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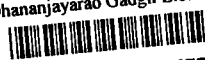
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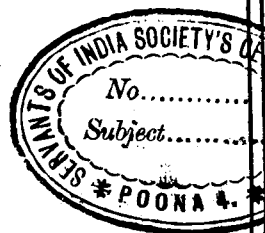


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Statement of Questionnaires issued and witnesses examined.

Type of Questionnaire.	Total number of copies issued.	Number of witnesses addressed including local Governments, Associations, firms, etc.	Number of written replies received.	Number of witnesses examined orally on written replies.	Number of witnesses examined outside the questionnaire.
1. General	195	64	56†	51	1
2. Landlords	62	8	7	6	..
3. Iron and Steel . . .	46	8	2	5	..
4. Railways	54	3	2	2	..
5. ropeways	44	2	2	3	..
6. Commissioners for the Port of Calcutta, and The Irrigation Department, Bengal. }	39	2	2	2	..
7. Special questionnaire addressed to Dr. C. S. Fox.	36	1	1	1	..
TOTAL .	476*	83	72	71‡	1

* Includes 162 copies sent to the Director of Public Information, Government of India.

† Including 11 not addressed.

‡ Certain Associations sent two representatives but they have been treated as one witness.

ALPHABETICAL LIST.

Witnesses.	Firm, appointment or representative.	Serial number of witness.	Written evidence page.	Oral evidence page.
Anderson, Wright & Co., Messrs.	I. A. Clark	10	68	69
Andrew Yule & Co., Ltd., Zamindaries of.	P. S. Keelan, C.I.E. . .	60	500	501
Archibald, D. M. .	General Manager, Lodna Colliery Co., Ltd.	29	201	206
Ashcroft, C. E. .	Agent, Sunkerpore Colliery	14	94	99
Baksi, K. K. .	Manager, Kirkend Colliery	25	175	181
Banerjee, J. G. .	Manager, Radhamadhabpur Colliery.	44	391	..
Bell, J. A. . .	Agent, East Indian Railway.	66	521	524
Bengal-Nagpur Railway.	J. Wilson	67	526	531
Bird & Co., Messrs. .	Agents, Burrakur Coal Co.	8	62	65
	Agents, Kumardhubi Engineering Works, Ltd.	69	537	540
	Representatives, F. W. A. Carpenter and E. O. Pearce.			
Bose, B. K. . .	Manager, Gonsadih Colliery	26	182	188
	Representative, Indian Mine Managers' Association.	2	..	18
Bose, P. C. . .	Representative, Indian Miners' Association.	4	..	35
Bose, Siva Kali .	Representative, Indian Colliery Labour Union.	3	..	31
Bose, S. K. . .	Representative, Geological, Mining and Metallurgical Society of India.	6	..	52
Bown, R. J. . .	Messrs. Gillanders Arbuthnot & Co.	12	..	74
Brook, J. . .	Representative, National Association of Colliery Managers (Indian Branch).	1	..	11

Witnesses.	Firm, appointment or representative.	Serial number of witness.	Written evidence page.	Oral evidence page.
Burch, W. M.	Agent, Messrs. Equitable Coal Co., Ltd.	41	379	..
Burdwan Raj Estate	M. N. Dutt	59	497	..
Carapiet, G. G. . . .	Manager, Bunsdeopur Colliery.	33	228	232
Carpenter, F. W. A. .	Representative, Messrs. Bird & Co., Agents, Kumardhubi Engineering Works.	8	..	540
Carver, G. A.	Superintendent, Kasimbazar Raj Wards' Estate Collieries.	22, 58	153, 490	161, 495
Central Provinces Government.	C. D. Deshmukh, C.I.E., I.C.S.	47	403	405
Chatterjee, M. M. . .	Representative, Jharia Raj Estate.	62	..	506
Clark, I. A.	Representative, Messrs. Anderson, Wright & Co.	10	..	69
Commissioners for the Port of Calcutta.	Representatives, D. Kilford and Commander C. V. L. Norcock.	70	544	544
Cooksey, W.	Officiating Colliery Superintendent, State Railways' Colliery Department.	30	209	214
Cork, F. L.	Colliery Superintendent, Messrs. Macneill & Co.	17	114	121
Creet, A. T.	Consulting Engineer, Messrs. Martin & Co.'s Collieries.	42	383	..
Deshmukh, C. D. . . .	Representative, Central Provinces Government.	47	..	405
Dholakia, J. K. . . .	Consulting Mining Engineer	32	221	225
Dutt, M. N.	Superintendent, Mineral Properties, Burdwan Raj Estate.	59	497	..
Dutton, R. D.	Representative, Messrs. Indian Iron and Steel Co., Ltd.	65	..	516
East Indian Railway	J. A. Bell	66	521	524
Farquhar, A.	Representative Mining and Geological Institute of India.	5	39	46

