, page 15. Inspection and inquiry made.
53	5th October, 11 A.M.	Sudamdih Mine, Bhujudih P. O.	Sudamdih Coal Co., Ltd.	Budhu Gori, (m.), 32, <i>Coal-cutter.</i>	Coal .	Deceased left his working place and began to cut coal from the corner of a pillar when a mass of about two tons of coal fell from the pillar and overwhelmed him. No marks of injury were found, and he is presumed to have died from the effects of suffocation and shock. A girl who was passing at the time was knocked down and severely injured about the head. Inspection and inquiry made.
54	25th October, 5 P.M.	Kurkend Mine, Kusunda P. O.	Central Kurkend Coal Co., Ltd.	Luki Turi, (m.), 22, <i>Coal-carrier.</i>	Coal .	Deceased was one of a gang of three men who were driving a length of 20 feet of a long continuous face of coal towards a boundary a few feet distant. The officials permitted them to undercut with the result that a mass of coal 18 feet long by 0 to 5 feet wide and 4 feet high, fell away from a smooth joint and killed him on the spot. The weight of the fallen coal was about seven tons. The other two men had just ceased work and gone home. Inspection and inquiry made.



APPENDIX II—contd.

Fatal Accidents, 1910—contd.

Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Cause of accident and remarks.
<b>FALLS OF ROOF AND SIDES—concl'd.</b>						
<b>Falls of sides—concl'd.</b>						
55	6th December, 3-45 P.M.	Shivrajpur Mine, Shivrajpur P. O.	Shivrajpur Syndicate, Ltd.	Chinda Raghla, (m.), 25, Sewa Narasingh, (m.), 23, Babar Namla, (m.), 20, Oondhia Joria, (m.), 14, Kania Chinda, (m.), 8, Roopla Dipla, (m.), 10, Rangli Bindle, (f.), 18, Hatia Mansingh, (m.), 22, Gullia Chimaria, (m.), 20, Viria Ramji, (m.), 30, Jania Lakada, (m.), 40, Jhingli, (f.), 20, <i>Coolies.</i>	Manganese	While twenty-seven persons were working at the bottom of a quarry a portion of the hanging wall collapsed. Eleven were killed outright and one died an hour later. In this part of the mine the hanging wall is intensely folded. <i>See Report, page 15.</i> Inspection and inquiry made.
56	14th December, 1-30 A.M.	Pottery Mine, Raniganj P. O.	Burn & Co., Ltd.	Chuni Baurin, (f.), 14, <i>Coal-carrier.</i>	Coal	Deceased entered a gallery just as a miner was wedging down a piece of coal. Although warned of the danger she failed to stand clear with the result that she sustained a compound fracture of her right leg and arm from the effects of which she died. <i>See Report, page 17.</i> Inspection and inquiry made.
<b>IN SHAFTS—(20 deaths).</b>						
<b>Overwinding—(2 deaths).</b>						
57	18th June, 12 Noon.	Raghnathbati, Sitarampur P. O.	Sudhi Coal Co., Ltd.	Duli Baurini, (f.), 12, Sumi Baurini, (f.), 16, <i>Water-bailers.</i>	Coal	During the temporary absence of the winding engine man the boiler fireman, without authority, raised from the bottom of the shaft a cage in which were the two deceased. He overwound and, there being no detaching hook, the cage struck the cross beams in the head gear, and the rope broke. The cage fell 305 feet to the bottom and the women were killed on the spot. Inspection and inquiry made.
<b>Whilst ascending and descending by machinery—(3 deaths).</b>						
58	28th January, 10-30 A.M.	Pottery Mine, Raniganj P. O.	Burn & Co., Ltd.	Jangli Kori, (m.), 40, <i>Coal-cutter.</i>	Coal	Deceased was being raised up a shaft 109 feet in depth by a gang of women hauling a rope when he let go the rope and fell to the bottom. He was killed on the spot. Inspection and inquiry made.
59	6th June, 12-30 P.M.	New Damra Mine, Kalipahari P. O.	Phularitand Coal Co., Ltd.	Nihal Shah, (m.), 25, <i>Shaft-sinking sirdar.</i>	Coal	Deceased lighted a round of 5 gun-powder shots at the bottom of the shaft and had been drawn up in the bucket for about 15 feet when one of the shots exploded. He was sitting on the rim of the bucket, and on being struck by flying rock fell to the bottom of the shaft. He was killed on the spot. Inspection and inquiry made.

60	1st October, 1-30 P.M.	Khaira Mine, Kurunda P. O.	East Indian Coal Co., Ltd.	Bindu Kole, (m.), 25, <i>Pump-khalassi.</i>	Coal	Deceased went down in the water bucket to see what depth of water there was in the shaft. A few minutes later he shouted to be drawn up. When the bucket had been raised about 20 feet the hook-man noticed the rope oscillating and shouted to the engineman, who stopped the engine. After waiting for some little time the bucket was slowly drawn to the surface. Bindu was found lying at the bottom of the bucket, having sustained injuries from which he died shortly after. The bucket probably collided with some girders in the shaft. Inspection and inquiry made.
<b>Falling into the shaft from the surface—(2 deaths).</b>						
61	6th February, 6-45 P.M.	Bejdih Mine, Sitarampur P. O.	Equitable Coal Co., Ltd.	Kedar Banri, (m.), 30, <i>Bankman.</i>	Coal	While carrying coal to mend the pit bank fire deceased caught his foot against a beam and stumbled forward into an unfenced sinking shaft 358 feet deep. His body was found in the sump. <i>See Report, page 17.</i> Inspection and inquiry made.
62	14th September, 4-30 P.M.	Gopalichak Mine, Jharia P. O.	Gopalichak Coal Co., Ltd.	Ananta Burhi, (m.), 35, <i>Fitter.</i>	Coal	Whilst lowering a small Tangye pump the coolies let go the handles. Deceased made a grab at the rope which was attached to the pump for steadying it and was dragged down the shaft.
<b>Falling from part of the way down—(7 deaths).</b>						
63	21st January, 3 P.M.	Bhutgoria Mine, Jharia P. O.	Aldih Coal Co., Ltd.	Sukia Gorain, (f.), 26, Neria Goalin, (f.), 36, Uday Mahato, (m.), 55. <i>Bailing coolies.</i>	Coal	While two men and four women were being lowered the cage was stopped as a tub had got into the sump. The three deceased took off the safety chain and walked out, thinking the cage had reached the pit bottom and fell down 81 feet. Neria and Uday died almost immediately and Sukia about a quarter of an hour later. Inspection and inquiry made.
64	29th August, 8-30 P.M.	North Anantapur Mine, Morrison P. O.	North Anantapur Gold Mines, Ltd.	Balapolunir Rodrigadu, (m.), 30, <i>Stuff-coolie.</i>	Gold	Deceased was climbing up a shaft on a ladder and fell when 17 feet from the bottom. Inquiry made.
65	4th October, 10-30 A.M.	Taroktan Mine, Mogok P. O.	Burma Ruby Mines, Ltd.	Moung San Win, (m.), 18, <i>Coolie.</i>	Rubies	Deceased was guiding a rope which was raising a pipe from a disused pump at the bottom of a shaft. The pipe caught the plank on which he was standing and shook him off. He failed to maintain his hold on the rope and fell down the shaft about 40 feet, dislocating his neck.
66	8th October, 8-30 P.M.	Sibpur Mine, Charanpur P. O.	Katras Jharia Coal Co., Ltd.	Meighu Kole, (m.), 25, <i>Miner.</i>	Coal	While descending a shaft 242 feet deep deceased fell out of the cage. It is surmised that the pick upon which he was leaning slipped and that he lost his balance. <i>See Report, page 17.</i> Inspection and inquiry made.
67	27th November, 4-30 P.M.	Borra Mine, Sitarampur P. O.	New Beerbhum Coal Co., Ltd.	Icha Muchi, (m.), 35, <i>Pump-khalassi.</i>	Coal	The edge of an ascending hoppit caught a suspended platform upon which deceased was repairing a pump in a sinking shaft and made it turn turtle, both he and the pump being precipitated into the sump 15 feet below. Although there was plenty of room in the shaft a clearance of 18" only had been allowed between the hoppit and the platform. Inspection and inquiry made.
<b>Things falling from the surface—(3 deaths).</b>						
68	17th June, 10-30 A.M.	Serampur Mine, Giridih P. O.	East Indian Railway Co.	Gondo Turi, (m.), 30, <i>Onsetter.</i>	Coal	A piece of coal became dislodged from a tub that was being withdrawn from a cage and, falling down the shaft, struck the deceased on the head causing fracture of the skull. <i>See Report, page 18.</i> Inspection and inquiry made.
69	28th September, 5-30 P.M.	Bhulanbarari Mine, Jharia P. O.	Bhulanbarari Coal Co., Ltd.	Uohitlaldeo, (m.), 20, <i>Bellman.</i>	Coal	A line misty had come up the shaft in a cage and on his reaching the surface a crowbar slipped out of his hand and fell down the shaft killing the onsetter at the shaft bottom.
70	28th October, 1 A.M.	Borra Mine, Sitarampur P. O.	New Beerbhum Coal Co., Ltd.	Gurra Majhi, (m.), 32, <i>Miner.</i>	Coal	A piece of coal became dislodged from a loaded tub, owing to the cage settling on the keps at the surface with a bump, and fell down the shaft, striking deceased on the head just as, contrary to orders, he was crossing over the sump boards at the shaft bottom. There was a space of 8" between the end of the cage and the edge of the pit bank. A sirdar was present at the shaft bottom. <i>See Report, page 18.</i> Inspection and inquiry made.

