PART G

ANNUAL REPORT

OF THE

MINISTER OF MINES

OF THE PROVINCE OF

BRITISH COLUMBIA

FOR THE

YEAR ENDED 31ST DECEMBER

1937

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

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1938.

BRITISH COLUMBIA DEPARTMENT OF MINES.

VICTORIA, B.C.

Hon. W. J. ASSELSTINE, *Minister.*

JOHN F. WALKER, *Deputy Minister.*

JAMES DICKSON, *Chief Inspector of Mines.*

D. E. WHITTAKER, *Provincial Assayer and Analyst.*

P. B. FREELAND, *Chief Mining Engineer.*

R. J. STEENSON, *Chief Gold Commissioner.*

PART G.

INSPECTION OF MINES.

BY

JAMES DICKSON.

The Province is divided into six Inspection Districts, as follows:—

Inspection District.	Mining Divisions in District.
Coast	Quatsino, Clayoquot, Alberni, Victoria, Vancouver, New Westminster, Yale, and Nanaimo.
Northern Interior	Lillooet, Ashcroft, Clinton, Quesnel, Cariboo, Peace River, and those portions of the Liard and Omineca east of the 123rd degree of longitude.
Interior	Similkameen, Osoyoos, Nicola, Vernon, and Kamloops.
East Kootenay and Boundary	Greenwood, Grand Forks, Trail Creek, Nelson, Slocan City, Slocan, Arrow Lake, Ainsworth, Lardeau, Revelstoke, Fort Steele, Windermere, and Golden.
Northern	Queen Charlotte Islands, Bella Coola, Stikine, Portland Canal, Skeena, Atlin, and those portions of Liard and Omineca west of the 124th degree of longitude.

The Inspectors inspect the coal mines, metalliferous mines, and quarries in their respective districts.

BOARD OF EXAMINERS FOR COAL-MINE OFFICIALS.

James Dickson	Chairman, Victoria.
James Strang	Secretary, Victoria.
H. E. Miard	Member, Fernie.

Messrs. Strang and Miard and the Inspector of Mines of the district in which an examination is being held form the Board for granting certificates of competency to coal-miners.

An Inspector of Mines is empowered to grant provisional certificates to miners for a period not exceeding sixty days between regular examinations.

INSTRUCTORS, MINE-RESCUE STATIONS.

Richard Nichol	Nanaimo Section.
James L. Brown	Cumberland Station.
Alfred Gould	Princeton Station.
John T. Puckey	Fernie Station.

Geo. O'Brien, Inspector of Mines for the Nanaimo and Cumberland areas, died on December 26th, 1937, after seven years' service in these districts. He was formerly mine manager at several mines on Vancouver Island, and was previously Inspector of Mines and Mine-rescue Instructor in the East Kootenay District.

H. E. Miard, Inspector of Mines, was transferred from the Nelson Inspection District to the East Kootenay District, and John MacDonald, Inspector of Mines, was transferred from the East Kootenay District to Nanaimo.

H. C. Hughes and E. R. Hughes were appointed Inspectors of Mines, with headquarters at Nelson and Cumberland, respectively.

During 1937 the "Coal-mines Regulation Act" was amended as follows:—

AN ACT TO AMEND THE "COAL-MINES REGULATION ACT."

[*Assented to 10th December, 1937.*]

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of British Columbia, enacts as follows:—

1. This Act may be cited as the "Coal-mines Regulation Act Amendment Act, 1937."

2. Section 4 of the "Coal-mines Regulation Act," being chapter 188 of the "Revised Statutes of British Columbia, 1936," is repealed, and the following is substituted therefor:—

"4. (1.) No boy under the age of sixteen years and no woman or girl of any age shall be employed or be permitted to be in or about the surface workings of a colliery for the purpose of employment; and every manager shall, on the request of an Inspector, produce a copy of the certificate of birth or an affidavit or a statutory declaration setting forth the age of any boy employed in or about any mine or surface workings: Provided that this prohibition shall not affect the employment of any person engaged in the performance of clerical work, or in performing domestic duties in any hotel, boarding-house, or residence in connection with any colliery.

"(2.) No woman or girl of any age shall be employed underground in any mine, and no boy under the age of eighteen years shall be employed underground in any mine after the thirty-first day of December, 1937; but the provisions of this subsection shall not affect the employment of boys under eighteen years of age who have been or are employed underground before the thirty-first day of December, 1937."

3. Said chapter 188 is amended by inserting therein the following as section 77A:—

"77A. (1.) Where it is proposed to abandon a mine, or part of a mine, the owner, agent, or manager shall give notice in writing of the proposed abandonment to the Inspector of Mines while the workings of the mine or the part of the mine are still accessible, and shall see that all the workings of the mine or the part of the mine to be abandoned are surveyed and shown on the mine-plan before the abandonment occurs.

"(2.) Every person who fails to comply with this section shall be guilty of an offence against this Act."

4. Section 88 of said chapter 188 is repealed, and the following is substituted therefor:—

"88. (1.) Where the workings in any mine are approaching any abandoned workings, whether in or belonging to that mine or any other mine, the owner, agent, or manager in charge of the present workings shall report the circumstances in writing to the Inspector for the district in which the workings are situate before the present workings reach within five hundred feet of the abandoned workings; and no work shall be done within five hundred feet of the abandoned workings until a definite method of proceeding with the work has been submitted to and approved by the Inspector.

"(2.) In no case shall the workings of any mine approach nearer than one hundred and fifty feet to any abandoned workings until the abandoned workings have been definitely located by a bore-hole or bore-holes from the live workings and all standing water in abandoned workings has been drained off.

"(3.) This section shall not apply where the abandoned workings can be readily examined, and a knowledge obtained of the conditions prevailing therein.

"(4.) If the owner, agent, or manager fails to act in conformity with this section, he shall be guilty of an offence against this Act."

5. Section 97 of said chapter 188 is amended by striking out subsection (2), and substituting therefor the following:—

"(2.) The surveying of any mine and the preparation of the mine-plan from the surveys shall be done only by a person holding a certificate of competency as a mine surveyor under this Act, and each plan required to be kept in accordance with the provisions of this Act shall have inserted on it the date on which the last survey was made and the signature of the person making the survey."

PRODUCTION.

The total tonnage produced by the coal mines of the Province for the year ended December, 1937, was 1,444,687 tons, being an increase of 98,216 tons or 7.27 per cent. over the production of 1936.

The Coast District, which includes Vancouver Island, Nicola-Princeton District, and the Northern District, produced 985,551 tons, an increase of 109,686 tons or 12.52 per cent. over 1936.

Vancouver Island Collieries produced 818,447 tons, an increase of 105,410 tons or 14.78 per cent. over 1936.

The Northern District produced 4,517 tons.

The Nicola-Princeton District produced 162,587 tons, an increase of 5,025 tons over 1936.

The East Kootenay District produced 459,136 tons, a decrease of 11,470 tons or 2.49 per cent. from 1936.

The following table shows the output and *per capita* production daily and for the year of the various mines:—

Colliery and Mine.	Gross Tons of Coal mined during Year.	Days worked.	Total No. of Employees.	Tons of Coal mined per Employee daily.	Tons of Coal mined per Employee for Year.	No. of Employees Underground.	Tons of Coal mined per Underground Employee daily.	Tons of Coal mined per Underground Employee for Year.
Comox Colliery, No. 5 mine	269,547	249	589	1.82	455	463	2.29	582
Comox Colliery, No. 8 mine	19,925	272	164	0.44	121	147	0.50	135
Northfield Colliery	129,983	273	343	1.38	379	302	1.57	430
Western Fuel Colliery, Nanaimo	225,706	258	576	1.50	391	305	2.86	740
Reserve mine	150,471	257	232	2.52	648	188	3.11	800
Lantzville Colliery	6,351	261	22	1.09	288	17	1.42	373
Ida Clara Colliery	494	90	9	0.62	56	5	1.10	99
Chambers' mine	3,659	220	9	1.84	406	8	2.08	457
Jingle Pot Colliery	57	76	4	0.18	14	4	0.18	14
Beban's mine	10,913	259	58	0.72	188	37	1.13	295
Loudon's mine	400	127	5	0.63	80	3	1.00	133
Cassidy mine	678	95	3	2.37	226	2	3.58	339
Biggs' mine	81	31	4	0.64	20	4	0.64	20
Lewis' mine	182	39	2	2.33	91	2	2.33	91
Coalmont Colliery	94,136	229	200	2.05	470	126	3.26	747
Middlesboro Colliery	25,276	166	100	1.52	252	67	2.27	377
Blue Flame Colliery	6,009	81	45	1.64	133	29	2.55	207
Pleasant Valley Colliery	4,692	81	50	1.14	93	35	1.65	134
Princeton Tulameen Coal Co.	12,697	278	25	1.82	508	20	2.28	635
Granby Consolidated M.S. & P. Co.	18,873	283	62	1.07	304	42	1.58	449
Yale Colliery	326	51	5	1.27	65	4	1.58	81
Black mine	81	.....	2	.....	40	2	.....	40
Hat Creek Colliery	479	96	2	2.49	239	2	2.49	239
Bulkley Valley Colliery	4,313	199	11	1.96	392	8	2.71	539
Aveling Coal Co.	204	54	3	1.26	68	2	1.88	102
Coal Creek Colliery	111,265	174	156	4.09	713	121	5.28	919
Michel Colliery	347,871	226	472	3.26	737	341	4.51	1,020

Collieries of Vancouver Island Inspection District.

The output of Vancouver Island Collieries was 818,447 tons. Of this amount, 104,395 tons or 12.7 per cent. was lost in preparation for the market, 73,318 tons or 8.9 per cent. was consumed by producing companies as fuel, 609,653 tons was sold in the competitive market, 31,081 tons was added to stock; thus 74.4 per cent. of the output was sold. Of this amount sold in the competitive markets, 563,454 tons or 92.4 per cent. was sold in Canada and 46,199 tons or 7.6 per cent. was sold in the United States.

Collieries of the Nicola-Princeton District.

Of the gross output of 162,587 tons produced by the collieries of the Nicola-Princeton District, 18,858 tons or 11.0 per cent. was consumed by the producing companies as fuel, 757 tons was lost in preparation for the market, and 143,022 tons or 88.0 per cent. was sold in the competitive markets in Canada.

Collieries of the East Kootenay Inspection District.

The output of the collieries in the East Kootenay District was 459,136 tons. Of this amount, 17,205 tons or 3.7 per cent. was lost in preparation for the market, 11,947 tons or 2.6 per cent. was consumed as fuel by the producing companies, 67,634 tons or 14.7 per cent. was used in making coke, and 362,336 tons was sold in the competitive market. Of this amount 43,018 tons or 11.9 per cent. was sold in the United States and 319,318 tons or 88.1 per cent. was sold in Canada.

The following table shows the *per capita* production of the various districts for the past five years. Similar figures for the years prior to 1933 are shown in previous Annual Reports.

OUTPUT AND PER CAPITA PRODUCTION IN VARIOUS DISTRICTS.

Year.	District.	Gross Tons of Coal mined during Year.	Total No. of Employees at Producing Collieries.	Tons of Coal mined per Employee for Year.	No. of Men employed Underground in Producing Collieries.	Tons of Coal mined per Underground Employee for Year.
1933	East Kootenay District	477,677	698	684	522	915
	Coast District	787,069	2,396	328	1,719	457
	Whole Province	1,264,746	3,094	408	2,241	564
1934	East Kootenay District	627,619	754	832	551	1,139
	Coast District	719,471	2,139	336	1,499	480
	Whole Province	1,347,090	2,893	465	2,050	657
1935	East Kootenay District	407,110	819	497	614	663
	Coast District	780,858	2,152	363	1,531	510
	Whole Province	1,187,968	2,971	399	2,145	554
1936	East Kootenay District	470,606	606	776	459	1,025
	Coast District	875,865	2,208	396	1,556	563
	Whole Province	1,346,741	2,814	478	2,015	668
1937	Coast District	985,551	2,525	390	1,824	540
	Whole Province	1,444,687	3,153	458	2,286	632

The following table shows the production and distribution of coal by the various collieries and districts compiled from returns furnished by the owners:—

Collieries of British Columbia—Production, 1937.

Mine.	Sold. In Canada.	Sold. In U.S.A.	Sold. Elsewhere	Total Sales.	Lost in Washing.	Used in making Coke.	Used under Companies' Boilers, etc.	Total for Colliery Use.	Stocks. First of Year.	Stocks. Last of Year.	Difference. Added to.	Difference. Taken from.	Output for the Year 1936.
Vancouver Island District.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Canadian Collieries (D.), Ltd.—													
Comox Colliery (No. 5 mine)	222,604	10,691	.....	233,295	27,132	.....	5,411	32,543	3,368	7,077	3,709	.....	269,547
Comox Colliery (No. 8 mine)	16,012	804	.....	16,816	3,109	.....	.....	3,109	.....	.....	.....	.....	19,925
Northfield Colliery	83,712	18,389	.....	102,101	15,279	.....	68	15,347	.....	12,535	12,535	.....	129,983
Western Fuel Corp. of Canada, Ltd.—													
No. 1 mine	112,602	10,877	.....	123,479	37,706	.....	49,934	87,640	23,116	37,703	14,587	.....	225,706
Reserve mine	109,477	5,438	.....	114,915	19,572	.....	15,984	35,556	.....	.....	.....	.....	150,471
Lantzville Colliery	5,761	.....	.....	5,761	.....	.....	590	590	.....	.....	.....	.....	6,351
Ida Clara Colliery	494	.....	.....	494	.....	.....	.....	.....	.....	.....	.....	.....	494
Chambers' mine	3,659	.....	.....	3,659	.....	.....	.....	.....	.....	.....	.....	.....	3,659
Jingle Pot Colliery	57	.....	.....	57	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beban's mine	7,985	.....	.....	7,985	1,597	.....	1,331	2,928	66	66	.....	.....	10,913
Loudon's mine	150	.....	.....	150	.....	.....	.....	.....	.....	250	250	.....	400
Cassidy mine	678	.....	.....	678	.....	.....	.....	.....	.....	.....	.....	.....	678
Biggs' mine (Squaw Hill)	81	.....	.....	81	.....	.....	.....	.....	.....	.....	.....	.....	81
Lewis' mine	182	.....	.....	182	.....	.....	.....	.....	.....	.....	.....	.....	182
Totals, Vancouver Island District	563,454	46,199	.....	609,653	104,395	.....	73,318	177,713	26,550	57,631	31,081	.....	818,447
Nicola-Princeton District.													
Coalmont Collieries, Ltd.	82,483	.....	.....	82,483	.....	.....	11,653	11,653	.....	.....	.....	.....	94,136
Middlesboro Collieries, Ltd.	21,321	.....	.....	21,321	.....	.....	4,008	4,008	214	161	.....	53	25,276
Blue Flame Colliery	4,960	.....	.....	4,960	418	.....	631	1,049	.....	.....	.....	.....	6,009
Pleasant Valley Colliery	3,490	.....	.....	3,490	339	.....	863	1,202	.....	.....	.....	.....	4,692
Princeton Tulameen Coal Co., Ltd.	12,697	.....	.....	12,697	.....	.....	.....	.....	.....	.....	.....	.....	12,697
Granby Consolidated M.S. & P. Co., Ltd.	17,170	.....	.....	17,170	.....	.....	1,703	1,703	.....	.....	.....	.....	18,873
Yale Colliery	323	.....	3	326	.....	.....	.....	.....	.....	.....	.....	.....	326
Black mine	81	.....	.....	81	.....	.....	.....	.....	.....	.....	.....	.....	81
Hat Creek Colliery	497	.....	.....	497	.....	.....	.....	.....	.....	.....	.....	.....	497
Totals, Nicola-Princeton District	143,022	.....	3	143,025	757	.....	18,858	19,615	214	161	.....	53	162,587
Northern District.													
Bulkley Valley Colliery	4,313	.....	.....	4,313	.....	.....	.....	.....	.....	.....	.....	.....	4,313
Aveling Coal Company	204	.....	.....	204	.....	.....	.....	.....	.....	.....	.....	.....	204
Totals, Northern District	4,517	.....	.....	4,517	.....	.....	.....	.....	.....	.....	.....	.....	4,517
Grand totals, Coast District	710,993	46,199	3	757,195	105,152	.....	92,176	197,328	26,764	57,792	31,081	53	985,551
East Kootenay District.													
Coal Creek Colliery	71,370	33,068	.....	104,438	.....	3,493	2,987	6,480	7	354	347	.....	111,265
Michel Colliery	247,948	9,950	.....	257,898	17,205	64,141	8,960	90,306	533	200	.....	333	347,871
Totals, East Kootenay District	319,318	43,018	.....	362,336	17,205	67,634	11,947	96,786	540	554	347	333	459,136
Coal.													
Grand totals for Province	1,030,311	89,217	3	1,119,531	122,357	67,634	104,123	294,114	27,304	58,346	31,428	386	1,444,687
Coke.													
Crow's Nest Pass Coal Co., Ltd.—													
Michel Colliery	18,933	24,079	.....	43,012	.....	.....	.....	.....	267	464	197	.....	43,209
Total Coke for Province	18,933	24,079	.....	43,012	.....	.....	.....	.....	267	464	197	.....	43,209

COLLIERIES OF BRITISH COLUMBIA—MEN EMPLOYED, 1937.

