PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON. ROBERT LAURIER, *Minister of Mines* — H. C. RICKABY, *Deputy Minister*

Bulletin No. 131

REPORT

ON THE

Mining Accidents in Ontario

in 1940

By

Chief Inspector of Mines: W. O. TOWER, Toronto
Inspectors: A. E. CAVE, Kenora; J. B. TAYLOR, E. S. LITTLE, W. G. HARGRAVE, Kirkland Lake; A. S. BAYNE, Port Arthur; D. F. COOPER, Sudbury; E. B. WEIR, Timmins; D. P. DOUGLASS, Toronto

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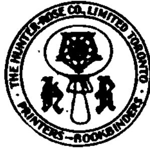
THE HUNTER-ROSE CO. LIMITED TORONTO
PRINTERS—BOOKBINDERS

TO THE HONOURABLE ROBERT LAURIER,
Minister of Mines.

SIR,—I beg to hand you herewith the report by the Inspectors of this Department on the accidents in the mines, metallurgical works, and quarries of Ontario during the year 1940.

I have the honour to be, Sir,
Your obedient servant,

H. C. RICKABY,
Deputy Minister of Mines.

DEPARTMENT OF MINES,
Toronto, January, 1941.

MINING ACCIDENTS OF ONTARIO, 1940

By

Chief Inspector of Mines, W. O. Tower, Toronto; Inspectors: A. E. Cave, Kenora; J. B. Taylor, E. S. Little, W. G. Hargrave, Kirkland Lake; A. S. Bayne, Port Arthur; D. F. Cooper, Sudbury; E. B. Weir, Timmins; D. P. Douglass, Toronto

Accidents during 1940

During the year 1940 at the mines, metallurgical works, quarries, and clay, sand, and gravel pits regulated by the Mining Act, there were 2,165 accidents to employees reported to the Department of Mines up to January 16, 1941. Forty-two fatalities arising out of 42 separate accidents were reported.

These returns represent a decrease of 128 (5.9 per cent.) in the total number of accidents reported and a decrease of 5 in the number of fatalities recorded over the preceding year.

The report shows a fatality rate of 1.18 men killed per thousand men employed, which is a decrease of 0.23 per thousand men over the preceding year and is 1.04 per thousand lower than the average for the past 25 years.

There were 60 non-fatal accidents per thousand men employed, which is a decrease of 7 (12 per cent.) from the rate of 1939.

The percentage of non-fatal accidents followed by infection decreased from 8 per cent. in 1939 to 6.7 per cent. in 1940.

The employment figures for the industry show an increase of approximately 6 per cent. over 1939. This increase was due to increased employment in producing mines, metallurgical works, quarries, and clay, sand, and gravel pits. The employment in non-producing mines shows a decrease.

Fatal Accidents

A comparison of fatal accidents for the past five years is given in the following table:—

Distribution	1936	1937	1938	1939	1940
Mines, underground	45	36	37	27	35
Mines, surface	5	5	2	3	1
Metallurgical works	4	5	5	3	2
Quarries	2	1	1	1	3
Clay, sand, and gravel pits	0	2	4	4	1
Total	56	49	49	38	42

ANALYSIS OF FATALITIES AT MINES, 1936–1940

Cause	1936	1937	1938	1939	1940
	per cent.	per cent.	per cent.	per cent.	per cent.
Fall of ground	20	20	32	27	39
Run of ore or rock	8	0	2	21	20
Shaft accidents	28	44	28	16	8
Explosives	16	17	26	10	3
Miscellaneous, underground	18	12	10	18	27
Surface	10	7	2	8	3

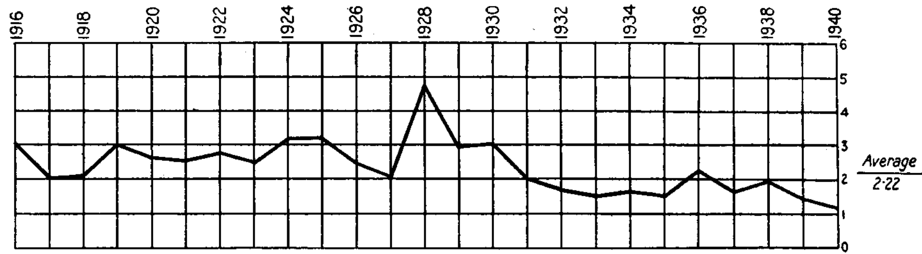

Diagram showing fatalities per thousand men employed between the years 1916 and 1940.

By months the fatal accidents occurred as follows:—

Month	No. accidents	No. men killed
January	3	3
February	4	4
March	0	0
April	2	2
May	3	3
June	3	3
July	6	6
August	5	5
September	2	2
October	2	2
November	7	7
December	5	5
Total	42	42

Classifying the fatalities according to industries gives the following:—

Asbestos mines	1
Gold mines	30
Iron mines	2
Nickel mines	3
Metallurgical works	2
Quarries	3
Sand, clay, and gravel pits	1
Total	42

The comparative fatality rate per thousand men employed at mines, metallurgical works, quarries, and clay, sand, and gravel pits is as follows:—

	Men employed	No. killed	Rate per thousand
Mines	26,326	36	1.38
Metallurgical works	6,361	2	.31
Quarries	2,059	3	1.46
Clay, sand, and gravel pits	829	1	1.21
Total	35,575	42	1.18

The ages of the men killed were as follows:—

17–20	21–25	26–30	31–35	36–40	41–45	46–50	Over 50	Total
1	7	5	13	8	4	4	0	42

The occupation and nationality of the men killed at mines, metallurgical works, and clay, sand, and gravel pits are set out in the following table:—

Occupation	British	Finnish	Hungarian	Jugo-Slav	Polish	Rumanian	Total
Cagetender	3	....	....	....	....	....	3
Driller	10	2	1	1	....	1	15
Drill helper	1	....	....	....	....	....	1
Electrician	1	....	....	....	....	....	1
Fitter (boiler-maker)	1	....	....	....	....	....	1
Foreman	3	....	....	....	1	....	4
Furnace tapper	1	....	....	....	....	....	1
Labourer	3	....	....	....	....	....	3
Motorman	2	....	....	....	....	....	2
Powderman	1	....	....	....	....	....	1
Shaftman	2	....	....	....	....	....	2
Shoveller	2	1	....	....	1	....	4
Switchman	1	....	....	....	....	....	1
Timberman	1	....	....	....	....	....	1
Timberman's helper	1	....	....	....	....	....	1
Trammer	1	....	....	....	....	....	1
Total	34	3	1	1	2	1	42

TABLE OF FATAL ACCIDENTS IN MINES, METALLURGICAL WORKS, QUARRIES AND GRAVEL, SAND, AND CLAY PITS, 1916–1940

Year	Persons killed at metallurgical works and mines	Persons employed at metallurgical works and producing mines	Persons employed at non-producing mines (estimated)	Total persons employed	Fatal accidents per 1,000 employed
1916	51	14,624	2,000	16,624	3.07
1917	36	16,791	1,000	17,791	2.02
1918	32	14,726	500	15,226	2.1
1919	39	11,926	1,000	12,926	3
1920	29	10,486	1,000	11,486	2.61
1921	24	8,436	1,000	9,436	2.54
1922	30	9,500	1,500	11,000	2.72
1923	30	10,500	1,500	12,000	2.5
1924	40	11,000	1,500	12,500	3.2
1925	42	11,500	1,500	13,000	3.23
1926	32	11,500	1,500	13,000	2.46
1927	33	13,311	2,000	15,311	2.1
1928	85	15,787	2,000	17,787	4.76
1929	55	17,145	1,849	18,994	2.89
1930	56	18,217	317	18,534	3.02
1931	37	17,820	447	18,267	2.03
1932	25	14,378	431	14,809	1.69
1933	25	15,080	804	15,884	1.57
1934	34	19,302	1,254	20,556	1.65
1935	36	21,444	1,528	22,972	1.57
1936	65	25,725	2,547	28,272	2.30
1937	52	28,938	3,220	32,158	1.62
1938	62	29,434	1,421	30,855	2.01
1939	47	32,444	897	33,341	1.41
1940	42	35,137	438	35,575	1.18

TABLE OF FATAL ACCIDENTS IN

No.	Date	Name of mine	Name of operator	Name of deceased	Age
1	Jan. 13	Helen	Algoma Ore Properties, Ltd.	John Klavechuk	24
2	Sept. 14	"	" " " "	Eino Maki	34
3	Dec. 5	Aunor	Aunor Gold Mines, Ltd.	Herman Palmer	30
4	Feb. 20	Berens River	Berens River Mines, Ltd.	A. Paakkarinen	31
5	April 15	Central Patricia	Central Patricia Gold Mines, Ltd.	John C. Bell	35
6	July 5	Chesterville	Chesterville Larder Lake Gold Mining Co., Ltd.	P. M. Robinson	23
7	July 28	Coniaurum	Coniaurum Mines, Ltd.	J. Cutulovich	37
8	May 23	Delnite	Delnite Mines, Ltd.	Cecil C. Ohrling	47
9	Aug. 7	De Santis	De Santis Porcupine Mines, Ltd.	Phillippe Gobeille	31
10	Nov. 28	Dome	Dome Mines, Ltd.	Alex. Harrower	38
11	Feb. 21	Hollinger	Hollinger Consol. Gold Mines, Ltd.	Joseph Singleton	47
12	Feb. 26	"	" " " " "	Norman Hill	26
13	July 5	"	" " " " "	E. Morgan	45
14	Nov. 19	"	" " " " "	Laurier Larcher	22
15	Jan. 18	Creighton	Internat. Nickel Co. of Canada, Ltd.	Richard S. Stephenson	40
16	May 5	"	" " " " " "	Karl Kenttala	23
17	Dec. 13	Frood	" " " " " "	Francis Boyer	22
18	Dec. 29	Jodelo	Jodelo Gold Mines, Ltd.	Malcolm McMillan	32
19	June 3	Kerr-Addison	Kerr-Addison Gold Mines, Ltd.	D. Niskanen	31
20	Feb. 14	Lake Shore	Lake Shore Mines, Ltd.	Jos. B. McDonald	42
21	May 4	" "	" " " "	Eli Kordic	35
22	Nov. 12	" "	" " " "	Johan Galinoc	37
23	July 15	Silverman	La Re Exploration Co.	Peter L. Wasney	33
24	Nov. 5	Little Long Lac	Little Long Lac Gold Mines, Ltd.	Jos. E. Moore	30
25	Jan. 5	McKenzie Red Lake	McKenzie Red Lake Gold Mines, Ltd.	Kost Krys	35
26	Nov. 6	MacLeod-Cockshutt	MacLeod-Cockshutt Gold Mines, Ltd.	Joe Basar	32
27	Nov. 5	Moneta	Moneta Porcupine Mines, Ltd.	George Kulok	37
28	Aug. 24	Rahn Lake	Montrose Mines, Ltd.	Cuyler Johnson	39
29	Dec. 1	Mace	Northern Peat Co., Ltd.	E. A. Gloucester	32
30	April 5	Paymaster Consolidated	Paymaster Consol. Mines, Ltd.	Hector Dempsey	28
31	June 26	St. Anthony	St. Anthony Gold Mines, Ltd.	Louis Buday	42
32	Sept. 28	"	" " " "	Harold Carr	25
33	July 6	Sturgeon River	Sturgeon River Gold Mines, Ltd.	Dimytro Baraniuk	40
34	June 30	Hanalda	Uchi Gold Mines, Ltd.	John H. Norquay	26
35	July 2	Wolfe Lake	Wolfe Lake Mines, Ltd.	Clifford W. Carter	18
36	Dec. 10	Wright-Hargreaves	Wright-Hargreaves Mines, Ltd.	A. H. Bourassa	31

OR ABOUT ONTARIO MINES, 1940

Occupation	Nationality	Married or single	Above ground	Below ground	Cause
Driller	British	S	....	1	Caught in run of muck from muck-pile.
Foreman (pit boss).	Finnish (nat.)	M	....	1	Crushed in run of muck in pit.
Mech. shovel operator.	Finnish	M	....	1	Struck by fall of rock.
Driller	Finnish	S	....	1	Struck by fall of rock.
Timberman's helper.	British	S	....	1	Fell down raise to stope floor.
Motorman	British	S	....	1	Crushed between locomotive and car.
Driller	Jugo-Slav	M	....	1	Remained too long at scene of blast.
Foreman (shift boss).	British	M	....	1	Buried in run of muck.
Shaftman	British	M	....	1	Crosshead stuck and dropped; man fell to bottom of shaft, 50 feet.
Fitter and boiler-maker.	British	S	....	1	Buried in muck in measuring pockets; asphyxiation.
Driller	British	M	....	1	Crushed between car and wall.
Driller's helper	British	M	....	1	Caught in run of muck in mill-hole.
Driller	British	M	....	1	Struck by fall of rock.
Trammer	British	S	....	1	Struck by fall of rock.
Foreman (shift boss).	British	M	....	1	Slipped from ladder and fell down manway.
Driller	Finnish	S	....	1	Struck by fall of rock.
Switchman	British	S	....	1	Crushed between car and timber.
Shaftman	British	S	....	1	Struck by fall of rock.
Timberman	Finnish (nat.)	M	....	1	Fell down raise from ladder to muck in stope, 40 feet.
Driller	British	M	....	1	Crushed by rock burst.
Driller	Jugo-Slav (nat.)	M	....	1	Struck by fall of rock.
Driller	Jugo-Slav (nat.)	M	....	1	Buried in fill when fill fence collapsed; crushed by timber.
Driller	British	M	....	1	Carbon-monoxide poisoning.
Motorman	American (nat.)	M	....	1	Crushed between motor and timber.
Cagetender	Polish (nat.)	M	....	1	Crushed between cage and timber.
Cagetender	Jugo-Slav (nat.)	M	....	1	Buried in skip by muck from chute; asphyxiated.
Driller	Rumanian (nat.)	S	....	1	Struck by fall of rock.
Shoveller	British	S	....	1	Crushed by fall of ground.
Cage helper	British	M	....	1	Crushed between cage and timber.
Driller	British	M	....	1	Crushed by fall of rock.
Driller	Hungarian	S	....	1	Struck by fall of rock.
Driller	British	M	....	1	Fell 250 feet down ore-pass.
Shoveller	Polish	M	....	1	Struck by fall of rock.
Electrician	British	M	1	....	Electric shock.
Labourer	British	S	....	1	Carbon-monoxide poisoning.
Shoveller	British	M	....	1	Struck by fall of rock.

TABLE OF FATAL ACCIDENTS

No.	Date	Plant	Name of operator	Name of deceased	Age
1	Oct. 8	Copper Cliff....	Internat. Nickel Co. of Canada, Ltd....	Francis Barnes....	43
2	Oct. 29	" "	" " " " " " ...	Wm. Cashmore...	50

TABLE OF FATAL ACCIDENTS

No.	Date	Name of operator	Name of deceased	Age
1	Aug. 14	Grenville Crushed Rock Co., Ltd......................	J. Petroniak......	49
2	Aug. 14	Hamilton Builders' Supply, Ltd......................	Wm. Ashbaugh...	32
3	Aug. 19	Ontario Rock Co., Ltd..............................	Donald Ellis......	24

TABLE OF FATAL ACCIDENTS AT

No.	Date	Name of operator	Name of deceased	Age
1	Aug. 26	Sidney Rogers....................................	Albert Benson....	32

AT METALLURGICAL WORKS, 1940

Occupation	Nationality	Married or single	Cause
Labourer	British	M	Struck by falling brick.
Furnaceman (tapper)	British	M	Struck by train.

AT QUARRIES, 1940

Occupation	Nationality	Married or single	Cause
Screening plant foreman	Polish	M	Struck by handle of crowbar.
Powderman	British	M	Explosion of caps and powder in cap-house.
Driller	British	M	Remained too long at scene of blast.

SAND, CLAY, AND GRAVEL PITS, 1940

Occupation	Nationality	Married or single	Cause
Labourer	British	M	Caught by cave-in of bank.

Non-fatal Accidents

The causes of non-fatal accidents at mines are shown in the following table:—

Cause	Surface	Under-ground	Total
Fall of persons	65	206	271
Falling objects	41	136	177
Drilling machines	1	150	151
Tramming	7	119	126
Strain while lifting	24	96	120
Hand tools	51	58	109
Rock or ore at chute	1	105	106
Fall of rock or ore at face	....	95	95
Handling rock or ore	12	80	92
Falling rock or ore, drilling, scaling, etc.	1	83	84
Crushed between two objects	25	49	74
Machinery	57	14	71
Flying objects, sledging, etc.	22	47	69
Nails or splinters	11	47	58
Transportation	1	50	51
Running into or striking objects	13	22	35
Cage, skip, or bucket	1	32	33
Burns	24	2	26
Explosives	....	16	16
Poisoning from cyanide, lead, arsenic	16	....	16
Rock burst	....	14	14
Fall down shaft, raise, or stope	....	10	10
Electricity	3	....	3
Unclassified	2	1	3
Total	378	1,432	1,810

The causes of non-fatal accidents at metallurgical works were:—

Cause	Number
Fall of persons	21
Falling objects	20
Crushed between two objects	15
Strain while lifting	12
Machinery	10
Hand tools	9
Burns	8
Flying objects, sledging, etc.	7
Burns by slag, matte, or scrap	6
Gas	4
Handling material	3
Poison	3
Cranes, ladles, or hooks	2
Explosives	2
Transportation	1
Nails or splinters	1
Elevators	1
Total	125

The causes of non-fatal accidents at quarries were:—

Cause	Number
Handling material	26
Falling objects	17
Fall of persons	13
Flying objects, sledging, etc.	13
Fall of rock	8
Crushed between two objects	8
Hand tools	6
Strain while lifting	4
Machinery	3
Explosives	3
Transportation	2
Nails or splinters	1
Poison	1
Burns	1
Total	106

The causes of non-fatal accidents in contract diamond-drilling were:—

Cause	Number
Caught in moving parts	10
Fall of persons	9
Nails or splinters	8
Crushed between two objects	8
Falling objects	6
Hand tools	6
Caught in drill screw	3
Strain while lifting	3
Burns	2
Flying objects	2
Running into or striking objects	2
Total	59

The causes of non-fatal accidents at clay, sand, and gravel pits were:—

Cause	No.
Fall of material	8
Fall of persons	6
Machinery	3
Hand tools	2
Crushed between two objects	2
Strain while lifting	1
Nails or splinters	1
Total	23

Infection

Records show that infection followed in 142 cases out of a total of 2,123 accidents.

Location	No. of accidents	Accidents followed by infection	Per cent. infection
Mines, underground	1,432	84	5.9
Mines, surface	378	29	7.7
Metallurgical works	125	13	10.4
Quarries	106	3	2.8
Clay, sand, and gravel pits	23	3	13
Diamond-drilling	59	10	16.9
Total	2,123	142	6.7

Accidents from Explosives

Cause	Non-fatal		Fatal		Total	
	No. accidents	Men injured	No. accidents	Men killed	No. accidents	Men killed or injured
Fumes from blasting	4	4			4	4
Drilled into dynamite	3	4			3	4
Did not take sufficient cover	3	3			3	3
Walked into blast	4	4			4	4
Delayed too long at blast	3	3	1	1	4	4
Concussion from blast	1	1			1	1
Exploded detonator when crimping	1	1			1	1
Removing powder from missed hole	2	3			2	3
Total	21	23	1	1	22	23

Non-fatal Accident Frequency

The following table gives the respective non-fatal accident frequency at mines, metallurgical works, quarries, and clay, sand, and gravel pits, based on the number of accidents per thousand men employed, for the years 1930 to 1940, inclusive.

1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
117	100	98	95	93	90	83	85	70	67	60

Electric Accidents

The following table shows the fatal accidents due to the use of electricity at mines, metallurgical works, and quarries during the last ten years:—

1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Total
....	....	....	....	....	....	....	....	1	1	2

The following table shows the total number of non-fatal electric accidents during the last ten years:—

1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	Total
7	3	4	4	6	4	2	8	6	3	47

Classification of Non-fatal Accident Rates at Producing Mines

In the following table the producing mines employing more than 50 men are arranged in order, according to their rate of non-fatal accidents per thousand men employed:—

0—50

McIntyre-Porcupine
Garson (International Nickel)
Wright-Hargreaves
Frood (International Nickel)
Levack (International Nickel)
Hollinger mine
Creighton (International Nickel)
Matachewan Consolidated
McMarmac
Northern Empire
Helen (Algoma Ore Properties)
Howey
Lake Shore
Paymaster Consolidated

51—100

Sylvanite
Young-Davidson (Hollinger)
Dome
Bidgood
Falconbridge (mine only)

Average—64.8 accidents per thousand men

McKenzie Red Lake
Teck-Hughes
Hard Rock
Magnet
Tombill
Omega
Kerr-Addison
Central Patricia
Pickle Crow
New Golden Rose (Consol. Mining and Smelting)
Upper Canada

101—150	Ross (Hollinger)
	Cochenour Willans
	Hasaga No. 1
	Toburn
	Pamour
	Chesterville
	Golden Gate
	Coniaurum
	Hallnor
	MacLeod-Cockshutt
	Macassa
	Buffalo Ankerite
	Uchi
	Preston East Dome
	Little Long Lac
	Kirkland Lake Gold
	Madsen Red Lake
	Moneta
	Delnite
	Bankfield
	Gold Eagle
	Sachigo River
	Cobalt Products
	Wendigo
	Argosy (Jason)
	Sturgeon River
	Leitch
151—200	Sand River
	Straw Lake Beach
	Faymar
	Tyranite
	St. Anthony
	Berens River
	De Santis
	Morris Kirkland
	Cline Lake
	Aunor (Augite)
201—250	Broulan
	Naybob
251—300	Cordova (Consolidated Mining and Smelting)

Fires

Buffalo Ankerite Gold Mines, Limited

About 10 A.M. on Sunday, January 21, a fire occurred in the welding shop at the Buffalo Ankerite mine. The shop foreman was using an acetylene generator and a welding torch when a leak developed at the hose connection to the generator, and the lighted torch apparently fired an accumulation of acetylene in the air. This carried the fire directly to the leak at the generator and the fire at this point burned the hose both from the generator and the oxygen tank. It is thought that this flame played directly on to the safety fuse of a 250-cubic-foot bottle of acetylene and melted the safety fuse, which allowed the gas to start escaping from the bottle or cylinder.

Two sprinkler-system heads broke over the burning acetylene and a water-hose was also played into the room. No damage was caused by the fire except to the hose and to two gauges on the equipment. A window was broken to allow the passage of the water-hose. The burning acetylene cylinder was dragged outside, where it continued to burn for several hours. No injuries resulted from the fire, although the welding-shop foreman's eyebrows were singed when the gas in the room was ignited.

De Santis Porcupine Mines, Limited

At 11 P.M. on May 31, the cagetender noticed smoke at the 325-foot level in the shaft at the De Santis mine. He reported this to the shift boss. Upon investigation the drive pulley and the belt on the pump at the 325-foot-level station were found to be smoking.

The fire apparently was due to the fraying of a wood-fibre pulley. Friction apparently ignited this frayed portion, which was smouldering when it was discovered. The fire was immediately extinguished with a fire extinguisher.

Falconbridge Nickel Mines, Limited

A small fire occurred in No. 702-7 stope on the 750-foot level of the Falconbridge mine about 2.15 A.M. on August 16, immediately following blasting operations. It was extinguished about 3 A.M.

This stope had been mined up to the 500-foot level sill by cut-and-fill methods, and the sill was being mined out. No. 502-4 stope, immediately above on the 500-foot level, had been mined out over timber and filled.

About 2.15 A.M. on August 16, J. McNamara, A. Jolly, and Leo Jones blasted a breast in the sill. On returning to the scene of the blast they saw a small fire on top of the muck-pile, about 10 feet below the 500-foot level, and assumed that it was caused by burning powder. They returned to the shaft station and telephoned their shift boss, J. MacDonald. After waiting 15 or 20 minutes they returned to the stope and found the fire still burning, though less vigorously. They extinguished it with water in a few seconds.

The blast had apparently dislodged some small pieces of lagging from the timber under No. 502-4 stope and set fire to them. There were numerous unburned pieces on the muck-pile. This timber had been in place for some years and there was a dry fungus growth on it.

Hollinger Consolidated Gold Mines, Limited

Wood smoke was observed in No. 54SHE10NB drift on the 800-foot level of the Hollinger mine between 8 and 9 A.M. on March 28.

A diamond-drill had been set up in No. 85AE10NB drift on the same level, and a hole had been lined up to explore the area between the two drifts. The drillers were told to drill a hole 80 feet in depth.

On the morning of March 26, the drill broke through the wall of No. 54SHE10NB drift a few inches above the floor. After passing through 18 inches of tightly packed muck the bit entered and passed through a sill timber of 12-inch B.C. fir on the floor of the drift. The bit then passed across a space of 4 feet 6 inches a few inches above the track rails and entered another 12-inch timber of B.C. fir. The drill passed completely through this timber and 12 inches beyond it in tightly packed muck. The hole was then discontinued because it had reached its predetermined length of 80 feet.