APPENDIX II—contd.

Fatal Accidents, 1910—contd.

Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Cause of accident and remarks.
<b>IN SHAFTS—contd.</b>						
<b>Things falling from part of the way down—(2 deaths).</b>						
71	28th February, 7-30 P.M.	Lutchipur Mine, Sitarampur P. O.	Lutchipur Coal Co., Ltd.	Jatu Majhi, (m.), 22, <i>Miner.</i> Chuna Majhi, (m.), 30, <i>Onsetter.</i>	Coal.	The authorized onsetter with a miner was descending to resume charge of the shaft bottom when a loaded tub fell from the ascending cage, a distance of 325 feet, upon the descending cage and killed the occupants outright. The tub had been put on the cage by a miner who failed to drop the suck-bar. Inspection and inquiry made.
<b>Miscellaneous—(1 death).</b>						
72	25th March, 11-30 P.M.	Sodepur Mine, Sitarampur P. O.	Bengal Coal Co., Ltd.	Nirmal Meah, (m.), 18, <i>Onsetter.</i>	Coal.	Deceased stepped upon the sump boards to pick up a lump of coal when a loaded cage, which had just been raised from the bottom of the shaft, was lowered again, crushing him to death. Inspection and inquiry made.
<b>BY EXPLOSIVES—(8 deaths).</b>						
73	11th February, 8 A.M.	Benabir Mine, Jharis P. O.	Standard Coal Co., Ltd.	Fagu Manjhi, (m.), 35, Porbut Manjhi, (m.), 28, Naika Manjhi, (m.), 30, <i>Coal cutters.</i> Sambhu Manjhi, (m.), 8.	Coal.	The men were making country powder into cartridges in their house round a fire, when, probably from a spark, the powder exploded, injuring the three deceased so that they all died, Porbut on the 13th, Sambhu on the 15th and Fagu on the 19th February. See Report, page 18. Inspection and inquiry made.
74	24th February, 4 P.M.	Sendra Mine, Bansjora P. O.	Sendra Coal Co., Ltd.	Haril Singh, (m.), 26, <i>Sinker.</i>	Coal.	Six shots had been put off at 10 A.M. Only five were heard to go off, but the airdar concluded that two had gone off together. As four sinkers including deceased, were removing the debris at 4 P.M., a cartridge lying in it exploded, injuring him so severely that he died the following evening. Inspection and inquiry made.
75	20th July, 8 P.M.	Balaghat Mine, Kampti P. O.	Central Provinces Prospecting Syndicate, Ltd.	Chidi Mahadeo, (m.), 28, <i>Ore-worker.</i>	Manganese.	Deceased was drilling in an old hole which had been exploded three days before. The hole was not a misfire. An explosion occurred causing a fracture of his left hand. Blood poisoning supervened and he died a few days later. Inspection and inquiry made.
76	15th September, 7 A.M.	Balaghat Mine, Kampti P. O.	Central Provinces Prospecting Syndicate, Ltd.	Lutaru, (m.), 20, <i>Coolie.</i>	Manganese.	While deceased and others were loading a trolley blasting became necessary. They took shelter under a straw hut. When the shot was fired a stone weighing 8½ seers was hurled through the air for 348 feet. It fell through the eye of the hut on to his head, fracturing it. Inspection and inquiry made.
77	25th November 4-30 P.M.	Shivrajpur Mine, Shivrajpur P. O.	Shivrajpur Syndicate, Ltd.	Chago Judha, (m.), 45, <i>Coolie.</i>	Manganese.	Contrary to orders deceased took shelter during blasting operations in a cutting lying at right angles to the blast and was struck by a piece of rock which cannoned off the opposite wall. His left arm and four ribs were broken from the effects of which he died the next morning.
<b>IRRUPTIONS OF WATER OR FALLING INTO WATER—(6 deaths).</b>						
78	26th October, 9 A.M.	Murulidih Mine, Mohuda P. O.	Bengal Coal Co., Ltd.	Punit Dhobi, (m.), 30, Gura Mahato Gowala, (m.), 30, Bhiku Meah, (m.), 20.	Coal.	They were drowned by an inrush of water consequent on the holing of a working gallery into an accumulation of water in galleries by the rise. See Report, page 18. Inspection and inquiry made.

All Meah, (m.), 18,  
Jauu Meah, (m.), 22,  
Chatur Meah, (m.), 18,  
Main gallery drivers.

HAULAGE—(16 deaths).

79	20th January, 11.30 A.M.	Nodiha Mine, Dishargarh P. O.	Nodiha Coal Co., Ltd.	Rabi Baurini, (f.), 45, Bailing kamin.	Coal .	While seven loaded tubs were being raised up the brow of an incline the link of a coupling chain opened at a defective weld and five of the tubs ran back, breaking the back-stay and striking the deceased who was standing at the end of a landing. She was killed instantly. See Report, page 19. Inspection and inquiry made.
80	21st January, 11 A.M.	Kusunda Mine, Kusunda P. O.	Kusunda and Nuyadi Col- lieries, Ltd.	Gadhbha, (f.), 35, Coal-carrier.	Coal .	The hookman had either omitted to couple the three front tubs of a set of six empty tubs to the back three, or had coupled them improperly, and when he pushed the set over the brow, the three tubs ran wild, injuring two women, including deceased, who were in the incline waiting for their tubs. She died sixteen days later. See Report, page 19. Inspection and inquiry made.
81	29th January, 10 A.M.	Baraboni Mine, Asansol P. O.	Bilbera Coal Co., Ltd.	Gotapi Baurini, (f.), 40, Coal-carrier.	Coal .	After the signal to draw away the set had been given deceased attempted to cross the line between the first and second tubs of the set. She was knocked down and received injuries from which she died a week later. See Report, page 20. Inspection and inquiry made.
82	4th February, 4.15 P.M.	Bhulanbarari Mine, Jharia P. O.	Bhulanbarari Coal Co., Ltd.	Nimchand Kabal, (m.), 24, Line-coolie.	Coal .	Two empty tubs were being lowered from an incline into a level. As they went over the points, the lower tub became detached from the upper tub and ran violently into the level, injuring deceased. He died that night. Inspection and inquiry made.
83	17th March, 3 P.M.	Gauzlatan Mine, Katrasgarh P. O.	New Manbhumi Coal Co., Ltd.	Talu Bhori, (m.), 45, Trolleyman.	Coal .	As seven empty tubs were being lowered down an incline dipping 1 in 3, the hook attaching the tubs to the rope broke and the tubs ran wild, passing over deceased, who died from his injuries two hours later. Inspection and inquiry made.
84	19th April, 3 P.M.	Sitalpur Mine, Dishargarh P. O.	Bengal Coal Co., Ltd.	Parag Phasi, (m.), 30, Miner.	Coal .	Four empty tubs became detached from a set and ran wild down a haulage plane. They collided with two old tubs lying at the end of a landing behind which two miners, including deceased, on being warned of their danger, had taken refuge. Both men were seriously injured and deceased succumbed immediately on reaching the surface. Inspection and inquiry made.
85	17th May, 9.30 A.M.	Kila Ali Ehan Mine, Khost Colliery, Khost P. O.	North Western Railway	Hossain, (m.), 27, Outaller.	Coal .	Rather than wait for the riding tub, which was standing 180 feet below, to take him up to the surface, deceased preferred to climb the somewhat perilous ascent to the surface up a grade of 50°. Shortly afterwards he was picked up at the bottom of the drift suffering from concussion of the brain from the effects of which he died ten hours later. It is surmised that he lost his foothold. Inspection and inquiry made.
86	25th June, 12 Noon.	Sanctoria Mine, Dishargarh P. O.	Bengal Coal Co., Ltd.	Moula Bux, (m.), 38, Fitter's coolie.	Coal .	Owing to a storm deceased, without a light, took refuge in an incline. He was knocked over and killed by a tub which ran wild down the incline, having been blown over the brow by the storm. See Report, page 20. Inspection and inquiry made.
87	3rd July, 6.15 A.M.	Burra Dhemu Mine, Sitarampur P. O.	Burra Dhemu Coal Co., Ltd.	Sahaji Baurini, (f.), 45, Trammer.	Coal .	She was crushed by a tub which ran away owing to its not being properly spragged. Inspection and inquiry made.
88	7th July, 6 P.M.	Babisole Mine, Baktanagar P. O.	Bilbera Coal Co., Ltd.	Baneshwar Bauri, (m.), 45, Trammer.	Coal .	Owing to the breaking of a spring a loaded tub ran wild down a grade of 1 in 20. Deceased was crushed between this tub and another tub which he was pushing at the time. He sustained internal injuries and died about an hour afterwards. Inspection and inquiry made.

APPENDIX II—contd.

Fatal Accidents, 1910—contd.

Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Cause of accident and remarks.
<b>HAULAGE—concl'd.</b>						
89	16th July, 9 A.M.	Jinagora Mine, Jharia P. O.	East Barari Coal Co.	Manju Rajwarin, (f.), 41, Coal-carrier.	Coal .	As a set of five empty tubs was being lowered, the ropes became detached and the tubs ran wild. Deceased and her husband had reached the end of the first landing to get one of the tubs as soon as they arrived. They were warned by the hookman that the tubs had broken loose, but before they could escape the tubs smashed into them, pinning the woman against the corner of a pillar and breaking the man's leg. Inspection and inquiry made.
90	25th August, 7-30 A.M.	Gopalichak Mine, Jharia P. O.	Gopalichak Coal Co., Ltd.	Abdul Meah, (m.), 30, Pump-khalassi.	Coal .	Deceased was riding between the tubs contrary to orders when the haulage rope broke. The drag acted and threw the tubs off the rails. On jumping off he got caught between the side and one of the tubs.
91	29th September, 7 A.M.	Tirak Mine, Margherita P. O.	Assam Railways and Trading Co., Ltd.	Milap, (m.), 37, Gunjra, (f.), 26, Tub-pushers.	Coal .	Deceased were riding on the ninth tub of a workman's train of 25 tubs. The tub they were in was derailed and knocked out two settings. This caused a fall of coal from the roof which fell on them. They were killed on the spot. Inquiry made.
92	29th September, 4 P.M.	Barkui Mine, Pench Valley P. O.	Pench Valley Coal Co., Ltd.	Ajudia Prosad, (m.), 22, Miner.	Coal .	Deceased was standing at the bottom of an incline when a tub which had run wild from the surface struck him and killed him.
93	30th September, 2 A.M.	Sitalpur Mine, Dishargarh P. O.	Bengal Coal Co., Ltd.	Bhuji Baurini, (f.), 17 Rail kamia.	Coal .	Owing to the slipping of a haulage clip two tubs ran wild down a grade on an endless rope haulage plane. By some means deceased got in front of the tubs and was killed. Inspection and inquiry made.
<b>BY UNDERGROUND MACHINERY—(1 death.)</b>						
94	18th July, 1-30 P.M.	Chowraai Mine, Dishargarh P. O.	Equitable Coal Co., Ltd.	Nital Bauri, (m.), 20, Pump attendant.	Coal .	Deceased was in charge of an electrically driven three-throw pump, and, whilst leaning over to screw down a lubricator, his clothing got caught by a stud on a countershaft. He was carried round the shaft, sustaining injuries from which he died a few hours later. Inspection and inquiry made.
<b>SUNDRIES UNDERGROUND—(8 deaths.)</b>						
95	18th January, 2-30 P.M.	Mayo Mine, Khewra P. O.	Government of India	Nek Bibi, (f.), 65, Carrier.	Salt .	Deceased fell, whilst carrying marl weighing 41 seers, and received injuries which proved fatal. What exactly occurred is not known as she was dead when found.
96	11th February, 8 A.M.	Khoet Mine, Khoet P. O.	North Western Railway	Naku, (m.), 28, Miner.	Coal .	Deceased was climbing a stenton rising at an angle of 57° by the aid of a rope attached to a winch roll fitted with a pawl and ratchet. Just as he was about to land at the level above, the pawl became disengaged, the rope paid out and he fell to the bottom of the stenton 100 feet below. He sustained an injury to the brain from the effects of which he died a fortnight later. Inspection and inquiry made.
97	31st March, 1 P.M.	Khoet Mine, Khoet P. O.	North Western Railway	Musafir, (m.), 26, Miner.	Coal .	As deceased was trying to remove an obstruction in a coal shoot placed at an angle of 53° in a low stenton, one of the sections buckled and nipped his leg against the roof causing fracture above and below the knee. It took three hours' work to effect his release. He died from collapse early the next morning. Inspection and inquiry made.

98	14th April, 2 P.M.	Charanpur Mine, Charanpur P. O.	Apcar & Co.	Parson Lodh, (m.), 24, Miner.	Coal .	While cutting roof coal from a stool deceased lost his foothold and fell a distance of 9 feet. He managed to walk home, but succumbed shortly afterwards to compression of the brain. Inspection and inquiry made.
99	24th June, 2 P.M.	Jamadoba Mine, Jharia P. O.	Indian Collieries Syndi- cate, Ltd.	Bir Singh Kahar, (m.), 25, Tindal sirdar.	Coal .	While in the act of unloading a pump from two trollies by means of a lever, using a sleeper as a fulcrum, the latter turned over and allowed the pump to fall heavily half on the trollies and half on a cog placed to receive it with the result that it cant- ed over and struck deceased a terrific blow on the chest. Death was practically instantaneous. Inspection and inquiry made.
100	3rd July, 8 A.M.	Upper Ledo Mine, Margherita P. O.	Assam Railways and Trad- ing Co., Ltd.	Muriah Gore, (m.), 30, Coolie.	Coal .	Deceased was cleaning out a water course by the side of a tram line and slipped in the way of a full tub which was being pushed out. He was crushed between the tub and the side. Inquiry made.
101	23rd August, 4 A.M.	Dandot Mine, Dandot P. O.	North Western Railway .	Futteh Mahomed, (m.), 15, Coolie.	Coal .	A jamb slipped out from a tub which was on a slope and the tub ran over the boy's leg, fracturing it. He died from its effects on the 25th August.
102	31st December, 5 P.M.	Shampur Mine, Nirshachati P. O.	Shampur Coal Company, Ltd.	Somenia Bauri, (f.), 32, Loading coolie.	Coal .	Deceased was attempting to cross a level tram line underground when she was knocked down by an approaching tub which was being pushed by two men. She sustained severe flesh wounds on her right leg and died a month later. Inspection and inquiry made.
ABOVE GROUND.						
By Surface Machinery—(1 death).						
103	21st November, 2 A.M.	North Anantapur Mine, Morrison P. O.	North Anantapur Gold Mines, Ltd.	Madhowan Nair, (m.), 18, Mill-oiler.	Gold .	Deceased went to oil some machinery with a blanket round him. The blanket evidently was caught by the clutch of a belt wheel and he was drawn in and crushed. When found he was dead. Inspection and inquiry made.
On surface railways and tramways belonging to the Mine—(8 deaths).						
104	5th January, 8-30 P.M.	Madhubpur Mine, Baktanagar P. O.	Imperial Coal Co., Ltd.	Govinda Chandra Mitra, (m.), 37, Gomasta.	Coal .	Deceased was riding on the foot-plate of a colliery locomotive when it derailed and over- turned. He was pinned beneath it and sustained injuries which resulted in death within a few hours. Inspection and inquiry made.
1105	21st January, 1 P.M.	Satpukuria Mine, Asansol P. O.	Satpukuria and Asansol Collieries, Ltd.	Umed Akuria, (m.), 30, Locomotive fireman.	Coal .	Deceased was riding on the front of a colliery locomotive when it derailed and overturned. His foot was severely cut and he died a week later from blood poisoning. Inspec- tion and inquiry made.
106	3rd February, 2 P.M.	Satpukuria Mine, Asansol P. O.	Satpukuria and Asansol Collieries, Ltd.	Kalpo Ankuria, (m.), 32, Locomotive fireman.	Coal .	Whilst a colliery locomotive was running reversed deceased was shovelling coal into the fire box, when he slipped and fell through the guard rail on to the line. He was caught by the cow-catcher and killed on the spot. Inspection and inquiry made.
107	12th March, 9-30 A.M.	Chasnalla Mine, Bhujudih P. O.	Lodna Colliery Co., Ltd.	Amir Meah, (m.), 30, Haulage engine khalassi.	Coal .	Deceased was illegally riding upon a train of full tubs, drawn by a colliery locomotive, when the tubs, and ultimately the locomotive, became derailed owing to excessive speed. He was caught between the tubs and crushed so severely that he died the following day. Inspection and inquiry made.
108	30th May, 9 A.M.	Kandri Mine, Kampti P. O.	Central Provinces Prospecting Syndicate, Ltd.	Panna, (m.), 40, Coolie.	Manganese .	The brakeman lost control of the brake on a self-acting incline owing to its jamming. The upcoming empty wagon was overwound and caught one of the hookers, killing him instantaneously. Inspection and inquiry made.
109	20th June, 10 A.M.	Mansar Mine, Kampti P. O.	Central Provinces Pros- pecting Syndicate, Ltd.	Bari, (f.), 35, Loader.	Manganese .	Deceased was knocked down by a full tub and received severe injuries. Blood poisoning supervened and she died on the 30th June.
110	4th November, 9 A.M.	Angarpatra Mine, Katrassgarh P. O.	Union Coal Co., Ltd.	Gaya Kurmi, (m.), 28, Locomotive fireman. Lazar Ali Meah, (m.), 25, Hookman.	Coal .	During the temporary absence of the driver Gaya Kurmi started a colliery locomotive against orders. After going a short distance down a slight grade the locomotive got out of control and one of the six tubs, which it was pushing, derailed. This led to the derailment of the locomotive and it fell over a small bridge. The injector pipe burst and the two men in the cab were severely scalded. Gaya Kurmi was dead when removed from the cab, but Lazar Ali lived for two days afterwards. Inspection and inquiry made.

APPENDIX II—contd.

Fatal Accidents, 1910—contd.

Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Cause of accident and remarks.	
<b>ABOVE GROUND—contd.</b>							
<b>Miscellaneous on surface—(7 deaths).</b>							
111	3rd January, 4-30 P.M.	Bhuskajuri Mine, Asansol P. O.	Bhuskajuri Coal Co., Ltd.	Ragi Turi, (f.), 13, Water-bailer.	Coal .	Deceased went to draw water from a prohibited well and, falling in, was drowned. Inspection and inquiry made.	
112	20th January, 10-45 A.M.	Serampur Mine, Giridih P. O.	East Indian Railway Co.	Kripa Dasadh, (m.), 30, Coolie.	Coal .	Some coolies were overturning a heavy and unwieldy casting by means of a long prop when the casting suddenly overbalanced. The prop was jerked out of the hands of the coolies and struck deceased, who was stationed on the other side of the casting, on the head, killing him on the spot. Inspection and inquiry made.	
113	26th February, 7 A.M.	Loyahad Mine, Bansjora P. O.	Barakar Coal Co., Ltd.	Bugi Tamalli, (m.), 28, Underground roadman.	Coal .	Deceased and two others were removing rollahs, 18 feet to 30 feet in length, from a large piled stack in the yard, when, owing to taking most of the rollahs from one side, the pile overbalanced, fell upon him and killed him. Inspection and inquiry made.	
114	7th April, 8 A.M.	Diabargah Mine, Diabargah P. O.	Equitable Coal Co., Ltd.	Santhu Baurin, (f.), 25, Coal-carrier.	Coal .	Deceased was found drowned in a boiler feed water tank. As she was subject to epileptic fits it is surmised that a sudden attack rendered her helpless while she was bathing. Inspection and inquiry made.	
115	1st August, 5-45 P.M.	Loyahad Mine, Bansjora P. O.	Barakar Coal Co., Ltd.	Punia Pasin, (f.), 30, Wagon loader.	Coal .	Deceased was drowned in a well used for drinking purpose.	
116	30th September, 10-30 A.M.	Sodepur Mine, Sitarampur P. O.	Bengal Coal Co., Ltd.	Shawan Barwala, (m.), 32, Labourer.	Coal .	Deceased was killed by a fall of a portion of a gantry which was being dismantled. Inspection and inquiry made.	
117	11th December, 2-30 P.M.	Aldih Mine, Sitarampur P. O.	Aldih Coal Co., Ltd.	Abdul Rahman, (m.), 30, Coolie.	Coal .	While a rope conductor was being lowered in a shaft 560 feet deep the chain lashing it to the cage broke and it ran down the shaft. Before two of the men assisting could stand clear the end of the conductor whipped them on the legs. Septicæmia set in and deceased died from the effects eight days later. Inspection and inquiry made.	
Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Reason for exclusion.	Cause of accident and remarks.
<b>DEATHS NOT INCLUDED IN THE STATISTICS—(30 deaths).</b>							
1	2nd January, 6 A.M.	Serampur Mine, Giridih P. O.	East Indian Railway Co.	Lachu Meah, (m.), 80	Coal .	Not employed	It is surmised that deceased was washing himself when he fell backwards into the water and, being an old man, was unable to get out again. The tank was completely enclosed and its use forbidden. Inspection and inquiry made.
2	15th January, 4-30 P.M.	Shivrajpur Mine, Shivrajpur P. O.	Shivrajpur Syndicate, Ltd.	Lumba Girdhari, (f.), 8.	Manganese .	Not employed	Deceased was with her mother taking shelter during blasting operations when a small piece of rock projected from a shot struck her on the head and killed her instantly. Inspection and inquiry made.

3	23rd January, 10-15 A.M.	Jogta Mine, Sijua P. O.	Agabeg Brothers	Dulmhi Kotri, (f.), 65, Cow-keeper.	Coal	Not employed on the mine.	Deceased was crossing the siding with a cow. She was knocked down by a locomotive and full train as it was leaving the siding and was killed on the spot. Inspection and inquiry made.
4	9th February, 6-30 A.M.	Awlayheri Camp near Balaghat Mine, Kampti P. O.	Central Provinces Pros- pecting Syndicate, Ltd.	Halki, (f.), 24, Coolie.	Manganese	Not a mine accident.	Deceased fell into a well while drawing water and was drowned. She was subject to epileptic fits.
6	12th February, 4 P.M.	Kusunda Mine, Kusunda, P. O.	Kusunda and Nayadi Collieries, Ltd.	? (m.), 1.	Coal	Not employed	As six loaded tubs were being drawn up through a cross measure drift, a coupling broke and four tubs ran wild, killing the child who was being carried by his sister aged eight years. See Report, page 20. Inspection and inquiry made.
6	16th February, 8-30 A.M.	Serampur Mine, Giridih P. O.	East Indian Railway Co.	Jadu Bauri, (m.), 21.	Coal	Not employed	Deceased was found on a broad gauge line, his head being completely covered from his body. From the disposition of the body and the absence of other injuries it is surmised that he committed suicide on account of recent total loss of eyesight. Inspection and inquiry made.
7	19th February, 12 Midnight.	Lakshminganj Mine, Chora P. O.	Lakshminganj Coal Co., Ltd.	Rakhal Bauri, (m.), 10.	Coal	Not employed	Deceased went to drink water from an abandoned shaft and, falling in, was drowned. Inspection and inquiry made.
8	Probably 24th February, 1-30 P.M.	Jamadoba Mine, Jharia P. O.	Indian Collieries Syndi- cate, Ltd.	Gufuran Bibi, (f.), 25, Loader.	Coal	Not a mine accident.	The body of deceased was found floating in a well by a woman who went to draw water. She had probably been in the water four days. Inspection and inquiry made.
9	23rd April, 1-30 P.M.	Rajhara Mine, Rajhara P. O.	Bengal Coal Co., Ltd.	Kabutri Burhi, (f.), 4.	Coal	Not employed	Deceased, following some distance behind its mother who had crossed a narrow-gauge line in front of a locomotive attached to a set of wagons, attempted to crawl under one of the wagons while the set was in motion and was cut in two. Inspection and inquiry made.
10	3rd May, 1 P.M.	Dobari Mine, Jharia P. O.	R. N. Bagchi	Bishu Bhatra, (m.), 5.	Coal	Not employed	Deceased, 5 years of age, playing near the line, fell or jumped on the rail as shunting operations were in progress and was crushed to death. Inspection and inquiry made.
11	6th May, 11 A.M.	New Surataur Mine, Jharia P. O.	J. L. Banerji & Co.	Bidua Dasadhin, (f.), 15.	Coal	Not employed	The body of deceased was found floating on the water in an excavation made on the surface 8 feet deep. As there were no marks of violence on her body it is surmised that she met her death by simple drowning. Inspection and inquiry made.
12	19th May, 12 Noon.	Bhulanbarari Mine, Jharia P. O.	Bhulanbarari Coal Co., Ltd.	Bhato Gope, (m.), 21, Trolleyman.	Coal	On railway line.	While crossing a siding during shunting operations deceased was knocked down by an empty wagon and severely crushed. He died a few hours later. Inspection and inquiry made.
13	23rd May, 11-30 A.M.	Bhaganband Mine, Jharia P. O.	Borrea Coal Co., Ltd.	Pheranji Mushahir, (m.), 11.	Coal	Not employed	Deceased must have deliberately climbed the enclosing wall of a boiler feed water tank to bath and, being unable to scale the wall from the inside, was drowned. There were no marks of violence on the body. Inspection and inquiry made.
14	26th May, 1 P.M.	Srikistapur Mine, Kalipahari P. O.	Baliram Coal Co.	Laki Majhain, (f.), 7 Durji Majhain, (f.), 7.	Coal	Not employed	Deceased were drowned whilst bathing in a boiler feed water tank. Inspection and inquiry made.
15	28th May, 5 P.M.	Warigaon Mine, Kampti P. O.	Central India Mining Co., Ltd.	Jama, (f.), 20, Coolie. Kakisa, (f.), 1½.	Manganese	Not a mine accident.	While cooking, the woman's clothes caught fire and, in attempting to get out of her hut, the flames spread to the hut and to the child who was sleeping in a cradle at the time.



