

INDEX

Canadian Mining Journal

Vol. 29

Including the Period

JANUARY 1st, 1908

————— TO —————

DECEMBER 31st, 1908

The Mines Publishing Co., Limited,
Toronto, Ontario.

INDEX

CANADIAN MINING JOURNAL; Vol. 29.

- Abitibi Lake District, by M. R. Baker, 509.
Abitibi Lake District, 486.
Abitibi Mining Co., 154.
Abrasures, Infusorial Earth, Uses of, 603.
Abrasive Materials in the U. S., 444.
Abrasive Products, Grinding Wheels, etc., 209-10.
Acadia Coal Co., 606a.
Acadia Powder Co., 577.
Accident at Norton Hill Colliery, 308.
Accidents, Ambulance Work in Mine, 245.
Accidents, Coal Mine, Their Causes and Prevention, 626.
Accidents in British Columbia Mines, 299.
Accidents in Nova Scotia Mines, 280.
Accidents, Mine, Prevention of, 222.
Adler, H. G. V., on "Concerning the Profession of Mining Engineering," 614; on Cobalt Ore Treatment, 655.
Adulteration of Paris Green, 485.
Advertising, Clean, 130.
Afforestation in South Wales, 544.
Air Compressors, Portable, The Use of, by Frank C. Perkins, *268-69.
Alberta, Annual Report of the Department on Coal Mines, *425-27.
Alberta Coal Lands, 2, 632-33, 668-69.
Alberta Coal Mines Regulations Act, 122.
Alberta Coal and Coke Co., 669.
Alberta Fuel Co., 669.
Alberta Government Examination for Mine Managers, 427-30.
Alberta, Labor Troubles in Coal Mines, 695-96, 698.
Alberta, Mineral Resources, A Bibliography of, by J. C. Gwillim, 210-11.
Alberta Railway and Irrigation Co., 251, 314, 633.
Alberta, Special Correspondence, 632, 668, 695, 27, 54, 87, 218, 251, 280, 314, 379.
Albert Manufacturing Co., 121.
Algoma Steel Co., 480.
Alliance Gold and Copper Mining Co., 185.
Aluminium and Some of Its Uses, by J. T. W. Echevarri, 627a-630a.
Aluminium, 530-32.
Apex Property, 480.
Amalgamated Copper Co., 91, 125.
American Foundrymen's Association, Standard Methods for the Analysis of Iron, 660.
American Petroleum Co., 284.
American Smelting and Refining Co., 30, 484.
Amparo Mining Co., 544.
Anglo-Mexican Mining and Exp. Co., 157.
Antimony, Output of United States, 488.
Antimony Pigments, 691.
Aranyl Molybdate, 691.
Arlington Mine, 512, 543.
Arsenic in Ores, A Rapid Method for the Estimation of, 75-76.
Asbestos Deposits of the Urals, 125, 382.
Asbestos-fibre Shingles, 569.
Asbestos in Quebec, 229, 344, 461.
Asbestos, Russian, 583a.
Asbestos Wood, Its Use and Qualities, 663a.
Ashworth, John, 436.
Ashworth, James and John, on The Present Position of the Coal Dust Problem, 558-60.
Asphalt in the Caucasus, 698.
Assaying, A Textbook of, Reviewed by H. E. T. Haultain, 305-07.
Assay of Silver Ores, The, by W. K. McNeill, 112.
Atikoken Iron Co., by L. B. Orchard, *36-40.
Atikoken Iron Co., 187, 480, 623.
Atlin Consolidated Gold Mining Co., 636.
Atlin, Hydraulic Operations, 639a.
Aurora Mine, 606a.
Australia, Mineral Output, 91.
Australia, Western, Report of Mining for 1907, *492-96.
Babine Lake Properties, 606a.
Badger Mine, 25, 58, 87, 154.
Baker, Manley B., 247; on Abitibi Lake District, 508-09.
Baldwin, C. Remble, 51.
Banking, Canadian, 584a, 616a.
Barrateros Mine in Mexico, 285.
Barrett Manufacturing Co., 64.
Bastin, Edson S., on Quartz and Feldspar, 469-73.
Bauxite in France, 411.
Bear Lake Copper Mines, 448.
Beatty, M., & Sons, a Large Canadian Plant, *180-81.
Beatson Copper Mine, 382.
Beaufort Tinplate Works, 670.
Beaver Consolidated Mining Co., 313, 410, 541.
Beaver Superior Mining Co., 28.