Friction caused by the drill passing through the timber created a smoke, which was noticed by the stope crew in No. 54SHE10 stope above the 800-foot level. The smoke abated after drilling was stopped. No one was affected.

A small, smouldering fire was discovered by Mine Captain J. Disley at the Central shaft tipple on the 950-foot level of the Hollinger mine, about 8.30 A.M. on March 30.

The tipple on the 950-foot level dumps four 3-ton cars simultaneously. The tipple mechanism is entirely iron and steel, with the exception of some spacing-plank between two steel plates at the round ends of the rotating tipple. This

plank is 1¾ inches thick and at one time filled half of a circular segment. There were originally about 7 board feet in the plank where the fire was found. Several years ago about half of this plank was burned out as a result of welding operations. This left a jagged surface.

The fire may have been started by someone attempting to throw a cigarette butt down the ore pass, so that the butt struck the wall a few inches behind the end of the tipple and bounced back and fell on the spacing-plank between the two steel plates. The wood at this time was dry-rotted and could be crumbled in the hand.

The fire was only smouldering when it was found. The smoke was exposed by the turning of the tipple as a train of cars was dumped. It is thought that the fire had smouldered for at least twelve hours.

The fire-fighting equipment at this tipple consists of a water-hose and a 2½-gallon soda-ash fire extinguisher.

A small fire occurred on surface in the steam-box at the northwest corner of No. 11 shaft-house of the Hollinger mine about 8.30 A.M. on August 1.

The steam-pipe is covered with asbestos sponge felted pipe covering. The fire occurred in a vertical section of the pipe-line, where the pipe turned up from under 2½ feet of ground. This vertical section next to the wall of the shaft-house was enclosed in a covering of light metal, in which the sawdust was packed. This was held to the outside wall of the building by brackets. A small opening between this covering and the wall may have been the reception point of a cigarette butt carelessly thrown away. The fire might have been started by sawdust coming in direct contact with the steam pipe through a slight movement of the asbestos covering caused by vibration of the pipe-line set up by the head-frame.

No damage was done. The box has since been filled with asbestos cement insulation.

A small fire occurred in No. 26 shaft of the Hollinger mine during the fore-noon of December 23, 1940.

No. 26 shaft is the new 5-compartment ore-shaft, construction of which was begun in 1938. It is now nearly complete.

On December 23 men were rivetting and burning on the swing guides above the shaft collar. The collar was covered over with plank and galvanized iron. There was a timber bulkhead 22 feet below the collar, where the cement ends and the shaft timber begins. Apparently a piece of hot rivet got through a small hole in the covering at the collar and dropped on to the bulkhead, landing near the northeast corner of No. 1 compartment. A smouldering fire was started on some plank covering the bulkhead and spread and charred the top of the wall-plate at this corner of the shaft. The posts and the lining of this shaft are metal.

This shaft is downcast and the smoke was first noticed down in the shaft. The fire was quickly extinguished with hand fire-extinguishers.

International Nickel Company of Canada, Limited

A minor outbreak of fire occurred at the 44th level station, No. 5 shaft, of the Creighton mine at 10.40 A.M. on February 19.

Mike Cushnir, a car repairman, and his helper, W. Kziazkiervicz, were preparing to burn some rivets out of a 4-ton Granby car with an oxy-acetylene torch in the course of their work. Cushnir was using a carbide lamp and was in the act of opening the acetylene-cylinder valve when ignition took place

around the packing nut. The heat burned off the hose connection, and the safety plugs of Rose's metal in the cylinder were melted before the fire could be put out, igniting the gas at those points. The cylinder was barred away from combustible material and allowed to burn until almost empty, when the flame was smothered and the cylinder taken to surface at 11.30 A.M.

The area was guarded throughout the time that the cylinder was burning. No noxious gas of any consequence was given off. Fire-fighting equipment was at hand to prevent any spread of the fire. A small blaze was started in the door of a wooden cabinet, but was put out with a soda-acid extinguisher.

A sulphide fire was discovered in No. 40 stope, 33rd level, at the Creighton mine shortly after 8 A.M. on July 11.

This is a shrinkage stope, about 150 feet long, about 40 feet wide from the 55-degree footwall to the hanging wall, and about 180 feet high. It has been mined to a height of 8 to 20 feet above the 30th level and drawn empty through box-holes, and backfilling was in progress. About half the stope was filled through a pass in the footwall near the north end of the stope. Track was then laid on the 30th level to the north end of the stope and extended into it on a wooden trestle, built on top of the fill already placed. Fill transported in Granby cars was dumped from this trestle, and the trestle was extended until the north half of the stope had been filled up to track level. The trestle was left in the fill. Work was then started to complete the backfilling with a blower.

When the day-shift fillman entered the stope on July 11, he discovered flames coming from a section of red-hot fill, about 2½ feet in diameter, which was enclosed by a cribbed bulkhead, located about 40 feet from the north end of the stope, where it had been erected on top of the fill covering the east side of the trestle. There was a considerable amount of sulphur dioxide given off, and some wood smoke.

The Mine Rescue Station was notified, and equipment was supplied and serviced until the fire was extinguished. A general alarm was not given throughout the mine as this stope is on the exhaust side of the mine ventilation. Numerous tests were made for carbon monoxide, but all showed negative results. Brattices were erected to shut off all ventilation if necessary, following which it was decided to use water on the fire. This was continued until 2.45 P.M., by which time it was apparent that the fire had been extinguished.

The fill in the fire zone was excavated, and it was found that the fire had been located over a trestle post, which had been almost totally consumed. The stringers and ties had been partially burned. The fill was very hot for a distance of about 10 feet from the fire zone.

Rock is used for backfilling and consists of rock-house rejects, having an average sulphur content of about 0.175 per cent. The fill in the locality of the fire was placed during December, 1939, and January, 1940.

A small electrical fire occurred in No. 1-1 drift, No. 42 crosscut, on the 2,400-foot level at the Frood mine about 2.55 P.M. on February 5. It took place at a trolley-line insulator and charred the trolley box over an area about 6 by 6 inches.

The fire was discovered by Shift Boss Fortin and put out with a Pyrene extinguisher. It apparently resulted from arcing caused by a loose insulator.

A small outbreak of fire occurred in a trolley box at the junction of No. 4 shaft crosscut and No. 4 by-pass drift on the 2,400-foot level of the Frood mine at 5.45 P.M., June 12.

Foreman H. Milks noticed a bright flash in the trolley box and opened the sectional switch. He discovered a small fire on the inside of the trolley box at a trolley hanger and extinguished it with wet mud. An area of about one square foot on the inside of the box was charred.

The trolley insulator was examined and found to be in good condition. It is a type N.2 Barn Hanger and has a rated capacity of 750 volts compared with the line voltage of 240 to 250 volts.

It is believed that the fire was caused by a short circuit through an accumulation of moist dust and copper salts.

Jodelo Gold Mines, Limited

A frame construction building, 70 feet long and 22 feet wide at both ends, with a central bay addition 14 feet square, was burned to the ground at the Jodelo mine on July 25. The fire was observed about 11 P.M. The building was completely razed an hour later.

The central section of the building housed an 80 h.p. locomotive-type boiler, the front end of which projected into the bay area of the building. There was a partition wall on each side of the boiler, making a room the width of the bay section and 36 feet long. There was also a small vertical boiler in the room. The boiler was hooked up to the water connections to the larger boiler but had not been used recently. In the south end of the building there was an old Canadian Rand 2-stage steam-driven compressor, having a rated capacity of 620 cubic feet, and an old 8- by 10-inch Jenckes hoist.

In the other end of the building there was a small steam-driven generator used to generate electricity for lighting the plant. This was not in operation at the time. The rest of this end of the building was storage space and workship. In this space there were an oxygen cylinder and a cylinder of acetylene gas, a half drum of rock-drill oil, one 5-gallon can about half full, after the fire, of Red Indian engine oil, and a similar amount of steam-cylinder oil in a similar container. The oil was not burned in either of these cans or in the drum. The acetylene and oxygen cylinders were both burst.

The compressor and hoist were both ruined. The boilers, which were both full of water, did not appear to be injured, aside from damage to external fittings.

The cause of the fire is not known. The company had been operating for five or six weeks previous to the fire on a one-shift schedule. The boiler fireman had been going to work somewhat earlier than the miners and had been letting the boiler fire die out at the end of the shift. On July 25 the workmen were all away from the plant about 2.30 P.M. The boiler flues were cleaned about 10 A.M. The dust was not raked out of the boiler but was left in the chamber in front of the flue.

E. H. Rutherford, mechanic, reports that he was at the plant about 8.30 P.M., when he deposited some detachable bits which he had had sharpened at a neighbouring mine. Another man, a non-employee of the company, is known to have passed the plant about 10 P.M., and he observed nothing unusual.

The fire was noticed about 11 P.M. from the manager's residence, approximately two-fifths of a mile distant. When the manager got to the fire it was most advanced in the bay portion of the building, indicating that it had started there. There was no accumulation of rubbish anywhere which might start the fire by spontaneous combustion. The floor of the building was all concrete with the exception of part of the storehouse, which was rock-filled and was kept tidy and clean.

There were no men in the mine. A stream of water was played on the shafthouse and headframe to protect them from sparks, and also on a pile of coal,

containing about 40 tons, which was lying on the ground in front of the boiler-room door. About 5,000 gallons of water were used from the 10,000-gallon supply tank.

Kelrowe Gold Mines, Limited

A frame building, 75 feet by 35 feet, at the Kelrowe mine was destroyed by fire on July 10. This building had been used temporarily as a hoist-room, compressor room, boiler-room, warehouse, and change-room. The operations at the property had been stopped on June 4. Arrangements had been made to have suitable buildings erected before operations were resumed.

Fire broke out at about 6 P.M. Only one man was on the property at the time, an employee of A. Patrice, the contractor who had carried out all the operations. The cause of the fire is unknown.

Lake Shore Mines, Limited

A smouldering fire occurred on February 2 at the Lake Shore mine. An acetylene torch was used to make certain repairs on the dump plates at the 2,000-foot-level crusher between 11 A.M. and 1 P.M. Repairs were completed with no sign of fire. At about 3.30 P.M. the crusherman noticed a smoky haze coming from behind the timbers each time a car was dumped. He turned the fire-hose on the suspected spot for half an hour. Again at 5.30 P.M. a hose was played on the spot for half an hour. At 11 P.M. the crusherman who came on shift used more water and a one-quart Pyrene extinguisher, which was successful in killing the smouldering fire. It is thought that a spark from the torch may have smouldered between the plates and timbers of the dump. There was no visible damage and only a small amount of smoke.

Paymaster Consolidated Mines, Limited

Fire broke out at 4.10 A.M. on March 20 in the steel-shop at No. 5 shaft at the Paymaster Consolidated mine and razed the entire building.

Two men were working in the shop at the time. One man was operating a Barnes 20-inch drill press and the other was tempering steel shanks in an open tank of oil. A third man entered the shop to get some fuel oil to mix with garbage which he was putting into an incinerator. He filled a can from a tap from the supply line leading from an oil-storage tank, which was buried outside, to the furnaces. Apparently, while this man was filling his can, the supply to the furnace was cut off. Then, when he closed the tap, the surge of oil flooded the furnace and the excess oil exploded and the flames shot from the furnace and rose to the roof, setting it afire.

One of the men ran immediately to the hoist-room, about 175 feet away, to warn the hoistman. The other man got out the fire-hose from the hydrants. There were two hydrants with 30-pounds water pressure within 50 feet of the shop. The pressure on these lines was later increased by hooking the mine pump directly to the lines giving 100 pounds pressure. The South Porcupine fire brigade arrived about twenty minutes after the outbreak of the fire, and the fire was prevented from spreading to other buildings.

The building was of frame construction, 48 feet by 58 feet 8 inches, by 14 feet, and was located 100 feet from the shaft. Parts of the building were oil-soaked. There were two open quenching-tanks of oil in the shop, both of which burned. There was also a tank of acetylene, which burst at the cap and leaked out, adding to the conflagration. No injuries were suffered by anyone working around the fire.

At the time of the outbreak of the fire there were 13 men underground. The cagetender and shift boss were on surface. They turned the ethyl mercaptan into the air-lines and the shift boss went underground to round up his men. Only five men, who were working in a drift, got the stench warning. The other workmen, four on motors and four scalers, were not using air, and the fact that the air was blowing wherever blasting had been done a few hours previously accounts for these men not noticing the stench around the shafts where they were working.

White Guyatt Mine

A 12- by 15-foot frame blacksmith shop was burned to the ground during the afternoon of September 18, at the White Guyatt mine, 12 miles east of Matheson. The White Guyatt property has been optioned by Wright-Hargreaves Gold Mines, Limited. This company has contracted with Caswell Construction, Limited, to do a certain amount of underground work. The latter company erected and equipped the blacksmith shop about the end of August.

A fuel-oil barrel had been placed on a stand behind the shop. The tempering-furnace burner was fed from this barrel. The blacksmith claimed that pressure was required to vaporize or emulsify the oil so that the burner would work properly. He therefore ran a 1-inch air-line from the high-pressure air-line, which was used for the steel-sharpener, to the top of the fuel-oil barrel. At this point on the 1-inch line he placed a "tee" and a Morrison safety valve, which was supposed to have been set to blow off at 10 pounds pressure.

The barrel blew up about three o'clock in the afternoon, and was thrown about 50 feet into the air. The oil in the barrel was scattered, and much of it fell over the shop. The building caught fire immediately, probably from the furnace back-firing through the feed line, which was broken. No one was injured. The material loss was not great. No other building was endangered by the fire.

The accident was the result of placing too much pressure on a fuel-oil barrel, which was not designed to withstand pneumatic pressure.

Yama Gold Mines, Limited

A shaft fire was discovered at Yama Gold Mines, Limited, at 6.25 P.M. on July 25. No men were underground at the time.

W. MacDonell, deckman, noticed smoke emerging from the shaft and immediately notified the fireman on duty. The alarm was sounded. A fire-hose was connected to the hydrant at the shaft manway, and a flow of water was started down the manway. Within 8 minutes a second line of hose had been connected to the high-pressure fire-pump at the boiler and a second stream was turned into the shaft compartments. Pumpmen were despatched to all pumping stations to insure a steady supply of water. The fire was extinguished at 6.55 P.M.

Owing to the shortage of air for drilling purposes, the pumps were operated by steam. On July 25 a leak developed in the steam line at the 23rd set, or 205 feet from surface. This was welded between 4.45 P.M. and 5 P.M. Hot metal which fell between the platform and lining boards of the manway was the cause of the fire. The platform and five lining boards were charred.

The 3-compartment, No. 1 or main shaft at the Yama mine is quite wet, and the management thought no fire hazard existed. Fortunately hydrants and hoses had been installed at shaft stations and collar, and necessary equipment was immediately available.

No welding is to be done in future by the mechanical staff underground unless metal plates are used and the immediate area thoroughly wetted down.

Prosecutions

Rex *vs.* Fred Clark

On September 21, 1941, a charge was laid against Fred Clark, machine runner and subcontractor to Caswell Construction, Limited, contractors in turn to Wright-Hargreaves Mines, Limited, optioners of the White Guyatt mine, as follows:—

That on September 19, 1940, Fred Clark of the White Guyatt mine, Nunro, district of Cochrane, did unlawfully drill within five feet of a hole containing explosives, contrary to the provisions of Section 160, subsection 73 (b) of the Mining Act.

Clark pleaded guilty before Magistrate Tucker on October 5, 1940, at Matheson Court House, and was fined $25.00 and costs amounting to $10.15, or one month in jail. The fine was paid.

Rex *vs.* Fred Derwin

On September 21, a charge was laid against Fred Derwin, driller, at Sylvanite Gold Mines, Limited, as follows:—

That on September 3 in the Township of Teck, Fred Derwin did unlawfully, being employed in or about the Sylvanite gold mine and having placed explosives in five holes in the face of 1113 subdrift, Sylvanite gold mine, fail to fire the said charges in one blasting operation, contrary to Section 160, subsection 78 (b), the Mining Act of Ontario, R.S.O., 1937, Chapter 47.

Derwin pleaded "guilty" before Magistrate S. Atkinson on September 25 and was fined $10.00 and costs, or ten days. The fine was paid.

Rex *vs.* W. D. Fry

A charge was laid against W. D. Fry, a chute blaster at the Falconbridge Nickel Mines, Limited, as follows:—

That Wilfred David Fry at Falconbridge Nickel Mines, in the district of Sudbury, on or about the 23rd day of February, A.D. 1940, did use a fuse in a blasting operation less than 3 feet in length, contrary to Section 160, subsection 76, of the Mining Act of Ontario.

A plea of "guilty" was entered before Magistrate J. S. McKessock at Sudbury, on February 29. The minimum fine of $10.00 and costs, or 30 days, was imposed. The fine and costs, totalling $21.00, were paid.

Rex *vs.* Dan Gillis
Rex *vs.* Joel Pilliacka
Rex *vs.* Paavo Warri

Separate charges were laid against Dan Gillis, Joel Pilliacka, and Paavo Warri, miners at the J-M Consolidated Gold Mines, Limited, Jackson Manion, as follows:—

That . . . of the hamlet of Jackson Manion, in the district of Kenora (Patricia portion), on or about the 24th day of February, A.D. 1940, at the hamlet of Jackson Manion in the said district of Kenora, did unlawfully allow himself to be hoisted in a bucket in the winze of the J-M Consolidated Gold Mines, Limited, contrary to the provisions of Section 160, subsection 146 (a), of the Mining Act of Ontario.

All three pleaded "guilty" on March 8, and each paid a fine of $10.00 and costs.

Rex *vs.* Clifford Henderson

On September 26, 1940, a charge was laid against Clifford Henderson, deckman at the Kerr-Addison mine:—

That on September 11, in the township of McGarry, Clifford Henderson did unlawfully being an employee of Kerr-Addison Gold Mines, Limited, leave explosives near the entrance to

the said mine and did not transfer them to a designated storage place without undue delay, contrary to Section 160, subsection 64 (b), Mining Act of Ontario, R.S.O. 1937, Chapter 47.

Henderson pleaded "guilty" and paid a fine of $10.00 and costs on September 26.

Rex *vs.* J. Mali

A charge was laid against J. Mali, a crane chainman at the Copper Cliff smelter of the International Nickel Company of Canada, Limited, by Chief of Police F. R. Jarvis, of Copper Cliff, as follows:—

That Jack Mali on or about the 22nd day of December, 1939, at the town of Copper Cliff, being under the influence of liquor, did enter a mine, to wit, the Copper Cliff smelter, contrary to Section 285 of the Mining Act of Ontario.

A plea of guilty was entered before Magistrate J. S. McKessock, at Sudbury, on December 27. The minimum fine of $10.00 and costs, or 20 days, was imposed. The fine and costs were paid.

Rex *vs.* Otto May

Otto May, manager from February to May, 1940, of Wolfe Lake Mines, Limited, was charged with a breach of Section 170, subsection 1, of the Ontario Mining Act. The case was heard before Magistrate Atkinson, at Haileybury, on August 9, 1940. May pleaded "guilty" and was fined $200 and costs.

Rex *vs.* G. Moras

A charge was laid against G. Moras, driller at the Toburn Gold Mines, Limited, as follows:—

That on October 26 after loading the cut-holes, he placed explosives in a helper hole in the face of the subdrift in 574E stope, Toburn mine, and did not place a properly prepared detonating agent in said hole, in violation of Section 160, subsection 78(a), of the Mining Act of Ontario.

The charge was heard before Magistrate Atkinson in Kirkland Lake Police Court on December 14. Moras pleaded guilty and paid a fine of $10.00 and costs. The charge against Moras arose out of an accident in which J. Sekulic, a driller on the succeeding shift, drilled into powder, suffering injuries to his eyes and hand.

Rex *vs.* D. F. Pidgeon
Rex *vs.* E. Wride

The preliminary hearing of the case against D. F. Pidgeon, president and manager of Wolfe Lake Mines, Limited, and E. Wride, mine manager during June and July, was held in Kirkland Lake on August 8, and both men were committed for trial on a charge of manslaughter at the Fall Assizes at Haileybury. The charges arose out of a fatal accident to Clifford W. Carter, at the Wolfe Lake mine, on July 2, 1940.

On October 7 the Crown presented its evidence to the Grand Jury in the Haileybury Court House. The Grand July returned a true bill on the charge of manslaughter on the morning of October 8. A postponement of the trial until the Spring Assizes was granted at the request of the defence. Bail was set for D. F. Pidgeon and E. Wride at $3,500 each.

Rex *vs.* J. A. Poirier

A charge was laid against J. A. Poirier, of Hibbing, Minn., U.S.A., as manager of the La Re Exploration Company, as follows:—

On or about the 15th day of July, A.D. 1940, at mining location 357P near Hilly lake, in the district of Kenora, did unlawfully permit an internal combustion engine to be operated underground in a mine without permission in writing of the Chief Inspector of Mines for Ontario contrary to the provisions of Section 160, subsection 37, of the Mining Act of Ontario.

Poirier was arraigned for trial before Magistrate Wolfe of Kenora, on September 7, and pleaded "not guilty." The trial was held on September 14. On September 27 Magistrate Wolfe found Poirier guilty as charged and imposed the minimum fine of $100 and costs, or two months' imprisonment. The fine was paid.

Rex *vs.* Porcupine Lake Gold Mining Company, Limited

A charge was laid against the Porcupine Lake Gold Mining Company, Limited, as follows:—

That Porcupine Lake Gold Mining Company, Limited, and owner of mine workings in the township of Whitney, having received instructions on January 23, 1940, from E. B. Weir, an Inspector appointed under the Mining Act of Ontario, R.S.O. 1937, Chapter 47, Section 160, subsection 162, has refused or neglected to carry out the said instructions as required by the Mining Act of Ontario, contrary to the Mining Act, Section 170, subsection 1.

The case was heard before Magistrate Atkinson in South Porcupine on April 9. The lawyer representing the company entered a plea of "not guilty."

The company was found guilty and was fined $100 and costs, amounting to $16.75.

Rex *vs.* George Simpson

A charge was laid against George Simpson, manager of Porcupine Lake Gold Mining Company, Limited, as follows:—

That George Simpson being the manager of the Porcupine Lake Gold Mining Company, Limited, and having received written instructions on January 12, 1940, and on January 23, 1940, from E. B. Weir, an Inspector appointed under the Mining Act of Ontario, to proceed forthwith to provide an auxiliary exit at the mine workings of the said company in the township of Whitney as provided by the Mining Act of Ontario, R.S.O. 1937, Chapter 47, Section 160, subsection 19, has refused or neglected to carry out the said instructions as required by the Mining Act of Ontario contrary to the Mining Act of Ontario, Section 170, subsection 1.

The charge was heard before Magistrate Atkinson, at South Porcupine, on March 1. A plea of "not guilty" was entered. Simpson was found guilty and a fine of $100 and costs was imposed.

Rex *vs.* George Sutherland

A charge was laid against George Sutherland, machine helper, at the No. 2 operation of the Central Patricia Gold Mines, Limited, on April 25, as follows:—

That George Sutherland of the hamlet of Central Patricia, district of Kenora, Patricia portion, on or about the first day of April, at the hamlet of Central Patricia, being an employee of the Central Patricia Gold Mines, Limited, No. 2 operation, did unlawfully commit a careless act where explosives are stored, to wit, leaving a quantity of electric blasting caps in the 7th level powder magazine contrary to the provisions of Section 160, subsection 53(c), of the Mining Act of Ontario.

Sutherland pleaded guilty on May 9 and paid a fine of $10.00 and costs.

Rex *vs.* O. R. Wray

A charge was laid against O. R. Wray, former shift boss at the Kerr-Addison mine, as follows:—

That O. R. Wray, shift boss at the Kerr-Addison mine, on the 12th day of November, 1939, unlawfully did not, in violation of subsection 4, Section 159, Part VIII of the Mining Act of Ontario, take all necessary and reasonable measures to enforce the requirements of subsection 82, Section 160, Part VIII of the Mining Act of Ontario, in that he and M. Ponne, mucking machine operator, returned to the face of 509 crosscut after blasting it and before sufficient time had elapsed to allow the blasting gases to have been blown out or diluted to a safe degree, contrary to Section 159, subsection 4, of Part VIII of the Mining Act of Ontario.

The case was heard before Magistrate Atkinson in Kirkland Lake on January 18, 1940. Wray entered a plea of "guilty." A fine of $10.00 and costs was imposed. The fine was paid.

Mine Rescue Stations

During the year normal activities were carried out at the three mine rescue stations, at Timmins, Kirkland Lake, and Sudbury. Instruction in the use of the All Service gas mask was given at all the producing mines in the mining inspection district of Kenora. Eighty fully trained mine rescue teams were maintained, 20 teams in Sudbury district, 30 teams in Kirkland Lake district, and 30 teams in Timmins district.