Mine.	White Men.																		Indians.			Japanese and Chinese.									Total Men employed.		
	Supervision and Clerical.			Miners.			Helpers.			Labourers.			Mechanics and Skilled Labour.			Boys.			Labourers.			Miners.			Helpers.			Labourers.					
	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.
Vancouver Island District.																																	
Canadian Collieries (D.), Ltd.—																																	
Comox Colliery (No. 5 mine)	22	13	35	129		129	7		7	86	32	118	172	53	225	47	7	54											21	21	463	126	589
Comox Colliery (No. 8 mine)	7	1	8	19		19	4		4	42	7	49	64	8	72	11	1	12													147	17	164
Northfield Colliery	12		12	132		132	50		50	64	15	79	21	8	29	23	18	41													302	41	343
Western Fuel Corp. of Canada, Ltd.—																																	
No. 1 mine	16	28	44	123		123				107	108	215	42	65	107	17	15	32											55	55	305	271	576
Reserve mine	11	3	14	93		93				48	13	61	23	8	31	13	9	22											11	11	188	44	232
Lantzville Colliery	2		2	13		13				2	3	5		1	1														1	1	17	5	22
Ida Clara Colliery				5		5					2	2																	2	2	5	4	9
Chambers' mine				6		6	2		2		1	1																			8	1	9
Jingle Pot Colliery				4		4																									4		4
Beban's mine	1	1	2	18		18	5		5	3	4	7	10	6	16		2	2											8	8	37	21	58
Loudon's mine		1	1	2		2	1		1								1	1													3	2	5
Cassidy mine				2		2					1	1																			2	1	3
Biggs' mine (Squaw Hill)				4		4																									4		4
Lewis' mine				2		2																									2		2
Totals, Vancouver Island District	71	47	118	552		552	69		69	352	186	538	332	149	481	111	53	164											98	98	1487	533	2020
Nicola-Princeton District.																																	
Coalmont Collieries, Ltd.	9	11	20	73		73				8	18	26	34	42	76	2	2	4											1	1	126	74	200
Middlesboro Collieries, Ltd.	5	1	6	34		34	14		14	14	12	26		12	12		8	8													67	33	100
Blue Flame Colliery	3	2	5	9		9	9		9	5	9	14	3	5	8																29	16	45
Pleasant Valley Colliery	4	2	6	12		12	12		12	5	7	12	2	6	8																35	15	50
Princeton Tulameen Coal Co., Ltd.	1	1	2	16		16	3		3		2	2		2	2																20	5	25
Granby Consolidated M.S. & P. Co., Ltd.	4	1	5	15		15	16		16	5	9	14	2	7	9		3	3													42	20	62
Yale Colliery	1	1	2	1		1	1		1	1		1																			4	1	5
Black mine	1		1	1		1																									2		2
Hat Creek Colliery	1		1	1		1																									2		2
Totals, Nicola-Princeton District	29	19	48	162		162	55		55	38	57	95	41	74	115	2	13	15											1	1	327	164	491
Northern District.																																	
Bulkley Valley Colliery	1	1	2	3		3	3		3	1	1	2		1	1																8	3	11
Aveling Coal Company		1	1	2		2																									2	1	3
Totals, Northern District	1	2	3	5		5	3		3	1	1	2		1	1																10	4	14
Grand totals, Coast District	101	68	169	719		719	127		127	391	244	635	373	224	597	113	66	179											99	99	1824	701	2525
East Kootenay District.																																	
Coal Creek Colliery	5	2	7	63		63				29	12	41	22	19	41	2	2	4													121	35	156
Michel Colliery	14	9	23	188		188				40	52	92	96	66	162	3	4	7													341	131	472
Totals, East Kootenay District	19	11	30	251		251				69	64	133	118	85	203	5	6	11													462	166	628
Grand totals, Province	120	79	199	970		970	127		127	460	308	768	491	309	800	118	72	190											99	99	2286	867	3153

NOTE.—U.=Underground; A.=Above ground; T.=Total.

LABOUR AND EMPLOYMENT.

During 1937, 3,153 persons were employed in and about the coal mines of the Province, an increase of 10.8 per cent. compared with 1936.

Taking the average of all the mines in Vancouver Island District, about 30 per cent. of the working-days was lost through lack of trade. In the Nicola-Princeton District the different collieries worked on an average of about 70 per cent. of the working-days. In the East Kootenay District the average for the year was about 66 per cent.

The table on page 8 shows the number of persons ordinarily employed in and about the mines, distinguishing the persons and different classes employed underground and above ground, compiled from the returns furnished by the owners.

FUEL-OIL COMPETITION.

During 1937 imports of crude oil for refining in British Columbia totalled 205,680,478 gallons; in addition to which 18,669,902 gallons was imported for use in the Province and 24,368,477 gallons was brought in, duty free, for use in ships' bunkers.

From the refining of the above, 61,110,935 gallons of gasoline, 126,634 gallons of distillate, 29,909,012 gallons of light fuel-oil, and 162,079,133 gallons of heavy fuel-oil were sold; of the total sales only 5,001,959 gallons, practically all gasoline, were shipped outside British Columbia.

COMPETITION OF COAL PRODUCED OUTSIDE BRITISH COLUMBIA.

During 1937 the importation of coal into British Columbia from the United States consisted of 61 tons of anthracite, 2,540 tons of bituminous coal, and 1,217 tons of lignite; there were no other importations of coal into British Columbia.

Alberta coal sold in British Columbia consisted of 78,124 tons of domestic coal, 46,475 tons of sub-bituminous coal, and 144,424 tons of bituminous coal.

The following table shows the amount of Alberta coal brought into British Columbia during past years:—

Year.	Short Tons.	Year.	Short Tons.
1925	117,037	1932	136,188
1926	127,858	1933	119,026
1927	187,028	1934	123,968
1928	262,198	1935	221,758
1929	247,060	1936	244,928
1930	227,385	1937	269,023
1931	193,060		

Of the 1,119,531 tons of British Columbia coal marketed 170,726 tons was sold in the Provinces of Alberta, Saskatchewan, Manitoba, and Ontario, 89,220 tons was exported to the United States, and 159,658 tons was sold for ships' bunkers, so that of the total sales 799,927 tons of British Columbia coal was used within the Province.

HYDRO-ELECTRIC DEVELOPMENT.

At the end of 1937 the hydro-electric power installed in British Columbia totalled 728,000 horse-power, of which approximately 50 per cent. was actually in use. The following table shows the rate of increase of hydro-electric installations in the Province:—

Year.	Horse-power developed by Hydro-electric Plants.	Year.	Horse-power developed by Hydro-electric Plants.
1900	9,366	1927	473,142
1905	29,334	1928	523,902
1910	64,474	1929	559,792
1915	254,065	1930	630,792
1920	309,185	1931	655,992
1921	309,762	1932	713,792
1922	329,057	1933	717,602
1923	355,718	1934	726,000
1924	355,718	1935	728,000
1925	414,702	1936	728,000
1926	460,562	1937	728,000

For the purpose of comparison it may be stated that one developed horse-power per year is equivalent to the power value of 6 tons of coal.

ACCIDENTS IN AND AROUND COAL MINES.

During 1937, 3,153 persons were employed in and around the coal mines. Ten fatal accidents occurred during the year as compared with eight for 1936.

The ratio of fatal accidents per 1,000 persons employed was 3.17, as compared with 2.84 in 1936. In 1935 the ratio was 1.67; in 1934, 2.07; in 1933, 0.97; in 1932, 2.21; in 1931, 1.22; in 1930, 11.62; in 1929, 2.38; and in 1928, 2.64. The average for the ten-year period being 3.32

The number of fatal accidents per 1,000,000 tons produced during 1937 was 6.92; during 1936 the figure was 5.94; in 1935, 4.21; in 1934, 4.45; in 1933, 2.37; in 1932, 5.21; in 1931, 2.81; in 1930, 28.64; in 1929, 5.33; and in 1928, 5.54. The average for the ten-year period being 8.06 per 1,000,000 tons of coal mined.

The following table shows the collieries at which the fatal accidents occurred during 1937 and comparative figures for 1936:—

Name of Company.	Name of Colliery.	1937.	1936.
Canadian Collieries (D.), Ltd.	Comox No. 5	1	----
Canadian Collieries (D.), Ltd.	Northfield	1	----
Western Fuel Corporation, Ltd.	No. 1 mine	----	4
Western Fuel Corporation, Ltd.	Reserve mine	2	1
Beban's Colliery	Beban mine	4	----
Coalmont Collieries, Ltd.	No. 4 mine	----	1
Tulameen Collieries, Ltd.	No. 2 mine	----	1
Crow's Nest Pass Coal Co., Ltd.	Coal Creek	1	----
Crow's Nest Pass Coal Co., Ltd.	Michel	1	1
Totals		10	8

The following table shows the various causes of fatal accidents and their percentage of the whole with corresponding figures for 1936:—

Cause.	1937.		1936.	
	No.	Per Cent.	No.	Per Cent.
By falls of roof and coal	4	40.00	2	25.00
By mine-cars and haulage	2	20.00	4	50.00
By inrush of water from old workings	3	30.00	----	-------
By electric shock	----	-------	1	12.50
Miscellaneous	1	10.00	1	12.50
Totals	10	100.00	8	100.00

The following table shows the number of tons of coal mined for each fatal accident in their respective classes in the years 1937 and 1936:—

Cause.	1937.		1936.	
	No. of Fatal Accidents.	No. of Tons of Coal mined per Fatal Accident.	No. of Fatal Accidents.	No. of Tons of Coal mined per Fatal Accident.
By falls of roof and coal	4	361,171	2	673,235
By mine-cars and haulage	2	722,343	4	336,618
By inrush of water from old workings	3	481,562	----	----------
By electric shock	----	----------	1	1,346,471
Miscellaneous	1	1,444,687	1	1,346,471
Totals	10	144,468	8	168,309

The number of tons mined per fatal accident during 1937 was 144,468 tons, compared with 168,309 tons for 1936. The average for the ten-year period was 123,988 tons.

The following table shows the fatalities from various causes in coal mines during the year 1937 compared with 1936, according to Inspection Districts:—

District.	Number of Deaths from Accidents.					Total.	
	Falls of Roof and Coal.	Mine-cars and Haulage.	Inrush of Water from Old Workings.	Electric Shock.	Miscellaneous.	1937.	1936.
Vancouver Island	3	1	3	----	1	8	5
Nicola-Princeton	----	----	----	----	----	----	2
East Kootenay	1	1	----	----	----	2	1
Northern	----	----	----	----	----	----	----
Province (1937)	4	2	3	----	1	10	----
Province (1936)	----	----	----	----	----	----	8

District.	Accident Death-rate.			
	Per 1,000 Persons employed.		Per 1,000,000 Tons of Coal mined.	
	1937.	1936.	1937.	1936.
Vancouver Island	3.96	2.98	9.77	7.02
Nicola-Princeton	-----	3.79	-----	12.69
East Kootenay	3.18	1.65	4.35	2.14
Northern	-----	-----	-----	-----
Totals (1937)	3.17	-----	6.92	-----
Totals (1936)	-----	2.84	-----	5.94

The details regarding the occurrences of the fatal accidents in coal mines during 1937 are as follows:—

The fatal accident which occurred to James A. Barbour, millwright at the Beban mine, Extension, on April 27th was due to deceased being struck by a falling timber which he had failed to fasten securely while engaged in constructing a small bunker at the mine; deceased was not a mine employee.

The fatal accident which occurred to Paul Toth, miner's helper, No. 5 mine, Comox Colliery, on May 30th was due to a fall of roof at his working-face; the place was well timbered, but an unforeseen slip permitted the roof to break the laggings between the last stringer and the face, and caused the stringer to swing out of its proper position and allow a large cave of roof-rock. Toth was instantly killed.

The fatal accident to George N. Shepherd, Joseph H. Shepherd, and Joseph Carr, miners, Beban mine, Extension, on June 11th was due to an inrush of water from the abandoned workings of the adjacent No. 1 mine, Wellington Extension Colliery; these abandoned and flooded workings, abandoned in 1901, proved to have been advanced 350 feet further than shown on the mine-plan.

The fatal accident to Samuel K. Mottishaw, fireboss, Reserve mine, on July 19th was due to deceased being crushed between a loaded car and the roof timbers while riding up a slope. Deceased was riding in contravention of the regulations.

The fatal accident which occurred to John Bowness, miner, Reserve mine, on November 4th was due to a fall of rock at the working-face; the face was well timbered, but a large rock broke from an unforeseen slip and swung out the timber at the face, killing deceased instantly.

The fatal accident which occurred to William Cockburn, miner, No. 1 East mine, Coal Creek Colliery, on December 8th was due to a "bump" which displaced three sets of timber at the face and caused a cave of roof material which buried deceased; he was dead when recovered.

The fatal accident which occurred to Ralph Gregory, rope-rider, No. 3 mine, Michel Colliery, on December 9th was due to deceased riding down a steep incline with two uncontrolled timber cars and sustaining injuries to his head when the cars crashed at the foot of the incline. Deceased was found unconscious and died shortly afterwards; there were no witnesses of this accident.

The fatal accident which occurred to Tudor Sainsbury, miner, Northfield mine, on December 29th was due to a fall of roof at the working-face; the place was well timbered, but an undetected slip at the immediate face permitted a fall of roof which displaced the last set of timber; deceased was covered by the material which fell and died from suffocation before being uncovered by his fellow-employees who had immediately started rescue-work.

NOTE.—Mike Zenovich, a miner who was injured in No. 5 mine, Comox Colliery, on August 21st, 1933, died on February 10th, 1937, as a result of his injuries.

INUNDATION AT THE BEBAN MINE, EXTENSION.

At the Beban mine, Extension, on June 11th the main slope broke into the abandoned main slope of the old No. 1 mine, Wellington-Extension Colliery, and three men were drowned by the water from the abandoned mine; this old No. 1 mine was abandoned in 1901 and the plan of the workings showed the slope to be driven 160 feet below the adit-drainage level.

The Beban slope was started in 1935, converged on the line of the old No. 1 slope at an angle of 60 degrees, and was designed to pass the shown termination of the old slope at a distance of 250 feet.