Behrend Dry Concentrator for All Ores, *342-43.
Bell, Dr. Robert, 228.
Bell, J. M., on the Great Waihi Mine, *388-93, 420-24.
Bell Asbestos Mining Co., 352.
Belmont Iron Mines, 544.
Benito Juarez Co., 317.
Bennie, P. McN., on Grondell Process of Concentrating and Briquetting Iron Ores, *332-35.
Bevington, R. G., President of C. M. & M. Society of S. Africa, Inaugural Address, 497-99, 529-30.
Big Bend Mica Co., 186.
Blackwell, George G., 474.
Blast Furnaces, The Economic Distribution of Electric Power From, by B. H. Thwaite, 624-25.
Blasting Explosives, Safety, 601a.
Blaylock, S. G., 22, 57.
Blue Bell Mine, 187, 409, 698, 667a.
Blue Bird Mine, 26, 185, 219, 252, 408, 511.
Boards of Trade of Eastern B. C., Resolutions Passed, 18.
Bolling, Randolph, on A Canadian Method for the Technical Determination of Silicon in Pig Iron, *69-70; on The Technical Analysis of Magnetite, Hematite and Limonite, 363-65.
Bolton, Frederick, 50.
Bombshell Ore, The Origin of, by H. M. Chance, 402-03.
Bonanza Creek Gold Mining Co., Two Estimates, 66-67.
Bonanza Creek Mines, Their Value, 2.
Bannington Falls, Visit of C. M. L., 504.
Book Reviews, 627, 690, 62, 49, 150, 182, 274, 305, 341, 374, 403, 434, 473, 504, 536, 569, 601, 633a.
Boston Richardson Mine, 410, 416, 418, 445, 461, 638a.
Boundary Mines, 89.
Bounties on Iron Ore, 616a.
Bounties on Lead Extended, 258.
Bounties on Petroleum, 348.
Bounties Paid on Iron and Steel in 1907, 158.
Bovey, Dr. Henry T., 51.
Brennan, C. V., the Oldham Gold Mine, 509.
Brooklyn Mine, 381.
Breathing Apparatus, Its Advantage Shown, 486, 604a.
Breathing Apparatus, by Prof. Leonard Hill, *262-65.
Breathing Apparatus, Oxygen, The Use of, at the Sydney Mines Fre, by F. W. Gray, 487-88.
British-Canadian Asbestos Co., 345.
British Columbia Coal and Coke Tax, 3-4.
British Columbia Coal Tax, 35.
British Columbia Copper Co., 92, 155, *251-52, 253, 283, 315, 408, 513, 448, 480, 512, 616a, 647a, 668a.
British Columbia, Mineral on Moresby Island, 236-38.
British Columbia, Mineral Production of, by E. Jacobs, 683-84.
British Columbia, Mineral Production of, in 1907, by E. Jacobs, 648.
British Columbia, Official Bulletins, 162.
British Columbia, Placer Mining Act, 90.
British Columbia, report of Provincial Mineralogist, *1907.
British Columbia, Special Correspondence, 633, 696, 26, 56, 89, 154, 185, 219, 251, 315, 345, 380, 407, 447, 479, 511, 542, 576, 605a, 607a, 667a.
British Columbia University, 33, 98.
British Mines Inspectors, Reports of, for 1907, 328.
British Mining Enterprise in Mexico, 285.
Briquetting, Coal, in 1907, by Edward W. Parker, 530-32.
Briquetting in Germany, 513.
Briquetting of Fuels in British Columbia, by G. J. Mashek, *661-64, 685-87.
Brook, R. W., The Larder Lake District, *656-59.
Brough, Bennett H., 571.
Broughton Asbestos Fibre Co., 461.
Brown, E. Percy, on The Treatment of Stamp Mill Tailings at the Richardson Mine, Goldboro, N.S., 400-01; on How Can the Gold Industry of Nova Scotia be Assisted? 172-73.
Brown, M. Walter, 630.
Brownell-Granger Co., 22.
Brumell, H. P. B., on Modes of Occurrence of Canadian Graphite, 70-72.
Bruce Mines, 577, 637a.
Buchell Coal Areas, 349.
Buckingham Graphite Co.'s Mill Described, *15-18.
Buffalo Mine, 315, 640, 667, 609a, 641a, 670a.
Bullion-Beck Co., 609a.
Bullion King Co., 30.
Burchell, Herbert C., 215.
Bureau of Mines, Proposed for the United States, 11-14.