Summary of Rope Tests, 1940

The following is a summary of the tests made in the Wire Rope Testing Laboratories of the Department of Mines during 1940:—

Tests for Ontario mines under Act	564
Special informative tests	169
Tests for wire-rope manufacturers	35
Tests for mines outside Ontario	45
Other tests	2
Total	815

Fatal Accidents

MINES

Algoma Ore Properties, Limited

John Klavechuk, British, aged 24, single, employed as a driller at the Helen mine, was fatally injured in the open pit about 10.50 A.M. on January 13.

The open pit was started on the west slope of the Helen hill to mine a siderite iron deposit that cuts across the top of the hill. The floor of the pit is 120 feet below the hilltop, and a vertical face, extending across the full width of the ore body, is being mined eastwards. A churn drill and an electric shovel are used. Considerable secondary blasting is necessary to break up large chunks in the muck-pile.

On the morning of January 13, the face of the pit was about 280 feet long and 90 feet high. The muck-pile was evenly distributed against the face, at a slope of 40 to 45 degrees, to a height of 40 feet. The shovel was digging in the muck-pile near the centre of the face when it encountered a solid toe and several large chunks. Pit Boss A. Stefoiniu, assisted by Klavechuk, drilled a hole in the toe and another in a chunk with a plugger drill. He then took Klavechuk to the north side of a large chunk, located about 30 feet farther north and 15 feet up the slope of the muck-pile, and showed him where to drill a hole in it. Stefoiniu told Klavechuk to stay on the north side, as the muck on the south side had recently been disturbed by the shovel, and then left to get powder and fuse.

Klavechuk, assisted by M. Lisny, shovel helper, took the plugger and hose up to the north side of the indicated chunk, and was preparing to drill it when a few small pieces of muck rolled down the pile in that vicinity. He then moved the plugger to the south side, though warned by Lisny not to do so. Lisny helped him start the hole and then left to get more drill-steel. About 10.50 A.M. Klavechuk had drilled about 2 feet of hole when a slide started in the muck-pile immediately south of, and above, the chunk he was drilling. He left his plugger and ran towards the floor of the pit, but apparently, after taking a few steps, he was struck a glancing blow across the shoulders by a piece of flying muck. He was thrown to the north out of the path of the slide and fell head first

on the sloping muck-pile, striking his head violently. He was removed by special train to the Red Cross Hospital at Hawk Junction, where he died at 4 P.M. the same day. He had sustained a fractured skull and laceration of the brain, attended by profuse haemorrhage.

An inquest was held before Chief Coroner A. S. McCaig, M.D., at Sault Ste. Marie on January 16. The verdict of the jury was as follows:—

We, the jury enquiring into the death of John Klavechuk, find that he came to his death from injuries caused by a rock-slide in the Helen mine pit at 10.50 A.M., January 13, 1940, and died in the Red Cross Hospital, Hawk Junction, at 4 P.M. the same day. We find the circumstances of his death to be accidental and no blame to be attached to anyone.

Eino Maki, naturalized British subject, of Finnish birth, aged 34, married, employed as a pit boss at the Helen mine, was killed in the open pit about 8.05 A.M. on September 14.

A vertical face is being mined eastwards across the full width of the siderite ore body by means of churn-drilling. An electric shovel is used to load the broken ore into Athey wagons drawn by tractors. The face was about 245 feet long and 120 feet high after a blast on September 1, which produced about 46,000 tons.

When the day-shift crew started work at 8 A.M. on September 14, the muck-pile was about 40 feet high and within 50 feet of the face. Maki was instructed by Shift Boss W. Quarrel to have the muck-pile barred down and have holes drilled in the face from the muck-pile for rock bolts to which the safety-belt ropes could be attached. They had been attached previously to large chunks on top of the pile near the face, but this had become unsafe due to the reduction in the size of the pile. It was not considered feasible to put the ropes down from above, as the top of the face had been cut back by overbreak and was very jagged. Maki took three men up on the pile, and they started to bar it down without using safety-belts as is customary. Maki and J. McNabb were working about 75 feet from the north wall of the pit, while the other men were about 100 feet farther south.

About 8.05 A.M., Maki was standing on a large chunk, weighing about 3½ tons, barring at another in the pile below him, when a slide started at that point. McNabb jumped clear of the moving muck but Maki was thrown into it when the chunk on which he was standing rolled over. His left leg was caught between two large chunks, which pulled him down to within 3 feet of the pit floor. The one on which he had been standing rolled over him during the descent.

He was apparently dead when reached by the men on the pit floor. His chest had been badly crushed, and his left leg had been practically severed at the hip.

An inquest was held before Chief Coroner A. S. McCaig, M.D., at Sault Ste. Marie on September 17. The verdict of the jury was as follows:—

We, the jury, find that Eino Maki came to his death at the Helen mine on September 14, 1940, about 8.05 A.M. by being crushed by a falling rock while barring down rock-pile without wearing a safety-belt as is the usual custom. We, the jury, feel that greater precaution should have been taken by the man for his own safety and for that of his fellow workers.

Aunor Gold Mines, Limited

Herman Palmer, Finn, aged 30, married, with two children, employed as a mechanical shovel operator, was instantly killed on the 1,250-foot level of the Aunor mine by the fall of approximately 2 tons of rock at 7.20 A.M. on December 5. Palmer was first employed at the Aunor mine in June, 1939, as a surface labourer; after working for one month he was laid off, but was re-engaged two

months later for underground work. He had previously worked at the Bidgood mine.

The only work at this time on the 1,250-foot level was the driving of No. 1,202 crosscut. This crosscut is 6 feet wide and 7½ feet high. The face at the time of the accident was 155 feet south of the shaft station. Two rounds are broken daily in this heading. The drillers commence their shifts at 7 A.M. and 7 P.M.; the muckers commence at 3 A.M. and 3 P.M. A Gardner Denver mechanical loader is used.

No. 1,202 crosscut entered a band of talcose schist 50 feet south of the shaft station. This formation is about 200 feet in width, dips northward, and lies above the ore-bearing formation. It has been crosscut on all the levels above it. The ground is soft and is difficult to sound. It sloughs off from the back of the crosscut until an arch has formed. The practice when crosscutting this formation has been to scale the whole of it at the beginning and end of each shift.

Palmer and his partner, Rudolph Blais, went on shift at 3 A.M. Palmer acted as leader. The only other man in the mine at this time was the cage-tender.

Palmer and Blais scaled several tons of rock. About 39 feet behind the face was a piece that they thought might be loose, but which, upon sounding, appeared solid. They scaled all around it. Palmer was scaling about 5 feet ahead of this piece and stepped back under it just as it fell. The piece was 5½ feet long, 6 feet wide, and 1 foot thick. About 2½ feet of the width came from the wall and 3½ feet from the roof.

Palmer's injuries consisted of a severely compounded fracture of the left leg below the knee, amputation of the left arm above the elbow, severely crushed chest, head lacerations, and probable fracture of the skull. Death was instantaneous.

An inquest was held before Coroner H. E. Montgomery, in Timmins, on December 9. The jury's verdict was as follows:—

We, the jury, find from the evidence that Herman Palmer came to his death at the Aunor mine on December 5, 1940, from injuries sustained from a fall of rock from scaling. No blame attached to anyone.

Berens River Mines, Limited

Armas Paakkarinen, Finn, single, aged 31, employed as a driller at Berens River mine, was fatally injured in the No. 1 stope, No. 10 drift, on the 250-foot level, about 10.15 P.M. on February 19, when he was pinned under a falling slab of ore. He died at 12.15 A.M. on February 20 in the company's hospital. He had started to work at Berens River on February 18.

No. 1 stope, which is worked by the shrinkage method, had been mined to a height of 40 feet above the level at the time of the accident. At this elevation the values had dropped below ore grade and mining was discontinued. The stope was 75 feet long, averaged 6 feet in width, and dipped at about 60 degrees. The stope floor was stulled and was 6½ feet above the drift floor. The stope was served by five chutes at 15-foot centres and had a manway at each end.

The broken ore had all been drawn off except for the ridges of muck which were left between the chutes. The top of the muck was about 8 feet above the chutes. No work had been done in this stope for several days, but on the night-shift of February 19, Paakkarinen, with T. Cockle as a helper, was detailed to work there and clean out the muck between the chutes. To do this the men had to pick or pry the muck loose and into the chutes with scaling-bars.

Shortly after 7 P.M. the shift boss instructed Paakkarinen and Cockle to scale the hanging wall of any loose and to post or sprag if necessary. He pointed

out to Paakkarinen some small pieces of loose with orders to scale them down. He tested the hanging wall over the chute with a pick and found that it gave no evidence of being loose. He went through the stope again about 8.30 P.M., pointed out the loose to Paakkarinen, and again told him to scale it down. Paakkarinen did so.

About 10.10 P.M. the scaling-bar which Paakkarinen was using slipped from his hands down the muck and through the chute on to the drift below. He asked Cockle to go to the level and pass it up to him through the chute, which Cockle did. Before Cockle reached the manway, which was only 30 feet from the chute, he heard some muck falling into the chute and then Paakkarinen's calls for help. When Cockle reached the part of the stope where they had been working he found that Paakkarinen was completely covered, except for his head, under a slab of rock which had fallen from the hanging wall directly above the chute. Paakkarinen was face downward on the footwall, with the scaling-bar under him across his chest. The slab measured 15 by 10 by 1½ feet, but had broken into several pieces, and the part that was lying on Paakkarinen was about 7 feet long and weighed about 7 tons. He was released about 11.25 P.M., after the slab had been jacked off him, and was taken to the hospital, where he died at 12.15 A.M. The cause of death was given as shock and severe internal haemorrhage caused by numerous fractures of the pelvis.

The slab in place was long enough to be supported on the ends by the top of the muck ridges on each side of the chutes. The walls of the muck ridges were almost vertical on the chute side. The slab may have originally been so large that it gave no indication of being loose when sounded. Scaling had not been done very carefully, as considerable loose was found directly above the spot from which the slab had fallen.

There are several possible explanations of the accident. Paakkarinen may have undermined the slab, either by mucking or when he scrambled up the footwall; or he may have been actually standing under the slip, scaling the smaller piece, and have brought the larger piece down on himself.

An inquest was held at Berens River mine on February 20 before Coroner T. J. Goodison, M.D., of Red Lake. His verdict was as follows:—

I, T. J. Goodison, M.D., Coroner, conducting the inquest into the death of Armas Paakkarinen, without a jury, give my verdict as follows: That the deceased, Armas Paakkarinen, came to his death at about 12.15 A.M. on February 20th, 1940, at the Berens River Mines, Limited, hospital as a result of shock resulting from internal haemorrhages and crushing injuries to the lower body. From the evidence given at the inquest it is my opinion that the injuries sustained by the deceased, which resulted in his death, were caused by the deceased being accidentally caught by falling loose, on the 250 level of the Berens River Mines, Limited.

Central Patricia Gold Mines, Limited

John C. Bell, British, single, aged 35 years, employed as a timberman's helper at the Central Patricia gold mine, was fatally injured about 2.35 P.M. on April 15, when he fell through a dump-hole on the No. 5,855 sublevel into No. G6, an empty, 55-degree stope down to the 625-foot-level stope floor, a distance of about 118 feet.

The G ore body is located 500 to 600 feet west of the shaft, 100 feet south of the west end of the main ore body, and has been worked between the 625- and 375-foot levels. A raise was driven in the ore body from the 625-foot level to establish No. 5,855 sublevel at the 500-foot level elevation and later to connect with the 375-foot level. No. 5,855 sublevel is not connected to the shaft, but is reached through manways from the 375- or 625-foot levels in the stopes. The ore in No. G6 stope was mined by shrinkage methods from the 625-foot level

to within 20 feet of No. 5,855 sublevel. The stope was later emptied of muck. Subsequently 5 box-holes and chutes were established from No. 5,855 sublevel drift and a continuation of the stope, known as No. G5, was mined through to the 375-foot level. A raise was driven through to the sublevel from No. G6 stope in front of the centre or No. 3 box-hole, through which the ore from No. G6 stope could be passed to the 625-foot level. No. G6 stope was kept empty and acted as an ore pass for the broken ore from No. G5 stope.

No. G6 dump-hole is about 7½ feet in diameter and is covered, except for an opening 3 feet wide and 5 feet long directly in front of the chute. Hinged doors are provided to close this opening when the chute is not being pulled and for the men to stand on while barring the chute. A run-around track passes behind and under the chute, and spur tracks lead to the dump-hole on either side for dumping muck, which is trammed from the other chutes on the sublevel. There is a 3- by 5-inch stop-block, fastened by chains, across the spur track a foot back from the end of the rails and at the edge of the dump-hole. The dump-hole is guarded on each side by a log, 4 inches in diameter, flattened at each end to fit into wooden brackets nailed to posts on each side of the opening. The brackets hold the guard rail at 3 feet 6 inches above the tracks. An air-nozzle for blowing smoke is provided 5 feet west of the edge of the dump-hole. The nozzle is on the drift floor on the north side of the drift. No. 3 chute is on the south side. The air-valve is located 60 feet west of the nozzle. The dump-hole and the front of the chute cannot be seen until a position 20 feet past the air-valve is reached. Only the drift behind the chute can be seen from the air-valve.

At the time of the accident the 375-foot level-drift floor over No. G5 stope was being removed and stulls were being installed across the opening to carry the track.

On the night-shift of April 13, Kosti Bendokus and his partner had passed some 40 cars from No. 3 chute on No. 5,855 sublevel directly into No. G6 stope in order to lower the muck in No. G5 stope so that hitches could be cut and the drift stulls installed at the 375-foot level. There was no work on Sunday, April 14.

On April 15, Bell and C. Ollikainen were detailed to cut hitches and install three more stulls. Two hitches were cut and the stulls installed, but it was found that the muck was still too high to allow them to cut the hitches for the third stull, so the men went through No. G5 stope manway to the sublevel to draw off more muck through No. 3 chute. As it was found necessary to blast, Bell went for fuse and powder while Ollikainen prepared a place for the blast. Ollikainen worked on the east side of the chute and Bell on the west. Ollikainen placed a charge of two sticks of powder in the chute and lit the fuse. He walked around behind the chute, joined Bell, and went to the west end of the sublevel to wait for the blast to go off and at the same time to guard the manway from the 625-foot level. The manway from the 375-foot level is to the east of the chute. After the blast they waited about three minutes, then started back to the chute. Ollikainen, who was in front, stopped to get more powder and a fuse, as a second blast had been considered necessary. Bell passed him and went on to the chute. Ollikainen, observing that there was smoke around the dump-hole, told Bell to wait and at the same time stooped to turn the air on full. Bell hesitated, but continued. Ollikainen started for the chute and rounded a corner in sight of the dump-hole in front of the chute in time to see Bell's light disappear down the dump-hole. Bell fell 118 feet, mostly on a 55-degree slope, into a chute at the 625-foot level. He was removed from the chute about 2.40 P.M. in a semi-conscious condition and taken to the company's hospital, where he died at 7.40

P.M. His injuries consisted of multiple wounds about the head, a broken nose, a fractured skull, a fractured right femur, 4 inches above the knee, and a fractured right thigh. Death was due to shock following multiple injuries.

How Bell came to fall into the dump-hole can only be surmised, as he was out of Ollikainen's sight until the instant his light disappeared down the hole. The following facts were known after the accident. There was no smoke west of the dump-hole, but there was smoke directly over the dump-hole and in front of No. 3 chute. Two sticks of powder and a 7-foot fuse were used in the blast. The drift at the chute is usually clear of smoke in five minutes, even when a larger quantity of powder is used and the air is turned half on. The length of time that air was blown at half-force was estimated at about 3 minutes. The log guarding the west side of the dump-hole was lying on the track about 2½ feet back from the car-stop. The guard-log would normally be directly over the car-stop. It was long enough to project over the track which ran behind the chute. Bell worked on the west side of the chute.

According to the evidence, the guard-log could not be knocked out of place by the concussion from the blast. Ollikainen did not remember whether or not the guard-log had been in place. The log was sometimes removed when barring the chute. Ollikainen must have been within 45 feet of the chute to make it possible for him to see Bell's light disappear down the dump-hole. He saw only the reflection of the light; he did not see Bell.

Bell may have removed the guard-log, unnoticed by Ollikainen, to inspect the chute before the blast and, on returning, tripped over it and stumbled into the dump-hole.

An inquest was held at the Central Patricia mine at 4 P.M. on April 17 by Coroner E. S. Connor, M.D. His verdict was as follows:—

> I find that John C. Bell came to his death as a result of injuries sustained in an accidental fall down G6 stope in the Central Patricia gold mine at about 2.35 P.M. Monday, April 15, 1940.

Chesterville Larder Lake Gold Mining Company, Limited

Percival Michael Robinson, British, single, aged 23, working as mucking-machine helper and motorman, received fatal injuries when he was crushed between a battery locomotive and car in No. 301 crosscut on the 3rd level of the Chesterville mine, at 2.20 A.M. on July 5.

Robinson was assisting H. Krobel as a helper on a mucking-machine in mucking No. 3A1 mucking-machine box-hole in No. 303 west drift. E. Laska and M. Bogdan were operating a mucking-machine, mucking out a drift round which had been blasted in No. 304 west drift on the day shift of July 4.

Nos. 303 and 304 west drifts are driven west from No. 301 main crosscut. The distance between Nos. 303 and 304 west drifts where they intersect No. 301 main crosscut is 54 feet. No. 3A1 box-hole in No. 303 west drift is approximately 230 feet west of No. 301 main crosscut. The development heading in No. 304 west drift had advanced 136 feet west of the main crosscut at the time of the accident.

Nos. 303 and 304 west drifts turn sharply towards the north before intersecting No. 301 main crosscut. The curve in No. 304 west drift obstructs the view of No. 301 main crosscut at a point approximately 35 feet from the intersection.

The general procedure was for Robinson, as motorman, to pick up a load of empty 2-ton cars at the shaft station and push them in on No. 301 main crosscut and spot them north of No. 304 west drift. The motor was then spotted below No. 303 west drift towards the shaft station on the main crosscut. As the men

mucking in Nos. 303 and 304 west drifts required cars they would hand-tram one car from the main crosscut to their working place and load it. The loaded car was then hand-trammed to the main crosscut and down to the motor below No. 303 west drift, where it was coupled to the car or motor. When all cars had been loaded and the train made up, the train was pulled to the shaft station.

Prior to the accident a train of seven empty cars had been spotted north of No. 304 west drift in the main crosscut and the motor taken to its accustomed point below No. 303 west drift. Five of these cars had been loaded by Robinson, Krobel, Laska, and Bogdan and hand-trammed and made into a train on the main crosscut below No. 303 west drift. Of the last two empty cars, one had been trammed by Robinson and Krobel into No. 303 west drift, the other had been hand-trammed by Laska and Bogdan into No. 304 west drift.

Krobel started mucking. Robinson walked out of the drift to the main crosscut and for some unknown reason moved the train north on the main crosscut. The motor was standing on the switch at the intersection of No. 304 west drift and the main crosscut at the time of the accident. Robinson did not tell anyone of his intention to move the train.

In the meantime, Laska and Bogdan had loaded their car in No. 304 west drift heading. Bogdan proceeded to tram the car to the main crosscut. Laska had stopped to examine the track and was following Bogdan down the drift. Bogdan, on rounding the curve in No. 304 west drift, saw the train on the main crosscut directly before him. He called to Laska for assistance and tried to stop the car. Before Laska arrived, the loaded car had run into the motor on the main crosscut. Robinson, who was on the motor, was crushed between the motor and loaded car.

Robinson was released immediately by Laska, Bogdan, and Krobel, who had arrived in response to the cries for help. Bogdan claims that he saw the train, but did not see Robinson. This is very likely, because when Robinson moved the train he failed to turn on the headlight of the motor. Also the position in which he was found showed that he must have been bent over the control box and guard with his head and shoulders along the side of the motor, which might have thrown his own light down.

Bogdan tried to stop the car before the collision. The grade of the track at the curve in No. 304 west drift is 1.23 per cent., increasing to 2.54 per cent. before reaching the main crosscut. The 40-cubic-foot, 2-ton side-dump cars weigh approximately 1,635 pounds. When loaded, the cars weigh approximately 5,500 pounds. Bogdan and Laska, when tramming together, could control the loaded car on this track.

Robinson's injuries consisted of a bruised left shoulder and right arm, multiple fractures of the skull, and cerebral lacerations.

An inquest was held at Kirkland Lake Town Hall at 3.30 P.M. on July 11 before Coroner J. F. Edis, M.D. The jury returned the following verdict:—

Percy Robinson came to his death as a result of being crushed between ore car and motor on main drift of third level of Chesterville Larder Gold Mines on July 5, at 2.30 A.M. Cause of death, multiple fractures of skull and cerebral lacerations.

Coniaurum Mines, Limited

J. Cutulovich, Jugo-Slav, aged 37, married, with family in Jugo-Slavia, employed at the Coniaurum mine as a driller, was instantly killed about 12.30 A.M. on July 28 at the face of No. M-1 east crosscut on the 400-foot level, when the round of holes started to fire before he had completed lighting them. J. MacDonald, his helper, was seriously injured at the same time.

The east face of No. M-1 crosscut was approximately 2,750 feet distant from the shaft. The crosscut was being worked on a "double header" schedule, the drillers starting their shift at 7 A.M. and 7 P.M., and the muckers at 4 P.M. and 4 A.M. On the day shift of July 28 there were two missed holes, which the day crew blasted and mucked out. They then set up and drilled 6 holes. Cutulovich and MacDonald, who composed the drilling crew following them at 7 P.M., completed the round. Their work was inspected during the early part of the shift by Shift Foreman L. Parres. Cutulovich asked him if he could blast early and go to surface. Parres told him not to do so, but to blast at the regular time, 2 o'clock.

At 1.40 A.M., A. Carpenter, diamond-drill runner, and H. Pletch, helper, were on their way to the shaft station, when they found MacDonald at a point 1,700 feet from the station and 1,050 feet from the face. He had been injured. MacDonald was a short distance past an intersection where he would normally turn to go to the shaft. His electric light was broken, and he had lost his coat and hat. He was wet and cold. He was standing unsupported when found at the side of a chute. The mine doctor's examination later revealed that his skull was fractured, that the sight of his left eye had been destroyed, and that he had suffered contused lacerations of the scalp, face, neck, chest, arms, and hand.

Pletch assisted MacDonald out to the station while Carpenter ran ahead, called the cage, and telephoned word of the accident to Parres, who answered his call. Pletch stated that MacDonald said he believed his partner had been killed about 12.30 A.M. They had had trouble lighting their fuse, and it had been necessary to trim each fuse as they spit it.

MacDonald reached surface at 2 A.M. At 2.17 A.M., a rescue party consisting of one mine captain, two shift foremen, a shaft leader, and four shaftmen, equipped with a stretcher and three Burrell gas masks, went down to get Cutulovich. He was found almost buried in the muck 15 feet from the face. There was no gas at the face, and the gas masks were not necessary. It was found the *rigor mortis* had set in. Cutulovich had suffered a compound comminuted fracture of the skull, resulting in instant death.

The delay at the face was caused by difficulty in lighting the fuse, which had become wet from a flow of water from seams tapped by the drill-holes. After the accident water was found flowing from two seams in the back. Approximately 3½ gallons per minute was falling from the seam 8 feet from the new face, and a slightly smaller volume from the seam 3 feet from the face.

Ordinarily a burn-cut round of 30 holes was drilled, of which 24 holes were blasted. The whole round was blasted at one time. C.I.L. Clover Brand fuse, 10 feet in length, was used. The fuse ends were stained white.

On this occasion at least 30 fuses were used. Thirty-two painted fuse-ends were found in the muck. Two of these were tied together, indicating that they had been in the same hole. Two fuses had probably been in seven or eight of the wettest holes. Three short, unburned cuttings were found, which indicated that some fuses were cut at least twice. The handle of a jack-knife was also found. Two C.I.L., 1½-minute hot wire lighter wires were found. Apparently a greater amount than was necessary was cut from the fuse. Seven fuse cuttings were found, ranging in length from 3 feet to 3 feet 4 inches, and twelve cuttings ranging from 2 feet to 3 feet in length. The shortest cutting showing paint was 5 inches long. The practice of trimming the fuse as they lighted them, which these men followed, would have given ample spacing of the shots if the smallest amount possible had been cut from each fuse.

Apparently all the holes were lighted except the lifters. The left lifter fuse

had not been trimmed; the right lifter had not burned; the centre lifter fuse had been torn off before it had burned to the collar of the hole. With the exception of these holes the round broke well.

An inquest was held at Schumacher on August 7 before Coroner Frank Evans. The jury returned the following verdict:—

We, the jury assembled to enquire into the death of John Cutulovich, killed at the Coniaurum mine, July 28, 1940, at 12.30 A.M., on the 400-foot level, at the face of M-1 crosscut, find, according to the evidence submitted, the deceased delayed too long at the face in lighting the round.