When the Beban mine was dewatered after the partial flooding it was found that the old No. 1 slope had been driven some 300 feet further than was shown on the mine-plan.

Levels were being driven from the Beban slope towards the line of the old No. 1 slope for the purpose of dewatering, and as the possibility of the old slope having been driven further than was indicated on the plan the upper of these levels was designed to intersect the line of the old slope at a point below the shown termination of the slope; the two upper levels were protected by 20 feet advance drill-holes but had not reached the line of the old slope on June 11th.

About 60,000 gallons of water entered the Beban mine and this flooded the Beban slope for a distance of 110 feet from the face and partly flooded a short level at this point.

One man was drowned near the face of the slope and three others were washed up the slope and into the level by the rush of water; a fourth man was at work in this level and as the water rose to the roof at the entrance to the level all four men were shut in.

There was a place driven a short distance up from this level and which the water did not reach, but before the men located this place two of them drowned.

Emergency pumps were installed and the water lowered sufficiently to permit the recovery of the two live men ten hours after the water broke in.

An inquiry into the above accident was held under the "Public Inquiries Act."

EXPLOSIVES.

The following table shows the quantity of explosives used in coal mines during 1937, together with the number of shots fired, tons of coal produced per pound of explosive used, and the average pounds of explosive per shot fired (these quantities include all explosives used for breaking coal and for rock-work in coal mines):—

VANCOUVER ISLAND DISTRICT.

Colliery.	Quantity of Explosive used in Pounds.	Tonnage for Mine.	Total No. of Shots fired.	Tons of Coal per Pound of Explosive used.	Average Pounds of Explosive used per Shot fired.
Comox Colliery, No. 5 mine	73,284	269,547	86,700	3.67	0.84
Comox Colliery, No. 8 mine	14,890	19,925	29,500	1.33	0.50
Northfield Colliery	90,350	129,983	95,291	1.43	0.94
Western Fuel Colliery, No. 1 mine	66,743	225,706	105,254	3.38	0.63
Western Fuel Colliery, Reserve mine	61,600	150,471	91,930	2.44	0.67
Lantzville Colliery	6,050	6,351	7,250	1.05	0.83
Ida Clara Colliery	150	494	200	3.29	0.75
Chambers' mine	1,800	3,659	3,500	2.03	0.31
Jingle Pot mine	50	57	120	1.14	0.41
Beban's mine	9,680	10,913	17,542	1.12	0.55
Loudon's mine	175	400	300	2.28	0.58
Cassidy mine	440	678	700	1.54	0.62
Biggs' mine (Squaw Hill)	50	81	100	1.62	0.50
Lewis' mine	.....	182	.....	.....	.....
Totals for district	325,262	818,447	438,387	2.51	0.74

NICOLA-PRINCETON DISTRICT.

Colliery.	Quantity of Explosive used in Pounds.	Tonnage for Mine.	Total No. of Shots fired.	Tons of Coal per Pound of Explosive used.	Average Pounds of Explosive used per Shot fired.
Coalmont Collieries	28,920	94,136	48,500	3.25	0.59
Middlesboro Collieries	5,475	25,276	8,850	4.61	0.61
Blue Flame Colliery	990	6,009	2,800	6.06	0.35
Pleasant Valley Colliery	660	4,692	1,950	7.11	0.33
Princeton Tulameen Coal Co.	2,850	12,697	3,500	4.45	0.81
Granby Consolidated M.S. & P. Co.	9,250	18,873	10,050	2.04	0.92
Yale Colliery	500	326	720	0.65	0.69
Black mine	50	81	100	1.62	0.50
Hat Creek Colliery	200	497	400	2.48	0.50
Totals for district	48,895	162,587	76,870	3.32	0.63

NORTHERN DISTRICT.

Bulkley Valley Colliery	1,600	4,313	2,000	2.69	0.80
Aveling Colliery	50	204	60	4.08	0.83
Totals for district	1,650	4,517	2,060	2.73	0.80

EAST KOOTENAY DISTRICT.

Coal Creek Colliery	15	111,265	30	7417.66	0.50
Michel Colliery	36,076	347,871	49,342	9.64	0.73
Totals for district	36,091	459,136	49,372	12.72	0.73
Totals for Province	411,896	1,444,687	566,689	3.50	0.72

QUANTITIES OF DIFFERENT EXPLOSIVES USED.

	Lb.
Monobel of different grades	298,216
Permissible rock-powder	113,680
Total	411,896

The following is a list of explosives permitted for use in coal mines by the Honourable the Minister of Mines under the provisions of section 101, General Rule 11, clause (*i*), "Coal-mines Regulation Act":—

Polar Monobel No. 4
Polar Monobel No. 6
Polar Monobel No. 7
Polar Monobel No. 14
Polar CXL-ite No. 2

MACHINE-MINED COAL.

During the year 1937 mining-machines produced approximately 810,865 tons or 56.1 per cent. of the total.

The following table gives the district, number of machines, how driven, and type of machine used:—

District.	Number driven by		Type of Machine used.					
	Electricity.	Compressed Air.	Mavor and Coulson.	Anderson Boyes.	Hardy.	Siskol.	Ingersoll-Rand.	Pneumatic Pick.
Vancouver Island	—	38	4	14	6	14	—	—
Nicola-Princeton	—	24	—	—	—	11	13	—
East Kootenay	—	62	2	3	27	—	—	30
Totals	—	124	6	17	33	25	13	30

SAFETY-LAMPS.

There were 2,560 safety-lamps in use in the coal mines of the Province. Of this number, 216 were flame safety-lamps of the Wolf type and 2,344 were electric lamps of various makes, as follows: Edison, 2,284; Wolf electric, 60.

The following table shows the distribution of lamps by district, method of locking, and illuminant used:—

Vancouver Island District.

Colliery and Mine.	Method of Locking.		Illuminant used.	
	Magnetic Lock.	Screw or Automatic Clip.	Naphtha Gasoline.	Electricity.
Comox Colliery, No. 5 mine	38	450	38	450
Comox Colliery, No. 8 mine	11	156	11	156
Northfield Colliery	22	297	22	297
Western Fuel Colliery, No. 1	25	266	25	266
Western Fuel Colliery, Reserve	12	201	12	201
Lantzville Colliery	2	20	2	20
Ida Clara Colliery	2	18	2	18
Chambers' mine	2	14	2	14
Jingle Pot mine	2	-----	2	-----
Beban's mine	4	56	4	56
Loudon's mine	1	4	1	4
Cassidy mine	1	4	1	4
Riggs' mine (Squaw Hill)	1	6	1	6
Lewis' mine	2	-----	2	-----
Totals for district	125	1,492	125	1,492

Nicola-Princeton District.

Coalmont Colliery	6	119	6	119
Middlesboro Colliery	8	65	8	65
Blue Flame Colliery	4	42	4	42
Pleasant Valley Colliery	3	48	3	48
Princeton Tulameen Coal Co.	1	34	1	34
Granby Consolidated M.S. & P. Co.	5	52	5	52
Yale Colliery	1	10	1	10
Black mine	1	3	1	3
Hat Creek Colliery	2	8	2	8
Totals for district	31	381	31	381

Northern District.

Bulkley Valley Colliery	1	18	1	18
Aveling Colliery	6	-----	6	-----
Totals for district	7	18	7	18

East Kootenay District.

Coal Creek Colliery	12	130	12	130
Michel Colliery	41	323	41	323
Totals for district	53	453	53	453
Totals for Province	216	2,344	216	2,344

Approved Safety-lamps, Electric and Flame.

A list of the approved safety-lamps, both electric and flame, was published in the 1930 Annual Report. The following lamps, all electric, are now also approved:—

No. 8.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 18 of the United States Bureau of Mines. The only bulb approved for use in this lamp carries the symbol BM-18, and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio.

No. 9.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 18F of the United States Bureau of Mines. This model of Edison lamp in reality represents an extension of the lamp approval given under Approval No. 18. The only bulb approved for use with this lamp carries the symbol BM-18F and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio.

No. 10.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 18H of the United States Bureau of Mines. This lamp represents an extension of the No. 18 approval of the United States Bureau of Mines. The only bulb approved for used with this lamp carries the symbol BM-18H and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio.

No. 11.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 24 of the United States Bureau of Mines. The only bulb approved for use with this lamp carries the symbol BM-24 and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio. This lamp is known as the Edison Model J lamp.

No. 12.—The electric lamp manufactured by the Edison Storage Battery Company, Orange, New Jersey, U.S.A., under Approval No. 25 of the United States Bureau of Mines. The only bulb approved for use with this lamp carries the symbol BM-25 and is manufactured by the National Lamp Works of the General Electric Company, Cleveland, Ohio. This lamp is known as the Edison Model K lamp.

(Unless otherwise specified, all lamps are cap-lamps.)

Note.—*While the use of flame safety-lamps is permitted, it is the policy of the Department of Mines to encourage the use of approved electric safety-lamps for all persons underground in the coal mines, except such flame-lamps as may be required by the officials of the mines in the carrying-out of their duty and in such cases as it is considered advisable to provide flame safety-lamps in addition to the electric safety-lamps.*

ELECTRICITY.

Electricity is used for various purposes on the surface at ten mines and underground at six mines.

The purpose for which it was used, together with the amount of horse-power in each instance, is shown in the following table:—

Nature of its Use.	Aggregate H.P.
Above ground—	
Winding or hoisting	2,253
Ventilation	1,380
Haulage	285
Coal-washing	424
Miscellaneous	4,044
Total horse-power	8,386
Underground—	
Haulage	1,640
Pumping	1,180
Coal-cutting	1,093
Total horse-power	3,913
Total horse-power above and under ground	12,299

Of the above amount approximately 2,095 horse-power was operated as direct current and 10,204 as alternating current.

VENTILATION.

The reports of the District Inspectors give detailed information regarding the ventilation in the main airways and splits of the different mines; in the Comox mines the gas outflow is such that two machine-cut long-walls are the practical limit of one ventilation split and shot-firing is prohibited until one hour after the completion of the cutting process.

METHANE DETECTION.

During the year the Burrell Methane Detector was used to detect the presence of methane in percentages less than could be detected by use of the flame safety-lamp.

The Ringrose Automatic Firedamp Alarm tested in 1936 while giving fairly satisfactory results appears to be somewhat unreliable for constant use, but it is intended to secure some of an improved design for further testing purposes.

MINE-AIR SAMPLES.

Mine-air sampling was carried out in the various mines and 204 samples were taken during the year; of this number, eleven were spoiled in transit. The air of the mines at Comox Colliery and in the Crowsnest Pass District where the gass outflow is greatest is sampled most frequently. In addition to samples of the normal ventilation, a number of samples were taken in abandoned workings and from areas sealed off on account of fire. The analyses of the above samples are filed in the office of the Chief Inspector of Mines.

INSPECTION COMMITTEES.

At practically all the mines throughout the Province inspection committees appointed by the workmen under General Rule 37, section 101, "Coal-mines Regulation Act," were in operation throughout the year.

COAL-DUST.

Sampling of dust as per the Regulation for Precautions against Coal-dust was well maintained during the year and a total of 960 samples was taken and analysed at the different mines, and where the analyses showed less than 50 per cent. incombustible matter immediate steps were taken to see that the mine or part of the mine was rerock dusted.

DANGEROUS OCCURRENCES.

During the year the following dangerous occurrences, in addition to those causing injuries, were reported:—

On January 2nd a fireboss in No. 4 mine, Coalmont Collieries, Limited, while making a routine inspection on an idle day discovered spontaneous combustion in part of 10 West level; the seat of this heating could not be reached and this occurrence necessitated the sealing-off of the mine between No. 8 and No. 9 levels and the flooding of the affected area by water from outside the mine.

On January 7th the guard of one of the cages in No. 1 shaft, Western Fuel Corporation of Canada, Limited, was inadvertently left up by one of the shaft attendants and was torn off by the head-frame. The guard fell down the shaft and damaged the other cage; no person was injured.

On January 9th while six men were being lowered in No. 5 shaft, Comox Colliery, the cage chairs fouled the cage and arrested it; approximately 25 feet of loose rope had been paid out before the hoistman discovered that there was something wrong. He immediately stopped the hoist, but before anything else was done the cage slipped from its position and fell until arrested by the rope. One man suffered a fractured ankle and two others were slightly injured; the cage weighs 2.5 tons; a new hoisting-rope was immediately installed. It is probable that ice prevented the cage seats from being properly withdrawn in this instance.

On January 27th a small fire occurred on the floor of the main haulage tunnel and intake, No. 1 East mine, Coal Creek Colliery, due to a rope-roller breaking and allowing the haulage-rope to run on a tie; the consequent friction being sufficient to start a fire. The fire was extinguished without injury to any person.

On February 12th a large snowslide came down from above the surface works at Coal Creek Colliery and caused extensive damage to buildings and equipment and caused several days' shut-down of the mine. No person was injured.

On June 4th the southerly extension of Northfield mine, Canadian Collieries (D.), Limited, broke into some abandoned and flooded workings of the old East Wellington mine at a point 350 feet distant from the nearest workings shown on the mine-plan of the abandoned mine; a considerable volume of water entered the Northfield mine but no person was injured.

On July 20th a fire occurred in the fan-house at No. 1 East mine, Coal Creek Colliery; this was apparently due to one of the drive ropes breaking and wedging around the drive-shaft; the consequent friction causing the fire. The night-shift men were on their way out of the mine when the fire occurred; after the fire was extinguished and the fan was restarted no one was allowed in the mine until the fan had been running for several hours.

On July 22nd a small outbreak of fire occurred on 26 incline, No. 1 East mine, Coal Creek Colliery, due to a broken haulage-roller causing sparks from the friction between the roller and the haulage-rope; this fire was discovered and extinguished without injury to any person.

On September 1st an outbreak of spontaneous combustion in the Heading district, Reserve mine, Western Fuel Corporation of Canada, Limited, occurred. This area was sealed off with no injury to any person.

PROSECUTIONS.

During 1937 there were six prosecutions made for infractions of the "Coal-mines Regulation Act," as follows:—

Date.	Colliery.	Occupation of Defendant.	Offence charged.	Judgment.
Jan. 26	Canadian Collieries (D.), Ltd., No. 5 mine, Comox	Haulage-hand	Having matches in his possession in the mine; in contravention of General Rule 9	Fined $10 and costs.
Feb. 3	Canadian Collieries (D.), Ltd., No. 5 mine, Comox	Miner	Having cigar in his possession in the mine; in contravention of General Rule 9	Fined $10 and costs.
April 8	Canadian Collieries (D.), Ltd., No. 5 mine, Comox	Fireboss	Using compressed air to remove gas; in contravention of General Rule 1	Fined $10 and costs.
May 6	Canadian Collieries (D.), Ltd., No. 5 mine, Comox	Haulage-hand	Having matches and cigarettes in his possession; in contravention of General Rule 9	Fined $50 and costs and sixty days in jail.
May 31	Canadian Collieries (D.), Ltd., No. 5 mine, Comox	Haulage-hand	Having matches in his possession; in contravention of General Rule 9	Fined $25 and costs.
July 12	Canadian Collieries (D.), Ltd., No. 5 mine, Comox	Fireboss	Firing shots where gas-cap was found; in contravention of General Rule 12	Fined $50 and costs.

INQUIRY UNDER SECTION 48, "COAL-MINES REGULATION ACT."

On August 16th an inquiry was held at Cumberland to inquire into the conduct of Mr. Jasper Rutherford, fireboss, No. 5 mine, Comox Colliery, in regard to his firing a shot in the presence of gas in this mine on July 6th.

Mr. Robert Henderson, Nanaimo, was appointed to hold the inquiry, at which Mr. Rutherford did not appear although he submitted a written statement.