Byron S. White Co., 629, 668a.
Cadmium, Electroplating With, 681.
Cages, Hoisting, A New Safety Device for, *166-67.
Calgary Mine Operators and Workers, 58.
Callena Mines of Spain, 481.
Calumet and Hecla Co., 91, 484.
Canada, as a Dumping Ground for U. S. Coal, 666a.
Canada Corundum Co., 638, 638a.
Canada Iron Corporation, 581, 636a, 669a.
Canada, Northern, Development of, by J. B. Tyrrell, 612-614.
Canadian Operating Mining Companies, List of, 437-43.
Canada West Coal Co., 281.
Canadian Creek Mine, 58.
Canadian Exhibit at Franco-British Exhibition, *468-69.
Canadian Girl Claim, 409.
Canadian Metal Co., 668a-69a.
Canadian Mining Co., 195.
Canadian Mining Institute, 1, 2, 34, 51, 65, *67-68, 215, 244, 260, 274, 321, 328, 331-32, 369, 419, 455, 478, 571, 560-67, 674, *679-80, 627, 694, 626a, 639a.
Canadian Place Names, 535.
Canadian Zinc Co., 29, 90, 94-5, 252, 544, 606a.
Cantley, C. L., on Coal Washing as Practised at Sydney Mines, *525-29.
Casey Cobalt Co., 154, 250.
Cara Brea Tin Mines, 670.
Cariboo Consolidated Hydraulic Co., 284.
Cariboo, Gold Yield in 1907, 669.
Cariboo Mines, Guggenheim, 449.
Cars, A Novel Coupling for Mining, *171-72.
Cape Breton Coal, 2.
Cape Breton, Its Mines and Climate, 445.
Cape Breton Disaster, 54.
Cape Breton, Coal Mining in, During 1907, 652-54.
Cape Breton Coal Resources, 477.
Cape Copper Co., 254.
Centre Star Mine, 156, 252, 282, 447, 511, 698, 637a, 667a.
Cement from Slag, 635a.
Cement Pillars for Mine Timbers, 222.
Century Mine, 314.
Cerro de Pasco Copper Co., 126.
Chambers-Ferland Mine, 218, 250, 289-90, 301-62, 316, 478, 575, 638a.
Cherry Creek Co., 629.
China, a Market for Silver and Copper, 486.
China-clay, Its Nature and Origin, 633a.
Chisholm, Minnesota, Destroyed by Fire, 481.
Chrome Iron Mining in Canada, by H. F. Strangways, *42-47.
City Deep Shaft on the Rand, 221.
City of Cobalt Co., 25, 87, 154, 218, 314, 320, 478, 541, 572, 573, 632, 695, 670a.
Cinnabar Ores Wanted in New South Wales, 450.
Claims, Mining, Inspection in Ontario, 151.
Claims, Discovery and Location, 486.
Claims, Discovery Before Location, 322.
Claims, Discovery Before Location, by W. Thos. Newman, 324-25.
Cleveland Cobalt Mine, 25.
Cleave, A. H. W., on Ottawa Mint, *100-103.
Cleveland-Cobalt Mine, 154, 640.
Climate of Klondike, The, 130.
Clinton and Steindler Properties, 379.
Coal Along the Crow's Nest Pass, 668.
Coal at Big Marsh, N.S., 697.
Coal and Asphalt in Oklahoma, 125.
Coal and Steel, Battle Between Nova Scotia Companies, 320.
Coal Combine in Japan, 59.
Coal, Bituminous, in Northern Cariboo, 668.
Coal, Boring in P. E. Island, 381.
Coal, British Columbia, a Market in Mexico, 291.
Coal, British Trade in, 681.
Coal, Briquetting of Fuels in British Columbia, by G. J. Mashek, *661-64.
Coal Briquetting in 1907, by Edward W. Parker, 580-32.
Coal Cutter, The Jeffrey-Shortwall, *376-78.
Coal Cutters in British Collieries, 403.
Coal-cutting Machines in the United Kingdom, 636.
Coal, Conditions in Nova Scotia, 57.
Coal Dust Problem, The Present Position of, by James and John Ashworth, 558-60.
Coal Washing as Practised by the U. S. S. & C. Co., by C. L. Cantley, *525-29.
Coal Drilling Machinery, 704.
Coal Dust, Dumping of, 601a.
Coal Dust Problem, Dr. Oliver's Views, 574.
Coal Dust Question, 506.
Coal, Eight Hours for Miners in Alberta, 668.
Coal Fields in Austria-Hungary, 699.