Delnite Mines, Limited

Cecil C. Ohrling, aged 47, British, married, with two children, employed as shift boss, died from asphyxia when buried in muck in No. 622 shrinkage stope at the Delnite mine, about 8.45 P.M., May 23.

No. 622 stope on the 625-foot level is from 4 to 8 feet in width. There are eighteen chutes in the stope. In the 120-foot section between No. 2 and No. 3 manways, where the accident occurred, there are seven chutes. No. 11 chute is adjacent to the No. 2 manway, on the east side; No. 12 chute is 18 feet farther east; No. 13 chute is 32 feet east of No. 12 chute and is separated from it by a pillar 20 feet in length and 20 feet in depth; No. 14 chute is 10 feet east of No. 13 chute; No. 15 chute is 25 feet east of No. 14 chute; No. 16 chute is 11 feet east of No. 15; and No. 17 chute is 17 feet farther east, adjacent to No. 3 manway. Between Nos. 16 and 17 chutes there is a pillar 11 feet in length and 21 feet in depth. Both the pillars extend upward from drift back elevation.

From No. 2 manway east for 60 feet, or to a point directly over No. 14 chute, the stope had been mined through to the 500-foot level. The mining of the sill eastward from No. 2 manway filled the stope with muck to the back between No. 14 and No. 15 chutes. To lower the muck level chutes Nos. 13 to 15 were pulled. No. 15 chute hung up. The chute was blasted several times when it first hung up, in the latter part of April, but the blasting failed to bring it down. As there was no place to break muck in the stope the machinemen and their helpers were taken out and scalers and timbermen were put into the stope. It was decided at this time that the muck would be pulled down behind the breast to make room to blast.

During the first three weeks of May chutes Nos. 11 to 14 were pulled. On May 22 a machine crew was put back into the stope and blasting was started again, work being done from a travelway placed on lagging and stulls. This travelway was 29 feet below the 500-foot level at the pillar breast. The muck at the breast was only two or three feet below the platform, but sloped away to the west, under the platform, at an angle of approximately 45 degrees.

On May 22 fifteen holes were blasted in the sill pillar. The following morning the machine crew in the stope found two missed holes in the breast. These were blasted at lunch time. After lunch it was found that only one of these holes had exploded completely. The other hole was reblasted again at the end of the shift. When the night crew, consisting of Wm. Briscoe and W. Bellfoy, went into the stope shortly after 7 o'clock, they fixed their platform, which had been damaged by the reblast, and proceeded to scale until Ohrling entered the stope at about 8.30 P.M. From the platform Ohrling noticed that there was a hole in the muck about 18 feet beyond the end of the platform. This indicated that the hung-up muck over No. 15 chute had dropped. Ohrling jumped down on to the muck and went near the hole to examine it. He then called Briscoe and Bellfoy. The three men were examining the hole, a vertical opening about 5 by 8 feet in area, next to the hanging wall, when the muck

started to move under them. Briscoe moved further to the east along the footwall (dip of vein 67 degrees) and caught hold of a steel stuck in the wall. Bellfoy escaped over the moving muck back to the platform, but Ohrling, who was between the other two men, slipped into the hole. A great deal of muck rolled into the hole after both Briscoe and Bellfoy reached safety. Bellfoy was sure that Ohrling fell into the hole before much muck had rolled in.

After the run ceased, the muck still stood in a vertical position on the east side of the original hole, but the muck had run in from the west side down to a point about 20 feet below its original level and sloped back westward at an angle of approximately 60 degrees. Briscoe went down out of the stope through No. 3 manway.

No hope was held that Ohrling might still be alive. It was estimated that he had fallen much farther than they could then see into the hole, and it was known that tons of muck had rolled into the hole after he had fallen. The possibility of recovering his body from above was considered but not adopted because it was felt that it would be suicidal for men to go down into the hole without completely blocking back the vertical muck pile with stulls and lagging. Besides this, the hanging wall was loose and directly opposite the loose wall there was approximately 50 tons of loose muck resting on the footwall, which was apt to slide into the hole at any moment. It was calculated that Ohrling's body could not be more than 20 or 25 feet above No. 15 chute. Therefore instructions were given to pull the chute. About thirty 1-ton cars were pulled in the first hour. Pulling of the chute was carried on continuously for about thirteen hours, until the body was removed at 10.25 A.M. on May 24. A total of 228 cars were pulled from the chute. During this time watchers saw no movement of the top of the muck in the stope. The light from Ohrling's electric lamp was reflected through the muck for about an hour, between 3 and 4 A.M., then was suddenly cut off as the muck dropped in the hole. The doctor who was called to the scene, and who remained underground until the recovery work was completed, considered that death from asphyxia took place within five minutes after the accident.

All the workmen in this stope had been repeatedly warned that No. 15 chute was hung up. The record book, in which abnormal working conditions are reported, was kept at the mine. In this book both Ohrling and E. Lawson, the second shift boss on the 625-foot level, had recorded almost every working day of May that the chute was still hung up. There were safety ropes and harness in the stope at the time of the accident.

An inquest was held before Coroner H. E. Montgomery, in Timmins, on May 27. The jury's verdict was:—

We, the jury, find that Cecil Ohrling came to his death through negligence on his own part by not using safety equipment supplied by the mine.

De Santis Porcupine Mines, Limited

Phillippe Gobeille, British, aged 31, married, his wife and one child living in Timmins, employed at the De Santis mine as pumpman and nipper on the shaft-sinking crew, was instantly killed about 1.45 A.M. on August 7, when he fell from the bucket to the bottom of the shaft, a distance of 50 feet.

The 3-compartment main shaft at the De Santis mine is being sunk on a one-shift daily schedule. Regular mining operations are carried on from 8 A.M. to 12 midnight. At midnight the skip is hung up and the cage is removed and replaced by a sinking crosshead and bucket.

At the time of the accident the bottom of the shaft was 50 feet below the

station on the 825-foot level. The station was complete and was timbered back 11 feet from the station posts. There was a barricade of tight planking to a height of 9 feet, which left an opening of 5 feet at the top. There were two 6-foot sets of timber below the station level.

On the 4 P.M. to midnight shift immediately preceding the accident a burn-cut crosscut round was drilled off at the 825-foot level. The face of this crosscut was 30 feet south of the shaft timber. The men were late in finishing the round and did not blast until 12.30 A.M. on August 7. No damage to the timber was apparent.

After the crosscut crew finished work the cage was changed. The shaft leader, J. McIsaac, and Gobeille went down to adjust the air-hose to blow out the smoke from the crosscut blasting. On this trip the crosshead was lowered slowly for the last 75 feet above the station, and nothing was discovered out of place. Air was then blown until about 1.30 A.M., when the shaft crew, including Gobeille, went down to the bottom. It was found that the floodlight bulb was broken, and Gobeille went up to the 700-foot level to get another bulb. He sent the bucket back to the bottom when he got off. On the level he met D. Comber, a general utility man, who was going to pack the pump on the 825-foot level. One bucket of water was sent to surface by the shaftmen while Gobeille was getting the light-bulb. As the bucket came down Gobeille stopped it and he and Comber got on, and Gobeille, a former cagetender, rang the bucket to the 825-foot level.

At the 825-foot level Gobeille evidently intended to go down the shaft to install the light-bulb at the blasting-set. He rang a 2-bell signal, but the bucket did not move. He repeated the signal five times, at approximately one-minute intervals, with no result. The men at the bottom of the shaft called for the bucket, and Gobeille said the hoistman would not send it down. Gobeille apparently gave the first four signals from the landing in the manway where the pump was located, but stepped on to the bucket and then rang the fifth signal. Comber saw him on the bucket. At this moment the bucket dropped about 6 feet. Comber heard a splinter being torn from the guide and, on looking down, saw the bucket swinging from side to side and the splinter from the guide falling down the shaft. Gobeille was hanging over the south wall-plate of the first set below the level, with the bucket striking him. He then fell to the bottom, 44 feet below, where he landed on another bucket, which was lying on its side on the sloping muck. His neck was injured and his skull was fractured, causing instant death. None of the shaftmen at the bottom were injured, although the leader's hat was knocked from his head.

The accident was caused by the crosshead sticking in the shaft, just before the hoistman brought the bucket to a stop at the 825-foot level, and then dropping. An inspection of the crosshead and shaft after the accident showed that one set of guide shoes was not flared out. This set had caught in the guide and ripped off the splinter, stopping the crosshead. The splinter was 4 feet 8 inches long, 2½ inches wide, and tapered from a quarter of an inch at one end to a point at the other.

As the hoistman, D. Cooper, was easing the bucket down to the stopping point at the 825-foot station, he felt the load diminish about 14 inches above the station mark. A few moments later he received a two-bell lowering-signal. He did not move. This was repeated five times, at approximately one-minute intervals. Although the hoistman had thought that he had encountered an obstruction in the shaft, he decided, after the fourth lowering-signal, that possibly he had been wrong, and that the effect he had felt had been due to a man or men

stepping off the bucket before it had completely stopped. He also thought that if there had been anything wrong the man ringing the signals would have found it by that time. He decided to let out a few more inches of slack and then lift to determine whether he was lifting more than the rope alone. He could tell this by his ampere meter. His decision to lower a few inches probably coincided very closely with Gobeille's stepping on the bucket and repeating the signal the fifth time. The hoistman had slackened his brake when he felt a jerk which pulled enough rope from the drum to lower the bucket exactly 6 feet from the point where it had stopped. As the hoistman set his brake again, the bucket was set into a violent swinging motion.

An inquest was held on August 8, before Coroner H. E. Montgomery, in Timmins. The jury's verdict was as follows:—

We, the jury, find that Phillippe Gobeille came to his death through an accident at the De Santis Porcupine Mines, Limited, at approximately 2 A.M. on the morning of August 7, 1940, whilst endeavouring to free shaft-sinking crosshead, which had jammed on timber, which, from all evidence submitted, was caused by a rock striking guide from a blast on 825-foot level. We find that no blame can be attached to anyone, but we would recommend that in future more attention be paid to shaft inspection.

Dome Mines, Limited

Alexander Harrower, British, aged 38, single, employed at Dome Mines, Limited, as a boiler-maker's helper, died from mechanical suffocation about 8.30 A.M. on November 28, when he was buried under 6 or 7 feet of muck in the skip measuring-pocket of the No. 2 ore-pass chute, 17th level, No. 3 shaft.

Two 5-ton skips are operated in balance at the No. 3 shaft. The skips are filled from two hoppers, or measuring pockets. The hopper doors, immediately outside the shaft timber, are moved vertically upward and downward to open and close. The doors are operated by air-cylinders above them, the controls being at the north side of the operator's platform over the north half of the measuring hoppers. The hoppers are filled from the ore pass from two chutes. The numbers of the chutes, "1" and "2", are painted on the fronts of the chutes, above the arc gates, in figures 12 inches high, with lines 3 inches in width. The No. 1 ore chute is at the south end of the east-skip hopper, the No. 2 chute is at the south end of the west skip hopper. The arc gates controlling the flow of muck from the chutes to the hoppers open by swinging downward. When closed, the gates project about 3½ feet over the south end of the hopper and the lower edges of the gates are only a few inches above the lips of the hoppers.

Overhanging the west or No. 2 hopper from the west side there is a waste-pass chute, exactly like the ore-pass chutes, but at a higher elevation. The under side of the lip of this chute is 5 feet 9 inches above the top of the hopper. Muck runs from this chute directly into the No. 2 hopper, or, if desired, it is passed over the No. 2 hopper into the No. 1 hopper by means of a deflector chute hinged at the dividing line between the two hoppers. This deflector chute stands in a vertical position when waste is being run into the No. 2 hopper, or when the ore chutes are being operated. In this position it forms a dividing wall between the two hoppers.

The three chute gates and the deflector chute are each operated by 8-inch air-cylinders, the control valves for which are on a panel at the south side of the control platform directly opposite the valve controlling the skip-pocket gate of the No. 1 hopper. The clear passageway between the two sets of valves is 1 foot 9 inches.

The control valves on the panel are located in the following order from east to west: No. 1 ore-chute gate, No. 2 ore-chute gate, deflector chute, and waste-chute gate. When installed in 1938 these valves were all labelled on wooden

panels 2¼ inches in width, in black lettering on a white-paint background. At the time of the accident the label was missing from the No. 1 ore-chute control valve. The No. 2 ore-chute valve marking was in place. The figure "2" could be plainly seen at the top of the wooden panel, but the word "ore" which had been printed below the chute number was illegible. No lettering was discernible on the label which had once indicated the deflector-chute valve. The label indicating the waste-chute valve had "waste" plainly printed on it.

Each valve controlling the gates is operated by a handle 7 inches long, which is swung in a vertical arc to the left to close the chute gates and to the right to open them. In a neutral position the handle hangs vertically. The air to each operating valve is shut off by globe valves operated by small wheels about 2 inches in diameter. These globe valves are approximately 15 inches below the operating valves.

On the shift immediately preceding the accident the skiptenders were instructed to empty the ore-pass chutes and install safety bulkheads over the arc gates for the protection of the mechanical crew who were going to do repair work the following morning. This was done. The waste chute was left full, as no work was to be done at it. Skiptender A. Walker finished hoisting ore from the pockets and closed all the globe valves. The ore-chute gates were left open. The hoppers were left filled to within 3 feet of the top to provide something for the mechanics to work on.

About 7 A.M. on November 28, R. S. McWilliams, mechanical foreman, instructed Geo. Chambers, Piti Sicoli, and A. Peressini, boiler-makers, and their helpers, S. Millions, Geo. Dogue, and A. Harrower, to go to the 17th level loading pockets, No. 3 shaft, and replace the wearing-plates on the ore-pass arc gates and some side-plates on the No. 2 chute.

Peressini, Dogue, and Harrower started work in the No. 2 hopper; the other three men worked on the No. 1 chute from the No. 1 hopper. Both crews cut off the top row of bolts holding the wearing-plates on the inside of the ore-chute arc gates. To get at the lower bolts the gates had to be lifted. While Peressini and Harrower were working in No. 2 hopper, Dogue moved the gate for the men in the No. 1 hopper. To do this he opened the globe valve controlling the air to the No. 1 chute control valve. He does not remember closing it. Geo. Chambers also operated the No. 1 gate and opened the globe valve before doing so. He was not aware that Dogue had operated this valve. Later Dogue was asked to move the No. 2 chute gate. He climbed out of the No. 2 hopper to the operating platform and walked east to the valve panel. As he turned to operate the valve he saw the waste-chute gate opening. He shouted to Harrower and Peressini. Although Peressini was struck by muck he was not injured, and escaped by climbing into the No. 2 ore chute. Harrower was knocked down and buried. Waste ran out and piled up until it blocked itself. Harrower was dead when removed from the loading pocket.

An inquest was held before Coroner H. E. Montgomery in the Town Hall at South Porcupine on December 4. The jury brought in the following verdict:—

> We, the jury, find that Alexander Harrower came to his death accidentally at the Dome Mines, Limited, on November 28, 1940, from injuries or suffocation caused by being buried under a pile of rock coming from waste-chute, door being accidentally opened from some unknown cause

Hollinger Consolidated Gold Mines, Limited

Joseph Singleton, aged 47, married, British, employed at the Hollinger mine as a driller, in No. 66NHW16 slice-and-fill stope, on the 550-foot level, received injuries about 6.45 P.M. on February 2, which caused his death on February 21.

On the afternoon shift (3 P.M. to 11 P.M.) of February 2, Singleton and his helper, Ivan Falls, were backfilling at the east end of the stope, with a 1½-ton Hudson-type car. The men pushed a loaded car of sand to the dumping point 30 feet east of the sand chute. Falls then turned back to get a shovel at the west side of the chute and Singleton dumped the car of sand on the north side of the track. While Falls was looking for his shovel he heard Singleton shout, and when he ran back he found Singleton pinned against the south wall of the stope by the rim of the car box. Singleton was facing the wall with his back against the car.

In some manner the north wheels of the car truck had got over the north rail and the south wheels had slid off the south rail and had dropped down between the two rails. This had brought the top of the car box to a point 9 inches south of its normal position and Singleton was squeezed in a 5-inch space between the car box and the wall. He was pinned in this position for 20 or 25 minutes before being released by help summoned by Falls.

What caused the wheels to climb over the north rail so that the car canted over to the south is not known. A safety hook fastened to the side of the car truck is dropped down and hooked under the track rail to keep the truck from turning, when dumping, should the sand stick in the car box. This hook had just been changed from the north side of the car and attached to the south side, and it is believed that it was hooked under the rail before the south wheels slid off the rail.

Singleton apparently had difficulty in tipping the car box. It is probable that after getting it partly overturned he was forced to let it come back to the upright position. If it came back quickly it may have rocked the north wheels over the rail and caused the south wheels to slide off the rail and drop. There was a bad rail joint between the last two rails on the south side, which may have caused trouble when Singleton was dumping the car.

Superficial injuries suffered by Singleton consisted of abdominal and thigh abrasions. An X-ray picture showed only a crack in the pubes, without any displacement. This was not contributory to his death, which was due to a stoppage of the bowels, caused by adhesions arising from an abdominal abscess resulting from internal bruising and haemorrhage, which developed three or four days after the injury. Surgeons operated when the abscess was indicated, drained it, and searched for punctures of the bowels, but found none. Following the operation Singleton gradually lost strength. He was given several blood transfusions, but died on February 21.

An inquest was held in Timmins before Coroner H. E. Montgomery, on February 26. The jury's verdict was as follows:—

We, the jury, find that Joseph Singleton died from an accident which occured at the Hollinger mine on the second day of February, 1940. We, the jury, agree that it was an accidental death and no blame be attached to anyone.

Norman Hill, British, aged 26, married, was fatally injured about 10.05 P.M. on February 26, when he was caught in a run of muck and was buried in No. 53 mill hole in No. 2W3.2 slice-and-fill stope on the 425-foot level of the Hollinger mine.

No. 2W3.2 stope had been mined to a height of approximately 70 feet above he 425-foot level. A cut through the stope was just being completed at the east end of the stope. The last fill-barricade was close to the west end of the combination manway and mill hole, No. 53, at the east end of the stope. The manway had been covered over. Two breasts had been broken down since the last fill had been made, and the final breast was drilled off, with twenty-five light holes; 5 of these holes had been blasted by the day shift when they went off duty

at 3 P.M. The remaining 20 holes had been loaded and were ready to be lighted when the accident took place.

When the afternoon shift, consisting of W. Fournier, a runner, and Hill, his helper, went into the stope they found the muck at the east end almost level with the tops of the fill between the barricade and the breast. There was also some muck on top of the fill. A crew of chute-pullers was sent by H. Cox, the shift boss, to pull No. 53 mill hole during the whole shift. During the early part of the shift this crew had to blast seven or eight times to get large pieces of rock through the chute. They lunched about 6.30 P.M. Up to this time they had pulled only six 3-ton cars. After lunch the muck ran much better and they only had to blast once, at about 8.30 P.M. When they stopped at about 10 P.M. they had pulled a total of 19 carloads, or 57 tons. In the meantime, Fournier and Hill had mucked on top of the fill, throwing the muck into No. 54 mill hole, which was approximately 15 feet behind the barricade.

Cox visited the stope twice during the shift. At the time of his first inspection, shortly after 4 P.M., the chute-pullers were preparing to blast in the chute and Cox warned Fournier and Hill of this fact. He told Fournier that he could blast the remaining 20 holes in the breast if the muck were pulled down at the end of the shift enough to make sufficient room. Cox entered the stope the second time, and left again at approximately 9.20 P.M. At this time Fournier and Hill were loading the breast from a staging which they had constructed over the mill hole. There were several holes still to be loaded.

Later (perhaps before the loading of the holes was completed) the muck hung up at the top of the mill hole. Hill then tied a ¾-inch safety rope to a short steel placed in a bootleg left by the blasting of the back hole, next to the south wall, of the second last breast. This steel was almost directly over the barricade. Hill went down to the top of the mill hole and tied the rope around himself. He worked for ten or fifteen minutes with a scaling bar, trying to release the muck, while Fournier loaded three slash holes in the north wall behind the barricade. Fournier then told Hill to come up and they would blast at the top of the mill hole. Hill started to walk up the muck-pile near the south wall. When he was almost at the top the muck dropped and started to run under his feet. The loops of rope dragging behind him probably helped to pull him back. Fournier caught the rope, but it was cut by the running muck before he could be of any assistance. Hill dropped into the mill hole, and the run of muck covered him and filled the mill hole. He was removed about six hours later from a point some 12 feet below the top of the mill hole. His hat was buried below this level, and during the rescue work his scaling-bar was found several feet below him.

Hill was released by cutting out the 12th and 17th cribbing from the top of the mill hole, from the manway, and removing the muck through this opening and dropping it down the manway. The mill hole had been pulled over toward the west at this elevation at an angle of about 75 degrees, and Hill had fallen over under the hanging-wall side, and this gave him some protection. He was bent forward almost double. He did not lose consciousness and showed great pluck. When the muck was removed it was found that a piece of the safety rope was still tied around his hips.

He was taken to the hospital in Timmins, where he died at 2 P.M. on March 4. His injuries consisted of a broken arm and temporary paralysis and partial suspension of blood circulation in his legs. His death was attributed to acute nephrosis with uraemia, resulting from exposure while he was buried under the muck in the mill hole.

An inquest was held before Coroner H. E. Montgomery, in Timmins, on March 7. The jury's verdict was as follows:—

We, the jury, have found that Norman Hill came to his death by accident, possibly through careless use of a safety rope. The machineman should have stayed by the rope, also safety belt should have been used in going down the mill hole.

E. Morgan, British, married, aged 45, driller, was crushed to death by the fall of a slab of rock from the hanging wall of No. 59AE15.2 cut-and-fill stope on the 2,750-foot level of the Hollinger mine, at 5.05 P.M. on July 5.

The back of No. 59AE15.2 stope had been mined to a height of 75 feet above the level, with the exception of a 20-foot section over the mill hole, into which Morgan and his partner, O. I. Kleven, were then mucking. At this height the stope is 138 feet long and its width varies from 6 to 12 feet. At the time of the accident, mining operations consisted of mucking out the section of the stope west of the west mill hole, or combination mill hole and manway No. 33. The sand barricade was within 5 feet of the east end of the mill hole. The sand raise was farther east. This made it necessary to mine out the whole of the cut through the section west of the mill hole before making any additional fill. The ore at this elevation extended 40 feet west of the mill hole. The west face had been only 8 feet west of the mill hole when the stope was started.

The ore west of the mill hole had been broken to the face, the last blast having been made on July 4. Mucking was started by the day shift on July 5. Two men on this shift had put out thirty 3-ton cars of muck, a large part of which had run into the mill hole without any shovelling. The day-shift foreman visited the stope about 10.15 A.M. At this time the slab of rock, which later fell on Morgan, was about half concealed under the muck-pile, and he could not see that it was loose. He gave his men instructions to put in a stull directly above this piece, catching the hanging wall at a point 13 feet above the mucking-floor and 6 feet below the back. This was done. The hanging wall was bad at this time, as it had been on the two previous cuts, when the procedure had been to muck out sufficient to timber and then put in stulls to catch up the hanging wall. The first of these had been put in by the day shift.

The foreman returned to the stope again at 1.45 P.M., but at this time the stope was filled with smoke from blasting in the mill hole, and, being unable to see anything, he did not go up into the stope.

Morgan and Kleven went to work in the stope shortly before 4 P.M. They had been instructed by their shift foreman, E. A. Gledhill, to "carry on" with the work of the preceding shift. Gledhill had not reached No. 59AE15.2 stope when the accident took place. When they commenced work Morgan sounded the hanging wall, which sounded "drummy." Morgan did nothing about this loose and neither man said anything about it. They then scaled down the muck-pile and started to muck. They had mucked about three 3-ton cars, the amount pulled from the mill hole by the chute-pullers, when, without any warning, a triangular slab, with sides 7, 8, and 10 feet long, and 6 inches in thickness, fell from the hanging wall directly on Morgan, who was at the moment bent over his shovel. The lower part of the slab fell only 3 feet. Morgan was pinned beneath this slab, which broke in two pieces. His death was almost instantaneous. He did not make any cry. Kleven called the chute-pullers, who were then pulling the mill hole, and the three men released Morgan's body and took it to surface about fifteen minutes later, where it was met and examined by a doctor. The injuries consisted of a fractured spine and crushed chest.

An inquest was held by Coroner H. E. Montgomery, on July 10, in Timmins. The jury's verdict was:—

We, the jury, find that E. Morgan met his death in 2,750 stope by a fall of rock. Morgan having been a careful worker, we find that his death was accidental, no blame attached to anyone.

Laurier Larcher, British, single, aged 22, employed at the Hollinger mine, received injuries in No. 95E17.3 slice-and-fill stope on the 3,050-foot level on Saturday, November 16, about 3.35 P.M., which resulted in his death on Tuesday, November 19.