## APPENDIX II—contd.

## Fatal Accidents, 1910—concl'd.

Serial number.	Date and hour of accident.	Name and situation of mine.	Name of owner.	Name, sex, age, and occupation of person killed.	Name of mineral worked.	Reason for exclusion.	Cause of accident and remarks.
<b>DEATHS NOT INCLUDED IN THE STATISTICS—concl'd.</b>							
16	5th June, 2-30 P.M.	Brahmanbarari Mine, Jharia P. O.	East Indian Coal Co., Ltd.	Morni Bhushin, (f.), 30. Loader.	Coal . . .	On railway line.	During a storm a number of persons, amongst whom was deceased, took shelter under a wagon, deceased sitting on a rail with her back to a wheel. Suddenly a gust of wind caught a detached wagon, stationed 30 feet away, and drove it with considerable force into the wagon under which the people were sheltering and crushed her so severely that she succumbed shortly afterwards. Inspection and inquiry made.
17	17th June, 10 A.M.	Gopalichak Mine, Jharia P. O.	Gopalichak Coal Co., Ltd.	Sanpotia Shah, (f.), 9.	Coal . . .	Not employed	Deceased fell, unseen by any body, into an unprotected well and was drowned. As a bucket was subsequently found at the bottom of the well it is presumed that she went to draw water and missed her footing. Inspection and inquiry made.
18	3rd July, 12-30 P.M.	Sendra Mine, Bansjora P. O.	Sendra Coal Co., Ltd.	Pankhi Bhuia, (f.), 8.	Coal . . .	Not employed	Deceased strayed upon the line while shunting operations were in progress on a colliery siding and was run over by a wagon. Inspection and inquiry made.
19	12th July, About midday.	Jamuria Mine, Nandi P. O.	Equitable Coal Co., Ltd.	Chowri Koiri, (f.), 24.	Coal . . .	Not employed	Deceased was drowned in a boiler feed water tank where presumably she was bathing. Inspection and inquiry made.
20	13th July, 5-15 P.M.	Baraboni Mine, Charanpur P. O.	Ghusik and Muslia Collieries, Ltd.	Hari Bauri, (m.), 9.	Coal . . .	Not employed	Deceased was drowned in a well, which was properly fenced. Inspection and inquiry made.
21	15th July, 3 P.M.	Jamadoba Mine, Jharia P. O.	Indian Collieries Syndicate, Ltd.	Hasa Roy, (m.), 6.	Coal . . .	Not employed	Deceased was travelling along an endless rope haulage road in company with his grown up brother who had a baby in his arms, when he trod upon the moving rope and was thrown to the ground. Before the rope could be stopped a haulage clip attached by a chain to a loaded tub struck him a violent blow on the chest causing complicated fracture of the ribs. Inspection and inquiry made.
22	26th August, 9 A.M.	New Khas Jharia Mine, Jharia P. O.	R. J. Agarwala . . .	Setola Chamarin, (f.), 16, Coolie.	Coal . . .	Suicide . . .	After a quarrel with her husband deceased went to an old shaft full of water and jumped in. Inspection and inquiry made.
23	30th September, 1-30 P.M.	Miragpur Mine, Kampti P. O.	Central India Mining Co., Ltd.	Mathola, (f.), 1.	Manganese . . .	Not employed	Deceased's mother was cleaning ore when the child wandered about 5 feet away and fell into a small pool 2 feet deep which was half full of water owing to the previous day's rain. The father seeing the child in the water rescued it immediately. It was then taken to the camp where it expired at 2-30 P.M.
24	1st October, 8-30 A.M.	Sijua Mine, Sijua P. O.	Sijua Coal Co., Ltd.	Somra Hari, (m.), 10, Stone-picker.	Coal . . .	On railway line.	Deceased was run over by a train of coal wagons during shunting operations on the colliery siding. He received injuries to which he succumbed within a few hours. Inspection and inquiry made.

25	5th October, 1 A.M.	Napara Mine, Asansol P. O.	British Indian Coal Co., Ld.	Churna Beldar, (m.), 5.	Coal .	Not employed	Deceased was returning home in the twilight when he fell into a feed water tank containing 4' 9" of water but was rescued before life was extinct. Artificial respiration was tried vigorously for half an hour without avail. The top of the retaining wall was only 6" to 18" above the level of the ground. <i>See Report, page 20.</i> Inspection and inquiry made.
26	7th October, 10 A.M.	Jamuria Mine, Nandi P. O.	Equitable Coal Co., Ld.	Sukaldeo Choubey, (m.), 20, <i>Chaprasi.</i>	Coal .	On railway line.	Deceased was injured by a train of empty wagons which was being backed into the siding as he was crossing the line at a recognised pathway. Rain was falling heavily at the time and it is surmised that a damaged umbrella which was found close by contributed to the accident. Inspection and inquiry made.
27	27th October, 6 P.M.	Sibpur Mine, Charanpur P. O.	Katras Jharis Coal Co., Ld.	Dhoni Majhain, (f.), 35, <i>Loading woman.</i> Mongal Majhain, (f.), 1½.	Coal .	Murder and suicide.	A mother threw her baby and then herself into some water that had collected in an old incline cutting and both were drowned. Inspection and inquiry made.

## APPENDIX II—contd.

Table No. 2.

Statement of fatal and serious accidents in and about the mines regulated by the Indian Mines Act, 1901, during the year 1910.

PROVINCE.	District and mineral field.	Total average number of persons employed daily.	FATAL ACCIDENTS.			SERIOUS ACCIDENTS.			DEATH-RATE TO 1,000 PERSONS EMPLOYED.		
			Number of separate fatal accidents.	NUMBER OF DEATHS.		Number of serious non-fatal accidents.	NUMBER OF PERSONS SERIOUSLY INJURED.		Below ground.	Above ground.	Below ground and above
				Below ground.	Above ground.		Total deaths.	Below ground.			
<b>A.—COAL.</b>											
Bengal . . . . .	Hazaribagh { Bokaro-Ramgarh . . . . .	95	..	..	..	..	..	..	..	..	..
		52	..	..	..	..	..	..	..	..	..
		6,762	2	1	1	2	3	2	1	3	24
		50,978	34	45	5	50	33	21	12	33	141
		5,201	31	32	3	55	4	1	3	4	1491
		38	..	..	..	..	..	..	..	..	..
		22	..	..	..	..	..	..	..	..	..
		34,262	16	18	4	17	17	13	4	17	57
		15	..	..	..	..	..	..	..	..	..
		29	..	..	..	..	..	..	..	..	..
	597	..	..	..	..	2	2	..	2	..	
	214	..	..	..	..	..	..	..	..	..	
	TOTAL	98,268	83	111	18	124	59	39	20	59	177
Central Provinces	Chhindwara, Pench Valley . . . . .	765	2	2	..	2	1	1	..	1	3.08
	Narsinghpur, Mohpani . . . . .	966	..	..	..	..	1	1	..	1	..
	Chanda, Ballarpur . . . . .	688	..	..	..	..	1	1	..	1	..
	TOTAL	2,419	2	2	..	2	3	3	..	3	1.18
Panjab . . . . .	Jhelum . . . . .	1,224	3	3	..	3	3	2	1	3	3.98
	Shahpur . . . . .	402	..	..	..	..	..	..	..	..	..
	Minawali . . . . .	156	..	..	..	..	..	..	..	..	..
	TOTAL	1,782	3	3	..	3	3	2	1	3	2.57
Eastern Bengal and Assam.	Lakhimpur . . . . .	1,911	19	27	..	27	3	3	..	3	22.46
Baluchistan . . . . .	Sibi, Khost, etc. . . . .	891	4	4	..	4	6	5	1	6	7.07
	Loralai, Loralai . . . . .	9	..	..	..	..	..	..	..	..	..
	TOTAL	900	4	4	..	4	6	5	1	6	6.00
North-West Frontier Province.	Hazara . . . . .	5	..	..	..	..	..	..	..	..	..
GRAND TOTAL (COAL)		105,285	140	147	13	160	74	52	22	74	2.13
<b>B.—MICA.</b>											
Bengal . . . . .	Monghyr . . . . .	300	..	..	..	..	..	..	..	..	..
	Hazaribagh . . . . .	9,053	2	3	..	3	4	5	..	5	59
	Gaya . . . . .	1,233	..	..	..	..	..	..	..	..	..
	TOTAL	10,581	2	3	..	3	4	5	..	5	40
Madras . . . . .	Nellore . . . . .	2,720	1	2	..	2	2	4	..	4	1.13
Rajputana . . . . .	Ajmer-Merwara . . . . .	200	..	..	..	..	..	..	..	..	..
GRAND TOTAL (MICA)		13,501	3	5	..	5	6	9	..	9	63

## APPENDIX II—contd.

Table No. 2—contd.

Statement of fatal and serious accidents in and about the mines regulated by the Indian Mines Act, 1901, during the year 1910.

PROVINCE.	District and mineral field.	Total average number of persons employed daily.	FATAL ACCIDENTS.			SERIOUS ACCIDENTS.			DEATH-RATE PER 1,000 PERSONS EMPLOYED.				
			Number of separate fatal accidents.	NUMBER OF DEATHS.		Number of serious non-fatal accidents.	NUMBER OF PERSONS SERIOUSLY INJURED.		Below ground.	Above ground.	Below ground and above ground.		
				Below ground.	Above ground.		Total deaths.	Below ground.				Above ground.	Total number of persons injured.
<b>C.—MANGANESE.</b>													
Central Provinces	Nagpur	3,483	2	2	2	3	3	3	...	3.05	57		
	Bhaodara	1,581	...	...	...	...	...	...	...	...	...		
	Balaghat	2,459	2	2	2	1	1	1	...	...	81		
	Chhindwara	566	...	...	...	...	...	...	...	...	...		
	<b>TOTAL</b>	<b>8,089</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>36</b>	<b>77</b>	<b>48</b>		
Madras	Vizagapatam	2,325	...	...	...	...	...	...	...	...	...		
Bombay	Panch Mahals	853	2	13	13	4	3	1	4	38.69	1524		
	Ratnagiri	80	...	...	...	...	...	...	...	...	...		
	<b>GRAND TOTAL (MANGANESE)</b>	<b>11,347</b>	<b>6</b>	<b>15</b>	<b>2</b>	<b>17</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>8</b>	<b>1.97</b>	<b>53</b>	<b>1.5</b>
<b>D.—LIMESTONE.</b>													
Central Provinces	Jabalpur, Katni	2,420	...	...	...	...	...	...	...	...	...	...	
Panjab	Hoshiarpur	90	...	...	...	...	...	...	...	...	...	...	
	<b>GRAND TOTAL (LIMESTONE)</b>	<b>2,510</b>	...	...	...	...	...	...	...	...	...	...	
<b>E.—SALT.</b>													
Panjab	Shahpur	72	1	1	1	...	...	...	...	18.88	...	18.88	
	Jhelum	820	...	...	...	11	11	...	11	...	...	...	
	Mianwali	66	...	...	...	...	...	...	...	...	...	...	
	<b>GRAND TOTAL (SALT)</b>	<b>958</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>11</b>	<b>11</b>	...	<b>11</b>	<b>1.07</b>	...	<b>1.04</b>	
<b>F.—GEMS.</b>													
Burma	Mogok (Rubies, etc.)	1,483	1	1	1	2	...	2	2	1.59	...	68	
Madras	Kurnool (Diamonds)	39	...	...	...	...	...	...	...	...	...	...	
	<b>GRAND TOTAL (GEMS)</b>	<b>1,502</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	...	<b>2</b>	<b>2</b>	<b>1.56</b>	...	<b>66</b>	
<b>G.—SLATE.</b>													
Bengal	Monghyr	170	...	...	...	1	1	...	1	...	...	...	
Panjab	Kangra	275	...	...	...	...	...	...	...	...	...	...	
	Gurgaon	172	...	...	...	1	...	1	1	...	...	...	
	<b>TOTAL</b>	<b>447</b>	...	...	...	<b>1</b>	...	<b>1</b>	<b>1</b>	...	...	...	
	<b>GRAND TOTAL (SLATE)</b>	<b>617</b>	...	...	...	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	...	...	...	
<b>H.—GOLD.</b>													
Bombay	Dharwar	337	...	...	...	1	...	1	1	...	...	...	
Madras	Anantapur	1,186	2	1	1	2	1	1	1	1.60	1.77	1.68	
	<b>GRAND TOTAL (Gold)</b>	<b>1,523</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1.57</b>	<b>1.12</b>	<b>1.31</b>

## APPENDIX II — contd.

Table No. 2—contd.