After hearing the evidence submitted by the Chief Inspector of Mines and the District Inspector of Mines, Mr. Henderson ordered that the Second-class Certificate of Competency (No. B 219) and Third-class Certificate of Competency (No. C 644) held by Mr. Rutherford be cancelled, and this was done.

GOVERNMENT RESCUE-STATIONS.

The Department of Mines has four mine-rescue stations in different parts of the Province and centrally located in the mining districts—namely, at Nanaimo, Cumberland, Princeton, and Fernie. During the year many requests were received from medical men for oxygen and the inhalators for use in emergencies, and immediate service was rendered in every case. In the larger coal-mining districts of Crowsnest, Cumberland, and Nanaimo experienced teams maintain a regular schedule of training throughout the year and so keep ready for any emergency calls.

The preliminary training course consists of twelve two-hour lessons in the actual use of oxygen apparatus and Burrell all-service gas-masks in an irrespirable atmosphere and instruction on the approved method of dealing with mine fires and recovery-work. The training itself is strenuous work, and all candidates have to undergo a special physical examination before starting training and must be under 34 years of age.

During the year, in addition to the regular teams in training, thirty-nine new men took the full training and were granted certificates of competency:—

Cert. No.	Name.	Where trained.	Cert. No.	Name.	Where trained.
943	John Reid Nichol	Nanaimo.	963	Romeo Jombatista Cimoline	Michel.
944	Magnus Brown	Cumberland.	964	Isaac Richard Hughes	Michel.
945	Mario Galeazzo	Cumberland.	965	Robert Kitchener Taylor	Michel.
946	Joseph Melville McHale	Cumberland.	966	Reginald Thelbert Taylor	Michel.
947	Leslie Webber	Cumberland.	967	Edward R. Hughes	Cumberland.
948	John Kivela	Nanaimo.	968	William Hnatuk	Princeton.
949	John Joseph Kelley	Hedley.	969	Isaac Plecash	Princeton.
950	Robert M. Alexander	Hedley.	970	Seiriol Llewellyn Williams	Nanaimo.
951	Earl A. Edwards	Hedley.	971	Fred Hedley	Nanaimo.
952	Guy Guido	Hedley.	972	John Romain Dean	Kimberley.
953	Howard Graham	Hedley.	973	James Robert MacFarlane	Kimberley.
954	William A. Gillespie	Hedley.	974	Alfred Leo Rivet	Kimberley.
955	Roscoe W. Hansen	Hedley.	975	Edward Howcroft	Kimberley.
956	Henry W. Jackson	Hedley.	976	Eugene Warren Keer	Kimberley.
957	Douglas Kirkpatrick	Hedley.	977	Clarence Charles Barr	Kimberley.
958	Robert C. Kelley	Hedley.	978	Charles Thomas Gover	Kimberley.
959	Donald Morrison	Hedley.	979	William James McKim	Kimberley.
960	John P. O'Rourke	Hedley.	980	Halge Ragnar Pearson	Kimberley.
961	Richard Smith, Jr.	Hedley.	981	Robert Windsor Shannon	Kimberley.
962	Carl Ernest Adams	Michel.			

MINE-RESCUE AND FIRST-AID WORK.

In all the coal-mining centres, first-aid classes and mine-rescue training was carried out, and this was ably supported by the Vancouver Island and Coast Mine Safety Association, the East Kootenay Mine Safety Association, and Princeton District Association, and by the Inspectors of Mines in the various districts.

Competitions in first-aid and mine-rescue work were held during the year under the auspices of these Safety Associations. These competitions are a great inducement to new men to take up this work, and they demonstrate to all interested in mining the large number of men who are fully qualified to give skilled attention to those who are injured in and around the mines.

In Fernie and Princeton the men from both coal and metalliferous mines take part in the first-aid and mine-rescue work and in this way great benefit accrues from an interchange of ideas.

More teams took part in these competitions in the various centres of the Province this year than in any previous year.

SUPERVISION OF COAL MINES.

During the year twenty-two coal companies operated thirty-one mines, employing 2,286 men underground. In the supervision of underground employees there were fourteen managers, fifteen overmen, ninety-eight firebosses and shotlighters, a total of 127, or one official for every eighteen persons employed underground.

"COAL SALES ACT."

During the year a considerable number of inspections were made under the "Coal Sales Act" and several complaints were investigated. The majority of the complaints were in the Vancouver District and most of these were due to small dealers accused of substituting an inferior grade of coal for a superior grade. Valuable assistance was rendered in this district

by the Weights and Measures Inspector for the City of Vancouver, who keeps a close check on the sale of coal in the city. Generally speaking, the regular coal-dealers try to conduct their business in accordance with the "Coal Sales Act."

LIST OF REGISTERED NAMES OF BRITISH COLUMBIA COALS, APPROVED BY THE CHIEF INSPECTOR OF MINES, IN ACCORDANCE WITH THE PROVISIONS OF THE "COAL SALES ACT."

Registered Names of Coal.	Colliery and District.	Producing Company.
Comox	Nos. 4 and 5 mines, Comox Colliery (Cumberland)	Canadian Collieries (D.), Ltd.
Old Wellington	No. 9 mine (Wellington)	Canadian Collieries (D.), Ltd.
Ladysmith-Wellington	No. 5 mine (South Wellington)	Canadian Collieries (D.), Ltd.
Ladysmith-Extension	No. 8 mine (Extension)	Canadian Collieries (D.), Ltd.
Hi-Carbon	Mixture of Canadian Collieries' coal and B.C. Electric coke	Canadian Collieries (D.), Ltd.
Nanaimo-Douglas	No. 1 mine, Upper seam (Nanaimo)	Western Fuel Corporation of Canada, Ltd.
Nanaimo	No. 1 mine, Lower seam (Nanaimo)	Ditto.
Nanaimo Reserve	Reserve mine (Nanaimo)	"
Nanaimo-Wellington	Blend of No. 1 mine, Nanaimo, and No. 5 mine, South Wellington	"
Mabury-Northfield	(Recovered from surface dump) (Wellington)	Mabury Engineering Corporation, Ltd.
Wellington South, Ida Clara	Ida Clara No. 1 (South Wellington)	Richardson Bros., Ltd.
Cassidy-Wellington	Cassidy Colliery (Cassidy)	Granby Consolidated M.S. & P. Co., Ltd.
Lantzville Wellington	Lantzville (Lantzville)	Lantzville Collieries, Ltd.
Biggs-Wellington	Biggs' mine (Wellington)	Biggs' mine.
Fiddick-Douglas	Fiddick mine (South Wellington)	Fiddick mine.
Little Ash-Wellington	Little Ash mine (Wellington)	Little Ash mine.
Jingle Pot	Jingle Pot (East Wellington)	Jingle Pot Colliery, Ltd.
Old Adit, Wellington	Old Adit (Wellington)	Old Adit Colliery (C. Stronach).
Chambers-Extension	Chambers (Extension)	R. H. Chambers.
Middlesboro	Middlesboro (Merritt)	Middlesboro Collieries, Ltd.
Nicola Sunshine	Sunshine (Merritt)	Sunshine Coal Co., Ltd.
Coalmont	Coalmont (Coalmont)	Coalmont Collieries, Ltd.
Princeton Blue Flame	Blue Flame (Princeton)	W. R. Wilson Mining & Investment Co.
Tulameen Coal, Princeton	Tulameen (Princeton)	Tulameen Collieries, Ltd.
Tulameen Valley Coal, Princeton	Tulameen (Princeton)	Tulameen Valley Coal Co.
Diamond, Princeton District, B.C.	Diamond (Princeton)	Pleasant Valley Mining Co., Ltd.
Sunrise, Princeton District, B.C.	Sunrise (Princeton)	Pleasant Valley Mining Co., Ltd.
Pleasant Valley, Princeton District, B.C.	Diamond and Sunrise blended (Princeton)	Pleasant Valley Mining Co., Ltd.
North Thompson Gem	North Thompson (North Thompson)	North Thompson Colliery, Ltd.
Yale Princeton Gem	Yale (Princeton)	Yale Princeton Coal Co., Ltd.
Granby Tulameen	Granby (Princeton)	Granby Consolidated M.S. & P. Co., Ltd.
Hat Creek	Hat Creek (Lillooet)	Canada Coal & Development Co., Ltd.
Princeton-Black Diamond	Black Diamond (Princeton)	Black Diamond Collieries, Ltd.
Bulkley Valley	Bulkley Valley (Telkwa)	Bulkley Valley Colliery, Ltd.
Aveling	Aveling (Telkwa)	Aveling Colliery.
Crow's Nest, Coal Creek	Coal Creek (Coal Creek)	Crow's Nest Pass Coal Co., Ltd.
Crow's Nest, Michel	Michel (Michel)	Crow's Nest Pass Coal Co., Ltd.
Corbin Washed	Corbin (Corbin)	Corbin Collieries, Ltd.

BOARD OF EXAMINERS FOR COAL-MINE OFFICIALS.

FIRST-, SECOND-, AND THIRD-CLASS CERTIFICATES AND MINE-SURVEYORS' CERTIFICATES.

BY

JAMES STRANG.

The Board of Examiners, which was formed on July 10th, 1919, now consists of James Dickson, Chief Inspector of Mines, Chairman; Henry E. Miard, member; and James Strang, member and Secretary of the Board.

The meetings of the Board are held in the office of the Department of Mines in Victoria. Examinations are held in accordance with the amended rules of the Board of Examiners and approved by the Minister of Mines on September 28th, 1929. Two examinations were held in 1937, the first on May 19th, 20th, and 21st, and the second on November 17th, 18th, and 19th.

The total number of candidates at the examinations were as follows: For First-class Certificates, 2 (2 failed); for Second-class Certificates, 2 (2 failed); for Third-class Certificates, 17 (12 passed, 5 failed); for Mine-surveyors' Certificates, 2 (2 passed).

The following is a list of the candidates who successfully passed in the various classes:—

Third-class Certificate.—Thomas H. Robertson, Irving Morgan, Alfred M. Maxwell, James Weir, John C. McInnis, Alexander Somerville, Thomas Taylor, Francis E. Wood, Leonard Cooper, Peter Lancaster, John Robert Neen, and John M. Wilson.

Mine-surveyor's Certificate.—David L. Monroe and Cecil H. Brehaut.

EXAMINATIONS FOR CERTIFICATES OF COMPETENCY AS COAL-MINERS.

In addition to the examination and certificates already specified as coming under the Board of Examiners, the Act further provides that every coal-miner shall be the holder of a certificate of competency as such. By miner is meant any person employed underground in any coal mine to cut, shear, break, or loosen coal from the solid, whether by hand or machinery.

Examinations are held regularly in all the coal-mining districts.

No certificate has been granted in any case where the candidate failed to satisfy the Board as to his fitness, experience in a coal mine, and a general working knowledge of the English language.

The year 1937 showed a great increase of candidates compared with 1936. Compared with fifty-seven candidates in 1936 there were 205 candidates in 1937 and of these 187 passed and eighteen failed to qualify.

In addition to the certificates granted above, substitute certificates were granted to miners who had lost their original certificates.

The Board of Examiners desires to thank the different coal-mining companies for the use of their premises for holding these examinations where necessary.

The Inspector of Mines in each district has authority under the "Coal-mines Regulation Act" to grant, after a satisfactory examination, a provisional certificate as a coal-miner to applicants, which entitles the holder to follow the occupation of a coal-miner for a period not exceeding sixty days or until the date of the next examination before the Board.

GOVERNMENT MINE-RESCUE STATIONS.

NANAIMO.

BY

RICHARD NICHOL.

The equipment maintained at this station consists of six sets of the Gibbs two-hour oxygen apparatus; six sets of the McCaa two-hour oxygen apparatus; twelve sets of the Burrell all-service masks; forty-two self-rescuers; two H.H. inhalators; 1 Sparklet resuscitator, with sufficient supplies to maintain the above in service.

One Ford panel truck is kept fully equipped, ready for any emergency. Four men took a full course of training and received their certificates, one of the men taking the full course was Dr. Seiriol Llewelyn Williams, of Nanaimo.

There were no emergency calls for the rescue apparatus during the year, but the inhalator was called for several times. There were also nineteen calls for oxygen from the Nanaimo and Ladysmith Hospitals and from local medical practitioners. These calls were responded to at once.

CUMBERLAND.

BY

JAMES L. BROWN.

The equipment of this station consists of eleven sets of McCaa two-hour oxygen apparatus; twelve sets of the Burrell all-service masks, with speaking diaphragm; one H.H. inhalator with dual face-mask; one Sparklet resuscitator; and twenty-five self-rescuers, with adequate supplies to maintain same in service.

During the year 650 cubic feet of oxygen was supplied to Cumberland Hospital for emergency purposes. Four fully trained teams from Comox Colliery carried out regular practice-work at this station; five new men took the full training course and received certificates of competency in this work. The trained teams are paid by the Canadian Collieries (D.), Ltd., for the time spent in rescue-training.

PRINCETON.

BY

ALFRED GOULD.

The equipment at this station consists of eleven sets of McCaa two-hour oxygen apparatus; eleven Burrell all-service masks; seventeen M.S.A. self-rescuers; one M.S.A. high-pressure pump to recharge cylinders; one H.H. inhalator, and an adequate supply of all necessary parts and materials for the maintenance of the machines.

There were no calls for rescue apparatus during the year. Four calls for oxygen administration were received from the Princeton Hospital, and were promptly responded to. The Instructor from this station paid a series of visits to the *Nickel Plate* mine, Hedley, during April, May, and June, taking with him six sets of McCaa two-hour oxygen apparatus, six Burrell all-service gas-masks, and an H.H. inhalator. Instructions were given in mine-rescue work and first-aid work. The training in rescue-work was carried out mainly in the abandoned workings of the mine. Eleven men completed the course of training, were examined and granted certificates of proficiency. Two men were trained at the station, and were granted certificates. Several men attended the station periodically during the year, and received a short refresher course in rescue work.

The annual field day of the Princeton and District Ambulance and Mine Safety Association was held on June 26th. The mine-rescue event was held on vacant lots adjoining the station, on which an artificial mine had been erected; five teams competed in this event.

FERNIE.

BY

JOHN T. PUCKEY.

The equipment at this station consists of one high-pressure pump; one H.H. inhalator; 1 pulmotor; six sets of Gibbs apparatus; 11 sets of McCaa apparatus; twelve Burrell all-service masks; ten electric safety-lamps; thirty-five self-rescuers, together with adequate supplies to maintain above in service.

Two regular mine-rescue teams from Coal Creek Colliery continued their monthly training during the year and several other teams renewed practices in June. Fifteen new men in all took the full course of mine-rescue work, five of these were from Michel Colliery and the other ten were from the Consolidated Mining and Smelting Company of Canada, Limited, at Kimberley; all of them were granted certificates, and are a welcome addition to those already trained.

The local medical practitioners made two calls for the inhalator during the year, and in addition for service in pneumonia cases called for several hundred cubic feet of oxygen; this was supplied at once.

INSPECTION OF COAL MINES.

VANCOUVER ISLAND INSPECTION DISTRICT.

BY

JOHN MACDONALD.

Western Fuel Corporation of Canada, Ltd. J. A. Boyd, President, Montreal, Que.; Lieut.-Col. C. W. Villiers, Vice-President, Nanaimo, B.C.; P. S. Fagan, Secretary-Treasurer, Nanaimo, B.C.; John Hunt, General Manager, Nanaimo, B.C. This company operated the No. 1 and Reserve mines, Nanaimo.

No. 1 Mine, Nanaimo.—W. Frew, Manager; T. Wood and G. Frater, Overmen. This mine is situated on the southerly end of the Esplanade in the City of Nanaimo and adjacent to the shore-line of the Strait of Georgia. It is the oldest operating coal mine in British Columbia and has four shaft openings, as follows: No. 1 and No. 2 shafts on the Esplanade; Protection shaft on Protection Island; and Newcastle shaft on Newcastle Island.