Nos. 95E17.3 and 95AE17 slice-and-fill stopes are worked by the same crews and are on one contract. The former was carried up 68 feet above the 3,050-foot level, and then a subdrift to the east, with floor elevation 60 feet above the level, disclosed ore which extended below the subdrift and above No. 95AE17 drift, on the level. The back in No. 95AE17 drift was then taken down and a 35-foot section was timbered and a combined manway and mill hole, designated as No. 43, was carried up at the east end of this new section of ore. On November 16 this section was mined to a height of 34 feet above the 3,050-foot level. This stope was connected by a fill raise out of the west end up to the floor of the subdrift in No. 95AE17 stope. The raise was open on November 16 and at that date was being used as a travelway into the stope, as it was necessary at that time to close the manway alongside No. 43 mill hole.

On the afternoon shift of Thursday, November 14, Joe Sloki, runner, and Jim Buck, helper, drilled and blasted a slash at the foot of the fill raise of No. 95AE17 stope. Before drilling they scaled the raise thoroughly and sounded the back of the subdrift, and found it solid.

On the day shift on Friday, Neil McInnis and helper scaled the slash which Sloki had blasted, and then started a drift round immediately east of No. 43 mill hole and manway, some 40 feet distant from the foot of the raise. On the Friday afternoon shift, Sloki and Buck finished this round, closed the manway beside it, and blasted the cut and helper holes and another 3-hole slash at the foot of the raise, and retreated from the stope through the fill raise and out of No. 95E17.3 stope through No. 23 mill-hole manway.

On Saturday morning McInnis and his partner, W. Robitaille, entered the stope over the route by which Sloki had left it. McInnis sounded the back of the subdrift over the top of the fill raise before going down the raise and scaled down a few small pieces, and the back sounded "all right" to him. He sounded the piece which fell at 3.35 P.M. the same day. He opened the manway at No. 43 mill hole for travelling during the day, so no one else passed by the top of the fill raise again until the end of the shift, when McInnis closed the manway again and blasted the drift-round square-up holes, and left the stope by the route he had followed in entering it.

Sloki did not go to work on Saturday afternoon. Larcher, who had been used on the 3,050-foot level for all sorts of odd jobs, was instructed by his shift foreman to go with Buck in Sloki's place. Larcher and Buck went to No. 95E17.3 stope through No. 23 manway and walked toward the top of the raise out of No. 95AE17 stope. They shut off the air and water which were blowing at the top of the raise. Buck was opening his knife to cut loose the hose, which was tied at the top of the raise. Larcher was standing about 5 feet away from Buck when a slab of rock fell from the roof and crushed Larcher under it. The rock was about one foot thick, 6 feet long, and from 4 to 5 feet wide, and weighed about 2 tons. Larcher was pinned beneath the slab, but the crushing effects

were minimized to some extent by a ladder and the 20-pound track rails on which the rock also rested after falling. Buck summoned help at once and Larcher was released in about 15 minutes. Their shift boss, although underground, had not yet been to this stope. He arrived just after Larcher was released.

Larcher was treated first for severe shock and was then taken to St. Mary's Hospital. His injuries consisted of a bruised chest and abdomen and internal haemorrhage around the peritoneal cavity. On Saturday evening his condition became worse and, after several doctors had held a consultation, it was decided that he should be operated upon at once to stop internal haemorrhage. He was first given a blood transfusion, then operated upon. Another blood transfusion followed, after which he seemed to improve. There was no rupturing of the kidneys or such injuries as usually are the cause of death in this type of accident and hopes were held for his recovery, but on Tuesday, November 19, he died suddenly. Pulmonary embolism was given by the attending surgeon as the immediate cause of death.

An inquest was held before Coroner H. E. Montgomery, in Timmins, on November 28. The jury's verdict was as follows:—

We, the jurymen, find that the deceased, Laurier Larcher, was fatally injured on November 16, 1940, by a fall of rock. After considering the evidence we find that death was accidental, with no blame attached to anyone.

International Nickel Company of Canada, Limited

Richard S. Stephenson, British, aged 40, married, employed as a shift boss at the Creighton mine, was fatally injured about 12.25 A.M. on January 18, when he fell down the manway connecting the 33rd level with No. 54 stope, on the 36th level.

This is a cribbed manway in a 7- by 11-foot fill-raise, located on the footwall at an inclination of about 55 degrees. It contains a continuous ladderway and an open steel-chute with vertical sides 2 feet high. There are horizontal platforms on the hanging wall at intervals of about 15 feet. The top of the manway at the 33rd level has separate doors over the ladderway and steel chute. The ladderway door is equipped with a chain to fasten it from below. The stope is being mined by filled square-set methods, and the 19th cut had been started from this fill raise several days previously, with the floor about 118 feet below the 33rd level on the incline of the raise.

On January 18, the 12 P.M. to 8 A.M. shift on the 30th, 33rd, and 36th levels was under the supervision of Shift Boss Stephenson. His crew in No. 54 stope, 36th level, consisted of O. Harris and A. Winter, who were advised by the off-going crew that room had just been blasted for a third square-set on the 19th floor. They went down the manway from the 33rd level, and Winter fastened the ladderway door from below to protect them while working around the foot of the manway. They were depositing their coats and lunch boxes on the 18th floor about 12.25 A.M., preparatory to starting work, when they heard something falling down the manway. Harris found Stephenson lying unconscious at the foot of the manway on the 19th floor.

Stephenson was removed to the first aid room on surface, where he died at 1.30 A.M. without regaining consciousness. He had sustained a compound fracture of the skull with extrusion of brain tissue, a fracture of the right ankle, and a dislocated left shoulder. A *post mortem* examination was made which found nothing organically abnormal.

It was found that he had gone directly to the 33rd level after taking over from the off-going shift boss at the 23rd level. He gave some directions to the

motorman on the 33rd level, visited the warehouse, and then went to the top of the manway, where he was last seen attempting to open the ladderway door. He apparently succeeded in unfastening the chain by inserting his arm through the space between the door and the frame, opened the door, and started down the manway. The first mark of his fall was found about 48 feet from the top, but there was no indication of what caused him to fall. There were no broken or missing rungs in the ladderway, which was clean and dry. The ventilation in the manway is strongly upcast, and it was clear of blasting fumes when Harris and Winter went down to the stope. Stephenson was using an electric cap-lamp.

An inquest was held by Chief Coroner P. E. Laflamme, M.D., at Creighton, on January 25. His verdict was as follows:—

Richard S. Stephenson, aged 40, employed as a shift boss at the Creighton mine of the International Nickel Company, died in the first aid room at the mine at 1.30 A.M. on January 18, 1940, from injuries received about 12.25 A.M. the same day. From evidence given, Stephenson was found unconscious on the 19th floor of No. 54 stope, 36 level, at the foot of the manway from 33 level, after two men on the floor below heard something falling down the manway. This manway was 118 feet long at an inclination of about 55 degrees, and had a continuous ladder in good condition. There were marks on the timber indicating that he had fallen about 70 feet down the incline. No evidence was obtained to show what had caused him to fall. Accidental death with no blame attached to anyone.

Karl Kenttala, British subject, born of Finnish parents, aged 23, single, employed as a driller at the Creighton mine, was fatally injured about 12.40 P.M. on May 5 by a fall of ground in the excavation for No. 6 shaft cage-hoistroom on the 52nd level.

This excavation is on the east side of the cage-hoistroom drift, with the floor about 8 feet below the base of rail. At the time of the accident the main part of the excavation was about 30 feet long, paralleling the drift, and about 20 feet wide. Three rows of square-sets had been installed and room had been made for a fourth row at the south side, and only the muck remained to be removed. The first two rows on the north side were one set high, while the third row was two sets high. The latter contained a slide which extended from the east side of the floor up over the drift. A slusher-scraper was operated on this slide to load the muck directly into cars on the drift track. Two development headings had been driven on the floor level, and were to be slashed out to enlarge the excavation. One of these was driven about 7 feet into the east wall directly in front of the scraper-slide, while the other was driven about 10 feet into the south wall in the southeast corner. The latter heading was about 7 by 9 feet in section and was filled with muck to a height of 4 or 5 feet.

Kenttala and two other men were working in this excavation on the day shift of May 5, under the direct supervision of Mine Foreman M. Horne. During the morning they scaled the back on the south side, then put out two boom timbers with lagging over the east half of the muck pile. About 12.40 P.M., Horne sent Kenttala into the south development heading to scale preparatory to attaching the slusher-rope block to a rock-bolt in the face of the heading. Kenttala had just started to scale some small pieces of loose about half way into the face when a chunk weighing about 3 tons fell from the back immediately behind him. He was knocked down by a glancing blow from the chunk, but it did not land on him. He was sent to surface in an unconscious condition and was dead on arrival there. Medical examination revealed that he had sustained multiple fractures of the lower thoracic and lumbar parts of the spine, and internal abdominal injuries.

The fall of ground exposed a joint dipping at about 45 degrees to the east, which had been cemented with quartz. The joint intersected a schisted shear zone dipping at about 65 degrees to the west. These planes of weakness formed

two sides of the ground which fell. It had been carefully tested about 11.15 A.M. by Horne, at which time it appeared to be solid.

An inquest was held by Coroner H. M. Torrington, M.D., at Creighton, on May 14. His verdict was as follows:—

Karl Kenttala came to his death on May 5, 1940, at Creighton mine, Ontario, shaft 5, on 52 level, No. 6 hoistroom, from multiple fractures of lower thoracic and lumbar spines received when a piece of pinched rock weighing about 3 tons fell striking Kenttala on his back causing these injuries. Accidental death.

Francis Boyer, British, aged 22, single, employed as a switchman at the Frood mine, was fatally injured about 5.30 P.M. on December 12, when crushed between a Granby car and a timber post at No. 15.5 fill raise on the 2,000-foot level. He died in the Copper Cliff hospital at 2.15 P.M. on December 13 from severe internal injuries.

This fill raise is located on the west side of No. 4 drift at the south end of the 2,000-foot level and serves No. 15.5 stope on the 2,200-foot level. It consists of a manway and a fill pass. The latter is on the north side and is covered with a grizzly. There is a movable ramp on the east side of the drift to dump Granby cars at the fill pass. The drift is timbered with gangway sets except at the grizzly, where there is a bridge set to span it. The posts of the bridge set are 10 by 18 inches in section, with the 18-inch face parallel to the drift.

About 4 P.M. on December 12, a train crew, consisting of Motorman L. Mills, Chute-blaster N. Mallette, and Switchman F. Boyer, was instructed to transport fill from No. 1 main fill pass to No. 15.5 fill pass. This work was undertaken with a battery locomotive and 5 Granby cars, with the locomotive pushing the full cars southward into No. 4 drift until they were beyond the fill pass. The first two cars adjoining the locomotive were uncoupled from the remaining cars and dumped by pulling them northward over the ramp, following which they were pushed back and recoupled to the other three cars, which were then dumped in the same manner. These movements were made by the motorman on receipt of whistle signals from the switchman, who stopped each car at the peak of the ramp until it was emptied.

Four trains had been dumped by 5.30 P.M., and the last car of the fifth train was about to be dumped. Boyer was standing in front of the manway on the south side of the fill pass, about a foot south of and in line with the post of the bridge-set. Mallette was sitting on the manway cover about 2 feet behind him. As the last car approached the ramp Mallette looked down into the fill pass and did not see Boyer until he heard him cry out and give a "stop" signal on his whistle. The train stopped immediately, with the rear end of the last car about half a foot south of the bridge-set post. Mallette found Boyer jammed between the partially opened car-door and this post, with his back to the door. The clearance between the door and the post was then about 9½ inches, in contrast to one of 18 inches when the door is closed. This clearance is reduced to a minimum of 1 inch as the south end of the door passes the north end of the post.

Mallette stated that Boyer told him to give three whistles to have the train continue northwards. He ran up toward the locomotive and repeated this to Mills, who then moved the train ahead about 3 feet and stopped it. This brought the end of the last car past the post. When Mills and Mallette reached the fill pass they found Boyer sitting on the grizzly, and unable to answer questions.

Boyer sustained a severe crushing of the abdomen and a fractured pelvis, with perforation of the small bowel. He died in the Copper Cliff hospital at 2.15 P.M. the next day, without making any statement as to how the accident had occurred. No evidence was found to indicate what had happened.

An inquest was held by Chief Coroner P. E. Laflamme, M.D., at Frood, on December 20. His verdict was as follows:—

Francis Boyer, age 22, employed as a switchman on the 2,000-foot level at the Frood mine of the International Nickel Company, died at 2.15 P.M. on December 13, 1940, at the Copper Cliff hospital from injuries received about 5.30 P.M. on December 12. From evidence given, he was standing on the south side of No. 15.5 fill-raise directing the dumping of a fill train by whistle signals, when in some manner he was caught and squeezed between the opening door on the last car in the train and the timber post at the edge of the fill raise, causing severe internal injuries. Death was accidental with no blame attached to anyone.

Jodelo Gold Mines, Limited

Malcolm McMillan, British, aged 32, single, employed as a shaftman at Jodelo Gold Mines, Limited, was almost instantly killed when his neck was broken by the fall of about 8 tons of rock at 1 A.M., December 29.

The Jodelo shaft has two compartments and is inclined at an angle of 68 degrees. At the time of the accident it was approximately 312 feet deep. The 2nd level is at 254 feet. The shaft was timbered for a distance of 42 feet below this level. The distance from the last timber to the muck was 16 feet, and there was about 3 feet of broken muck in the bottom of the shaft.

A change of shifts had been made at midnight. The 4 P.M. to midnight shift, led by Charles Gillard, had blasted a "V" cut and "square-up," consisting of 30 holes althogether, at 6 P.M. After the blasting the crew of five men scaled and then mucked twenty-nine 1-ton skip-loads. When scaling they found a loose slab of rock, which they tried to remove. They broke a portion off its west edge. They reported to the on-coming shift that the hanging wall was bad. The new shift was led by J. J. Hogan. The rest of the crew consisted of C. R. Rhamey, F. Cain, D. Hawley, and Malcom McMillan. They also tried to scale the loose slab on the hanging wall. They had just started to muck, and had sent the skip to surface, when the loose piece fell, or toppled over. The piece was 6 feet long, about 14 feet high, and 2½ feet thick. The bottom, which was at the level of the muck, was cut off by a slip going into the hanging wall at approximately 45 degrees. The hanging wall is an altered porphyry.

The slab was broken in two large pieces by the fall. The upper portion was thrown over to the footwall and pinned McMillan against the wall and the west rail of the removable skip-track. The rail was bent back about 3 feet to the footwall. The lower two-thirds of the slab was left leaning against the upper third, forming an arch under it about a foot and a half in height. Cain was knocked down under this larger piece, but the arching of the rock saved him from serious injury. Rhamey, who was near the west end of the shaft, received a cut on the hand at the same time, but both men were able to assist in removing McMillan. This work took about an hour and a half.

An inquest was held before Coroner H. L. Minthorn, M.D., at South Porcupine, on January 11, 1941. The jury returned the following verdict:—

With respect to the death of Malcolm McMillan, we, the jury, come to the conclusion that the deceased came to his death December 29th, 1940, around 1.30 A.M., by accidental means and no blame is attached to anyone.

Kerr-Addison Gold Mines, Limited

D. Niskanen, naturalized British subject, of Finnish birth, aged 31, married, employed as a timberman, was seriously injured at 11.30 A.M., on June 3, when he fell 40 feet from a ladder in No. 505-24 raise to the broken ore in No. 524-10 north stope on the 500-foot level of the Kerr-Addison mine. He died in Toronto General Hospital on December 11.

No. 505-24 raise is a 6- by 10-foot, timbered, 2-compartment opening, driven at an angle of 60 degrees from the 500-foot level to No. 324 crosscut on the 300-foot level to serve and ventilate No. 524-10 north stope. Stull sets were carried at 6-foot centres, and the chute side was lagged by 2- by 8-inch planking. Ladders and a steel-chute were carried on stulls in the 6- by 6-foot manway compartment. Ladders between platforms in the raise were installed so that all manway openings in each platform were covered by the ladder above. The general condition of No. 505-24 raise was excellent.

No. 524-10 north shrinkage stope is 140 feet long and 20 feet wide. The back, at the time of the accident, was 130 feet above the 500-foot level. As mining progressed in the stope the timber of No. 505-24 raise was removed and the raise was abandoned below that point.

On June 3, Niskanen and J. Fleming received instructions to strip four sets of timber from No. 505-24 raise, as another breast of No. 524-10 north stope was advancing. J. Sagin, shift boss, while in the stope at 8 A.M., on June 3, instructed the men to notch the stull caps and blast them out at lunch time while the drillers of the stope were having lunch. Sagin also told Fleming and Niskanen that if it was necessary to enter No. 505-24 raise from the 300-foot level after blasting they were to wear safety-ropes or safety-belts.

At 11 A.M. Fleming and Niskanen, using fifteen sticks of powder and three fuses, each 10 feet long, blasted out four stull sets. At 11.30 A.M., after having lunch, they returned to No. 505-24 raise from the 300-foot level. Fleming, followed by Niskanen, proceeded about 40 feet down the raise to the last ladder. This ladder was fastened securely at the top, but there was no platform at the bottom, as the timber had been blasted away, leaving a space of about 40 feet below. Fleming was on the last ladder, examining the work that had been done, when Niskanen fell head foremost down the raise. As he fell his feet knocked the hat and lamp from Fleming's head. Fleming stated that Niskanen made no outcry or struggle as he fell. Neither man wore safety-ropes. Fleming's explanation of this was that they had intended to look over the work to see if ropes were necessary for continuing the work from No. 505-24 raise.

Fleming immediately summoned aid, telephoning to the surface from the 300-foot-level station. He then proceeded directly to No. 524-10 north stope and aided in taking Niskanen to the surface. W. E. Cox, first-aid attendant at the mine, went directly to No. 524-10 north stope and directed the moving of the injured man. Niskanen was attended by Dr. Pollock before being transferred to Kirkland Lake District Hospital. He suffered from shock, a fractured right leg, fractured left wrist, and injuries causing paralysis of the lower part of the body.

The ventilation of No. 505-24 raise to the 300-foot level is good. The fact that Niskanen gave no outcry when falling led to the belief that he fainted or suffered a dizzy spell.

On September 6 Niskanen was moved to the Toronto General Hospital, where he died on December 11. Death was attributed to toxaemia from large trophic ulcers, complete paraplegia from crushing of the spinal cord in the cervical region, and fracture-dislocation of the cervical vertebrae.

An inquest was held on February 19, 1941, in the Kirkland Lake Municipal Hall before Coroner W. R. McBain, M.D. The jury returned the following verdict:—

> We, the jury, empanelled to enquire into the death of David Niskanen following an accident at Kerr-Addison Gold Mines, June 3, 1940, which caused his death December 11, 1940, find death was caused from a fall resulting in a fractured neck and severed spinal cord resulting in paralysis of lower body, which caused ulcers, resulting in death.

Lake Shore Mines, Limited

Joseph B. McDonald, British, aged 42, married, was instantly killed in No. 3,209E drift on the 3,200-foot level of the Lake Shore mine on February 14, at 9.05 P.M. He was first hired by the Lake Shore Mines, Limited, in June,1934, left their employ in November, 1935, and was rehired in June, 1936. He was employed as a driller.

No. 3,209E drift is driven on the middle vein. At the location of the accident, which was about 500 feet east of the main crosscut, this vein is 50 feet north of No. 1 vein and about 160 feet south of No. 2 vein. No. 1 vein at this point had been stoped and filled to the 3,075-foot level, and from the 3,325-foot level it had been stoped about 50 feet above the level and stopped. No stoping had been done on the No. 2 vein on this section.

On the middle vein a stope had been mined from the 3,200-foot level to the 3,075-foot level, its west margin being 45 feet east of the point where the accident occurred. This was completed in July, 1938. From the 3,325-foot level a stope had been carried through to the 3,200-foot level. The west margin of this stope on the 3,200-foot level was 75 feet east of the location of the accident. It was completed in August, 1939.

About 115 feet of backs had been taken down in No. 3,209E drift, working from west to east, and standard drift timber put in. The drift then being in waste, the south wall was slashed and the original drift cribbed for a width of 7 feet and a length of 22 feet. In this report the sets are numbered from east to west. The first two were standard sets, installed as safety sets, the back not having been taken down. The north ends of the first three caps were blocked on the crib. The south ends were supported by 10- by 10-inch posts. These were not lagged over. West from the third set, back-lagging was complete. The muck-pile was 10 feet ahead of the first set and the face of the slash 18 feet ahead. On February 5 a sharp cracking in the walls was reported by the crew on this drift. After that date no abnormal cracking or splitting of the ground was observed. Conditions in No. 3,209E drift on the day shift of February 14 and on the night shift were normal until the rock burst occurred.

The day-shift crew of February 14 had drilled throughout the whole shift and had blasted at the end of the shift. On night shift McDonald and P. Selbie scaled and commenced to muck. At about 9 P.M. J. Marinich, a loader, was in No. 3,209E drift with the motor to take out a car of muck as soon as it was loaded. When the rock burst occurred Marinich was on the seat of the motor, which was backed up to the car and was between the 2nd and 4th sets. McDonald was standing immediately to the south and Selbie was on the south side of the car. About 5 tons of rock burst off the south wall of the drift, causing fatal injuries to McDonald, partially burying Selbie, and slightly injuring Marinich. Marinich was able to make his way to No. 5 shaft station and call for help.

Wm. Allen, night captain, was on the 4,325-foot level at the time of the burst. On arriving at No. 6 shaft he was informed that the burst was on the 3,200-foot level. At the 3,200-foot station of No. 5 shaft he met the first-aid man. They went to No. 3,202E drift, where they met R. Belec and R. Thompson, who had taken a stretcher into No. 3,209E drift and come out for help. More help arrived and Allen organized rescue operations immediately. W. Selnes, assistant underground superintendent, took charge of the work at 9.30 P.M. Dr. Lynch was in attendance until Selbie was released at 11 P.M. McDonald's body was recovered at 11.30 P.M.

He had sustained severe crushing injuries on the left side of the chest and multiple fractures of the ribs, rupture of the left lung, multiple contusions of

the scalp, severe contusions of the right arm, abrasions of the right leg and contusions of the right side of the face. The chest injuries and rupture of the lung were given as the cause of death.

The material damage effected by the rock burst was not extensive. The post of the second set was knocked out and the cap partly dropped, and the post of the first set was knocked sideways. The north ends of the fourth and fifth sets were moved to the east, but no lagging was dropped down. About 5 tons of rock came off the south wall, opposite the second set, and about 2 tons between the fourth and fifth sets. The walls and back of the slash ahead of the first sets were loosened. The rock burst may have centred on the west margin of No. 3,309E drift to 8 feet above No. 3,309E drift. In No. 3,309E drift about 15 tons of rock burst off the walls and back, but the timber was not damaged. In No. 3,209E drift the track was heaved between the slash and No. 3,309E No. 6 section stope. Some rock was shaken off the walls and back of the drift. The brow of No. 3,209E No. 7 section stope was cracked.

An inquest was held on Wednesday, February 21, at 7.30 P.M. in the Kirkland Lake Town Hall before Coroner J. F. Edis, M.D. The jury returned the following verdict:—

We, the jury, find that Joseph B. McDonald met his death by having his chest crushed in by rock on February 14, 1940, due to rock burst on No. 3,209E drift at Lake Shore Mines, Limited.

Eli Kordic, a naturalized British subject, born in Jugo-Slavia, aged 35, married, his wife and three children in Jugo-Slavia, was fatally injured about 10.10 A.M. on May 4, when he was struck by falling rock in No. 2,301W pillar raise, of the Lake Shore mine. He had been employed at the mine as a driller since 1931.

No. 2,301W pillar raise is an 11- by 7-foot opening driven close to the west margin of the No. 3 shaft pillar, which is 165 feet long on the 2,325-foot level and 210 feet long on the 2,200-foot level. No. 3 shaft, now abandoned, is 30 feet in the footwall and 85 feet east of the west margin of the pillar at the elevation of the top of the raise. No. 3 shaft pillar extends from the 1,200-foot level to the 3,950-foot level and varies in length from 165 to 500 feet.

The raise had been completed to 80 feet above the 2,325-foot level and one round of a sublevel drift had been taken out to the west, the plan being to connect with a gangway in section 1-2,301W stope, now filled, and thence to the No. 1 manway, which is connected to the 2,200-foot level. It was then intended to mine the shaft pillar. The 82-degree, cribbed raise has two compartments, each 4 by 4 feet inside the timber, the manway being on the west side. The raise cribbing was level with the subdrift elevation.

The manway was bulkheaded on a 50-degree slope toward the chute. Entrance to the subdrift is through a "window" from the manway into the chute, 10 inches below the bulkhead.