Statement of fatal and serious accidents in and about the mines regulated by the Indian Mines Act, 1901, during the year 1910.

PROVINCE.	District and mineral field.	Total average number of persons employed daily.	FATAL ACCIDENTS.			SERIOUS ACCIDENTS.			DEATH-RATE PER 1,000 PERSONS EMPLOYED.				
			Number of separate fatal accidents.	NUMBER OF DEATHS.		Number of serious non-fatal accidents.	NUMBER OF PERSONS SERIOUSLY INJURED.		Below ground.	Above ground.	Below ground and above.		
				Below ground.*	Above ground.		Total deaths.	Below ground.				Above ground.	Total number of persons injured.
Bengal	Singhbhum	641	...	...	...	...	...	...	...	...	...	...	
Central Provinces	Nagpur	93	...	...	...	...	...	...	...	...	...	...	
Madras	Salem	900	...	...	...	1	...	1	1	...	...	...	
Baluchistan	Quetta-Pishin	8	...	...	...	...	...	...	...	...	...	...	
Bengal	Singhbhum	2,840	...	...	...	...	...	...	...	...	...	...	
Central Provinces	Jabalpur	...	...	...	...	...	...	...	...	...	...	...	
Central Provinces	Jabalpur	112	...	...	...	...	...	...	...	...	...	...	
Burma	Mandalay	2,621	...	...	...	1	1	...	1	...	...	...	
Bengal	Hazaribagh	11	...	...	...	...	...	...	...	...	...	...	
Burma	Maliwan	60	...	...	...	...	...	...	...	...	...	...	
	<b>GRAND TOTAL (Tns)</b>	<b>71</b>	...	...	...	...	...	...	...	...	...	...	
Central Provinces	Jabalpur	110	...	...	...	...	...	...	...	...	...	...	
Madras	Kurnool	10	...	...	...	...	...	...	...	...	...	...	
	<b>GRAND TOTAL (STREATITE)</b>	<b>120</b>	...	...	...	...	...	...	...	...	...	...	
Madras	Visagapatam	81	...	...	...	...	...	...	...	...	...	...	
	<b>GRAND TOTAL (ALL MINERALS)</b>	<b>144,880</b>	<b>117</b>	<b>170</b>	<b>16</b>	<b>166</b>	<b>107</b>	<b>78</b>	<b>82</b>	<b>110</b>	<b>1.69</b>	<b>.29</b>	<b>1.29</b>

\* Figures included along with that of Limestone.

## APPENDIX II—contd.

Table No. 3.

Statement of fatal accidents in mines regulated by the Indian Mines Act, 1901, during the year 1910, classified according to the age and sex of the workers.

MINERAL.	PROVINCE AND MINERAL FIELD.	Number of separate fatal accidents.	NUMBER OF DEATHS.								TOTAL BELOW AND ABOVE GROUND.	
			BELOW GROUND.				ABOVE GROUND.					
			Adult males.	Adult females.	Children (under 12).	TOTAL.	Adult males.	Adult females.	Children (under 12).	TOTAL.		
COAL . . . . .	Baluchistan . . . . .	4	4	...	...	4	...	...	...	...	4	
	Bengal {	Daltonganj . . . . .	...	...	...	...	...	...	...	...	...	...
		Giridih . . . . .	2	1	...	...	1	1	...	...	1	2
		Jharia . . . . .	34	36	9	...	45	4	1	...	5	50
		Raniganj . . . . .	47	52	18	...	65	5	2	...	7	72
	TOTAL (BENGAL) . . . . .	83	89	22	...	111	10	3	...	13	124	
	Central Provinces . . . . .	2	1	1	...	2	...	...	...	...	2	
Eastern Bengal and Assam . . . . .	12	26	1	...	27	...	...	...	...	27		
Panjab . . . . .	3	3	...	...	3	...	...	...	...	3		
TOTAL COAL . . . . .	104	123	24	...	147	10	3	...	13	160		
MICA . . . . .	Bengal . . . . .	2	3	...	...	3	...	...	...	...	3	
	Madras . . . . .	1	2	...	...	2	...	...	...	...	2	
	TOTAL MICA . . . . .	3	5	...	...	5	...	...	...	...	5	
MANGANESE . . . . .	Central Provinces . . . . .	4	2	...	...	2	1	1	...	2	4	
	Bombay . . . . .	2	0	2	2	13	...	...	...	...	13	
	TOTAL MANGANESE . . . . .	6	11	2	2	15	1	1	...	2	17	
SALT . . . . .	Panjab . . . . .	1	...	1	...	1	...	...	...	...	1	
GRMS . . . . .	Burma . . . . .	1	1	...	...	1	...	...	...	...	1	
GOLD . . . . .	Madras . . . . .	2	1	...	...	1	1	...	...	1	2	
GRAND TOTAL, ALL MINERALS . . . . .		117	141	27	2	170	12	4	...	16	186	

APPENDIX II—*conold.*

Table No. 4.

Statement of fatal accidents in mines regulated by the Indian Mines Act, 1901, during the year 1910, classified according to cause of accident.

MINERAL WORKED.	Number of separate fatal accidents.	NUMBER OF PERSONS KILLED.											DEATH-RATE PER 1,000 PERSONS EMPLOYED.		
		Explosions of fire-damp.	Falls of roof.	Falls of side.	In shafts.	By explosives.	Suffocation by gases.	Irruptions of water or falling into water.	Haulage.	Miscellaneous below ground.	Surface.	Total deaths.	Below ground.	Above ground.	Below and above ground.
Coal . . . . .	104	27	51	10	18	5	...	6	16	8	18	160	2.18	.34	1.52
Mica . . . . .	3	...	1	4	...	...	...	...	...	...	5	.03	...	.37	
Manganese . . . . .	6	...	...	12	...	3	...	...	...	...	2	17	1.97	.53	1.5
Salt . . . . .	1	...	...	...	...	...	...	...	...	1	1	1.07	...	1.04	
Gems . . . . .	1	...	...	...	1	...	...	...	...	...	1	1.56	..	.66	
Gold . . . . .	2	...	...	...	1	...	...	...	...	...	1	2	1.57	1.12	1.31
Total 1910 . . . . .	117	27	52	24	20	8	...	6	16	9	16	186	1.89	.29	1.29
Total preceding year.	126	6	31	26	30	5	...	8	16	10	25	152	1.40	.49	1.08
Difference . . . . .	-9	+21	+21	+6	-10	+3	...	+3	...	-1	-9	+34	+49	-20	+21

## APPENDIX III.

## PROSECUTIONS UNDER MINES ACT.

Statement of Prosecutions instituted under the Indian Mines Act, 1901, during the year 1910.

PROVINCE.	District.	Number of prosecutions.	Number of persons prosecuted.	Number convicted.	REMARKS.
Bengal . . . . .	Hazaribagh . . . . .	1	1	1	
Do. . . . .	Manbhum . . . . .	1	1	1	
Do. . . . .	Do. . . . .	1	1	.....	



**APPENDIX IV.**  
**MISCELLANEOUS.**

**Statement No. 1.**

**List of Inspection Circles.**

No. 1 Circle.	No. 2 Circle.	No. 3 Circle.
<p>(a) All mines in the districts of Palamau, Gaya, Monghyr, Singhbhum, Darjeeling, Ranchi and Sambalpur, and all mines other than coal mines in the district of Hazaribagh, and all mines in the district of Manblum, which are situated west of a line drawn from Adra Junction at mile 175 of the Bengal Nagpur Railway to Gobindpur at mile 169 on the Grand Trunk Road and continued across the district in each direction.</p>	<p>(a) All mines in the districts of Burdwan and Bankura to the west of a line drawn from mile 131 on the East Indian Railway main line near Asansol to mile 141 on the Ondal loop near Gaurangdi, and continued across the districts in each direction; and all mines in the district of Manbhum east of a line drawn from Adra Junction at mile 175 on the Bengal-Nagpur Railway to Gobindpur at mile 169 on the Grand Trunk Road, and continued in each direction across the district, and all coal mines in the district of Hazaribagh.</p>	<p>(a) All mines in the districts of Burdwan and Bankura to the east of a line drawn from mile 131 on the East Indian Railway main line near Asansol to mile 141 on the Ondal loop near Gaurangdi, and continued across the districts in each direction, and all mines in the districts of the Sonthal Parganas and Birbhum.</p>
<p>(b) All mines in Assam.</p>	<p>(b) All mines in Baluchistan.</p>	<p>(b) All mines in the Presidency of Bombay.</p>
<p>(c) All mines in Burma.</p>	<p>(c) All mines in the United Provinces.</p>	<p>(c) All mines in the Central Provinces.</p>
	<p>(d) All mines in the Panjab.</p>	
	<p>(e) All mines in Ajmer-Merwara.</p>	<p>(e) All mines in the Presidency of Madras.</p>

APPENDIX IV—*contd.*

## MISCELLANEOUS.

## Statement No. 2.

## List of holders of certificates as Managers of Coal Mines in British India.

(a) Certificates granted to holders of English certificates of competency.