Witnesses.	Firm, appointment or representative.	Serial number of witness.	Written evidence page.	Oral evidence page.
Fenwick, R. . .	Agent, Messrs. Bird & Co., Sijua.	38	..	335
Forbes, C. A. . .	Representative, Nawagarh Raj Estate.	61	..	503
Fox, Dr. C. S. . .	Superintending Geologist, Geological Survey of India.	35, 72	242, 550	257, 555
Geological, Mining and Metallurgical Society of India.	Representatives, S. K. Bose and Dr. S. K. Roy.	6	47	52
Ghosh, N. . . .	Manager, Muslia Collieries .	23	163	166
Ghosh, S. K. . . .	Representative, Indian Mine Managers' Association.	2	..	18
Gillanders Arbuthnot & Co., Messrs.	Agents, The Nobel's Explosives Co., Ltd., & The British Ropeway Engineering Co., Ltd., W. F. Tuckett.	12, 68	75, 534	535
Harmer, W. T. V. . .	Representative, Messrs. Indian Iron and Steel Co., Ltd.	65	..	516
Harrison, J. R. . .	Chief Mining Engineer, Railway Board.	37	286	307
Hindley, C. W. G. . .	Chief Mining Engineer, Messrs. Andrew Yule & Co., Ltd.	13	80	92
Indian Colliery Labour Union.	Representative, Shiva Kali Bose.	3	23	31
Indian Iron & Steel Co., Ltd., Messrs.	Representatives, R. D. Duttson, W. T. V. Harmer and H. V. Peeling.	65	514	516
Indian Mine Managers' Association.	Representatives, B. K. Bose and S. K. Ghosh.	2	13	18
Indian Miners' Association.	P. C. Bose	4	33	35
Irrigation Department, Bengal.	Representative, P. C. Roy	71	544	547
Jacobs, L. A. . . .	Chief Mining Engineer, Messrs. Shaw Wallace & Co.	21	141	151
Jardine, Skinner & Co., Messrs.	E. A. Paterson	9	66	67
Jharia Raj Estate . .	M. M. Chatterjee . . .	62	504	506

Witnesses.	Firm, appointment or representative.	Serial number of witness.	Written evidence page.	Oral evidence page.
Kanotra, M. M. .	Manager, Junnardeo No. 2 Colliery.	56	478	..
Kasimbazar Raj Ward's Estate.	G. A. Carver	22, 58	153, 490	161, 495
Keelan, P. S., C.I.E.	Chief Superintendent, Zamindaries, Messrs. Andrew Yule & Co., Ltd.	60	500	501
Kilford, D. . .	Representative, Commissioners for the Port of Calcutta,	70	..	544
Kirk, J. . . .	Colliery Superintendent, The Tata Iron & Steel Co., Ltd.	28	194	198, 510
Kolya, N. C. . .	Manager, Mahakali Coal Mine.	53	444	446
Lancaster, H. . .	Colliery Superintendent, State Railways' Coal Department.	24	167	172
Llewellyn, G. . .	Manager, Hirdagarh Collieries, Ltd.	51	426	435
Mackay, A. G. . .	Agent, The Bengal Iron Co., Ltd.	16	108	113
Macneill & Co., Messrs.	Agents, Equitable Coal Co., T. Ord.	7	54	59
Martyn, J. K. . .	Manager, Barkui Colliery .	50	419	424
Mining and Geological Institute of India.	A. Farquhar	5	36	46
Mitter, S. N. . .	Manager, Khas Sitalpur Colliery.	46	399	..
Mohatta Bros., Messrs.	D. K. Samanta . . .	11	71	74
Mondal, Rai Saheb U. N.	Manager, Deoli Colliery .	18	124	127
Mukerjee, D. N. .	Manager, Hindusthan Lalpeth Colliery.	54	448	461
Mukherjee, B. . .	Panchakote Raj Estate .	57	..	489
Mukherji, M. M. .	Manager and Agent, Messrs. Martin & Co.'s Collieries.	15	100	106
National Association of Colliery Managers (Indian Branch).	Representatives, J. Brook and R. J. Potheary.	1	8	11