The night shift on May 3 blasted the subdrift round. The total excavation, including the raise, was about 18 feet long and from 8 feet wide at the east end to 5 feet wide at the subdrift face. The back averaged 8 feet above the cribbing.

The day shift on May 4, consisting of E. Kordic and J. Kopec, both machinemen, and J. Steele, servicing the raise, pulled nine cars from the chute immediately after coming on shift. Kopec went up the raise, followed by Kordic. After entering the raise Kopec wet down the muck and scaled, Kordic being in the raise with him. Shift Boss P. Oliver and Mine Captain M. Seymour both visited the subdrift early in the morning and instructed Kordic and Kopec to stand two sets of timber before taking another round. Kordic went to the 2,325-foot level

and pulled three cars of muck while Kopec scaled. When Kordic came back to the subdrift he cleaned around the raise preparatory to covering the chute compartment. It was necessary to pull more muck, so Kopec went down to the level and pulled three cars. When returning for a fourth car he heard a signal from the raise and, coming under the manway, heard Kordic's call for help. He found Kordic on the second ladder from the top. He took him to the next landing and went for help. He found J. Steele at the bottom of the raise bringing timber and sent him up the raise to watch Kordic while he called for first aid. Kordic remained conscious and when asked, by Kopec and Steele, as to the cause of the accident, said that a rock burst had occurred.

Kordic was attended by Dr. Kelly in the manway and removed to the surface first-aid room and subsequently to the Kirkland District Hospital. He died at 11.45 P.M. He had received compound fractures of the lower left leg, contusion of the right side and back, laceration of the right hip, multiple fractures of the pelvis, and fractures of the five lower transverse processes of the lumbar vertebrae. Death was due to internal haemorrhage and to shock.

Examination of the raise showed a shovel partially covered with fine muck lying against the muck pile about 5 feet west of the manway. Between the shovel and the raise was a piece of rock weighing about 40 pounds. Immediately above this point the back was ellipsoidally concave, indicating the point from which an estimated 300 pounds of rock had fallen. The back had been scaled by Kopec and Kordic and this area had been sounded by Oliver, the shift boss. Although it is impossible to determine definitely the cause of the rock fall, the appearance of the back after the accident, the general fineness of the rock which came down, and the severity and multiplicity of Kordic's injuries indicate the occurrence of a strain burst in the back at this point. Kordic's statement supports this conclusion.

An inquest was held at 7.30 P.M. on May 8 in the Kirkland Lake Municipal Hall before Coroner J. F. Edis, M.D. The jury returned the following verdict:—

> We, the jury, empanelled to inquire into the death of Eli Kordic, find that he came to his death through internal haemorrhages, fractures and shock, sustained from a rock burst at Lake Shore Mines, May 4, 1940.

Johan Galinoc, driller, naturalized British subject, born in Jugo-Slavia, aged 37 years, was fatally injured in No. 3,702W section 6-1 stope at the Lake Shore mine, at about 7.40 P.M. on November 12. Galinoc, who was married, with wife and three children in Jugo-Slavia, had been employed by the Lake Shore mine since 1931.

No. 3,702W section 6-1 stope is a filled, square-set rill between the 3,700-foot and 3,575-foot levels, with a 30-foot vertical face below the 3,575-foot level. This vertical face is approximately 550 feet west of the main crosscut and 115 feet west of the east pillar of the stope. It consists of a 6-foot pony-set below the 3,575-foot level track and three 8-foot sets. From this point the rill face extends seven sets down and ten sets and a connecting set west to the chute-set. The manway set from the 3,700-foot level is one set west of this chute set. The stope averages about 13 feet wide.

The fill fence of the vertical cut, consisting of split 6- and 8-inch lagging, leaves one set open over the width of the stope. After the rill cut is taken, two vertical cuts are taken successively through to the level, the fill fence and the floor of the rill are put in, and fill is run in. The fill fence of the 6-foot pony set is stepped back one set.

Standard sets are 8 feet high and 5 feet 4 inches square. Caps and posts

are of 10-inch timber; girts are 5 inches by 10 inches. The sets are cap-butting. Spruce and jackpine are used.

The sets are blocked with the regular face and wall blocks, and the posts in the front row are blocked to the face at their centre points and braced from these points to the posts behind, back to the fill fence. Sand is used for fill. Considerable quantities of water seep down from the 3,575-foot level into this stope.

B. Wannamaker and D. Mahonney drilled and blasted the first breast of the vertical cut on the day shift of November 12. The length of this vertical cut was one standard set and a 3½-foot set. The stope, which was about 17 feet wide, was timbered with two standard sets with long posted blocks to each wall. All face and wall blocks to the level above were in place before the blast.

Galinoc and W. Connelly, both machinemen on the night shift, entered the stope from the 3,575-foot level at about 7.30 P.M. Connelly remained at the water-valve in the pony set while Galinoc went down to wash the face. Then Connelly went down to join Galinoc on the floor of the third set below the level. Galinoc was scaling the brow, which was about 2 or 3 feet above the floor. Connelly is positive that at this time the centre face-block and brace of the centre post and of the south post were in place, and that the centre face-block of the north post was out of place. As Galinoc scaled a slab off the brow, which was about a foot below the centre face-block of the centre post, Connelly saw the block became loose and fall out. The sets and fill fence collapsed, trapping Galinoc and Connelly in timber, muck, and fill. The collapse of the timber and fill fence allowed the sand to run out of the first two sets below the level back of the fill fence.

Charles Welsh, on the 3,575-foot level, heard the collapse and saw that the timber in the stope had collapsed and that no entrance could be gained from the 3,575-foot level. He immediately informed George Needham, shift boss, whom he met in the main crosscut. After giving the alarm at the No. 5 shaft station, Needham climbed down to the 3,700-foot level and entered the stope from the bottom. Connelly was found trapped near the north wall below the girt of the top set of the rill. Galinoc was caught in a mass of timber and muck to the east and south of Connelly. It was evident that he was dead. First aid was administered to Connelly by F. J. Redfern, night shift first-aid man. Rescue operations were commenced immediately under the supervision of W. Allan, night captain, and taken over later by H. McPhail, day captain, and W. Selnes, assistant underground superintendent. Connelly was extricated at 10.15 P.M., and Galinoc's body was removed at 1.10 A.M.

Galinoc's injuries consisted of a crushed left chest, fractured neck, compound fracture of right leg, and multiple contusions of body and extremities.

An inquest was held in Kirkland Lake Town Hall on November 20 before Coroner F. H. Wilson, M.D. The jury returned the following verdict:—

We, the jury, find that Johan Galinoc came to his death on November 12, 1940, at about 7.40 P.M. in stope 3702W Section 6-1 at the Lake Shore Mines in Kirkland Lake by a cave-in of rock and sand fill. We, the jury, find that death was accidental.

La Re Exploration Company

Peter Louis Wasney, aged 33, British, married, with three children, died between noon and 1 P.M. on July 15, as a result of being overcome by carbon-monoxide gas in the Breakneck shaft at the Silverman property, Claim No. 357P, some 7 miles east of Kenora.

The property has been worked at intervals for the past 35 or 40 years. A

considerable amount of stripping and trenching has been done, and there is a 6- by 8-foot vertical shaft, 44 feet deep, which was sunk about 35 years ago.

Working for the La Re Exploration Company, a personal venture of J. A. Poirier of Hibbing, Mich., U.S.A., who optioned the property, Wasney had been at the mine since July 8, with Paul Aranson, field man for the Kenopo Mining and Milling Company, also directed by Mr. Poirier. They were engaged in dewatering the shaft for sampling and inspection purposes. The dewatering was being done by a Fairbanks-Morse, self-oiling Typhoon pump, having a pressure of 100 pounds, a speed of 350 r.p.m., and a capacity of 600 gallons per hour. The pump was driven through three V-belts from an R. A. Lister No. 86454, single-cylinder, 2 h.p. gasoline engine. The gasoline tank on the engine held a gallon and would run for 5 hours without refilling. Neither the pump nor engine was new. The pump and the engine were mounted on two 2- by 8-inch planks, 4 feet long, fastened at the end by two pieces of 2- by 4-inch plank. This assembly was in turn mounted on three pieces of 2- by 8-inch plank, 6 feet long, which served as a raft.

The pump assembly was supported, and raised or lowered as the water level changed, by a ½-ton chain-block and a ¼-inch wire rope. The chain-block was held by a tripod over the shaft.

Each morning it was the custom to start the gasoline motor and run the pump until mid-afternoon, at which time it was out of gas. The men would then return home to Kenora. When they returned next morning, the shaft apparently would be free of gas and they would descend, put in ladders if necessary, fill the tank and start the motor and pump again.

On Monday, July 15, the same procedure was followed, and the motor was started about 9 A.M.; but at 12.15 P.M., just after Aranson and Wasney had eaten their lunch, the pump stopped. There was then about a foot of water left on the low side of the shaft bottom. There were three vertical ladders reaching the bottom of the shaft, fastened to sprags across one end of the shaft. The rung interval was about 16 or 18 inches.

Against Aranson's advice, Wasney went down the shaft to see what the trouble was. Wasney was down about 4 or 5 minutes, when he apparently felt himself being overcome by the gas and started to climb the ladders. When about 12 feet from the bottom, he fell off the ladders down into the sump with his head under water. Aranson descended but was only able to raise Wasney out of the water on to the high side of the bottom when he felt himself getting faint. He was barely able to climb to safety himself.

As soon as he could he started for the highway for help. He hailed a passing car and reached town about 1 P.M. Two firemen and a doctor with an ambulance and inhalator equipment reached the shaft about 1.10 P.M., less than half an hour after the accident. After Wasney was removed from the bottom of the shaft, artificial respiration was applied, the respirator was used, and heart stimulants were injected. This treatment was continued for about an hour and a half with no results, and at 2.38 P.M. Wasney was pronounced dead.

An inquest was held in the Court House at Kenora on August 9 at 7.30 P.M. before Coroner D. G. Mason, M.D. The jury's verdict was as follows:—

After hearing the testimony of various witnesses including medical doctor, first on the scene of the accident, the deceased Wasney's employer, his helper, and members of rescue squad of local fire brigade, and having weighed the evidence carefully and mindful of the oath taken by us, we hereby present our verdict. We find that Peter Wasney came to his death in the vicinity of Hilly Lake, Kenora district, from effects of carbon monoxide poisoning on Monday, July 15, 1940, and under circumstances set forth in evidence of aforementioned witnesses. We are also of the

opinion that proper care was not exercised to protect the lives of the two workmen involved in that the operation of dewatering the mine as practiced by the deceased and his helper was illegal. No life-saving equipment or protection was supplied and it would appear that the deceased who, according to the evidence, was in charge of the job was either inexperienced, ignorant of consequences of his action, or heedless as to the results of same.

Little Long Lac Gold Mines, Limited

Joseph Ernest Moore, a naturalized British subject, born in the United States of America, aged 30 years, married, with wife and child living in Geraldton, employed as a motorman at the Little Long Lac gold mine since July 27, 1940, was fatally injured about 1 P.M., November 4, in the No. 1,601 west drift on the 2,200-foot level, when he was caught between a platform timber and the top of his motor. He died in the Little Long Lac hospital at 10.05 P.M. on November 5.

The work in No. 1,601 west drift was stope preparation. Backs had been taken down along the length of the drift and most of the stope-floor timbering completed. On the day of the accident a mucking-machine operator, two timbermen, and Moore, as motorman, were working in the drift. It is the practice to keep the stope-floor timber installed fairly close to the face of the muck pile to keep the walls supported and to afford protection to those passing through the drift. The walls do not remain solid without support and the stope back becomes loose. The back of the drift is about 17 feet above the rail after slashing.

On November 4, the floor timbering was completed to within 45 feet of the muck pile and three round timbers had been placed, 12 feet apart, ahead of the floor timbers to hold planks to make a platform for the timbermen to stand on when drilling hitches and installing the floor timbers. Moore was occupied with supplying the mucking-machine with empty cars and taking out the full ones. The procedure was to push an empty car into the mucking-machine, with the motor, wait there until the car was filled, and haul it out to the switch some 200 feet away, where empty cars were stored. He would couple an empty car to the full one and push it into the mucking-machine. He would leave four empty cars on the switch and return to the face with the other one. This was done until five cars had been filled, then Moore would haul his train to the pocket and dump the cars.

When he made the first trip to the mucking-machine in the morning it was found that the cars and the motor would not pass in under the platform timbers, and they had to be raised. Moore worked in the drift all morning and about 1 P.M., when leaving the mucking-machine with two full cars, he was caught between the middle platform timber and the top of his motor.

The timbermen had drilled hitches with their platform on the front and middle timbers first and then moved the platform back to the middle and rear timbers. The front timber was left in place to be used later when installing the stope-floor timbers. The timbermen had finished drilling hitches and were placing the floor timbers at the time of the accident. Neither saw what happened but, hearing the noise, they reached the drift in time to see Moore, who had got off his motor, holding his chest and to catch him as he collapsed. Moore was placed on a timber-truck and taken to the shaft station.

No one saw the accident, but the shift boss, Jack Peat, who arrived with the cage, following the 9-bell signal, and waited with Moore until the stretcher and blankets arrived, said that Moore told him the accident happened as he was coming out with two full cars. He had pulled away from the mucking-machine and felt the left wheels of one of the cars pass over some muck on the track. He stood up to see if the car would stay on the track. He also looked out the

drift as he stood up and was at that time about 8 feet from the platform. Satisfied that the cars would not go off the track, he opened the motor just as he was pinned between the platform timber and the top of the motor.

Moore was not thought to be critically injured at the time he was admitted to the hospital, but after about four hours his condition became worse and he died at 10.05 P.M. the next day. He had suffered chest injuries with complete collapse of the right lung. A *post mortem* examination revealed that the bronchus had been torn completely across. Death was due to shock and secondary haemorrhage.

Investigation showed the platform timber to be 5 feet 2 inches above the base of the rail, the side of the battery box to be 3 feet 7 inches, and the peak in the centre to be 4 feet 2 inches. The battery box is 3 feet 1 inch long and has a two-way light assembly on top, 6½ inches in diameter, extending the length of the battery box except for 8 inches at each end. The clearance above the peak of the motor would be 1 foot and possibly 5½ inches above the top of the light. The motorman's seat is on the right-hand side of the motor and the controls are on the left. It was shown that when he was seated the top of the motorman's head would be 3 or 4 inches higher than the bottom of the platform timbers, making it necessary to incline the head to pass under without striking the timbers. When seated, the motorman faces across the drift and can see either way along the drift by turning his head.

An inquest was held in the Geraldton police office on November 6 at 7.30 P.M. before Coroner D. P. Beyers, M.D., of Nipigon. The jury's verdict was as follows:—

> We, the jury, find that Joseph Ernest Moore died from injuries received on November 4, about 1 P.M., while at work on the 16th level of the Little Long Lac gold mine. These injuries were purely accidental and no blame can be attached to either the mine or employees.

McKenzie Red Lake Gold Mines, Limited

Kost Krys, a naturalized British subject, of Polish birth, aged 35, married, employed as a cagetender, was instantly killed at 12.28 A.M. on January 5 in the main shaft of the McKenzie Red Lake mine, when he was crushed between the wall-plate and the cage in which he was riding.

The main shaft at the McKenzie Red Lake mine is a vertical, 3-compartment opening, 475 feet deep, with levels at 150, 250, 350, and 450 feet. The long axis of the shaft lies north and south. The south compartment is the manway, and the north compartment and the centre compartment are hoistways. Men are transported in the north compartment only. The 450-foot-level station is on the west side of the shaft; the deck is on the east side. The cages rest on a solid bulkhead at the 450-foot level.

Krys started to work at this mine on November 1, 1935, as cookee, and was later transferred underground, where he worked as a mucker and trammer until April 11, 1937. He was then sent to the 36-degree, inclined winze as skiptender. He worked there until January 3, 1940. On the night shift of January 3 he worked at the main shaft with the cagetender and on the following day was given charge of the cages. The regular cagetender left that day. Krys had operated the cages previously at various times during the hoisting of men, but had not actually been given full charge. This was his first shift alone in charge of the cages.

He had been instructed in his duties by both the shift boss and mine captain before he took over as cagetender, and was particularly warned that he must always be sure that the cage bar was down in place when muck was being

hoisted and that the cage doors must always be closed and latched when men were being carried.

Krys did this work satisfactorily until lunch time, which was at 11 P.M., and hoisted the men for lunch and lowered them again with the bar in place and the doors closed and latched. Then some eighteen cars of ore and waste (nine trips in balance) were hoisted from the 450-foot level, after which the hoistman received a man-signal for surface. The hoist was started slowly, and just as the hoist-controller reached the full-speed notch, and the cage was about 30 feet from the level, there was a jerk on the hoisting-rope. The hoist was stopped immediately and the hoistman reported to the shift boss, who was in his office in the next building.

Knowing that there would be no one at the 450-foot-level station, the shift boss telephoned to the winze hoistman to have the skiptender go to the 450-foot-level main-shaft station and find out what had happened. In the meantime two men who were tramming from the waste pass to the main shaft arrived at the station and saw Kry's body lying on the floor of the station. One of them telephoned to the surface and told what had happened. The shift boss then telephoned for the doctor and proceeded down the shaft manway.

Krys was found lying on his back with his head about a foot from the post between the hoisting compartments and his body straight out from the shaft His hat and left boot were found on the bulkhead. The free end of the station bar was resting on the floor of the station and the bracket that held the bar had broken off. An inspection of the north compartment of the shaft revealed that the cage bar had pierced the third wall-plate (8 by 8 inches) above the station and protruded through it about 2 feet. The inside of the bracket was broken off and the bolt had been sheared off. Slivers of wood were found in the west side of the cage-hood, the cage-doors on both sides of the cage were latched open, in mucking position, and the free end of the east bar was resting on the floor of the cage. The cage had stopped with the bottom midway between the fifth and sixth sets.

The brow set is 16 feet above the floor of the station and the shaft sets are at 6-foot centres. The wall-plate of the brow set and the next set above were found to have had 2½ inches split off the inside across the full width of the compartment, 4 feet 8 inches. This break was not new and it was explained that the bar of the cage had been left upright about a year before and had caught in these wall-plates as the cage was raised, splitting them. A 2- by 3-inch piece was missing from the top side of the third wall-plate, where the bar had gone through. The spot where the bar entered the wall-plate was 14 inches south from the north post and 3 inches in from the face of the wall-plate. Measurements showed that the top of the bar would have to be leaning from 5 to 6 inches off the vertical to the south and from 5 to 6 inches away from the cage to have pierced the wall-plate as it did. The south half of the inside of the fourth wall-plate seemed to have been cleaned of mud, etc. The mud on the wall rock behind the wall-plates appeared as if something had been dragged over it from just above the fifth set to the fourth. The sixth set had a mark along the face from 8 inches north of the south post to 6 inches past the centre of the compartment. The shaft had quite an overbreak behind the fifth wall-plate and only 6 inches of clearance behind the fourth.

From the evidence and a visit to the scene of the accident, it would seem that Krys proposed to go to surface to see if the waste bin was full. As he knew he would be hoisting cars again he did not take the trouble to unlatch the doors from the mucking position. As he had been used to operating the skips where

there was no bar to close, he neglected to do this, leaving the bar in a more or less vertical position, where it would remain after he had taken off the last empty car. The bar was loose enough to lean out into the shaft far enough for the top end to catch the shaft timbers. It did not catch in the first two sets on account of their being split and undersized. It is thought that when the bar pierced the third set it stopped the cage momentarily. This threw Krys off balance and out of the cage as the bolt holding the bar sheared off and the cage catapulted up the shaft.

The injuries Krys received indicated that he must have been caught between the fifth wall-plate and the cage-floor, turned around the wall-plate head first, and thrown down along the wall inside the shaft timber to the fourth set, and then out into the compartment past the face of the fourth wall-plate. He hit the bar at the 450-foot station, breaking off the hook, and turned over and out into the station, feet first. His injuries consisted of a broken left leg, broken arms, fractured skull, deep laceration of the right side of the head, and a badly crushed chest.

An inquest was held on January 5 at 2 P.M. at McKenzie Island by Coroner J. D. Mason, M.D., who gave the following verdict:—

The deceased, Kost Krys, came to his death at the hour of 12.28 on the early morning of January 5, 1940, in the No. 1 vertical shaft of the McKenzie Red Lake gold mine, Patricia district, as a result of crushing injuries to his skull and chest, also fractures of the arms and legs. From the evidence produced at this inquest it is in my opinion that the accident which caused his injuries was caused by the deceased, Kost Krys, neglecting to close the bar and the doors of the cage, giving the signal to lift the cage to the surface from the 450 level. The bar of the cage, being turned upright, caught in the timber of the shaft, throwing the occupant, Kost Krys, between the floor of the cage and the timbers of the shaft, thus causing the crushing injuries from which he instantly died.

MacLeod-Cockshutt Gold Mines, Limited

Joe Basar, naturalized British subject, born in Jugo-Slavia, aged 32, married, with a wife and child residing at Geraldton, employed as a cagetender at the No. 2 shaft of the MacLeod-Cockshutt mine, died of asphyxia about 11.20 P.M., November 6, when he was completely immersed in about 2½ tons of soft muck in the skip.

The No. 2 shaft at the MacLeod-Cockshutt mine is a vertical, 4-compartment opening; one compartment is a manway, another is an airway, and the other two are hoistways. The hoisting compartments are 5 feet between dividers by 5 feet 6 inches between wall-plates. The long axis of the shaft is north and south and the hoistways are in the south half of the shaft.

Combination cage-over-skip assemblies operate in each of the hoisting compartments. The distance between the bottom of the cage and the top of the skip is 4 feet 11 inches. The floor of the cage is 5 feet wide, leaving 3 inches of clearance between the cage and the wall-plates. The skip is 3 feet by 4 feet 11 inches at the top and is 5 feet deep.

Regular loading-pockets are in operation below the 5th level, but at the 6th, which is the bottom level, only brow pockets were installed. The brow pockets hold between 20 and 30 tons and either skip can be loaded by opening a gate in the corresponding compartment. The gates are 35 inches wide, 32 inches high, and 9 inches thick. They are made of ½-inch plate with a ⅜-inch wear plate on the inside, and are filled with 8- by 8-inch fir blocks. They weigh about 600 pounds each. The gates work between 3- by 3- by ⅜-inch angle iron guides and are operated by 6-inch air cylinders. The air cylinders are operated by valves, located about 12 feet above the skips when the skips are in loading position. The pocket openings are 29 by 12 inches. Each compartment is lined at the pockets.

When spotted for loading, the top edge of the skip is 5 feet below the bottom of the gate and the bottom of the gate is 3 feet back from the inside of the shaft timbers. A chute guides the muck into the skip and each skip has a lip 7 inches high on the front half of the sides, to prevent muck spilling over the skip when being loaded. There is a distance of 18 inches from the back of the guide runner to the back of the skip.

Preparations for deepening the shaft through the airway had been completed and the shaft sump cleaned out, using the sinking-bucket. The wet muck was dumped into the 6th-level pocket, from where it could be loaded directly into the skips and hoisted to surface.

About 11 P.M., Basar went to the 6th level to empty the pocket. The gate of the south side of the pocket was stuck and could not be opened by the air cylinder alone. Basar went to the 5th level, where he contacted Harold Paul, shift boss, and took him back to the pocket to assist him. They travelled in the north cage. The north skip was loaded first and sent to the surface, but the gate of the south pocket was still stuck. Basar took a bar down to the skip and straddled the back of the skip to pry the pocket gate open, while Paul operated the air cylinder. After a minute or so of effort the gate suddenly opened. Paul claims to have shut the gate immediately and called to Basar to find out if the skip was full. He received no reply to repeated calls, so he knelt down and looked under the cage floor. The skip was full, but Paul could not see Basar.

Basar's body was recovered from the bottom of the skip when it was hoisted to the dump and slowly emptied. From 10 to 20 minutes had elapsed from the time the gate opened until the skip was emptied.

It was not unusual for the pocket gates to stick as often as two or three times during a shift, and it was customary to release them by working from the top of the skip. Basar's body was found on the bottom of the skip, facing away from the pocket and directly below where he had been standing. He must have lost his balance and fallen into the skip at the same moment as the pocket gate opened, the wet muck pouring in on top of him. The bar, which was 6 feet long, was found standing upright in the skip on the side nearest the pocket.

An inquest was held in the Mariaggi Hotel at Geraldton on November 7 at 9 P.M. before Coroner Wm. Powell, M.D. The jury returned the following verdict:—

> We, the jury, have determined that the deceased, Joe Basar, came to his death on November 6, on or about 11.20 P.M., at the 6th-level loading-pocket, MacLeod-Cockshutt gold mine. Death was due to suffocation caused by complete immersion in about 2½ tons of soft mud. We also find that no blame can be attached to the MacLeod-Cockshutt Gold Mines or any of its employees.