## FIRST CLASS.

NAME.	No. of Indian certificate.	Date of Indian certificate.	No. of English certificate.	Date of English certificate.
Whitworth, Charles Stanley . . . . .	148	7th February 1910 . . . . .	2326	8th January 1904.
Webster, Gerald Cecil . . . . .	149	Ditto . . . . .	3034	1st July 1907.
Husband, Robert . . . . .	150	Ditto . . . . .	3325	24th February 1909.
Elphinstone, William Spencer . . . . .	151	30th March 1910 . . . . .	2581	28th April 1905.
Dufton, Frank . . . . .	152	12th September 1910 . . . . .	2756	27th February 1906.
Gibson, Ernest . . . . .	153	Ditto . . . . .	3495	30th October 1909.
Wilson, James . . . . .	154	Ditto . . . . .	3028	14th June 1907.

## SECOND CLASS.

Press, William G. . . . .	19	21st November 1910 . . . . .	6563	11th June 1908.
---------------------------	----	------------------------------	------	-----------------

(b) Certificates of service.

## FIRST CLASS.

NAME.	No. of certificate.	Date of certificate.	REMARKS.
Haloo, Ramji . . . . .	135	12th September 1910.	

(c) Certificate of competency.

## FIRST CLASS.

Ashcroft, Charles Edwin . . . . .	54	30th March 1910.
Dennis-Jones, Allan A. . . . .	55	Ditto.
Wilkinson, Ronald . . . . .	56	Ditto.

## SECOND CLASS.

Ghosh, Satyendra Nath . . . . .	53	30th March 1910.
Akone, J. P. . . . .	54	Ditto.
Johnston, John Munroe . . . . .	55	Ditto.
Wise, Thomas Louis George . . . . .	56	Ditto.
Bhattacharya, Bhaba Charan . . . . .	57	Ditto.

APPENDIX IV—*contd.*

## MISCELLANEOUS.

## Statement No. 3.

List of Universities and Colleges in England and India approved by the Governor General in Council for the purposes of Rules 32 and 33 under the Indian Mines Act, 1901.

Name of Institution and Degree or Diploma.	Date.
University of Birmingham in respect of its Degree of B.Sc. in Mining and Diploma in Mining.	11th June 1904.
University College of Bristol in respect of its Senior Diploma in Mining.	16th September 1904.
University of Cambridge in respect of its Diploma in Mining Engineering.	6th June 1905.
University of Durham in respect of its Degree of B.Sc. in Mining	21st December 1903.
Durham College of Science in respect of its Diploma in Mining	29th June 1904.
University of Glasgow in respect of its Degree and Diploma in Mining.	28th September 1904.
Glasgow and West of Scotland Technical College in respect of its Diploma in Mining.	28th June 1904.
University of Leeds in respect of its Degree of B.Sc. in Mining and Diploma in Mining.	21st November 1904.
University of London in respect of its B.Sc. Degree in Mining for Internal Students, subject to the Degree being endorsed by the University with a certificate of four months' practical experience in a mine.	9th June 1905.
University of London in respect of its B.Sc. Degree in Mining for External Students, subject to the Degree being endorsed by the University with a certificate of four months' practical experience in a Mine.	7th August 1906.
Royal School of Mines in respect of its Associateship in Mining	24th March 1904.
University of Oxford in respect of its Diploma B. for Colliery Engineers (in Scientific Engineering and Mining subjects).	11th February 1905.
University College of Sheffield in respect of its Diploma in Mining.	15th July 1904.
University College of South Wales and Monmouthshire in respect of its Diploma in Mining.	19th April 1904.
Wigan Mining and Technical College in respect of its Diploma in Mining.	26th August 1904.
Civil Engineering College, Sibpur, in respect of its Diploma in Mining.	22nd February 1907.
Merchant Venturers' Technical College, Bristol, in respect of its Diploma in Mining Engineering.	5th October 1905.
Victoria University of Manchester in respect of its Degree and Certificate of Mining.	14th February 1906.
University College of Nottingham in respect of its Diploma in Mining Engineering.	28th March 1906.
University of Sheffield in respect of its Degree of Bachelor of Engineering. (Mining).	30th June 1906.
Heriot-Watt College in respect of its Certificate in Mining Engineering.	16th January 1908.
Calcutta University in respect of its Degree of Bachelor of Engineering in the branch of Mining Engineering.	24th September 1910.

APPENDIX IV—*contd.*

## MISCELLANEOUS.

## Statement No. 4.

## SIBPUR COLLEGE.

## THE MINING CLASSES.

## CIRCULAR.

THESE classes are attached to the Overseer Section of the Apprentice Department.

*General explanation.*—The Mining Classes are designed to afford theoretical training in the principles of mining generally, to prepare students for positions of responsibility in coal or metal mines, and in the case of students attending for instruction in coal mining, to qualify them to appear for the examinations of mine managers, as required by the Indian Mines Act, VIII of 1901.

The course at Sibpur for regular mining students will extend over four years. At the end of the second year the sub-overseer examination is held. The specialised instruction in mining at Sibpur is given in the third and fourth years of the college course, according to the attached syllabus, and the diploma examination takes place at the end of the fourth year.

The classes are open to both regular students and special students.

*Regular students*—Are those who have qualified for admission by passing the sub-overseer examination of the Civil Engineering College, or an equivalent test of other colleges.

Their age limits are 17 years minimum and 19 years maximum on admission.

*Special students.*—Persons resident in Bengal, who have been employed upon mines, will be admitted as special students under the following conditions:—

- (a) that they have completed at least two years' practical work upon a mine; and
- (b) that they have passed (i) the B. Final Examination, (ii) the Matriculation or Entrance Examination of any Indian University, or (iii) any test equivalent to the Middle School Examination of the Code for European Schools.

There is no limit of age for such special students.

All applications for admission from outside candidates should be posted so as to reach the Principal's office by 1st April.

Regular students should apply in the proper form available from the Principal's office.

Special students must provide, (a) proof of educational attainments, and (b) a statement showing the nature and extent of their employment upon mines and the period thereof, supported by certificates from the mine managers under whom they have worked.

## SCHOLARSHIPS AWARDED BY THE GOVERNMENT OF BENGAL.

*For regular students.*—Two scholarships of Rs. 12 monthly and three of Rs. 6 are provided. These will be awarded on the results of the sub-overseer examination by the Director of Public Instruction on the recommendation of the Principal. Students trained at the Civil Engineering College or any affiliated technical school in Bengal are eligible for these scholarships. If they are on the Reduced fee list, they will be charged full tuition fees.

*For special students.*—Two scholarships of Rs. 150 monthly for European candidates and two of Rs. 50 monthly for Indian candidates, each tenable for two years, are offered. These will be awarded annually by the Director of Public Instruction on the recommendation of the Mining Advisory Board.

These scholarships are available for candidates who have had at least two years' actual experience of colliery work. They must have passed the Calcutta University Entrance Examination or an equivalent. For Europeans the Middle Scholarship Examination of the Code for European Schools or equivalent is accepted.

There is no limit of age.

Application for these scholarships should be made to the Principal of the Civil Engineering College, when applying for admission.

There is no residential accommodation available at the college for special students, scholarship-holders or otherwise: they must make their own arrangement for board and lodging, and must attend the college daily from 8 A.M. A mid-day meal will be supplied if desired at the college at a definite monthly charge to be fixed by the Principal.

## SCHOLARSHIPS AWARDED BY THE GOVERNMENT OF EASTERN BENGAL AND ASSAM.

*For regular students.*—Three of the value of Rs. 15, one being reserved for each of the following classes, namely, European, Muhammadan and Hindu, confined to students domiciled in Eastern Bengal and Assam.

APPENDIX IV—*contd.*Statement No. 4—*contd.*

*For special students qualified as above.*—One of Rs. 30 for an European. Two of Rs. 20— one for a Muhammadan and one for a Hindu. The rates for special students are fixed on the understanding that they will reside at the college hostel. If accommodation is not available, Government are prepared to consider an increase. Applications for these scholarships to be made to the Director of Public Instruction of Eastern Bengal and Assam.

The session begins each year on or about the first Monday in May. The college closes for the long vacation about the first week of August and re-opens about the end of October. Special students must pass all college test examinations and must appear at the diploma examination held at the end of the course.

The following fees will be charged from special students :—

*Caution money deposit.*—Rs. 5, which will be returned on leaving the college after deducting any charge-dues owing.

*Tuition fee.*—Rs. 3 monthly payable for 12 months in the year.

*Mid-day meal.*—Rs. 10 monthly for Europeans, and Rs. 5 for Indians.

All fees become due on the 15th of the month.