- Coal Importers of France Organizing, 637.
 Coal in Australia, 221.
 Coal in Austria-Hungary, 254, 670.
 Coal in Cape Breton, Sulphur Question, 2, 477.
 Coal in Chili, 412.
 Coal in Crow's Nest Pass, 696-97.
 Coal in Germany, 577.
 Coal in India, 640a.
 Coal in Indiana, 670a.
 Coal in Mexico, 544.
 Coal in Nicola Valley, 696.
 Coal in North Alberta, 218.
 Coal in New Zealand, 544.
 Coal in Queensland and Victoria, 125, 411, 640a.
 Coal in Queensland, 411.
 Coal in Russia, 544, 607a.
 Coal in Saskatchewan, 123, 821.
 Coal in Siberia, 91.
 Coal in Spitzbergen, 350.
 Coal in Wales, 513.
 Coal in Yorkshire, 221.
 Coal in the Yukon, 537.
 Coal Lands in Alberta, 2.
 Coal, Lignite Used on Railway, 668.
 Coals, Low Grade Classification, 179.
 Coal Mine Accidents, Their Causes and Prevention, 626.
 Coal Mine Fatalities, 610.
 Coal Miners and the Newspapers, 290.
 Coal Mines, Alberta, 632-33.
 Coal Mines, Accidents in Germany, 29.
 Coal Mine Sampling, Uniform and Systematic, 456.
 Coal Mines, A School for Rescue Work in, *327-28.
 Coal Mines, Explosions, 22.
 Coal Mines of Alberta, Annual Report of the Department, *425-27.
 Coal Mines of Ohio, 569.
 Coal Mines, Ownership by Railways in Indiana Prohibited, 91.
 Coal Mines Regulations Act of Alberta, 122.
 Coal Mining, Contract Price at Bankhead, 314.
 Coal Mining, Death Rate in U. S. Mines, 488.
 Coal Mining in New South Wales, 637.
 Coal Mining in the United States in 1907, 20.
 Coal Mining in Cape Breton During 1907, 652-54.
 Coal Mining Machine for Low Veins, *277-79.
 Coal Mining Operations of the Dominion Coal Co., by F. W. Gray, *57.
 Coal Mining, Submarine, by John Johnston, 135-36.
 Coal, Miners, Wages in New Brunswick, 667.
 Coal, Moisture in, 167.
 Coal, Operations in Germany, 59.
 Coal, Operations of Nova Scotia C. & S. Co., 672.
 Coal, Output of Alberta, 88.
 Coal, Output of British Columbia, 1907, 298.
 Coal, Output of South Wales, 157.
 Coal, Output of Transvaal, 30.
 Coal, Output of the World, 1906, 674a.
 Coal, Output in United Kingdom, 127-28, 187, 317, 319, 411.
 Coal Production in Europe and America, 636.
 Coal Production in Greece, 637.
 Coal, Production in India, 59.
 Coal, Production in Nova Scotia, 638.
 Coal, Rescue Apparatus in Scotland, 693.
 Coal Resources of Queensland, 637.
 Coals, Classification of, by the Split Volatile Ratio, by D. B. Dowling, *143-46.
 Coal, Safety Measures in Mines, 192.
 Coal-Steel Case in Nova Scotia, 697.
 Coal, Submarine Leases Bill in Nova Scotia, 186.