Moneta Porcupine Mines, Limited

George Kulok, a naturalized British subject, of Rumanian birth, aged 37, single, employed at the Moneta Porcupine mine as a driller, was instantly killed at 12.15 A.M. on November 5 by a fall of approximately 10 tons of rock, while scaling in No. 2-2 stope on the 2nd level.

No. 2-2 stope is a slice-and-fill operation. At the time of the accident the first slice above the stope floor had been mined. This slice had been carried southward from the north end of the ore body to a waste section about 30 feet north of the fill raise. The hanging wall in this section of the stope is a graphitic slip. The ore in the first slice was cut off by the section of waste at an angle of 45 degrees across the stope so that the ore extended about 13 feet farther to the south along the footwall than along the hanging wall. The width of the stope in this section was from 11 to 13 feet. The point of waste extending between the

graphitic slip and the ore had been broken off by the blasting of the last breast leaving the left third of breast in waste and the right two-thirds in ore.

At this stage the work in the stope was stopped for a couple of weeks, and the men were put to work in No. 3-2 stope on the level below. The work in No. 3-2 stope was finished and on November 4 at 7 P.M. the night-shift foreman, on instructions from Captain F. Harrison, sent the crew back to No. 2-2 stope, where they had been working two weeks before. The crew consisted of Kulok and his helper, W. Cadeau. Kulok had worked at the Moneta mine for three years. Cadeau was employed May 10, 1938. The two men had worked together for about eighteen months.

No. 2-2 stope was inspected by Shift Boss K. McLeod shortly after 7 P.M. He sounded the ground and considered it tight. He saw the two workmen again at the shaft station at 10.15 P.M. and talked with them at the entrance to the stope about 5 minutes before the accident.

Kulok and Cadeau were drilling the ore section of the breast mentioned above with a stoper drill. They had drilled four vertical holes along the footwall and started to drill the first hole of the second row when they realized that they were drilling in loose ground. They removed their machine and hose and started to scale. Both men were lifting on one scaling-bar when suddenly a large block of waste rock, weighing about 10 tons, fell from the back and the hanging wall. Kulok was directly under it and was instantly crushed to death. Cadeau was knocked forward and fell against the footwall, where he was pinned by the legs.

The greatest dimensions of the block were: length 10 feet, width 6½ feet, and thickness 4½ feet. It fell away from the graphitic slip on the hanging wall. The upper face which broke away from the back was a rusty, nearly horizontal slip.

Two chute-pullers, working on the level at the waste-pass chute, heard Cadeau call and, while one of them went to the station for help, the other released Cadeau by removing small rock from under his legs. Cadeau suffered no broken bones, but his left leg was severely bruised.

An inquest was held before Coroner H. E. Montgomery in Timmins on November 29. The jury's verdict was:—

> We, the jury, are unanimous in our decision that no blame is attached to anyone in bringing in a verdict of accidental death [and the following was added by the Coroner] in the case of George Kulok, who was killed by a fall of rock, November 5, 1940, at Moneta Porcupine Mines, Limited.

Montrose Mines, Limited

Cuyler Johnson, British, aged 39, single, who had worked at the Montrose mine as a mucker since August 13, 1940, received fatal injuries when he was crushed beneath a fall of ground in the main south drift on the 88-foot level on August 24 at 7.17 A.M.

The 8- by 10-foot main south drift on the 88-foot level has been driven a distance of 160 feet south and west from the main shaft. On August 23, C. Dell, machineman, and his partner, Earl Proulx, drilled off an 8-hole footwall slash at a point approximately 136 feet from the shaft in the main south drift. Five sticks of 40 per cent. Polar Forcite gelatine powder and four 10-foot fuses were used to blast four holes just before the men went off shift. Between 7.30 P.M. and 8.15 P.M. on August 23, E. S. MacCarthy, manager, examined the results of the blasting done by the day shift. At this time the condition of the back was good, with the exception of a small loose piece about 20 feet from the face.

On Saturday, August 24, MacCarthy instructed L. W. Cole and Johnson to go to the place which had been blasted on the 88-foot level. They were informed

of the loose piece seen by MacCarthy the previous evening and were told to scale the back carefully before starting to muck.

Dell and Proulx visited the place on the 88-foot level about 7 A.M., August 24. Dell scaled some loose before examining the face. Both men claimed that, apart from small loose pieces resulting from the blast, the back was sound. When Cole and Johnson arrived at the face shortly after 7 A.M., Dell showed them a small loose section about 20 feet from the face, which they were to take down before scaling ahead to the face. Dell and Proulx then left to do other work.

Johnson, using a scaling-bar and standing on the hanging-wall side of the drift, started to scale. Cole, standing on the footwall side and using a pick, was assisting him to take down loose rock when, without warning, approximately 35 tons of rock fell from the back. Johnson was buried. Cole's foot was caught, but he was not injured.

Assistance was summoned by Cole, and Johnson's body was recovered immediately. Dr. Fitch was sent for and arrived from Matachewan at 8.30 A.M. Johnson had received crushing injuries to his head and neck, many broken ribs, broken left arm, torn and dislocated right shoulder, torn arm muscles, fractured pelvis, broken right leg, and several broken sections in the region of the tenth thoracic vertebra. The internal organs were protruding from his back.

After the accident three very distinct slips were noted, which undoubtedly caused the accident. Two slips ran parallel with the drift and met at a point 6 feet above the back. A third slip ran at right angles to the drift. The slips formed a wedge-shaped piece of ground in the roof. This piece was about 18 feet long and 10 feet wide, and ranged in thickness from a few inches to 7 feet at the highest point.

An inquest was held before Chief Coroner J. S. McCullough, on August 26 at Matachewan. The jury's verdict was as follows:—

The said Cuyler Johnson met death by an unforeseen accident at the Montrose mine, Bannockburn township, in the southwest drift of the 88-foot level at approximately 7.17 A.M., Saturday, August 24, 1940.

Northern Peat Company, Limited

Edward Albert Gloucester, one of a cage-loading crew employed by the Northern Peat Company, Limited, on a salvage operation at the Vipond mine, was instantly killed at 8.30 A.M. on December 1 at the North Thompson shaft, when the cage was moved following an improperly given signal. Gloucester was 32 years old, British, and married, with five children.

Mace Gold Mines, Limited, ceased regular mining operations on October 15, 1939. Because some of the stopes are in the near vicinity of Hollinger mine workings, the mine has not been permitted to fill with water.

In October, 1940, the Northern Peat Company, Limited, commenced salvaging pipes and rails and other scrap iron of value from the mine. This work is confined to easily accessible areas and does not include stope manways or raises. Experienced miners are used underground. The operation will be completed about December 17.

The single-drum Allis-Chalmers hoist formerly used by the Vipond and Mace companies on the 1,250-foot level was installed just outside the old hoist-room, but about 30 feet closer to the shaft collar, for use in carrying on the salvage operations. A shed was erected over it. One cage was installed.

In the salvage operation the two signal lines were transferred from the original hoist-house to the new hoist-house. The line used for the cage signals ran from the hoist-room to all stations underground. The second line, for the vacant

compartment, ran from the hoist-room to the collar only. The return flash signals were not transferred from the original hoist-room to the new one, and consequently the hoistman could not return the signals.

A set of standard signals and notes on their use had been given to W. B. Brewer, manager of the Northern Peat Company, prior to the setting up of the hoist, with verbal instructions to use them. Brewer has no first-hand mining experience and does not take charge of the underground work. H. McQuarrie was in charge of the work at first and was followed by H. E. Jamieson. Both men are experienced miners. Brewer depended on his men to adopt the proper signal system after giving them a copy of the code. Instead, they continued to use the code formerly used by the Vipond and Mace companies. The destination signals of this code were still hanging at the shaft stations and in the headframe. These earlier operators had moved the cage on the destination signal. The signals used by the Mace company were recorded audibly in the hoist-room only. The return system had been by flash on a separate line.

On the day of the accident, A. Burnette, who had been helping the regular deckman for a couple of weeks, was acting as deckman, assisted by R. Emond, who had been a deckman's helper at the Pamour mine for several years.

On Sunday morning, December 1, two crews went to work. A track crew went to the 8th level and started to work at some distance from the shaft. Another crew, consisting of Angus McDonald, Isaac Logan, and E. A. Gloucester, went to the 7th level (733-foot) and commenced to load rails, which were piled at the station. The rails, which were 20 feet long and weighed 12 pounds per foot, were to be hoisted to surface. The cage was spotted with the floor flush with the station floor. The hood was turned up and the rails were stood on the cage floor. Gloucester was on top of the cage holding the upper ends of the rails while McDonald and Logan loaded them. Fifteen or sixteen rails had been put on to the cage when the accident occurred.

In the meantime, W. H. Church, the hoistman, who is the holder of a fourth-class stationary engineer's certificate, was waiting for a signal to bring the cage back to surface, as a crew of pipemen was ready to go underground. He thought that an undue length of time had passed and wondered if signals were not coming through to him.

About 8.30 A.M. he asked Burnette to "test the bells." Burnette had never made this nor even seen it made. The hoistman did not specify what bells he wanted tested or how many bells he wished to have rung. Burnette went directly to the shaft collar from the hoist-room, a distance of about 125 feet, and rang "one bell" on the cage line, following it immediately with "one bell" on the line for the vacant compartment, which can be used only from the collar to the hoist-room. Church did not expect him to ring on the line used by the underground men. As there is no connection between the two lines, testing the line used from the collar to the hoist-room would not prove whether or not the other line was working from underground. Church did not think Burnette had had time to reach the shaft collar when he received the first bell. He assumed that this signal came from underground and started to lift the cage.

When the cage started to move Gloucester was standing with one foot on it and one on a divider. He shouted as the cage started. McDonald and Logan were picking up a rail. Logan, who was nearest the shaft, jumped to the signal-cord and gave "one bell" just as the cage paused momentarily about 4 feet above the level. This signal was received by the hoistman, but the cage did not stop. When it had travelled a total distance of about 11 feet the rails jammed in the timber, and Gloucester was crushed between the top of the cage and the first

divider above the station brow. He was killed instantly. His injuries included a fracture of the base of the skull, a broken neck, broken ribs, fractures of both forearms, fracture of the right leg, peritoneal wounds, and severely contused chest.

An inquest was held before Coroner H. E. Montgomery at Schumacher on December 3. The jury's verdict was as follows:—

> We, the jury, find that on December 1, 1940, at the Mace mine, Albert Gloucester met his death by being crushed between the cage and the shaft timber on the 700-foot level by the cage being moved from a one-bell signal reaching the hoistman. We, the jury, think that if there had been a return system in use this accident could have been prevented. We recommend this system be put in use before further operations.

Paymaster Consolidated Mines, Limited

Hector Dempsey, driller, British, aged 28, married, was instantly killed in No. 1,403B west stope on the 1,450-foot level of the Paymaster Consolidated mine about 1.20 P.M. on April 5.

No. 1,403B west stope is about 105 feet long and slightly over 3 feet in width, and is timbered with stulls. The mucking-floor at the time of the accident was 47 feet above the 1,450-foot level. The stope back was from 15 to 30 feet above the mucking-floor. There are five chutes, 20 feet apart, numbered from 16 to 20, inclusive. Nos. 17, 18, and 20 are mill-hole chutes.

On April 4 the afternoon shift shovelled ore into No. 20 mill hole and pulled it down about 15 feet below the top of the mill hole. About 9.30 A.M. Dempsey and his partner, A. Lusa, were shovelling into this mill hole when Shift Boss D. S. MacLennan visited the stope. MacLennan told both Dempsey and his partner to shovel on the west side of the mill hole. Dempsey continued to muck on the east side of the mill hole. The mill hole was filled and the men were piling the muck on top of it when the accident occurred. Lusa was on the west side of the mill hole, with his back toward his partner. Dempsey, it is thought, was picking off a ledge on the hanging wall, which was nearly vertical at this point, when approximately 4 tons of rock slid out of the footwall, dropped 4 feet to the mucking-floor, and then canted over, pinning Dempsey in a standing position against the hanging wall. Dempsey's head was crushed and his jaw and neck were fractured.

The block of rock was 5½ feet in width, 7 feet in depth, and 4 feet thick at the top. It was about 18 inches in thickness at the bottom and had been undercut by the mining of a calcite stringer at this point. The piece, including most of the vein, broke away from a smooth, gouge-coated face behind it. Dempsey had removed the muck which had been under the base of the block. Lusa saw Dempsey sound this wall a couple of times during the shift and it appeared sound. Two timbermen, who were also working in the stope at the time, had placed a mill-hole stull within 2 feet of the block a couple of days prior to the accident. At that time the wall all seemed solid.

An inquest was held at South Porcupine before Coroner H. E. Montgomery on April 11. The jury's verdict was:—

> We, the jury, find, from the evidence given, that Hector Dempsey came to his death at Paymaster Consolidated Mines, in the township of Tisdale, on April 5, 1940, about 1.20 P.M., by being crushed by a piece of loose. No blame attached to anyone.

St. Anthony Gold Mines, Limited

Louis Buday, Hungarian, aged 42 years, single, was killed by a fall of ground in No. 750-1 stope at the property of the St. Anthony Gold Mines, Limited, at 9.45 P.M., June 26.

No. 750-1 stope is located 450 feet west of the main shaft on the 750-foot level. It is 700 feet long and averages about 10 feet in width. It strikes north and south. The drift is timbered with stulls and lagging, with chutes at 20-foot centres and manways at intervals of 100 feet. At the time of the accident the stope had been mined by shrinkage to a height of about 38 feet above the timber. Up to this height the footwall was almost vertical, but here the dip of the vein flattened to almost horizontal. A slice about 10 feet wide was taken along the flattened dip on the footwall. The rock in this particular section of the stope tends to slab off in thin sheets. The quartz breaks away suddenly, with little warning, in what are sometimes called "air blasts." At No. 6 manway the broken ore had been pulled down to the floor of the slice on the footwall side and about 8 feet lower on the hanging-wall side.

On the day shift of June 26 a round of 15 holes, 7 feet deep, had been drilled and blasted in the footwall slice at No. 6 manway. This was recorded in the log book.

Before the night shift went underground on June 26, Frank Absenger, the shift boss, instructed Louis Buday, driller, Murray Kane, driller, and Montague, Murphy, drill helper, to go to No. 750-1 stope. He told them that a round had been blasted at No. 6 manway and that they were to scale the place and then to set up and drill another round there.

The men went to the working place and started scaling. At 9.15 P.M., when the shift boss visited the place, they were still scaling, but the work was almost completed. No dangerous loose remained on the walls and roof. After the shift boss left, the men completed the scaling in about 15 minutes and started to bring in the steel preparatory to drilling. Murphy was in the lower part of the manway, Kane was in the upper part of the manway, and Buday was up in the stope, standing on the flat footwall taking the drill-steel from Kane as it was passed up. The men completed passing up all the steel and Murphy and Kane commenced to climb up to get out of the manway into the stope. Buday walked from the manway to a point about 7 feet away and stooped to pick up a plank to commence setting-up. At the instant he stooped down, a large, thin sheet of loose rock fell from the roof directly over him and struck him on the back of the head, knocking him down and causing him to fall down the sloping top of the muck pile to the footwall side of the stope. Kane and Murphy were just emerging from the top of the manway and witnessed the accident. Kane shouted to Buday, but did not receive any reply and, as his lamp had been knocked off the top of the manway, where it had been resting, and had gone out, he sent Murphy immediately to get help.

When help arrived, Buday was found to be dead. When the body reached the shaft station about 10 minutes after the accident, Dr. Johnston, the mine doctor, who had arrived in company with the mine captain, examined it and expressed the opinion that Buday had been instantly killed.

The piece of loose which struck Buday was about 3 or 4 feet wide, 7 feet long, and about 4 inches deep at its thicker end, tapering to 1 or 2 inches at the thinner end. It fell from a height of about 8 feet from the footwall on which Buday was standing and broke up into many small pieces.

Buday sustained the following injuries: fractures at the base of the skull and in the occipital region, fracture of the nasal bones and right zygoma, fracture of the right clavical and ribs on the right side of the chest, and multiple abrasions and contusions of the face. The cause of death was the fracture at the base of the skull, which resulted in brain injuries.

An inquest was held at Sioux Lookout on July 10, before Coroner Harold Morison, M.D. The jury returned the following verdict:—

We, the jury, duly chosen to inquire for our said Lord the King, when, where, how, and by what means the said Louis Buday came to his death, do upon their oath say, that he met death by accident caused by falling rock at St. Anthony mine at 9.45 P.M., June 26, 1940.

Harold Carr, British, aged 25 years, married, with one child, was fatally injured at 12.30 A.M., September 28, when he was caught by falling ore and fell down an ore pass from the 250- to the 350-foot level of the St. Anthony mine.

The ore pass where the accident occurred consisted of a mill hole from the 250- to the 350-foot level, about 200 feet north of the shaft.

Most of the ore above the 250-foot level was mined out by shrinkage and the stopes pulled empty some years ago. During the past few months, however, some ore has been mined above the 150- and 100-foot levels at the extreme north end of the ore body, about 100 feet north of the point where the accident occurred. The ore from these stopes has been dumped into the empty stopes at the 150- and 100-foot levels and, passing through an opening 24 feet wide in the drift-timbers at the 250-foot level, falls into the mill hole to a chute at the 350-foot level, whence it is drawn and trammed to the shaft. At the point where the ore passes from the empty stope above the 250-foot level, the footwall flattens to about 50 degrees, from the regular dip of about 80 degrees throughout the rest of the vein. The south side of the 24-foot opening in the drift-timbers consists of an inclined bulkhead above the stulls, to deflect the ore into the opening. The north side consists of the horizontal stulls and lagging of the original drift-timbers and commences at an old chute, which is open and through which the ore is allowed to fall.

No work has been carried out on the 250-foot level for over a year, but as it was necessary to pass the broken ore through this section, the mine captain, Earl Snyder, had been in the habit of inspecting the 250-foot level once a week. The main purpose of this was to ascertain whether the ore was being "hung up" by possible broken timbers in the opening at the level. George Thomas, the shift boss, was in the habit of inspecting this section three or four times a week.

Up until September 26 the ore had been dumped from the 150-foot level, and the movement of the car on the track, as well as the voices of the trammers, could easily be heard from the 250-foot level. Thomas states it had been the practice to wait under cover of the drift timbers on the south side of the opening until ore had been dumped, and to cross the opening when he could hear the empty car returning on the track.

On the night of the accident, Thomas was taking Carr on a tour of inspection of the mine to familiarize him with the workings. As the trammers were dumping ore from the 100-foot level, Thomas and Carr could not hear the car on the track. They, therefore, waited a short period and, not hearing any movement above, started to cross to the north side of the opening. They were half way across when they heard loose ore coming from above, and both hurried to get under the drift-timbers on the north side of the opening.

Thomas reached the old chute and stayed under the timber, but Carr scrambled up the footwall on top of the chute with the apparent intention of going north on top of the drift-timbers. Thomas could see him climbing across the top of the chute and called to him to ask if he was safe, but received no answer. After the carload of ore had passed Thomas shouted again to Carr, but received no answer. Upon investigating, he could not see Carr's light and, deciding he must have fallen down the ore pass, went to get help. Carr was found in the chute on the 350-foot level.

Dr. David Johnston, mine physician, was summoned and examined Carr before he was taken from the chute and carried to the surface. Carr's injuries consisted of extensive bruising, cuts and lacerations about the face and scalp, a bad cut on the right side of the head, and a fracture of the skull. He died at 7.20 A.M. the same day, from the fractured skull.

An inquest was held at Sioux Lookout, on October 4, before Coroner S. M. Burris, M.D. The jury returned the following verdict:—

While working at the St. Anthony Gold Mines on September 29, Harold Carr died at about 7.30 A.M. from an accident at about 12.15 A.M. on the same day while performing his duties of inspecting an ore pass on the 250-foot level when he was struck by falling rock dumped from the 100-foot level, causing him to fall through the chute to the 350-foot level. We recommend that inspections be made at a time when ore is not being dumped.

Sturgeon River Gold Mines, Limited

Dimytro Baraniuk, Polish, aged 40 years, married, was instantly killed in the south stope on the 1,000-foot level of the Sturgeon River mine on November 3, between 1.30 and 2.50 P.M. He had been employed as a mucker since July 6, 1940.

The mining method at the Sturgeon River mine is resuing cut-and-fill. The south stope is about 550 feet long and, at the time of the accident, had been mined to a height of 90 feet above the 1,000-foot level. The levels are cut at intervals of 125 feet. In this section of the mine the vein is 8 inches wide and up-holes are drilled on alternate sides along the vein with stoper machines. The ore is blasted on to a plank floor laid on top of the fill and is shovelled into cribbed mill holes. Up-holes are also drilled in the waste along the hanging-wall side of the vein and blasted later to provide fill.

The south stope is served by 12 mill holes at 50-foot centres, numbered consecutively from 1 to 12, starting at the north end of the stope. Mill holes Nos. 1, 5, 8, and 10 are combined mill holes and manways. The stope is reached from the 875-foot level through a 45-degree raise, the bottom of which is just north of No. 8 mill hole.

On the day of the accident, Baraniuk, along with George Pampura, machineman, and Carl Kulikowski, helper, entered the stope shortly after 8 A.M. from the 875-foot level and proceeded north, Pampura going in front with a scaling-bar. The three men stopped near No. 5 mill hole, where the previous shift had blasted, and Pampura scaled the back and walls. When the scaling was completed, about 9.15 A.M., Wm. McKee, the shift boss, took Baraniuk north to a position between Nos. 2 and 3 mill holes, and told him to muck some broken ore into No. 3 mill hole. McKee showed Baraniuk some loose rock and remained until he had scaled it down. He revisited the stope about 1.30 P.M. and showed Baraniuk another place which apparently had become loose since the morning visit. McKee claims to have scaled the stope himself this time.

About 2.50 P.M., Pampura finished drilling and put the machine and hoses away, while Kulikowski went to get powder and fuse. The two men could not see the place where Baraniuk was working, as a waste-pillar obstructed their view. When Kulikowski returned, Pampura called to Baraniuk to see if he was still working. He received no answer to his call, and went in to tell Baraniuk they were ready to load. As he passed under the waste-pillar he saw Baraniuk's light at the side of the stope, shining toward him. He went toward the light and found Baraniuk dead beneath a slab of waste.

The piece of rock measured 6 feet by 3 feet by 16 inches and was part of a larger slab which had fallen from the hanging-wall shoulder left by the removal of the vein and the waste-holes of the previous lift. The piece was originally

about 12 feet long, pointed at the north end, and 3 feet by 16 inches at the south end. It had broken in falling. Examination of the hanging wall showed the piece to have fallen from a slip paralleling the hanging wall and cut by a flat joint on top. The area from which the slab fell had been tested at least twice during that shift, the last time being at 1.30 P.M., and had been considered solid.

It is believed, from the nature of Baraniuk's injuries, that he was hit as the slab fell and afterward was pinned under it as it hit the floor and fell over towards the footwall. The injuries consisted of extensive crushing of the left side of the head and laceration of the brain, a possible fracture of the spine, and crushing of the chest.

An inquest was held in the police office at Beardmore on November 7 at 2 P.M. before Coroner Wm. Powell, M.D., of Port Arthur. The jury's verdict was as follows:—

We, the jury, find that Dimytro Baraniuk died on November 3, 1940, at the Sturgeon River gold mine as a result of injuries received when he was crushed by a falling rock while working in the mine. It is our opinion death was accidental and all reasonable precautions were taken.

Uchi Gold Mines, Limited

John Henry Norquay, British, aged 26, married, an electrician, employed by Uchi Gold Mines, Limited, since January 27, 1940, was electrocuted at the Hanalda mine at 3.35 P.M. on June 29.

Norquay was making tests on a 10 k.v.a., 2,300-volt, 230-115-volt secondary, oil, out-door type lighting transformer. The transformer was protected by a 7,500-volt, 50-ampere, enclosed drop-out-type cut-out. The transformer was mounted 20 feet above the ground on a 40-foot pole, and supported by galvanized iron transformer mounts. Two No. 6 conductors, 2,300 volts, weatherproof, insulated primary leads were brought down a distance of 13 feet from a 3-phase, 2,300-volt line to insulators spaced 31 inches apart, then taken through the cut-outs to the primary leads of the transformer. The secondary was a 3-wire circuit, 230-115-volt, with grounded neutral. The transformer case was grounded. The mine had been closed on May 31, and the transformer was being used to provide lighting for the mine office and manager's residence only.

About 11.30 A.M. on June 29, a fuse protecting the lighting transformer was blown during an electrical storm. D. A. Farnsworth, the manager, went to the Uchi mine to get an electrician to restore the power. Norquay was sent over to replace the blown fuse and was instructed to test the transformer windings to ground. A megger was provided for this purpose. Norquay arrived at the property at 3.20 P.M. with Farnsworth, who left him and went to the mine office, where he remained for about 10 minutes. When he came out and saw the electrician working at the transformer on the pole, he asked if anything were wrong with the transformer. Norquay replied that he would know in a few minutes. Farnsworth went into the hoist-room and, on coming out a few minutes later, saw that Norquay was in contact with a live wire. Smoke was rising from the position of his hands. Farnsworth ran to the telephone and told the electrical superintendent at the Uchi mine to cut off the power. A period of about three minutes elapsed before the power was turned off.