A full description of the surface plant, method of working, and system of haulage in and around the mine has been given in previous annual reports. The only change to be reported in connection with the surface equipment is the removal of two boilers from the plant on Protection Island; these were installed at the Reserve mine.

No. 1 mine worked 258 days during the year with an average production of 875 tons per day. This shows a decrease of 300 tons per day as compared with the 1936 output, and is accounted for by the fact that several of the active producing districts are gradually decreasing in area as the extraction of pillars continues. Both the Douglas and Newcastle seams were operated until June when all the long-wall faces in the latter seam were abandoned and the material taken out. Since then the whole of the output has come from the Douglas seam, where all operations are confined to the extraction of pillars.

The ventilation is provided by two fans; one located at Protection shaft and operating as a "blower" fan, and one at No. 2 shaft on the Esplanade which is operating as an "exhaust" fan, the distance between these two units being approximately 1¾ miles. The ventilation has been generally good throughout the mine, samples of air having been taken regularly in all splits and return airways, the resultant analysis of same being generally satisfactory.

Approximately 50 per cent. of the men are taken by ferry across the bay from Nanaimo to Protection Island, a distance of 1½ miles, where they descend Protection shaft; the remainder enter the workings by way of the No. 1 shaft. Considering the prevailing difficulties in this mine due to roof movements, the roadways and working-places have been kept in good condition. All precautions were taken to guard against the coal-dust hazard by frequent applications of inert dust and cleaning up of roadways. Samples of the dust were taken each month where required in accordance with Regulation No. 4 of the Coal-dust Regulations, all of these being well above the minimum standard set by the above regulation. The miners' "gas committee" made frequent inspections of the workings and kindly furnished copies of their reports. All report-books required to be kept at the mine were examined regularly and found in good order.

There were no fatalities in this mine during the year, but five serious accidents occurred which were specially investigated. Of these, two were caused by falls of rock; two by mine-cars and haulage; and one by a fall from a railway-car in the repair-shops on the surface. In addition to the above, there were a number of minor accidents involving a loss of time varying from a few days to several weeks.

Reserve Mine, Nanaimo.—W. Roper, Manager; A. W. Courtney, Overman; R. Houston, Shiftboss. This mine is situated in the Cranberry District, about 5 miles south of Nanaimo. The Douglas seam is the only one in operation at present and this is reached by means of two shafts at a depth of 1,000 feet.

This mine operated 257 days during the year with an average output of 585 tons per day, a large proportion of this production coming from the extraction of pillars. New development-work consisted of driving a main slope and counter through the solid rock for a distance

of 2,500 feet from the No. 2 West heading to tap the seam; from this point the main slope and diagonal slope were driven for a distance of 300 feet and 600 feet, respectively, by the end of the year, all indications pointing to a good section of coal in this area. However, several small faults and rolls were encountered necessitating a considerable amount of rock-work being done to get suitable grades for haulage.

The ventilation has been generally good at all inspections and the workings kept clear of noxious gases. Due to an outbreak of spontaneous combustion in the 10 East Heading district, it was found necessary to isolate this section from the rest of the mine by the erection of fire seals at the intake and return for this district. Samples of the mine-air have been taken every month in the returns from each split, the resultant analysis of same being found generally satisfactory. All roadways, where required, are treated with inert dust to reduce the danger of coal-dust and samples of the dust have been taken each month on the roadways, all of which were in keeping with the standard set by the Coal-dust Regulations.

Regular inspections of the workings were made by the miners' "gas committee," and this committee kindly furnished copies of all their reports of inspection. The report-books required to be kept at the mine were examined frequently and found in good order.

There were two fatalities and six serious accidents in this mine during the year. The fatal accidents were the result of one man being caught by a stringer while riding on a loaded car, while the other was caused by a fall of rock. Of the six serious accidents, three were caused by falls of rock; one caused by blasting; one by mine-cars and haulage; and the other when a mine mechanic put his hand forward to examine a bolt at a hoist just as the machinery was set in motion and his hand was jammed between the eccentric and the frame of the hoist. In addition to the above, a number of minor accidents occurred which caused a loss of time from a few days to several weeks.

Canadian Collieries (Dunsmuir), Ltd.

J. A. Boyd, President, Montreal, Que.; Lieut.-Col. C. W. Villiers, Vice-President, Nanaimo, B.C.; P. S. Fagan, Secretary, Nanaimo, B.C.; John Hunt, General Superintendent, Nanaimo, B.C.; Robt. Laird, District Superintendent, Cumberland, B.C. The mines operated by this company during the year were Nos. 5 and 8, Comox Colliery, Cumberland; Northfield mine at Northfield, and the No. 10 mine at South Wellington. Comox Colliery is situated near Cumberland and is connected to Union Bay by the colliery railway, 12 miles in length, over which the whole of the output is transported. The Northfield Colliery is situated about 4 miles north of Nanaimo and has railway connections over the Esquimalt & Nanaimo Railway and the Western Fuel Corporation's private lines with the loading-wharves at Nanaimo where all coal is shipped. No. 10 mine is situated at South Wellington, which is approximately 7 miles south of Nanaimo. This latter property has not yet been developed to the producing stage.

No. 5 Mine, Comox Colliery.—J. S. Williams, Manager; S. Jones and H. Devlin, Overmen. This mine operates the No. 2 seam which is reached by a shaft 280 feet in depth. All the workings lie to the dip of the shaft and are accessible by four slopes which were driven from the level of the No. 1 seam. Practically all of the output was produced from the various long-wall faces with the exception of the development places in the Main slope district where steady progress is being made in the preparation of new walls. These are laid out with an average length of 300 feet and equipped with Meco-type conveyors which carry the coal from the faces to the loading-points on the levels. All mining is done in the rock-bands, either in the centre of the seam or underneath, by means of Anderson-Boyes coal-cutting machines which mine the coal to a depth of 6 feet. In the development places, the coal is undercut by means of Hardiax post type punching machines, compressed air being used to operate the coal-cutters and conveyors.

A new 500-horse-power electric hoist was installed during the year at the top of the main slope. This unit is equipped with a 6-foot-diameter drum carrying 5,300 feet of 1⅛-inch rope and is giving satisfactory service on this long haul. A considerable portion of the slope has been relaid with heavy steel as a precaution against derailing of the trips which of necessity must travel at a high rate of speed on such a long slope. Each trip is made up of eighteen cars with a safety-car behind as a safeguard against accident to the hoisting equipment. The main travelling-way and main slope have been cleaned up and enlarged where necessary to provide a larger intake area and reduce the resistance on the

air. A new diagonal slope has been driven from the half-way hoist to reach a large area of coal which lies to the left of the No. 1 West section. The seam in this area varies from 2½ to 3 feet in thickness with a fairly strong roof and will be worked by the regular long-wall system and conveyors.

An additional Canadian Ingersoll-Rand, Class P.R.B.-2, cross-compound duplex belt-driven air compressor was installed early in the year. This machine has a displacement of 936 cubic feet of air a minute at 300 r.p.m., and is driven by a 150-horse-power Westinghouse synchronous motor, 25 cycle, 3-phase, 2,200 volts, 750 r.p.m. This makes a total of six compressors located underground at a distance of 6,000 feet from the shaft.

The heavy outflow of methane from the workings in this mine demands a continual improving and enlarging of existing airways, coupled with the driving of new and more direct roadways to carry the large volumes of air necessary to dilute and render harmless the gases given off. In this connection, the management is to be congratulated on the fact that a number of the main returns from the various splits have been greatly enlarged and a new main return airway, 1,600 feet in length, 7 feet in height, and 14 feet in width, was completed and incorporated in the ventilating system on the East side of the mine in the latter part of the year. Work was also begun on a new air-drift, 8 by 16 feet, which is being driven through the rock on a pitch of 65 degrees from the Main slope section for a distance of 850 feet, where it will make connection with a new 10-by-12-foot air-shaft now being sunk from the surface to an ultimate depth of approximately 300 feet. When completed, this new opening will be used as a main intake airway for a considerable period of time and when the workings have advanced to the point where further changes are imperative, it will be equipped with a large fan and used as a main return. When the above connection is made, a big improvement should result in the general ventilating conditions as the main body of the intake air will be available at the most strategic point for distribution to the different districts. All the development-work in the Main slope area has been done by the pillar-and-stall method with a view to providing every precaution against movements in the strata in the vicinity of the air-drift.

Rock-dusting is carried on continuously in this mine, a total amount of 364,200 lb. of rock-dust were used during the year and distributed over approximately 4,000,000 square feet of surface. The dust is applied on all main roadways by means of special dust-cars built for this purpose while small boxes or troughs in conjunction with air nozzles are used in all other places. Water-sprays are constantly in use at the discharge end of all conveyors and all main partings are equipped with water-sprinklers which are used to thoroughly wet down all loaded cars before they are taken out on the main haulage. Samples of dust were collected each month from the different roadways as required and the analysis showed these to be in keeping with the standard set by the Coal-dust Regulations. Samples of air were taken regularly in the returns from all splits and main return airways, the resultant analyses providing a fund of useful information in checking on the quantities of methane given off from the faces and passing along the various returns.

Frequent inspections were made by the miners' "gas committee," and copies of all these reports of inspection were received through the courtesy of the committee members. All report-books required to be kept at the mine were examined regularly and found in good order. One fatal accident and seven serious accidents occurred in this mine during the year. The fatal accident was caused by a fall of rock, while the others occurred as follows: One due to the cage falling from the pit-head to the ground level before it was brought to a halt; three were caused by falls of coal and rock; and three by mine-cars and haulage. There were also a large number of minor accidents which caused a loss of time varying from a few days to several weeks.

No. 8 Mine, Comox Colliery.—Jas. Quinn, Manager; A. Watson, Overman. This mine is situated in the vicinity of the Lake Trail road and 2 miles east of the mine camp at Bevan. The seams are reached by two shafts each 1,000 feet in depth; these were dewatered and repaired to the 700-foot level in the latter part of 1936 after having been closed down for over twenty years. Prospecting-work only had been done when the shafts originally tapped the coal-measures and it was necessary to make new roadways and sidings to facilitate the new development in the No. 1 Seam area. A shaft-pillar 1,000 feet in diameter was marked off and narrow openings driven beyond this limit before opening out on the long-wall method

of work. Up to the present time, operations have been confined principally to the south side of the mine where the Main level has been rapidly driven ahead and No. 1 Incline turned off to the right and No. 1 Diagonal slope set off to the left. The area around the shafts for a distance of 1,200 feet is badly faulted, but the face-lines are being opened out in more regular ground; this has greatly facilitated the winning-out of the three walls in operation with another one approaching the producing stage. The No. 1 seam is approximately 30 inches thick with a band of bone and shale in the centre which varies from 6 to 26 inches in thickness; the cutting is done in this centre band by means of Anderson-Boyes overhead long-wall machines. Meco-type conveyors are used on the walls and all machinery is operated by compressed air. The roof conditions are none of the best and require close attention on account of the numerous slips encountered together with cap-rock or false roof from 4 to 6 inches thick which usually comes down with the coal.

The ventilation is produced by a Keith fan which is capable of passing 100,000 cubic feet of air a minute, under a water-gauge of 2.5 inches. Duplicate intake and return airways are projected for each side of the mine and these will simplify the ventilating problems as the workings increase in extent. The mine drainage is taken care of by two single-stage electric pumps, one situated in each shaft at the 80-foot level, each unit delivering 150 gallons of water per minute. A new rock-drift has been driven to connect both shafts below the present pumping-station and, when this is completed, all the water will be collected at this point and then pumped up the downcast shaft by a 4-stage electric pump; all the water that accumulates below the 700-foot level is hoisted with a 600-gallon-capacity bucket up the No. 2 shaft, the water-level being kept down to a point 200 feet below the present shaft-bottom.

During the year, 74,300 lb. of rock-dust were used in treating approximately 350,000 square feet of surface. Regular sampling of the mine-air and dust was attended to in all returns and haulage roadways. The workings were inspected frequently by the miners' "gas committee" who kindly furnished copies of all reports of inspection. All report-books were examined periodically and found in accordance with the regulations.

Compressed air is supplied to the mine by a large Ingersoll-Rand compressor located on the surface. This machine is driven by a 750-horse-power motor and has a displacement of 2,100 cubic feet of air a minute. Additional buildings erected during the year were the large compressor-house, blacksmith- and machine-shop, lamp cabin, office, and store-room. Twenty-five dwelling-houses at No. 8 mine were reconditioned, and forty houses, hotel, store, and club-rooms at Bevan Camp were repaired and occupied by the employees of this mine. A number of the miners live at Cumberland and these are taken to the mine by train, which also picks up the men at Bevan when passing through the camp. At the end of December, the output had been raised to 340 tons per day with 142 men employed underground and seventeen men on the surface.

Northfield Mine.—A. Newbury, Manager; J. Sutherland, Overman. This mine operates the Wellington seam and was reopened in the latter part of 1936 after having been closed for over forty years. During the present year an enormous amount of repair-work has been carried on retimbering and enlarging roadways. The main haulage roadways on both sides of the mine have been straightened out and improved, and this programme has entailed the driving of portions of these roadways through a total distance of 3,200 feet of solid rock. No. 5 Incline is being driven in the roof-rock above the old Wellington No. 5 mine abandoned workings to develop a large area of the upper Wellington seam, which averages from 24 to 30 inches in thickness. It is anticipated this roadway will also provide a means of access to some pillars that were left in the early days of mining in this district in the vicinity of old No. 5 mine shaft. All main roads are being laid with heavy steel and are projected with a view to handling a large output.

This mine is operated on the long-wall system, the coal being cut by Anderson-Boyes machines while Meco-type conveyors are used on the walls to transfer the coal to the loading-stations on the main levels; all of the above machinery is driven by compressed air.

The surface plant is all operated by electricity, the power being supplied by the Nanaimo-Duncan Utilities, Power, and Light Company. The main hoist at No. 1 shaft is an Ingersoll-Rand, bicylindro-conical drum, 60- and 90-inch diameters, driven by a C.G.E. 350-horse-power, 2,200-volt, 3-phase, 60-cycle a.c. motor. The ventilation is produced by a Sirocco-type fan,

driven by a 35-horse-power, 440-volt, 3-phase, 60-cycle a.c. motor, and is operating on the exhausting principle at No. 2 shaft. Two Ingersoll-Rand 29 by 18 by 14½ angle-type compressors, driven by 500-horse-power synchronous motors, 300 r.p.m., 2,200 volts, 3-phase, 60 cycle, each machine having a capacity of 3,300 cubic feet of air a minute, supply the power to operate all machinery underground. The tipple is a 3-car gravity plant, equipped with all necessary picking-tables, loading-booms, and shaking-screens, the latter being fitted with a Hendrick patented lip-screen. A large centrifugal pump having a capacity of 800 gallons per minute, driven by a 60-horse-power 2,200-volt motor, has been installed as an emergency fire unit.

While the method of operation in this mine causes a certain amount of crushing and squeezing on the roadways, working conditions have generally been found satisfactory at all inspections. The miners' "gas committee" have made regular inspections of the workings and furnished copies of all their reports. The necessary report-books required to be kept at the mine have been examined during all visits of inspection and found in good order.

One fatal accident and one serious accident occurred in this mine during the year, both of which were the result of falls of coal and rock. In addition to the above, a large number of minor accidents occurred involving a loss of time varying from a few days to a few weeks.