 Coal, Submarine Mines in Nova Scotia, 446.
 Coal, Tax in British Columbia, 27, 57.
 Coal Tests in Queensland, 699.
 Coal, the F. C. Caldwell Case, 88.
 Coal, the Rhodnda Seam Struck, 382.
 Coal, The Weathering of, 664.
 Coal, Trade Expanding in Britain, 698.
 Coal Trade, St. Lawrence, 194.
 Coal Trade in South America, 699.
 Coal-washing Plant, 607a.
 Cobalt and Nickel, The Determination of, by W. K. McNeil, 272-73.
 Cobalt and the Globe, 518.
 Cobalt, Boom in Mining Stocks, 582a, 613a.
 Cobalt Central, 250, 253, 575, 695.
 Cobalt District for Year 1907, Report on, by Arthur A. Cole, *168-71.
 Cobalt Dividend Payers, 447.
 Cobalt, Dividends by Various Companies, 382.
 Cobalt, Double Hand-drilling Contest, 407.
 Cobalt Lake Mine, 25, 28, 30, 60, 87, 313, 348, 635, 695.
 Cobalt, Leasing System of, 574.
 Cobalt Central Mine, 25.
 Cobalt Man in a Dilemma—Mind and Matter, 556, 566, 632a.
 Cobalt Majestic Co., 667.
 Cobalt Merchants' M. & M. Co., 695.
 Cobalt Mines, Equipment of, a detailed statement of machinery installed, 106-07.
 Cobalt, Ore Product in the Various Mines, 1907, 668.
 Cobalt Ores, Concentrating, by G. H. Gillespie, 103-106.
 Cobalt Ores, by W. K. McNeil, 617-18.
 Cobalt Ore Treatment, by H. G. V. Adler, *655.
 Cobalt, Present and Future, *194, 200-203.
 Cobalt Region, Ores and Rocks of the, by R. E. Hore, 300.
 Cobalt, Report on, for 1907, 162.
 Cobalt, Sale of Railway Lands, 577.
 Cobalt, Shipments of Ore for Six Months, 1908, 414.
 Cobba-Sexton Mining Co., 667.
 Cobalt Silver Deposits, Inspired News, 674.
 Cobalt Silver Queen Co., 670a.
 Cobalt Stocks, Boom in the Market, 454-55.
 Cobalt, Thefts of High-grade Ore, 227.
 Cobalt, the Price of Silver, 569.
 Cobalt Townsite Mining Co., 700, 642a.
 Cobalt, Visit of C. M. I., *502-03, 562.
 Cobalt, Wage Scale, 142.
 Cobalt, "66" Camp, 217.
 Cochrane-Cobalt Co., 541, 576.
 Coeur d'Alene Mining District, 635a.
 Cokemaking in Virginia, 433.
 Coke, Moisture in, 519.
 Coke, Production at Connellsville, 516.
 Cole, Arthur A., Report on Cobalt District for 1907, *168-71.
 Coleman Cobalt Co., 510.
 Coleman Miners' Union Resolutions, 27.
 Coleman Properties, 218.
 Coleman Township, Inspection of Claims no Longer Required, 695.
 Coll, C. J., on Some Recent Explosions in Coal mines, 146.
 Collieries, a New Safeguard, 99.
 Collieries of the Prussian Government, 205.
 Collieries of Vancouver Island, 387.
 Colonial Mine, 154, 184.
 Colorado Group, 605a.
 Columbus Cobalt Mine, 576.
 Companies Incorporated in Cobalt and Larder Districts, 58.