The electrical superintendent at the Uchi mine arrived at the scene of the accident about 3.45 P.M. Dr. N. W. Sutton arrived about 3.50 and found that the electrician was dead. He accordingly ruled that resuscitation would be useless.

It was found that Norquay had opened both cut-outs and had disconnected the grounded neutral on the secondary winding and one of the primary leads on

the load side of the cut-out. A pair of rubber gloves was found on top of the transformer case. The transformer and cut-outs were mounted on the north side of the pole. The deceased was hanging by his safety belt on the east side of the pole, facing west. The primary lead he had disconnected was bent back to the south side of the transformer. It would seem from the burns received that he had been in the act of changing his position on the pole. He was supporting himself with his left hand on the grounded iron transformer mount when his right hand inadvertently came in contact with the 2,300-volt lead on top of the insulator.

An inquest was held at the Uchi mine office on July 4 at 5 P.M. by Coroner T. J. Goodison, M.D., who returned the following verdict:—

The deceased, John Henry Norquay, accidentally came to his death at approximately 3.35 P.M. June 29, 1940, at Hanalda Gold Mines. The death resulted from the deceased accidentally touching a 2,300-volt line at the Hanalda transformer.

Wolfe Lake Mines, Limited

Clifford William Carter, aged 18, British, single, employed intermittently as a labourer at the Wolfe Lake mine since February, 1940, died from carbon monoxide poisoning at the 200-foot-level station of the No. 2 shaft. The accident occurred on July 2 between the hours of 9 A.M. and 12.15 P.M.

The 2-compartment No. 2 shaft is 235 feet deep. The hoisting compartment is 4 feet 6 inches by 4 feet 6 inches, and the manway compartment is 3 feet 6 inches by 4 feet 6 inches inside the timbers. Levels are established at 50, 100, and 200 feet. At 150 feet a station only has been cut.

During May and June, Wolfe Lake Mines, Limited, had been reopening the property. The No. 2 shaft was dewatered and sampling was done on the 50- and 200-foot levels. In order to dewater the shaft a small pump driven by a gasoline engine was installed in the shaft. A 1-inch pipe-line, attached to the engine exhaust, ran to surface and extended 3½ feet above the collar. At the time of the accident the pump was set on the manway platform about 10 feet above the 200-foot level. The pump is a Fairbanks-Morse machine, capable of delivering 600 gallons per hour. It is chain-driven by a Briggs and Stratton, 1 h.p., 1-cylinder, 4-cycle air-cooled gasoline engine. During an inspection of the mine on May 14 this installation was discovered. It was not running. Instructions were given to remove the gasoline-driven pump from the mine at once. The instructions were confirmed the following day by letter. Everyone on the property knew that instructions had been given to remove the gasoline pump from underground.

Otto May was in charge at the property as mine manager until June 20, when he was replaced by E. T. Wride, who had been at the property since about May 18 as mechanic. Wride was informed in a letter from Col. D. E. Pidgeon, the president of the company, that he was to carry on when May left.

On the night of Friday, June 28, Carter descended No. 2 shaft to start the pump, but could not do so. He told Wride, who went down the shaft and started the engine. This is the last known time that the engine was running.

Wride was expecting delivery of an electric motor to replace the gasoline engine on Saturday, June 29, and on Monday, July 1, he and Carter went down the shaft to arrange for dismantling and hoisting the pump to surface. The two men planned to unhook the pump on Tuesday, July 2. Carter was to get a wrench and meet Wride, who was working on the road, and they were to go down the shaft together.

Carter did not come in for lunch at noon, and Wride and Quibell, the

caretaker, who was also working on the road, went to look for him. They went to the gasoline storage-house and then to the shaft. Wride went down the shaft, followed by Quibell. They found Carter on the floor of the 200-foot-level station, in front of the manway compartment. He was lying on his back in water which did not quite reach his nose. Wride felt his pulse and realized that he was dead. He thought that Carter had been killed in a fall. He ordered Quibell to surface and followed him up the ladders. He claims he did not detect any gas or feel any effects of gas. Quibell said he felt sick, but did not know whether it was from gas or shock.

Wride went to Kirkland Lake to inform the Provincial Police, the Coroner, and the Mine Inspector.

Mearl Whyte, who had worked at the property previously, was called for and taken to Kirkland Lake. On instructions from Wride, he took back a coil of 1-inch rope to the property, arriving approximately half an hour before Coroner Edis, M.D., the Provincial Police, Wride, and the Mine Inspector, who arrived at 5.30 P.M. Whyte went immediately to the shaft and proceeded to the 200-foot level. He felt sick and weak and started to climb to surface. He got as far as the 50-foot level. When Wride and the Mine Inspector arrived at the shaft collar, Quibell and Mrs. Mary Acton were there.

As Wride was not anxious to go down the shaft, the Mine Inspector went and found Whyte sitting in the drift on the 50-foot level. The man was very weak, and it was realized that he was probably suffering from carbon monoxide poisoning. This was the first knowledge the Inspector had that gas was present in the shaft. He helped Whyte to surface, where he was attended by Dr. Edis.

A rescue squad of four men from the Lake Shore mine and equipment from the Mine Rescue Station at Kirkland Lake arrived at the mine at 8.30 P.M. in response to a telephone call from Bourkes. Carter's body was recovered at about 10 P.M.

A *post mortem* examination was performed by Dr. G. A. Cowie, who gave the cause of death as carbon monoxide poisoning. There was a slight bruise over the right eye.

The inquest has been postponed *sine die*. Criminal charges have been laid against the officials of the company.

Wright-Hargreaves Mines, Limited

A. H. Bourassa, a mucker, aged 31, British (French-Canadian), married, with two children, was fatally injured when struck by loose rock in No. 3,401E subdrift T.D.B. of the Wright-Hargreaves mine, at 10.35 A.M., December 10.

No. 3,401E subdrift was driven west from No. 3,401E stope at No. 3,404 crosscut, to break into No. 3,401E stope at No. 3,400 crosscut. The elevation of the subdrift is 39 feet below No. 3,301E drift. A block 140 feet in length had been mined and filled west from No. 3,401E stope at No. 3,404 crosscut, leaving a manway at its west margin. A length of 95 feet of backs had been taken down for the next block, and about 25 feet of muck, measured along the subdrift, remained to be mucked. At the back the vein averages 3 to 4 feet in width and dips at an angle of 50 or 60 degrees to the south. The hanging wall had been spragged to a point 6 feet from the toe of the muck pile.

On the night shift of December 9, P. Vale and G. Tripp mucked eight cars. Dan McDonald, shift boss, was in the stope at 1.20 A.M. and found conditions satisfactory. Projecting about 18 inches above the muck there was a slab on the hanging wall which appeared loose. McDonald instructed the crew, who had already tried to scale it, to pay particular attention to it and to take it down

as soon as sufficient muck had been removed. At the end of the shift the crew left a scaling-bar in the crack to attract the attention of the succeeding shift.

The day shift of December 10 consisted of Bourassa and W. S. Roach. They scaled the hanging wall and took down some small pieces of loose rock. They then considered the hanging wall sound except for the slab supported by the muck, which they tried to take down but could not move. After filling the fifth car, Bourassa picked up a scaling-bar to try this loose piece again. As he started up the muck pile, another slab fell from a height of about 5 feet on the hanging wall, knocking him down. The slab was 8 feet long and averaged 2½ feet in width and 10 to 12 inches in thickness. It broke into four pieces in falling. Bourassa was found in a doubled-up position at the margin of one piece, with loose muck covering his body, and another piece, which would weight about 50 pounds, on his head. He was extricated in less than ten minutes and removed to Kirkland District Hospital, where death occurred at 8.15 P.M. the same day. He had received the following injuries: fracture of the base of the skull, compressed fracture of the fourth thoracic vertebra, fracture of the jaw, fracture of the nasal bones, and multiple contusions and abrasions. Death was attributed to the fracture of the base of the skull.

On examining the hanging wall afterwards, it was observed that the fallen slab had come from between two poorly defined slips. The basal slip dipped 65 degrees north and the top slip about 10 degrees north. The west end of the slab that fell was adjacent to the loose piece that had been observed, the lower west corner being roughly even with the face of the muck pile and a few inches below its crest. Bourassa was considered to be exceptionally particular in regard to scaling.

An inquest was held in Kirkland Lake Municipal Hall on December 18 before Coroner R. H. Armstrong, M.D. The jury returned the following verdict:—

We, the jury, empanelled to enquire into the cause of the death of A. H. Bourassa, find that death was accidental, caused by falling rock. We would also suggest that more care be exercised in scaling in similar places.

METALLURGICAL WORKS

International Nickel Company of Canada, Limited

Francis Barnes, British, aged 43, married, employed as a labourer at the Copper Cliff smelter, was fatally injured about 6.30 A.M. on October 8, when his skull was fractured by bricks which had broken away from the flue damper of No. 7 reverberatory furnace. He died in the Copper Cliff hospital at 8.30 A.M. the same day from intracranial haemorrhage.

The flue damper consists of interlocking fire-bricks, which are suspended on tie rods from a horizontal I-beam. The bricks are about 13½ by 7 by 3 inches in size and weigh about 18 pounds. The damper is about 12½ feet wide and 10 feet high and is slung from a 5-ton chain-block, by means of which it can be raised or lowered through a slot in the roof of the horizontal brick-lined flue to regulate the draught. The flue is 12 feet wide and 10 feet high inside the brickwork. The damper brick has an average life of about 4 months, and had been renewed on September 4.

The furnace was shut down for repairs at 6.45 P.M. on October 7. About 6.20 A.M., on October 8, Shift Boss J. Lawson ordered F. Barnes, E. Severin, and H. Smith to close the damper and thus stop the draught of cold air through the furnace. The damper was partially closed at that time. The men went up on the deck at the west side of the flue, and Severin started to operate the endless chain actuating the chain-block. He lowered the damper about 6 inches and

then handed the chain to Barnes. Barnes had lowered the damper about 2 inches when eight half-bricks suddenly became detached from top of the west end of the damper and fell to the deck. One or more of them hit Barnes on the head and knocked him unconscious.

Four of the half-bricks had been broken off from whole bricks at the first tie rod, while the other four had been laid up as half-bricks. The corresponding whole bricks on the east end of the damper were fractured at the tie rod but had not fallen. There was nothing to indicate that the damper had jammed in lowering, but it is believed that this was probably what occurred.

An inquest was held by Chief Coroner P. E. Laflamme, M.D., at Copper Cliff on October 29. His verdict was as follows:—

Francis Barnes, aged 43, employed as a labourer at the Copper Cliff smelter of the International Nickel Company, was fatally injured about 6.30 A.M. on October 8, 1940, when hit on the head by falling brick. He was pulling the chain operating a chain-block to lower the flue damper on No. 7 reverberatory furnace when eight half-bricks broke off the west end of the damper and fell about 12 feet to the floor. He sustained a fractured skull, and died in the Copper Cliff hospital at 8.30 A.M. the same day from intracranial haemorrhage. Accidental death with no blame attached to anyone.

William Cashmore, British, aged 50, married, employed as a tapper at the Copper Cliff smelter, was killed in the Orford building about 8.10 P.M. on October 29, when hit by a train on the main slag-track near No. 6 blast furnace.

This track runs through the Orford building on the north side of a line of three blast furnaces. On the south side of this track, in front of the furnaces, there is a siding about 425 feet long from switch to switch. Directly in front of the furnaces the main track and the siding are 13½ feet apart. This space contains a concrete sidewalk, 5 feet wide, next to the siding, then a drainage ditch, 3 feet wide. Empty slag pots are switched into the north end of the siding by a trolley locomotive and pulled into position under the slag spouts of the blast furnace settlers by means of an air-winch, which then moves the full pots to the west end of the siding, where they are picked up by the locomotive.

Three empty pots were switched into the east end of the siding by the locomotive shortly after 8 P.M. on October 29. W. Cashmore and E. Lacey then prepared to spot a pot under the slag spout of No. 6 blast furnace settler with the winch. Cashmore attached the cable to the north side of the slag pot car, and started to walk westwards on the sidewalk beside it, as Lacey operated the winch. The west end of the car had just reached a point underneath the spout when a small spill of slag occurred from the latter. It hit the steel plate covering the pot-dumping mechanism, and was spattered around. Cashmore jumped the ditch and started to cross the main track in front of a train of four full pots, which was being pushed eastwards by the locomotive. He was knocked down between the rails and dragged for a distance of 71 feet, during which time the train passed completely over him. He sustained multiple fractures, and was dead when assistance reached him. The train crew, consisting of Engineer B. Tunney and Brakeman H. Crawford, did not know an accident had occurred until they returned from the slag-dump.

An inquest was held by Chief Coroner P. E. Laflamme, M.D., at Copper Cliff on November 13. His verdict was as follows:—

William Cashmore, age 50, employed as a tapper at the Copper Cliff smelter of the International Nickel Company, was killed about 8.10 P.M. on October 29, 1940, when run over by a slag train in the Orford building. From evidence given, Cashmore was walking beside an empty slag pot, which was being pulled under the slag spout of No. 6 blast furnace settler by an air winch, when a small amount of slag ran out of the spout and splashed around. He ran across on to the main track in front of a moving slag train, and was instantly killed. Accidental death with no blame attached to anyone.

PITS AND QUARRIES

Grenville Crushed Rock Company, Limited

John Petroniak, Pole, aged 49, married, with five children, employed as screening-plant foreman at the Hawk Lake quarry of the Grenville Crushed Rock Company, Limited, was killed about 7.55 P.M., July 4, when he was struck on the right side of the face and neck by the handle of a crowbar he was using to close the door of a Western-type side-dump car, one end of which had caught on the end of the car body.

The Western-type cars used at the Hawk Lake quarry hold 12 yards, are 21 feet long and 9 feet wide, have a side 2 feet high, and are operated over standard-gauge tracks. The cars have independent doors on either side and can be dumped to one side or the other. In dumping, the car body is tilted by means of horizontal air cylinders underneath through wire ropes and pulleys. The door on the elevated side rests on the car bottom during the dumping and remains closed while the door on the opposite side is held stationary as the floor of the car drops away from it. The door is held stationary by two straps, which cross each other. The top strap is fastened to the truck of the car through a vertical and a horizontal curved strap; the other end fastens to the end of the door. The top strap is 1 by 4 inches, the bottom strap ⅝ by 3 inches. The door is made up of two 2½- by 12-inch hardwood planks and is reinforced and protected by angle irons. It weighs between 600 and 800 pounds.

After the cars are dumped, the corner of the end of the car often catches under the door straps as the bottom of the car returns to its normal position. This raises the end of the door and holds it open. To close the door it is necessary to pry, hammer, or jolt the straps free.

A train of eight such cars is used to dispose of the fines or screenings from the crushing-plant. Just previous to the accident the train of cars had been dumped and the rear car door became caught. The cars were returned to the screening plant with the first car spotted under the chute from the screenings bin. The stuck door was not closed at the dump as was customary.

Apparently no one actually saw what happened, but Brakeman G. Thorpe, who was standing on a platform at the bins directing the loading and spotting of the cars, was just about to give the signal to move the train when he noticed someone fall, as he thought, between the last two cars. He gave the engine driver a signal not to move, ran back, and looked under the cars but could find no one, but on looking in the corner of the last car he saw Petroniak lying on his back diagonally to the centre of the opposite side of the car.

A 5-foot crowbar was found at this corner jammed between the top of the end of the car and the straps which hold the door stationary during dumping.

The sequence of events might have been as follows: Petrionak had followed the train from the dump and noticed that the door was not closed when loading was resumed. He climbed into the car with a 5-foot crowbar and had tried to pry the bottom door strap free to allow the door to close. As the door fell, the top strap hit the pry end of the crowbar, which caused the other end to fly up, hitting Petroniak on the back of the neck.

Petroniak suffered a fracture and dislocation of the second cervical vertebra, compression injury to the spinal cord between the first and second cervical vertebrae, and a slight injury to the right side of the jaw.

An inquest was held in the Kenora Court House on July 9 at 3.30 P.M. before Magistrate T. H. Wolfe, and the jury returned the following verdict:—

We, the coroner's jury, after hearing the evidence in the case of the death of John Petroniak of Kenora, Ont., find that the deceased came to his death accidentally at about 7.55 P.M. on the

evening of July 4, 1940, at Hawk Lake, in the district of Kenora, while employed by the Grenville Crushed Rock Company, Limited, at their plant at Hawk Lake. We believe that the deceased died of a broken neck caused by being accidentally struck by the handle of a heavy crowbar which the deceased was using at the time.

Hamilton Builders' Supply, Limited

William Ashbaugh, British, aged 32 years, married, with two children, was instantly killed by an explosion in the powder-house at the quarry of the Hamilton Builders' Supply, Limited, in Barton township, Wentworth county, on August 14, at 1.05 P.M. He had been employed at the quarry since June 1, 1940, as a powderman.

Ross Head, president of the company, had made arrangements to have Ashbaugh blast on the afternoon of August 14. In the morning he went to Aldershot and met the truck which delivers explosives. He obtained two cases of dynamite, which he put into his car, intending to take it to the quarry after lunch. He had not arrived at the quarry when the accident occurred.

Fifty holes had been drilled and were to be blasted by means of electric current after the powder arrived.

The building in which the powder was stored was 37 by 25 feet, with 4- by 4-inch studding, sheeted with 1-inch boards and covered with galvanized iron roofing. It was also used as a garage and storage place for machinery and oil. A space 12 feet square in the northwest corner had been partitioned from the rest of the building. This room had a cement floor and the door was provided with a lock. A shelf on the east wall, 5 or 6 feet above the floor, was used to hold the blasting-caps and electric blasting-caps. A work-bench was built on the west side of the room. Tools, machinery parts, and a barrel of oil were stored in this room. The company did not provide a regular crimping tool for capping the fuses. The usual practice was to use a pair of pliers or a jack-knife.

At 1 P.M., Ashbaugh obtained the keys of the explosives storage building from Lloyd Gallagher, quarry foreman, and went to the building. About 1.05 P.M., an explosion occurred. When Gallagher and Stanley Anderson arrived at the scene they found the building completely demolished. Ashbaugh's body was lying 15 feet west of the building. Fire broke out about ten minutes after the explosion. No definite reason for the explosion can be established. From examination of the scene of the blast it would appear that dynamite was in the building at the time of the accident. From records kept at the company office, the quantity of detonators on hand on August 14 was as follows: blasting-caps, 369; 4-foot electric blasting-caps, 238; 6-foot electric blasting-caps, 156; 8-foot electric blasting-caps, 91.

On August 2, when an inspection of the quarry was made, about a quarter of a case of 40 per cent. Polar Forcite was found under a work-bench in the room partitioned from the larger shed. On the shelf on the opposite wall about 800 blasting-caps and electric blasting-caps were stored. Lloyd Gallagher, the quarry foreman, was instructed to have the dynamite removed. He was also instructed to provide a suitable, locked container for the blasting-caps.

On August 19, during the investigation of the accident, Gallagher stated that he had asked Ashbaugh to take the dynamite out of the building but did not know if his instructions had been carried out. From the damage done by the explosion, it is evident that there was dynamite in the building at the time.

As the blasting on the afternoon of August 14 was to be done by means o electric current, there would have been no need for Ashbaugh to cap fuses. After the accident one large rock with a drill-hole in it was found in the quarry. This rock would require secondary blasting, and Ashbaugh may have been making

up a fuse for this purpose. He had been in the habit of smoking two or three cigarettes after lunch, but no one noticed whether or not he was smoking when he went to the building.

An inquest was held on August 27 at the City Police Station in Hamilton before Coroner J. H. Mullin, M.D. The following is a copy of the jury's verdict:—

When: August 14, 1940. Where: At Hamilton Builders' Supply quarry in township of Barton. How: By an explosion. What caused the explosion we are unable to say from evidence produced. Recommendations: We certainly think that more care should have been taken to see that all dynamite was removed from the shed after instructions given by the Provincial Inspector on Aug. 2, 1940, and that a man handling explosives should have more experience or qualifications before being hired to perform such duties.

Ontario Rock Company, Limited

Donald Ellis, British, aged 24, married, with two children, was instantly killed at the Ontario Rock Company's quarry at Havelock at 6.45 A.M. on August 19 by broken rock thrown by a blast. He had been employed as a driller during the summers of 1936, 1937, 1938, and 1940.

The practice at this quarry is to blast once a year. This usually provides enough broken rock to take care of requirements for the season. Secondary blasting of the larger pieces of broken rock is carried on nearly every day.

On August 16 and 17, fifty-one holes had been drilled in the large rocks lying against the face of the quarry. It was arranged to blast these holes on Monday, August 19. Early in the morning of August 19 it rained for an hour and a half or two hours. This made it necessary to pump the water out of the holes when the crew arrived at 6 A.M.

Clifford Scott, quarry foreman, was in charge of the loading of the holes, assisted by German Ellis. German Ellis had prepared the dynamite, fuse, and spitters on Saturday, August 17. He organized the lighting of the holes and placed the men before giving the signal to light on the morning of the 19th. There was some dynamite left over after loading the holes, and Scott took it out of the quarry. He did not come back until after the blast.

Pumping out and loading the holes took about 40 minutes. Six men were detailed to light the fuses. They worked in pairs. Approximately 45 sticks of 40 per cent. Forcite were used to load the 51 holes. The fuse was in pieces 3 feet 6 inches long, and "splitters" 2 feet 4 inches long were provided to light them. Each man was to light approximately 8 holes, then to climb up over the broken rock to the top of the quarry. Standing instructions were that each man was to leave the scene of the operation when his spitter had burned out.

The signal to start lighting was given. Wesley Smith finished lighting his last hole near the top of the quarry just as his spitter burned out. He saw German Ellis, Charlie McFall, and Alex. McFall standing at the rim of the quarry and said to them, "Come on, we are late now." He then ran to the jaw crusher, 230 feet away.

Geo. McGowan was working with German Ellis and had finished lighting his holes when Don Ellis, below him, called for a knife, as one of the fuses had become wet. German Ellis gave McGowan a knife to split the fuse. McGowan went down to help Don Ellis and the latter lit the fuse. They realized that they were late and, rather than attempt to go over the top, they ran down over the rock in the quarry. On the way down they separated. The shots then started to go off. One piece of rock hit McGowan, knocking him behind a big rock. He crawled in behind this rock, but was hit several times with flying pieces. After the blast Smith and German Ellis came back to the quarry and heard McGowan yelling. His leg was badly injured, but he told them to go and look for Don Ellis.

Don Ellis was found practically covered with rock; only a part of his shirt was showing. He was dead. He had suffered a broken left arm, broken lower jaw, and fractured skull.

McGowan was taken to a private hospital at Havelock and attended by Dr. J. Holdcroft.

It would appear that the men stayed too long after their spitters burned out and did not leave themselves time enough to get away.

An inquest was held at 2 P.M. on September 23 in the Town Hall at Havelock before Coroner Munroe, M.D. The jury's verdict was:—

We, the jury, find that on August 19, about 6.45 o'clock, Donald Ellis came to his death by a blast at the Ontario Rock Company, causing a fractured skull. We further find no evidence of negligence on the part of the company.

Sidney Rogers' Pit

Albert Benson, a labourer, aged 32, British, married, with one child, was fatally injured by a fall of ground at Major Sidney Rogers' gravel pit, on lots 18 and 19, Brantford township, Brant county, about 6.30 P.M. on August 26.

The face of the pit is about 8 feet high—5 feet of gravel and 3 feet of overburden. Its length is approximately 15 feet. The pit has been used very little during the last two years. Benson owned a truck and was delivering an occasional load of gravel in Brantford. Four loads of gravel were taken from the pit on Saturday, August 24.

On the day of the accident Benson was working with Herbert Rowe and L. Bacon. Rowe, who had been shovelling beneath an overhanging bank, had just stepped out and Benson had stepped in to shovel when the cave-in occurred.

Benson was buried up to the neck in a sitting position by about two tons of clay and earth. Bacon started to dig him out, while Rowe went to the home of Major Rogers, some distance away, to call an ambulance. Major Rogers came to the pit and assisted in releasing Benson. Dr. M. M. Faris was called. An ambulance rushed Benson to the hospital, where he died a few minutes after being admitted.. His injuries consisted of a fractured left leg and a crushed chest.

An inquest was held before Coroner A. J. Craven, M.D., on September 6 at 8.30 P.M. at the City Police Station, Brantford. The jury's verdict was as follows:—

We, the jury, called to enquire into the death of Albert Benson at the Brantford General Hospital, in the city of Brantford, in the county of Brant, on August 26, find he was accidentally crushed by a fall of earth at the pit of S. Rogers.