No. 10 Mine, South Wellington.—W. Wilson, Manager. This new opening is situated in Section 9, Range 6, Cranberry District, at a point located half a mile to the south of the old Wellington-Extension No. 5 mine. Work was commenced in May when a slope was driven from the surface for a distance of 650 feet where it was stopped in faulted ground. It was then decided to drive the counter-slope ahead to prove the ground and then drive back uphill to connect with the main slope on a permanent grade suitable for the main haulage. The ventilation is provided by a small Sturtevant fan which is driven by a 10-horse-power motor; this unit is capable of producing 25,000 cubic feet of air a minute. Two small Canadian Ingersoll-Rand compressors, with a combined capacity of 450 cubic feet of air a minute, provide the power in the meantime to operate the drilling-machines, pumps, and a small air-hoist. The water used to cool the compressors is pumped from an adjacent lake by an electrically driven Canadian Allis-Chalmers turbine-pump.

This mine is still in the prospecting stage, and while some coal has been found in the slopes it is estimated that these roadways will have to be driven a considerable distance before they are clear of the troubled area and into the regular seam. Working conditions in general have usually been found satisfactory at all inspections. This mine was free from serious accident during the year.

Lantzville Colliery.

No. 1 Mine, Lantzville.—A. Challoner, Overman. This mine is situated on the shore-line of the Strait of Georgia, 9 miles north of Nanaimo. The workings are reached by a slope from the surface; this roadway is 270 feet in length and dips at an angle of 30 degrees. The Wellington seam is operated in this area, the coal averaging 30 inches in thickness which is mined by hand on a modified long-wall method of working. This mine was in operation 261 days during the year with an average production of 24.3 tons per day. This property is operated on a co-operative system with seventeen men employed underground and five on the surface. The ventilation is provided by a small fan which is capable of passing 15,000 cubic feet of air a minute; working conditions were found to be generally satisfactory at all inspections and no serious accidents were reported.

Biggs' Mine.

J. Biggs, Operator and Fireboss. This mine is situated in the Wellington area and all operations were confined to the extraction of some small surface pillars which had been left from previous operations. This property was operated only for a period of thirty-one days with a production of 81 tons of coal. Ventilation was provided by natural means and was sufficient for all requirements. Working conditions were found to be fairly good, and the mine being naturally damp was generally free from coal-dust.

Jingle Pot Mine.

A. McLaughlin, Operator. This mine is situated in the vicinity of the old original Jingle Pot site and was opened up to recover some small surface pillars which were left in the first working. It operated for a period of seventy-six days during the first four months of the year and produced 57 tons of coal. The ventilation was provided by natural means, this being ample for the needs of the mine. As

this area is naturally damp, the workings generally were free from coal-dust. No accidents were reported.

Richardson Bros.' Mine.

Richardson Bros., Operators. This mine is situated on the site of the former operations of the Pacific Coast Coal Company at South Wellington, and all activities were chiefly confined to the extraction of some surface pillars in the Douglas seam which were left in the first working in this area. This mine was operated ninety days during the first four months of the year, and produced 664 tons of coal. These workings were ventilated by natural means and, being naturally damp, were free from coal-dust. No accidents were reported from this mine.

Chambers' Mine.

R. H. Chambers, Operator; Chas. Webber, Fireboss. This mine is situated in the Extension area in the vicinity of the old Extension No. 1 mine and was developed to recover some surface pillars that were left in bygone years. It was in actual operation for a period of 220 days during the year and produced 4,097 tons of coal. The workings are ventilated by natural means and were found clear of noxious gases at all inspections; being naturally damp, all roadways were generally free from coal-dust. No accidents were reported during the year.

Beban's Mine

F. Beban, Operator; J. Wilson, Overman. This mine is also located in the vicinity of the old Extension No. 1 mine and was opened in 1936 to develop a solid area that was left intact in former operations in this field. The main slope was driven down on the full pitch of the seam and levels turned off to the left; one of these, No. 2 Left, was driven 8 feet wide with advance drill-holes 20 feet in length, kept ahead of the face as a precautionary measure against contacting the abandoned workings of old No. 1 mine. In the meantime, the main slope was being driven ahead into what was generally considered to be solid ground, but on June 11th this place tapped a flooded area in the old No. 1 mine, resulting in a large body of water breaking through and causing the death of three men. After this water had been pumped out, an examination of the abandoned area showed that the old No. 1 slope had been driven a considerable distance ahead of the point marked on the old plans as being the actual limit of drivage for this place. Following this regrettable occurrence, a restricted area was outlined on the plan ahead of the Beban workings and precautionary drilling of long diamond-drill holes ahead with the necessary flank holes on each side was ordered as a safety measure in all roadways in this area which were approaching in the general direction of the old abandoned mines. The old workings were successfully tapped in No. 1 Left level by a drill-hole 135 feet in length which permitted the water to be drained off to this level. A roadway was then driven through to the old Diagonal slope and this area dewatered. This made it possible to get a connection put through from the Diagonal to the old Extension No. 3 workings for drainage purposes. When this work was completed, active development was resumed in the main slope workings.

An Ingersoll-Rand compressor having a capacity of 350 cubic feet of air a minute was added to the surface plant in June, while another return-tubular boiler, 126-horse-power, was installed in October. A new air-shaft, 6 by 6 feet, was sunk to connect with the old water level and the fan moved to this new location. The ventilation is produced by a steam-driven 28-inch-diameter Keith fan capable of passing 20,000 cubic feet of air a minute, under a water-gauge of 0.5 inch. The ventilation was good throughout the mine at all inspections, while all parts examined were found to be generally free from coal-dust.

This mine operated on 259 days during the year and produced 9,316 tons of coal; punching-machines of the Post type are used to cut the coal which is then loosened and brought down by the use of explosives. The fatal accidents caused by the inrush of water mentioned above were specially investigated and full reports submitted covering same.

Loudon's Mine.

W. D. Loudon, Operator; G. Stewart, Fireboss. This mine is located at a distance of 1 mile from the town of Wellington and was opened solely for the purpose of extracting some small surface pillars that had been left intact by former operators. Work was commenced at this property in July and continued steadily until the end of the year; during this period, a total of 127 days were worked and 655 tons of coal produced. The ventilation was provided by natural means and was quite sufficient for the mine requirements; working conditions in general were found to be satisfactory at all visits of inspection. No accidents were reported.

Cassidy Mine. J. McKellar and Associates, Operators; T. Bullen, Fireboss. This mine was opened in the latter part of the year on the old Granby property at Cassidy for the purpose of recovering some surface pillars that were left when the Granby mine was abandoned. A short slope was put down from the surface to tap the seam and a level turned off to follow the strike, crosscuts being broken away from this level at suitable points to explore the area, but usually these holed through into the old gobs a short distance from the level. The owners of this small mine have displayed commendable initiative and have erected a small tipple and screening plant on the surface which enables a better product being shipped to their customers. Power to operate the hoist is supplied by a gasoline-engine. This mine was in operation ninety-five days and produced 674 tons of coal. The ventilation is produced by natural means and is quite sufficient for the mine requirements. General working conditions were found satisfactory at all inspections.

Lewis' Mine. T. Lewis and Son, Operators; A. McLaughlin, Fireboss. Operations at this property were commenced in May, when approximately 200 feet of the Jingle Pot slope at East Wellington was cleaned out and repaired to the No. 2 level. A skip was then started along the high-side of this level with a view to developing a small area of solid coal that was left by the old operators. Active production was begun in the latter part of the year when a total of 125 tons of coal was produced in thirty-nine days of operation. A small centrifugal pump was installed on the slope a short distance below the No. 2 level; this is driven by a 5-horse-power motor, the power being supplied by the Nanaimo-Duncan Utilities, Power, and Light Company. Ventilation is provided by natural means and working conditions were found generally satisfactory.

Somenos Prospect, Cowichan Municipality.—Kovich and Associates, Operators. This prospect is situated on Section 12, Range 4, in the Somenos District near Duncan. A 6- by 7-foot slope was being driven on a grade of 25 per cent. through the shales, but definite information is lacking at the time of writing as to the exact amount of work that has been accomplished during the year or whether the slope has actually reached the coal-seam.

Berkley Creek Prospect. H. McLean Davidson and Associates. This property is located in the old Extension area in the vicinity of Berkley Creek and consists of a short drift which was being driven through the gravels. Owing to the proximity of this opening to the abandoned workings of the old Extension Colliery, all further advance in this roadway was prohibited during November and an order issued limiting future operations to precautionary advance drilling with a view to locating the above old workings. Upon receipt of this order, it would appear that all operations were indefinitely suspended.

At all mines operating in this district, the Edison electric cap safety-lamp is used exclusively by the workmen, while Wolf safety-lamps are carried by the officials for testing purposes. All fatal and serious accidents were immediately investigated and reported on in detail; in all cases of fatal accident the inquests were attended, and the courtesy of the Coroner is acknowledged on behalf of the Department for the privilege of examining the witnesses present on such occasions with a view to ascertaining any information which might prove to be of value in the future in averting serious accident. It should be unnecessary to again remind all officials and workmen that a strict adherence to the regulations and the application of sound common sense in the exercise of their various duties would eliminate many of these so-called accidents, with their consequent physical suffering and financial loss. In this connection a heavy responsibility rests on the shoulders of the firebosses and shot-lighters, as these officials are in more frequent touch with the workmen while travelling around their respective districts, and are therefore afforded more opportunities to correct loose practices amongst the men and point out the proper method attending to their various duties. Much valuable information along these lines may be obtained from a study of the accidents that occur during the course of each month, and the writer is quite certain that many officials would be genuinely surprised to see how many of these can actually be classed as avoidable occurrences.

NICOLA-PRINCETON INSPECTION DISTRICT.

BY

JOHN G. BIGGS.

The following coal companies operated in this district during 1937: The Coalmont Collieries, Limited; Middlesboro Collieries, Limited; the Wilson Mining and Investment Company, Limited (Blue Flame mine); Pleasant Valley Mining Company, Limited (Pleasant Valley coal mine); the Tulameen Valley Coal Mining Company, Limited; Princeton Tulameen Coal Company, Limited; Granby Consolidated Mining, Smelting, and Power Company, Limited; Golden Glow Mining Company, Limited; Yale Coal Mining Company, and the Francis Glover Trust Company.

The Coalmont Collieries, Limited, Middlesboro Collieries, Limited, and the Granby Consolidated Mining, Smelting, and Power Company, Limited, continued to operate during the whole of the year, while the Wilson Mining and Investment Company, Limited, and the Pleasant Valley Mining Company, Limited, ceased operations at the Blue Flame and the Pleasant Valley mines in Princeton during the month of April, when the material was withdrawn from the mines and the mines closed. The Granby Consolidated Mining, Smelting, and Power Company, Limited, leased the Bromley Vale coal-mining property from the Princeton Properties, Limited, as operated during 1936 by the Black Diamond Coal Company, Limited. The Princeton Tulameen Coal Company, Limited, took over the coal-mining interests of the Tulameen Valley Coal Company (generally known as the Lind mine), while the Golden Glow Coal Mining Company, Limited, took over the Robert Haigh and Partners coal-mining developments, situated on Lot 406 in the Bromley Creek district at Princeton, with a view of bringing this mining development into production.

Coalmont Collieries, Ltd. Blake M. Wilson, President, Vancouver, B.C.; General J. W. Stewart, Vice-President, Vancouver, B.C.; A. H. Douglas, Secretary, Vancouver, B.C.; D. McLeod, Treasurer, Vancouver, B.C.; George Murray, Superintendent, Blakeburn, B.C. This is the largest coal operation in the district and consists of Nos. 4 and 5 mines, at present employing about 200 men. The mining operations are conducted at Blakeburn, situated on the North Fork of Granite Creek, at an elevation of 1,600 feet above, and 4 miles by road from, the town of Coalmont, where the mine-tipple, screening plant, and power plant are located on a spur off the main line of the Kettle Valley Railway. The coal is transported over the mountain to the mine-tipple below at Coalmont by means of an aerial tramway 2½ miles long; the buckets on the tramway constitute the body of the mine-cars and have a capacity of 1 ton. (Plant and tipple described in previous reports.)

No. 4 Mine.—James Littler, Overman; Robert Murray, Frank Bond, Thomas Bryden, Robert Barrass, Firebosses. This mine has been described in previous reports. In January spontaneous combustion was discovered in 10 West level and caused the sealing-off of the mine below this point, the sealed-off area being flooded with water pumped into the mine.

Pillar-extraction from the Nos. 8 and 9 levels has maintained the production since that time, and preparations are now being made to extract the pillars between the main haulage level and the outcrop. Ventilation is maintained by a double-inlet fan driven by a 75-horsepower motor, and at the last inspection there was 13,000 cubic feet of air per minute passing down the main slope for the use of thirty men. The brattice and stoppings were in fairly good order and the mine well timbered; no methane was discovered during the year and analyses of dust samples show same to be in accordance with the "Coal-mines Regulation Act."

No. 5 Mine.—William G. Brown, Overman; Wilfred Valentine and Frederick Millar, Firebosses. This mine is situated 2,800 feet north of No. 4 mine and 250 feet higher in elevation, and is connected to No. 4 mine yard by a surface incline; Nos. 4 and 5 mines operate in the same seam. This is a slope mine with the main slope dipping 20 degrees to a point 2,000 feet from the portal, at which point inferior coal was met; production is from pillar extraction in Nos. 4 and 5 levels.

During the year a larger fan was installed, which at the last inspection was passing 13,000 cubic feet of air per minute into the mine for the use of twenty-five men.

At this somewhat isolated community there is a resident doctor and a well-equipped first-aid room in charge of a trained first-aid man. There was no change in the general equipment at this colliery during the year.

Middlesboro Collieries, Ltd.

His Honour E. W. Hamber, President; E. McDonald, Secretary; Robert Fairfoull, Manager. This colliery is situated on a branch of the Kettle Valley Railway about 1 mile from Merritt and consists of Nos. 2 South and 3 North mines. The plant and equipment have been described in previous reports and there were no changes during the year; ninety men are employed.

No. 3 North Mine.—A. E. Allen, Overman; Garnet S. Corbett, Fireboss. This is a slope operation on the seam for a distance of 450 feet, at which point the seam flattens for a distance of 400 feet. The seam is 6 feet thick. Seven men are employed; headings are driven up the pitch to the surface outcrop for ventilation purposes; no methane gas was found at the different inspections during the year.

No. 2 South Mine.—James Fairfoull, Overman; Wm. Ewart, Thomas Rowbottom, and Leslie Dickie, Firebosses. The seam is from 6 to 8 feet thick, is steeply inclined, and occupies a small basin to the extent that the main adit-level, driven into the hillside, after following the strike of the seam for 4,500 feet, again reaches the surface close to the portal; headings are driven to the surface outcrop above the main level and provide efficient natural ventilation; 115,000 cubic feet of air was passing through this mine at the last inspection for the use of forty-two men.

Compressed air is the only power used underground and all the coal is mined by Post-type puncher-machines. No methane was found during the year, and analyses of dust samples show that the precautions of the "Coal-mines Regulation Act" regarding coal-dust are observed.

Granby Consolidated Mining, Smelting & Power Company, Ltd.

Granby Colliery No. 1, Princeton.—N. L. Amster, President, New York; A. S. Baillie, Vice-President, Copper Mountain, B.C.; B. E. Perks, Secretary-Treasurer, Vancouver, B.C.; W. R. Lindsay, Superintendent, Allenby, B.C.; Thos. M. Wilson, Manager, Princeton, B.C. This mine was formerly known as the Bromley Vale Colliery and is situated in the Bromley Creek area about 6 miles west of Princeton. The seam is 12 feet thick, but only the best part comprising the lower 6 feet is mined.

The mine was developed by an adit-drift which follows the strike of the seam for 600 feet, at which point a slope was driven down the pitch with levels projected on both sides; the coal is mined with the Post puncher-machine and requires very little blasting.