Regular students, who must be residents, will be charged in full the fees noted in the Rules of the Apprentice Department.

A camp of practical mining and surveying will be held for six weeks in the cold weather of each session in the colliery districts.

## SYLLABUS OF MINING COURSES.

## COURSE I.

*Geology applied to Mining.*—(One lecture per week.)

Classification of rocks: characteristic fossils and economic products of the principal systems.

Structure of rocks; foldings, faults, cleavage, formation of mineral veins.

Principles of geological surveying: methods employed in constructing geological maps and sections. Special reference to the geology of India.

*Mining Engineering.*—(Two lectures per week.)

Boring by hand and power machines.

Sinking and lining shafts; various methods employed in special cases.

Systems of haulage, underground and aboveground, aerial ropeways.

Hoisting, headgear, ropes, safety appliances.

Mining legislation.

*Section A.*—(One lecture per week.)

Methods of working coal, shaft pillars, preliminary work, and various methods of working the seams. Special reference to thick coal working as practised in England and different parts of the world.

Shot-firing; coal-cutting by machinery.

Surface subsidence and under-sea working.

Timbering and other supports.

Coal mine plans and sections, connecting surface and underground surveys.

*Section B.*—(One lecture per week.)

Prospecting for and methods of working mineral veins.

Alluvial mining and open workings.

Hydraulic mining; dredging for gold; ore-beds and deep leads overhand and underhand stopping.

Hand and power drilling; blasting, timbering.

Metal mine plans.

## COURSE II.

*Descriptive Mineralogy.*—(One lecture per week.)

Physical properties of minerals; description of various ores and fuels; methods of determination.

Prospecting operations.

*Mining Engineering.*—(Two lectures per week during first-half of session.)

Drainage of mines; adit levels; pumping machinery; dams; boring against old workings.

Ventilation of mines; natural and artificial ventilation; splitting and regulating air-currents; types of fans; water-gauge and anemometer.

Power-application in a mine; discussion of relative merits of steam, water, compressed-air, electricity and oil, as sources of applied power.

*Section A.*—(One lecture per week.)

Description of gases found in coal mines; colliery explosions; safety lamps; instruments for detecting fire-damp; treatment of men overcome by foul air.

APPENDIX IV—*contd.*Statement No. 4—*concld.*

Arrangement of surface works at a colliery ; sorting and screening coals ; coal-washing, briquette making, coking and bye-products.

*Section B.*—(One lecture per week.)

Surface works of metal mines, sorting, crushing, sizing, and concentration of various ores. Modern ore-dressing machinery, and slime tables.

Special reference to treatment of gold, silver, copper, lead and zinc.

Cyanide and Chlorine treatment of slimes.

## Statement No. 5.

## MINING INSTRUCTION IN BENGAL.

## RANIGANJ AND JHARIA COALFIELDS.

Lectures for session 1910-11 will be delivered throughout the session at the following centres :—

1. Lecture room near Sijua station on Mondays at 6-30 P.M.  
Lecturer—Mr. S. McMurtrie.
2. Lecture room near the Jharia Club on Tuesdays at 5-30 P.M.  
Lecturer—Mr. S. McMurtrie.
3. Lecture room at Messrs. Apcar and Company's Charanpur Colliery on Thursdays at 5-30 P.M.  
Lecturer—Mr. H. C. Read, B.Sc. (BIRM.)
4. Lecture room near Dishargarh Club on Wednesdays at 5-30 P.M.  
Lecturer—Mr. L. A. Jacobs, B.Sc. (DUN.)

The course of instruction consisting of about 25 lectures, will commence in November 1910. At the end of the course an examination will be held and candidates who pass the examination will receive a certificate recording their success. No candidate will, however, be permitted to sit for examination, unless he has attended fifty per cent. of the lectures.

All Europeans and English speaking Indians are cordially invited to attend.

The Mining Advisory Board desire that colliery managers will kindly publish this information in their collieries, and use their influence to maintain a regular attendance of the students.

\*Particulars of the Sibpur College Mining Classes and of the scholarships connected therewith may be obtained from the Principal.

*The following Sub-Committees have been appointed for each centre.*

## RANIGANJ DISTRICT.

*Dishargarh Centre.*

Mr. G. C. Leach (Chairman).  
" Geo. Miller.  
" F. Owen.  
" W. J. Rees.  
Babu M. N. Roy (Begunia).  
" H. P. Mukherji (Chota Dhemo).  
The Local Lecturer (Secretary).

*Charanpur Centre.*

Mr. G. C. Leach (Chairman).  
" R. Mitchell.  
" E. M. Patterson.  
" A. Russell.  
Babu Rajoni Prokash Chuckerbutti.  
" Surendra Nath Sarkar.  
The Local Lecturer (Secretary).

## JHARIA DISTRICT.

*Jharia Centre.*

The Chief Inspector of Mines (Chairman).  
Mr. J. J. Turnbull.  
" R. J. Browne.  
" A. S. Thomson.  
Babu Bhupati Mukherji.  
" Sita Nath Dutta.  
The Local Lecturer (Secretary).

*Sijua Centre.*

Mr. R. R. Simpson (Chairman).  
" A. Agabeg.  
" W. Hutton-Williams.  
" E. S. Bennertz.  
Babu Lalit Mohan Chowdhuri.  
The Local Lecturer (Secretary).

## APPENDIX IV—concl'd.

## Statement No. 5—concl'd.

## SYLLABUS OF THE COURSE OF INSTRUCTION.

THE course will treat principally of the more practical operations in actual mining, with special reference to India, and the principles underlying such operations will be thoroughly discussed. Special attention will be paid to the various methods of working thick seams.

At the close of each lecture questions will be set for home work.

## FIRST YEAR COURSE.

*Geology.*—General structure of the crust of the earth: Definitions and descriptions of fault, dyke, outcrop, dip, strike, unconformity, etc.; composition and properties of coal; special reference to the coal measures in India: Importance of recording results of observations.

*Exploration.*—Advantages of borings; driving through faults, washouts, dykes, etc.; methods of maintaining the direction and gradient of such drivages.

*Boring and Winning.*—Different systems of boring; choice of methods; cost of boring. Winning coal by inclines, adits, shafts, shafts and crosscut.

*Sinking.*—Site of colliery; position of shafts, excavation and shape; blasting with use of safety fuse and electric battery; explosives and detonators, their safe storing and handling; lining the shafts and scaffolding; sinking pit banking arrangements, bowks, waterbarrels, bull chain and hook, etc. Special difficulties in sinking and how to deal with them.

*Opening out and methods of working.*—Shafts pillars; arching or supporting the pit bottom; quarrying; pillar and stall; double road stall; long wall.

*Thick coal.*—Methods of working in South Staffordshire and Warwickshire, in Upper Silesia and France; methods of working thick seams by long wall, by inclined slices, and by horizontal slices, also the Rabatage System.

*Timbering and Supporting.*—Fixing of props and double timber; chocks or cogs, special methods of timbering to withstand pressure from the roof, sides and floor; securing dangerous holes in the roof due to heavy falls; use of iron or steel girders; stowing and packing; arching.

*Gases met with in coal-mines.*—Their experimental preparation by chemicals and illustration of their physical and physiological properties; methods of detecting; explosion and gob fires.

*Ventilation.*—Natural and artificial methods; coursing the air; use of stoppings, brattices, doors, airbridges, regulators, etc.; measuring the quantity of air, use of thermometer, barometer, water-gauge, anemometer; the friction of air in mines and the elementary theory of splitting.

*Safety lamps.*—Theory of the safety lamp, Sir Humphrey Davy's Experiment; the Davy lamp, the Clanny and Thomas and Williams lamps, the Marsaut and Mueseler lamps; firedamp detectors.

## SECOND YEAR COURSE.

*Mechanical Engineering of Collieries.*—Winding engines, discussion of the different types, calculation of the dimensions of cylinders, length of stroke, diameter of drum, etc.; strength of winding ropes and chains, detaching hooks, capping winding ropes, care and examination of ropes.

*Pumping.*—Importance of a good system; measurement of quantities of water; lifting and forcing pumps; pumps for sinking; temporary and permanent pumps; calculation of dimensions of pumps to perform a given duty, etc.; strength of pipes, methods of supporting, different types of joints.

*Hauling.*—Tramways, tubs and wagons; conveyance by self-acting inclines; single-rope haulage; main and tail; endless rope; endless chain; calculations concerning inclines, sizes of haulage engines, ropes, etc.; signalling; capping of haulage ropes.

*Surface arrangements.*—Boilers; Cornish, Lancashire, and water-tube types; boiler fittings, injectors, and steam-pipes, etc.; boiler explosions, incrustation, corrosion, and priming; calculations on boilers; Heap-steads; arrangement of roads around pit bank; simple screening and sizing.

*Transmission of power* by steam, compressed air, and electricity; discussing the relative merits of each system.

*Coke.*—Its production and composition; different types of ovens; recovery of by-products.

A. DU PRÉDENNING,

Supdt. of Industries and Inspector of Technical Education.

Department of Mines, India.

---

**REPORT**

OF THE

**CHIEF INSPECTOR OF MINES IN INDIA**

**Under the Indian Mines Act (VIII of 1901)**

FOR THE

**YEAR ENDING 31st DECEMBER 1910**

BY

**G. F. ADAMS,**

*Chief Inspector of Mines in India*



**CALCUTTA**  
**SUPERINTENDENT GOVERNMENT PRINTING, INDIA**  
**1911**