Witnesses.	Firm, appointment or representative.	Serial number of witness.	Written evidence page.	Oral evidence page.
Nawagarh Raj Estate	C. A. Forbes and H. Sen Gupta.	61	502	503
Norcock, - Commander C.V.L.	Representative, Commissioners for the Port of Calcutta.	..	..	544
Ord, T. . . .	Representative, Messrs. Macneill & Co.	7	..	59
Panchakote Raj Estate.	B. Mukherjee	57	487	489
Pandya, P. H. . .	Manager, Jote Dhemo Colliery.	40	375	..
Parry, A. H. . . .	Sales Agent, Messrs. Shaw Wallace & Co., Chhindwara.	49	414	418
Paterson, E. A. . .	Representative, Messrs. Jardine Skinner & Co.	9	..	67
Pearce, E. O. . . .	Representative, Messrs. Bird & Co.	8	..	65, 540
Peeling, H. V. . . .	Representative, Messrs. Indian Iron & Steel Co., Ltd.	65	..	516
Penman, Dr. D., C.I.E.	Chief Inspector of Mines .	36	259	282
Penman, R. B. . . .	Agent, Gopalichuck West Colliery.	34	235	240
Penman, W. B. . . .	Manager, Samla Collieries .	19	128	132
Percival, Dr. F. G. .	Representative, Messrs. Tata Iron and Steel Co., Ltd.	64	..	510
Phelps, J. E. . . .	Colliery Superintendent, East Indian Coal Co., Ltd.	39	338	-
Pothecary, R. J. . .	Representative, National Association of Colliery Managers (Indian Branch).	1	..	11
Ramgarh Estate . .	S. McLeod Smith	63	507	508
Rawal, G. S. . . .	Agent, K. and N. Collieries	27	188	193
Rees, W. J.	Manager, Noondih Jitpore Collieries.	31	215	220
Robb, W. D.	Manager, Hurriladih Colliery.	45	394	...
Ross, J. B.	Representative, Messrs. Shaw Wallace & Co.	48	..	412

Witnesses.	Firm, appointment or representative.	Serial number of witness.	Written evidence page.	Oral evidence page.
Roy, M. B. . .	Manager, Guzdar Kajora Colliery.	43	386	..
Roy, P. C. . .	Executive Engineer, Irrigation Department, Bengal.	71	544	547
Roy, Dr. S. K. .	Representative, Geological Mining and Metallurgical Society of India.	6	..	52
Samanta, D. K. .	Representative, Messrs. Mohatta Bros.	11	..	74
Sen Gupta, H. . .	Manager, Nawagarh Raj Estate.	61	502	..
Sharpley, Prof. Forbes W.	Indian School of Mines .	..	557	..
Shaw Wallace & Co., Messrs.	Ross, J. B. . . .	48	407	412
Smith, McLeod S. .	Manager, Ramgarh Estate	63	507	508
Spark, E. . . .	Colliery Superintendent, New Beerbhoom Coal Co., Ltd.	20	136	139
Tarleton, S. F. . .	Deputy Chief Mining Engineer, Messrs. Bird & Heilgers' Collieries.	38	312	..
Tata Iron & Steel Co., Ltd., Messrs.	Representatives, J. Kirk and Dr. F. G. Percival.	64	510	510
Thomson, J. . . .	Superintending Engineer, The Ballarpur Collieries Co.	52	436	441
Tuckett, W. F. . .	Representative, Messrs. Gillanders Arbuthnot & Co.	68	..	535
Warde, I. . . .	Manager, Damua Colliery .	55	462	..
Wilson, J. . . .	Mining Engineer, Bengal-Nagpur Railway.	67	..	531

APPENDIX.

**Note submitted by Professor Forbes W. Sharpley of the
Indian School of Mines, Dhanbad.**

Referring to my interview with your Committee recently in Dhanbad I raised a number of points in connection with (a) Illumination in Coal Mines and (b) Indian Research in Safety in Mines about which your Chairman asked me to let the Committee have a memorandum.

Illumination.

I pointed out it was being increasingly recognised in the chief Coal Mining countries—notably Great Britain, Germany and the U. S. A.—that improved lighting was a means of reducing the accident rate. I quoted one or two opinions, and these and others are given in the footnote. They are merely a selection from a large number in a similar strain. Quite a number of references have been made on the matter in evidence given before the Royal Commission on Safety in Coal Mines at present sitting in Great Britain.

By 'good' lighting I meant not only more lamps of a higher candle power but, also, the correct placing and shading of lamps so as to avoid glare. Where a low intensity of illumination exists glare even from a 1 c.p. lamp can seriously affect the ability to see objects in the same field of vision. Much improvement can be effected by correctly shielding and directing the light from existing lamps even without increasing the number of candle power of lamps and hence at a low cost. These remarks apply to both fixed and portable lamps underground and to lamps on the surface, e.g., over picking belts, etc. I have seen, for example, cases where a haulage engine attendant below ground could only see with great

"There has been a continuous reduction in the number of accidents as the mains lighting has been extended, and the steady decline in the number of compensation cases is most marked . . . The number of cases per month has fallen from 6½ to 1½. . . ."