The power installation consists of three small compressor units having a total of 1,000 feet free air capacity; the compressors are Diesel driven. The coal is transported by motor-truck to bunkers on the north bank of the Similkameen River, a distance of 4 miles, at which point it is conveyed across the river to the steam power plant of the Granby Consolidated Mining, Smelting, and Power Company, Limited; this power plant supplies the electrical power required at the Copper Mountain mine and the Allenby concentrator of this company.

Princeton Tulameen Coal Co., Ltd.

Guy F. Atkinson, President, San Francisco, California; Geo. H. Atkinson, Vice-President, San Francisco, California; W. D. Seaman, Secretary-Treasurer, Princeton, B.C.; James Taylor, Princeton, B.C. This mine was formerly known as the Lind mine, and consists of a slope from the surface on a pitch of 16 degrees for a distance of 350 feet, with three levels developed on each side; several openings have been driven through to the surface for ventilation purposes and there is practically no dust, as the workings are wet.

During the year a modern small tipple and screening plant was constructed and an electric-driven slope-hoist installed. The coal is hauled by motor-trucks to a spur on the Kettle Valley Railway at the old Princeton Colliery, a distance of 1½ miles; thirty men were employed at this mine.

The Princeton Yale Company, the Golden Glow Mining Company, and the Black Coal Company each did some development-work at their respective properties, but the total production of coal was small.

Hat Creek Colliery.* L. D. Leonard, Manager, Ashcroft, B.C.; Harry Hopkins, Fireboss. Some 400 tons of coal was produced from this mine during the last three months of the year. It was sufficiently marketable to be in demand at Lillooet, Ashcroft, and Kamloops. Two men were employed on the surface and two underground. No indications of gas were found at the different inspections during the year and the ventilation was fairly satisfactory; however, further development will require the use of a fan or a ventilation raise to the surface. Pillar-extraction gives the required tonnage at present.

NORTHERN INSPECTION DISTRICT.

BY

CHARLES GRAHAM.

Bulkley Valley Colliery. F. M. Dockrill, Lessee and Operator. This mine is located on Goat Creek, a tributary of Telkwa River, about 7 miles from Telkwa, to which point coal is hauled by motor-truck and shipped via Canadian National Railway; the market is chiefly domestic and limited to the line of the Canadian National Railway between Prince George and Prince Rupert.

The Main slope was extended during the year and additional levels turned off. These levels all ran into a squeezed area and have been temporarily abandoned. A new slope has been turned off the present slope about 100 feet from the portal and is being driven down on the full dip. Pillar-extraction is being carried on in No. 1 level.

No inflammable gas has been detected on any visit. The mine roadways are damp and dust treatment is applied at intervals. Electric lamps are used. Conditions generally in the mine are good.

Northwest Anthracite Syndicate. Thos. Campbell, Superintendent; Wm. Dinsdale, Fireboss. The property is situated in Glacier Gulch, on Hudson Bay Mountain, near Smithers. Several seams of anthracite coal outcrop on the mountain. A crosscut adit is being driven from near the valley floor to intersect these seams. This working still lacks considerable distance from reaching its objective. Work has been carried on in a small scale and there have been frequent stoppages during the year. No sign of inflammable gas has been detected.

Skeena Development Syndicate.—J. M. Wilson, Fireboss. Some blacksmith coal and a few tons of domestic coal have been mined along the outcrop of the Betty seam and brought across the river by cable. Only two men have been employed.

EAST KOOTENAY INSPECTION DISTRICT.

BY

JOHN MACDONALD.

Coal Creek and Michel were the only collieries producing during the year—these are owned and operated by the Crow's Nest Pass Coal Company, Limited, with head office in Fernie. Corbin Colliery is still closed and likely to remain so for some time to come. Except in a few isolated cases, working conditions in general have been found very satisfactory at all inspections in regard to the state of the ventilation, treatment of coal-dust, and general maintenance of working-places and roadways. Where it was found necessary to bring any matter to the attention of the various managers or other officials, they proved themselves at all times to be ready and willing to co-operate in effecting the proper remedies with the least possible delay. Crushed limestone-dust is the medium used to combat the coal-dust hazard on all roadways, gob-lines, and entrances leading to extracted areas. Nine hundred and thirty-two samples of dust were taken in the district, ten of which were found to be

* By Thomas R. Jackson.

under the minimum standard set by Regulation No. 4 of the Coal-dust Regulations. It is still necessary to use explosives at Michel Colliery to bring down the mined coal, and the regulations governing their use have been faithfully adhered to by the officials in charge of such blasting operations.

One hundred and twenty-six accidents were investigated; two of these were fatal, thirteen classed as serious, while the remainder caused a loss of working-time ranging from a few days to several weeks in extent. The investigations again brought out the fact that the exercise of reasonable care and a closer observance of the regulations on the part of the men directly involved would have prevented a large percentage of these accidents, with their subsequent suffering and financial loss.

The Edison electric cap safety-lamp is used exclusively at all mines by the workmen, while Wolf safety-lamps are carried by all officials and bratticemen for testing purposes. In addition, Burrell gas-detectors are provided at all mines and readings taken regularly to check the methane content in the various return airways. Copies of the " Coal-mines Regulation Act " and special rules are posted up at each mine and all report-books required by the regulations have been examined regularly and found in good order.

Coal Creek Colliery.—C. Stubbs, Manager. No. 1 East mine only has been operated during the year, production being still confined to the districts situated to the west of the main haulage-tunnel. The programme of cleaning up and repairing the roadways in the old 16 East district has been successfully completed, and it is now possible to gain access to all strategic points for inspection purposes so that a quick check can be made if any untoward conditions should develop. This operation has been carried on under very trying conditions, and the fact that it has been brought to a successful conclusion with entire freedom from accident reflects great credit on the skill and care constantly exercised by the men entrusted with this work.

A large snowslide came down the ravine opposite the tipple on the north side of the valley on February 12th and caused extensive damage to many of the surface buildings, timber-yards, and steam-lines; this caused a temporary suspension of underground operations, but emergency repairs were completed and work resumed on February 15th. Three outbreaks of fire were discovered and promptly dealt with. Two of these resulted from the friction set up by the rope running over damaged rollers on the main haulage-tunnel and 26 West incline, while the other occurred in the fan-housing on the surface. The latter fire was the result of one of the driving-ropes breaking and coiling around the driving-shaft where the excessive friction caused it to heat and go on fire. It was very fortunate for the future prospects of this colliery, especially in the case of the underground outbreaks, that these fires were discovered before gaining much headway in roadways passing large quantities of air.

The method of work as planned in 1936 has been continued along the same lines during 1937 and, up to the time of writing, has fulfilled all expectations regarding the anticipated behaviour of the strata. The small sacrifice pillars that were left in are apparently serving the purpose of steadying the heavy conglomerate roof and causing the floor to heave, as in many parts of the extracted areas the floor and roof have practically come into contact with each other. When the peculiar conditions governing this field are taken into consideration, the management is to be congratulated on the care and close attention given to the planning and operation of this system, inasmuch as it involved a radical departure from that formerly adopted as being the only method applicable to local conditions.

No. 1 East Mine.—J. Caufield, Overman. This mine is ventilated by an electrically driven 11- by 7½-foot Sirocco fan, which, running at a speed of 150 r.p.m., produced an average quantity of 122,200 cubic feet of air a minute, under a water-gauge of 3 inches. The ventilation is divided into two splits; the quantity passing in each at the last inspection measured as follows:—

No. 1 split: 27,000 cubic feet of air a minute for the use of thirty-five men and four horses. Burrell gas-detector, 1.6 per cent. methane.

No. 2 split: 30,100 cubic feet of air a minute for the use of thirty men and three horses. Burrell gas-detector, 1 per cent. methane.

Main return: 134,000 cubic feet of air a minute. Safety-lamp indicated 0.6 to 0.7 per cent. methane.

Roadways and timbering have been kept in good shape and well treated for dust, all roadways and working-places where such treatment is necessary being given frequent applications of limestone-dust. Three hundred and twenty-seven samples of dust were taken in accordance with Regulation No. 4 of the Coal-dust Regulations, all but seven of these being above the minimum standard set by the above regulation. Fifteen samples of air were taken during the year, mostly in and around the 16 East old workings, where an extensive programme of repairing and cleaning up of key roadways has been steadily carried on for the purpose of facilitating inspections of these abandoned areas, thus making it possible to examine and check on any incipient heatings that might occur in this section.

Michel Colliery.—B. Caufield, Manager. In the early morning hours of October 25th, the tipple, wet washer, slack-bins, and dry-cleaning plant at this colliery were completely destroyed by fire, which apparently originated in the boiler plant situated at the upper end of the coke-ovens. This small unit was erected for the express purpose of providing heated air to dry the washed coal and was connected to the tipple by an air-duct through which the hot air was carried to the washer. During the comparatively brief interval that elapsed from the time of turning in the alarm and getting the fire-fighting forces organized, the fire, assisted by the draft created by its own heat in the air-passage and also by the presence of a certain amount of coal-dust, had travelled through this airway with lightning rapidity and attacked the main tipple and washery at various points, eventually enveloping the slack-bins and dry-cleaning plant. It was early apparent to those in charge that the tipple with its adjacent buildings were doomed, so all efforts were concentrated in preventing the flames from destroying the snow-sheds leading to the mines. Almost immediately plans were drawn up to erect a temporary wooden structure, which was completed and put into operation on December 9th, with a capacity of 1,000 tons in eight hours. This tipple was erected and operating in the short space of seven weeks from the time construction was begun, and was equipped to deliver all the different sizes and grades of coal to supply the market requirements.

At the end of December, practically all of the men who had been deprived of their employment due to the fire were back to work, except for a few who were waiting to be placed in No. 1 seam as soon as haulage arrangements were suitable. While the temporary tipple was in process of erection, the engineering department of the company was busy with plans and specifications for a new steel structure which will be erected in 1938, construction to begin as soon as the weather permits.

No. 3 Mine.—Robt. McFegan, Overman. This mine operates the upper No. 3 seam and is ventilated by an electrically driven 12- by 6-foot Sullivan fan, which, running at a speed of 240 r.p.m., produces an average quantity of 140,000 cubic feet of air a minute, under a water-gauge of 3.1 inches. Ventilation is divided into two splits; the quantities passing in each measured as follows:—

No. 1 split: 8,500 cubic feet of air a minute for the use of thirty-six men and six horses. Safety-lamp indicated a trace of methane.

No. 2 split: 12,000 cubic feet of air a minute for the use of forty-four men and five horses. Safety-lamp indicated a trace of methane.

Main return: 26,400 cubic feet of air a minute for the use of eighty men and eleven horses. Safety-lamp, 0.4 to 0.5 per cent. methane. Roadways and timbering have been kept in good repair and usually well treated for coal-dust. One hundred and thirty-two samples of dust were taken in accordance with Regulation No. 4 of the Coal-dust Regulations, all of which were above the minimum standard set by the above regulation.

No. 1 Mine.—W. McKay and R. B. Bonar, Overmen. This mine is reached by a crosscut tunnel from the upper No. 3 seam of No. 3 mine, which intersects Nos. 2, 1, "A," and "B" seams; Nos. 1, "A," and "B" ony being operated at present. This mine is also ventilated by No. 3 mine fan. The ventilation is divided into two splits; the quantities passing measured as follows:—

No. 1 seam, return: 30,000 cubic feet of air a minute for the use of six men and two horses. Safety-lamp indicated a trace of methane.

"B" seam, return: 18,000 cubic feet of air a minute for the use of thirty men and four horses. Burrell gas-detector, 0.7 per cent. methane.

Main return (all mines): 145,000 cubic feet of air a minute for the use of 116 men and fifteen horses. Safety-lamp, 0.4 to 0.5 per cent. methane.

No. 1 mine, main return: 77,000 cubic feet of air a minute for the use of thirty-six men and six horses. Safety-lamp, 0.5 to 0.6 per cent. methane.

Roadways and timbering have been kept in good shape and generally well attended to regarding treatment for coal-dust. A total of 273 samples of dust were taken in accordance with Regulation No. 4 of the Coal-dust Regulations, all except three of which were above the minimum standard set by the above regulation.

No. 3 East Mine.—J. Henney, Shiftboss. All operations in this area were again confined to necessary repairs to main roadways and patrolling the fire area adjacent to the main return airway.

Corbin Colliery.—W. Almond, Acting-Accountant, in charge. The mines at this colliery still remain closed, with no signs apparent of a resumption of operations. Some slack coal was gathered off the dumps at the tipple and distributed to the school, colliery office, and a few of the residences. During the year, a decision was reached by the company to dispose of all their equipment; some material has already been sold to other operators in the district, but the main tipple plant remained practically intact at the end of the year. The services of the two watchmen were dispensed with toward the latter part of the year and this change now leaves Mr. W. Almond as the only remaining official representative of the company in the Corbin area.

INSPECTION OF METALLIFEROUS MINES.

BY

JAMES DICKSON.

During 1937 the "Metalliferous Mines Regulation Act" was amended as follows:—

AN ACT TO AMEND THE "METALLIFEROUS MINES REGULATION ACT."

[*Assented to 10th December, 1937.*]

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of British Columbia, enacts as follows:—

1. This Act may be cited as the "Metalliferous Mines Regulation Act Amendment Act, 1937."

2. Section 24 of the "Metalliferous Mines Regulation Act," being chapter 189 of the "Revised Statutes of British Columbia, 1936," is amended by striking out the words "the last preceding section" in the second line of subsection (1), and substituting therefor the word and figures "section 21."

3. Section 27 of said chapter 189 is amended by sriking out the figures "41" in the first line of subsection (5), and substituting therefor the figures "42."

4. Section 39 of said chapter 189 is amended as follows:—

(*a.*) By striking out the figures "42" in the third line, and substituting therefor the figures "43."

(*b.*) By inserting after the word "period," in the first line of clause (*a*) of General Rule (7), the word "not."

(*c.*) By striking out the word "block-holding" in the first line of General Rule (26), and substituting therefor the word "block-holing."

(*d.*) By adding to General Rule (28) the following clause:—

"(*g.*) Where shafts or winzes are being sunk or raises are being driven, or where any places are abnormally wet or other emergent conditions are present, the Inspector may order that all blasting in such shafts, winzes, raises, or other places shall be done by means of an electric current; and may rescind such order according to the conditions obtaining."

(*e.*) By striking out General Rule (74), and substituting therefor the following:—

"(74.) Before drilling is commenced in any working-face, the driller or miner shall make a careful examination of the exposed surface for holes or sockets in which any explosive may have remained from previous blasting; and where power-driven drills are in use this examination shall include the washing of all the exposed surface and the washing-out of all holes and sockets by water under pressure, so that all such holes and sockets may be closely examined for the presence of any remaining explosive."

PRODUCTION.

The output from the metalliferous mines for 1937 was 6,145,254 tons, an increase of 1,688,733 tons from the tonnage of 1936. This tonnage was produced from 185 mines, of which 113 produced 100 tons or more.

FATAL ACCIDENTS IN METALLIFEROUS MINES (INCLUDING UNDERGROUND PLACER-MINING).

There were twenty-three fatal accidents in and around the metalliferous mines and concentrators in 1937, being an increase of nine from the figures of 1936. There were no fatal accidents in the quarries of the Province.

There were 5,421 persons under and above ground in the metalliferous mines and 1,168 persons in the concentrators in 1937. The ratio of fatal accidents per 1,000 persons employed was 3.79.

The tonnage mined per fatal accident during 1937 was 256,052 tons, compared with 318,322 tons during 1936. The tonnage mined per fatal accident for the last ten-year period was 366,479.

The following table shows the mines at which fatal accidents occurred during 1937 and comparative figures for 1936:—

Mining Division.	Mine.	No. of Accidents.	
		1937.	1936.
Vancouver	Britannia	2	4
Lillooet	Minto	1	1
Lillooet	Bralorne	1	1
Lillooet	Pioneer	2	----
Cariboo	Cariboo Quartz	1	1
Cariboo	Wingdam	3	----
Omineca	Harrison Creek (placer)	1	----
Similkameen	Copper Mountain	4	----
Nelson	Reno	----	1
Nelson	Ymir Yankee Girl	----	1
Nelson	Ymir Consolidated	1	----
Nelson	Wesko	1	----
Osoyoos	Nickel Plate	----	1
Windermere	Thunderbird	----	1
Trail Creek	Velvet Gold (mill)	----	1
Fort Steele	St. Eugene Extension	1	----
Fort Steele	Sullivan (concentrator)	1	1
Fort Steele	Sullivan	1	----
Salmo	Kootenay Belle	1	----
Spillamacheen	Golden Eagle Claim	2	----
Zeballos River	Privateer Claim	----	1
Totals		23	14

The following table shows the cause, the percentage to the whole of the fatal accidents, with comparative figures for 1936:—

Causes.	1937.		1936.	
	No.	Percentage.	No.	Percentage.
By blasting	3	13.05	4	28.57
By falling down chutes or shafts	5	21.70	2	14.29
Haulage	1	4.35	----	------
By falls of ground	9	39.15	5	35.71
By carbon-monoxide poisoning	2	8.70	----	------
Snowslide	----	------	1	7.14
Miscellaneous	3	13.05	2	7.29
Totals	23	100.00	14	100.00

FATAL ACCIDENTS IN METALLIFEROUS MINES.

The fatal accident which occurred to Alexander MacKenzie, miner, Minto Gold Mines, Limited, on January 18th was due to his being struck on the head by a small piece of rock which fell some 15 feet and killed him instantly. He was wearing a defective hat; it is probable that a safety-hat in good condition would have prevented his death.

The fatal accident which occurred to A. E. Taylor, labourer, in the concentrator of the Consolidated Mining and Smelting Company of Canada, Limited, at Chapman Camp, on April 2nd was due to deceased being caught and crushed by the screw of a coal conveyor which distributes coal to the boilers. He had apparently attempted to step across the conveyor in contravention of orders and had no need to do so.

The fatal accident which occurred to James Hardy Sproule, trammer, Pioneer Gold Mines of B.C., Limited, was due to deceased stepping or falling from an ore train into an uncovered raise down which he fell a distance of 74 feet; a cover was provided for this raise, but there was no evidence available regarding the person or persons who had left it uncovered.

The fatal accident which occurred to T. Gazzola, miner, Britannia Mining and Smelting Company, Limited, on May 9th was due to deceased being struck on the left foot by a rock which came down a transfer-raise; he died of bronchial pneumonia in Vancouver General Hospital on May 24th, this arising as a result of the accident.

The fatal accident which occurred to William Gibbon, part owner, Harrison Creek Ventures, Limited, on June 4th was due to deceased being crushed between two clay boulders on the floor of this hydraulic operation; deceased was assisting in driving a bar into one of the boulders when a slab broke off and squeezed him against the other boulder.

The fatal accident which occurred to Bagnor Benson, miner, and G. B. Shaw, mucker, in the *Melvin* mine of the Consolidated Gold Alluvials of B.C., Limited, on June 14th was due to deceased being caught near the face by a round of eighteen shots. As the place was dry, fuse was being used and all the shots had been spit and deceased had apparently retreated some little distance from the face before the first shots went off; there was no available evidence to show why the deceased had not left the face in ample time.

The fatal accident which occurred to Finley McArthur, miner, Ymir Consolidated Gold Mines, Limited, on June 17th was due to deceased falling down a raise after being overcome by carbon monoxide from blasting in the raise. Blasting during the previous shift had deranged the ladders and timbering at the face of the raise and deceased and others were engaged in repairing this damage. Four individual shots had been fired to dislodge some of the damaged timbers, and McArthur then went up the raise to investigate conditions but was overcome. The compressed-air supply in the raise was used during the firing of the shots and afterwards, but proved to be insufficient to dilute the carbon monoxide to a safe minimum.

The fatal accident which occurred to Nick Priza, chuteman, *Copper Mountain* mine, Granby Consolidated Mining, Smelting, and Power Company, Limited, on June 18th was due to suffocation caused by deceased being caught and covered by a run of wet muck from a glory-hole chute. Apparently a large body of frozen muck had thawed out on the floor of the chute and came down with sufficient force to cause deceased and his partner to loose control of the chute-gate and cover deceased; his partner had a narrow escape.

The fatal accident which occurred to Walter Markgren, miner, Pioneer Gold Mines of B.C., Limited, on June 25th was due to deceased being squeezed by a slab from the foot-wall which fell out and caught him against the hanging-wall and also injured Vincent Joseph, his nipper. There had been two sprags set against this slab on the previous day but both were found displaced when the accident was discovered; deceased and nipper had been dragging their drill and equipment past this point and may have disturbed the sprags.

The fatal accident which occurred to Joseph Edward Sherwood, shaft miner, Bralorne Mines, Limited, on June 24th was due to deceased being struck on the head by a rock which presumably fell from the bucket which was being hoisted at this time; he died on June 28th from his injuries.

The fatal accident which occurred to Matt Jarvenpaa, miner, Wesko Mines, Limited, on July 13th was due to deceased being struck on the head by a 1-inch diameter pipe which fell down a raise; deceased had fastened the pipe to the ⅜-inch tugger rope in the raise by means of half-hitches which failed when the pipe had been hoisted some 70 feet; 6 feet of the pipe went through his safety hat and head.

The fatal accident which occurred to H. J. R. Bremner, mucker, Britannia Mining and Smelting Company, Limited, on August 4th was due to deceased being struck by a train of empty cars which was being switched into side-track near where he was loading a car; the train became derailed at the switch and the cars went in where deceased was at work and before he could get clear.

The fatal accident which occurred to G. L. Laribee, prospector, and G. Hansen, 17 years of age, on August 14th in the *Golden Eagle* prospect, owned by the former, was due to carbon-monoxide gas from blasting; three shots had been fired at the end of the previous day in a prospect-shaft of small area and some 20 feet deep. Deceased had gone down this prospect-hole on the 14th and had apparently been overcome by gas and died; they were not discovered until the following day. From evidence given at the inquest it was found that very old dynamite of a type prohibited for mining had been used, and that the men had previously

been affected by carbon monoxide in this small prospect. Beyond relatives no one knew of this prospecting operation.

The fatal accident which occurred to Hugh S. Cameron, timberman, *Sanderson* mine, Consolidated Gold Alluvials of B.C., Limited, on August 16th was due to a cave-in of gravel and boulders when retimbering at a point where a new place was being started; a new bridge timber had been placed and a post withdrawn when the cave-in occurred, which completely covered deceased.

The fatal accident which occurred to Steve Bandish, miner, *Copper Mountain* mine, Granby Consolidated Mining, Smelting, and Power Company, Limited, on August 27th was due to deceased falling from a manway ladder in a stope on to the muck pile some 12 feet below. He died from his injuries on August 31st.

The fatal accident which occurred to William Condon, jaw-crusher operator, *Copper Mountain* crushing plant, Granby Consolidated Mining, Smelting, and Power Company, Limited, on September 14th was due to deceased being struck on the head by the crusher fly-wheel when he apparently got under or leaned over the safety-fence to examine the crusher-bearings; the crusher should have been stopped if an examination was necessary.

The fatal accident which occurred to Valentino Vogrig, timberman, *Copper Mountain* mine, Granby Consolidated Mining, Smelting, and Power Company, Limited, on August 4th was due to injuries received when the cage in which he, with sixteen other men, were riding struck the shaft-bottom with sufficient violence to injure all of the men; Vogrig died on September 26th from a blood-clot due to above accident.

The fatal accident which occurred to Robert Alphonse Mahon, leading miner, St. Eugene Extension Mines, Limited, on November 8th was due to deceased being thrown down the main shaft from a staging about 40 feet below the collar when a shaft guide which was being lowered to that point slipped from the lowering rope and broke the staging, causing deceased to fall 370 feet to the water in the shaft-bottom. The body was not recovered until November 19th. The guide timber was secured by a timber hitch with a half-hitch further up and under a lag screw through the guide, but the timber hitch apparently fouled some of the shaft timbers when the guide was being lowered and had been loosened thereby. Such timbers should be lowered by means of a bridle with a pin through the timber.

The fatal accident which occurred to Theodore Swanson, head timberman, Kootenay Belle Gold Mines, Limited, on December 8th was due to a cave-in at the face of a working which was being driven through unconsolidated ground. The working was timbered to the face and bulkheaded above, but a sudden release of the overhead material caused the timbering to collapse and instantly kill Swanson who was engaged in examining the timbering at this time.

The fatal accident which occurred to John F. Gillis, mucker, Cariboo Gold Quartz Mining Company, Limited, on December 23rd was due to a fall of ground in a stope; the miner in charge of the place had barred down all visible loose ground and was engaged, with the assistance of deceased, in setting up his drill at this time; the rock that fell weighed approximately 1 ton.

The fatal accident which occurred to Allan Bruce Ritchie, general superintendent, *Sullivan* mine, Consolidated Mining and Smelting Company of Canada, Limited, on December 27th was due to deceased being struck by a flying rock from a shot in a stope. Deceased had entered the stope by means of a manway that was not in use, but which was not fenced off, after the men who had spit the shot had gone to guard the approaches of the regular manways into the stope.

Falls of ground was again the largest individual cause of fatal accidents in spite of intensive efforts to keep this potential danger before both officials and employees at the different mines.

DANGEROUS OCCURRENCES.

On March 27th while three men were being lowered in the 3,927 incline skip, *Sullivan* mine, the Consolidated Mining and Smelting Company of Canada, Limited, the brakes failed to act efficiently when approaching the bottom of the incline and caused the skip to strike the bottom with sufficient force to slightly injure the three men. Riding of men in this raise was immediately suspended to permit changes and adjustments in the braking system.

On August 4th at the No. 1 Shaft, *Copper Mountain* mine, the Granby Consolidated Mining, Smelting, and Power Company, Limited, the main tie-bolt of the friction-drive of the

hoist broke while a cage containing seventeen men was being hoisted, and caused the cage to get out of control to the extent that it went to the bottom of the shaft, where it struck with sufficient violence to injure all of the men, one of whom died on September 26th from his injuries. This shaft is 800 feet deep with stations at 200-foot intervals and is equipped with a single cage and a counterbalance; the hoist was a double-drum, friction-strap drive, driven by compressed air, and is equipped with a Lilly control for the automatic application of the brake in a case of overwinding or overspeeding.

The cage was about midway up the shaft when the friction-bolt broke and the cage immediately stopped and began to descend the shaft; the automatic control came into action as soon as the descending cage reached the speed at which the control was set to operate, and the brake then retarded the cage but failed to bring it to rest and the cage descended to the bottom of the shaft a distance of 400 feet from its position when the friction-strap failed.

The hoist brake had been adjusted two days prior to this accident and was apparently in good working order. The surface of the brake-blocks were in good condition but showed indications of foreign material which may have been due to grease and dust projected on to the brake-race by the broken friction-strap. While the automatic brake did not prevent the cage from reaching the bottom of the shaft it retarded the cage sufficiently to avert a major disaster. The free drums on this hoist did not serve any purpose in this installation and immediately following the above accident the friction-drive was removed and the drums were secured rigidly to the main shaft of the hoist.

On October 6th in No. 2 Shaft, *Pioneer* mine, the West side skip stuck in the dump while being backed out and several hundred feet of the hoisting-rope was paid out before the hoistman discovered there was something wrong. The hoisting-rope was damaged and a new one was immediately installed.

On December 3rd the miners in the 3,927 drift, *Sullivan* mine, had finished loading a round of shots and were preparing to couple up the lead wires to the permanent blasting-line at a point 85 feet back from the face of the drift when the round went off prematurely; it is presumed that one of the men had inadvertently allowed one of the lead wires to contact the live trolley-wire at this point. Following this occurrence additional cut-out switches were installed on both the firing-line and trolley-line and orders given that all power must be cut off the trolley-line before starting to load shots; no person was injured.

PROSECUTIONS.

During the year 1937 there were four prosecutions made for infractions of the "Metalliferous Mines Regulation Act" and special rules, as follows:—

Date.	Mine.	Occupation of Defendant.	Offence charged.	Judgment.
Jan. 7	Colpe Mining Company, Ltd., Atlin	Manager	Failure to comply with the orders of the Inspector as per section 7, "Metalliferous Mines Regulation Act," to provide a suitable ladder-way in a shaft to maintain a second exit from the mine	Fined $300 and costs, plus $5 per day for 97 days; the latter part of the penalty was disallowed by an appeal to the Supreme Court due to a technicality in the information.
March 5	Livingstone Mining Co., Ltd., Blewitt	Manager	Failure to report an accident as per section 14, "Metalliferous Mines Regulation Act"	Charge dismissed on a technicality.
March 5	Livingstone Mining Co., Ltd., Blewitt	Manager	Failure to keep a plan of the mine as required by section 21 (1), "Metalliferous Mines Regulation Act"	Charge dismissed due to relating sections 21 and 24 of the "Metalliferous Mines Regulation Act" being separated; this is now amended.
March 5	Livingstone Mining Co., Ltd., Blewitt	Manager	Failure to provide a properly-constructed stretcher as required by General Rule 55, section 38, "Metalliferous Mines Regulation Act"	Fined $100 and costs.

EXPLOSIVES USED IN MINING.

During 1937 the explosives used in metalliferous mines in British Columbia consisted of 10,118,000 lb. of high explosives, 4,410,000 fuse detonators, 1,219,000 electric detonators, 168,200 delay-action electric detonators, and 25,652,000 feet of safety fuse.

It is noted that blasting by electrical means is increasing each year.

AIR-SAMPLING.

Most of the air-samples taken in the metalliferous mines were taken at the faces of long single drifts after blasting to determine whether carbon monoxide was present, and the sampling done throughout the year shows a reduction in the number of instances where traces of this gas was found.

DUST AND VENTILATION.

The ventilation of the average metalliferous mine is improving yearly, due to the better understanding of the value of ventilation beyond merely supplying air for breathing purposes.

The increased use of larger-capacity fans for general ventilation and booster fans for the ventilation of single drifts is not only supplying augmented ventilation, but is the best means of quickly removing from the mine the dust that is unavoidably produced.

In all mines it is standard practice to have all the rounds blasted either at the end of the shift or by blasters on the graveyard shift, and only incidental bulldozing in chutes or bulldoze chambers is done during the working shift; where there may be constant blasting in bulldoze chambers the smoke and dust is dealt with by local fans.

There is an increased application of water-sprays at dust-producing operations such as transfer-chutes and at the crushers in mills, and at the latter there is a growing use of exhaust fans to control and remove dust.

MINE-LIGHTING.

There are now approximately 2,500 electric safety-lamps in use in the metalliferous mines and it is expected that more will be in use each year; in no case where the electric safety-lamp has been used has there been a return to the carbide-lamp.

FIRST-AID AND SAFETY WORK.

First-aid work is being well maintained in all the mining areas and during 1937 competitions were held in this work at Stewart and in Bridge River, as well as in the older established districts.

Practically all the larger mines have organized safety committees which inspect the mines both for the purpose of studying safety conditions and interesting their fellow-employees in working safely. These local safety committees have the advantage of knowing their own mines intimately and have a personal knowledge of the details that may easily be overlooked by an Inspector who can visit the mines only at intervals; the work of these safety committees is worthy of considerable expansion.

QUARRIES.

Quarries in the Province were fairly active throughout the year, although the number of men employed was only 724, as compared with 931 in 1936; the number of men employed in processing plants increased to 327 in 1937, as compared with 288 men in 1936.

There were no fatal accidents in quarries or processing plants during 1937.