(Atkinson & Allsop: "*An Experiment in Coal-Face Lighting*". *Trans. Inst. Min. Engrs.*, Vol. 90, 1936, page 282.)

"The improved lighting is of tremendous value in . . . helping to avoid ugly accidents."

"The authors are satisfied that the improved lighting is a very important factor in keeping the accident rate as it is."

[Jones and Maynard: "*Coal Face Illumination by means of Compressed Air-Electric (M. L.) Lamps*". *Coll., Guard.*, Vol. 152 (12th June 1936, page 1100).]

"While definite figures are not available, it seems probable that approximately 35 per cent. of the underground accidents in the mines of the United States are caused by inadequate or improper illumination."

[O. W. Owings (U. S. Bureau of Mines): "*Some Mine Lighting Practices in the United States*". *Trans. Illum. Eng. Soc.*, Vol. 29, 1934, page 60.]

difficulty and strain down the haulage way on account of bare lamps being hung right in his line of vision over the engine in front of him and because quite inadequate lighting was provided in the haulage road itself. In India where so many mines are free from gas there is little excuse for inadequate lighting while now-a-days safe lighting even at the coal-face of gassy mines is becoming possible of achievement.

I consider that some steps should be taken to lay before mine managers and others concerned the advantages to be obtained from better lighting. I have referred above only to safety since the Committee is concerned principally in this cause but there are other advantages to be obtained and which are even more easily demonstrated, e.g., increased output, cleaner coal, etc., etc. Much research, also, requires to be done on the best lighting methods. I refer to research in general terms below but I might mention here as one instance alone that a sharp divergence of opinion is held by different authorities as to the relative safety from ignition of gas by direct current and high frequency alternating currents. The matter has been shelved for some years, owing to the difficulty of reconciling results. If the advantage of A.C. high frequency currents could be finally and conclusively demonstrated it would go far to increasing the safe use of adequate illumination in gassy mines even at the coal face.

Incidentally I agreed that the use of electric safety hand lamps (or cap lamps) was preferable to flame safety lamps in Indian mines since it was less easy to take down below undetected and incorrectly assembled electric lamp than a flame-lamp in a similar state and that in any case, an incorrectly assembled electric safety lamp was not so likely to prove unsafe in use even if it escaped detection.

Research.

I pointed out that in my opinion the whole question of research in India on matters concerning safety in mines was in an unsatisfactory position. No research at all worth mentioning on this subject was being done in this country whereas in other countries, notably Great Britain and the U. S. A., a vast amount of invaluable work had been and was being done. For instance the Safety in Mines Research Board in Great Britain have published nearly 100 papers embodying the results of research very much of which is taken advantage of directly or indirectly by the coal mining industry in this country. India is thus making use of research done in other countries but is not making any contribution of her own—even for her own benefit. I consider this state of affairs should be remedied.

There is much scope for research in India both on problems of peculiar importance to Indian conditions and on those the successful solution of which would be valuable to the coal mining industry both in India and in other parts of the world. I have in mind a wide range of subjects—a range greater than that covered

by the Safety in Mines Research Board in Great Britain since there are other bodies in that country, *e.g.*, the Medical Research Council, which undertake research in industrial safety problems including mining and to which there is no corresponding work being done here.

It would be impossible here to mention all the subjects on which useful work could be done but I might as an example mention one. (I have already referred above to Illumination on which alone work might be done from many aspects.) It is not at present possible to tell by external examination whether a steel-winding or haulage rope is entirely safe for its work and ropes have either to be taken out of service well before the end of their useful safe life or else a risk of breakage must be run. Magnetic methods of detecting internal flaws offer means of proving the strength of ropes *in situ*. The problem has been tackled by several investigators but so far no entirely successful magnetic test has been evolved. Here is a problem of common interest to India and other mining countries. I am myself at the moment doing some work on it but with inadequate experimental facilities.

I suggest that a Research Board dealing with safety and other problems in coal mining should be set up in India and be financed by a small cess on raisings or from other sources. The value of the work done (as properly directed industrial research has demonstrated many times) might well be incalculable. Incidentally the prestige of India as an industrial country would, I submit, be considerably enhanced.

It appears anomalous that large sums can be spent on research in India on many other problems—chiefly agricultural but also of an industrial nature—and none on so important an industry as coal mining.