 Companies, Mining, List of Canadian Operating, 437-43.
 Companies, Provincially Incorporated, Status of, 610.
 Company Reports, 30, 60-2, 92, 128, 188-90, 222, 285, 515, 545, 578, 700, 607a, 641a, 670a.
 Compensation Act, Alberta, Discussion of, 87-88.
 Compensation, Workmen's, in Nova Scotia, 86.
 Concentrating Cobalt Ores, by G. H. Gillespie, *103-106.
 Concentrating Plant of Boston Consolidated Co., 634a.
 Concentration, Methods of, at Cobalt, by Geo. E. Sanston, 458-61.
 Concentration, Elmore Process, 253, 513.
 Concentration of Cobalt Ores, 99.
 Concentration, Vanner Tests, 399.
 Concentrator, Behrend Dry, for All Ores, *342-43.
 Concentrator, Dry, Test, 569.
 Concentrator, Northern Customs, 575.
 Conciliation Board in Nova Scotia, 86.
 Concrete Foundations, Reinforced, for Stamp batteries, *586-89a.
 Company Stores, 54.
 Comiagas Mines, 25, 87, 154, 284, 314, 511, 375, 632, 646a.
 Coombs, Frederick Norton, 51.
 Copper, at Parry Sound, 449.
 Copper, Annual Production of Canada and U. S., 320.
 Copper Cliff, Examination of Well Water, by J. W. Rawlins, 687-88.
 Copper Cliff Properties, 635, 695.
 Copper Cliff, Visit of C. M. I., 562.
 Copper, Consumption in Germany, 31.
 Copper, Cost of World's Supply, 403-4.
 Copper, Discovery Near Zambesi, 671.
 Copper Fields of Nevada, 22.
 Copper in Australia, 157, 544.
 Copper in Bulgaria, 699.
 Copper Industry in Butte District, 637.
 Copper in Quebec, 229.
 Copper in Russia, 513.
 Copper in Tasmania, 544.
 Copper in the Yukon, 411.
 Copper, Market Value of, 214.
 Copper, Official Reports of Cost of Producing, 506.
 Copper Ore, Low Grade, Treatment of, by James Parkes, 49.
 Copper Ores of Sudbury-Soo District, by J. C. Gwillim, 680.
 Copper, Output of Arizona, 640a.
 Copper, Output of British Columbia, 1907, 298.
 Copper, Output of Michigan, 644a.
 Copper, Output of Montana, 317, 644a.
 Copper, Output of Principal Copper-producing Countries, 450.
 Copper, Production of Arizona, 157.
 Copper, Production of the United States, 1906, Review, 48.
 Copper, Production of the World, 191-92.
 Copper, Production of Montana, 350.
 Copper, Production of Norway, 221.
 Copper, Production of Ural, 125.
 Copper Queen Co., 30.
 Copper and N.-W. Railway, 254.
 Copper Smelters, Laboratory Routine in Modern, by H. T. Waller, 621a, 626a.
 Copper, Stock in England and France, 638.
 Copper, White Horse Properties, 639a.
 Corbin, D. C., 697.
 Corporations and Politics, 519.
 Cost of Mining at Joplin, 214.
 Costs of Mining and Milling in S. Africa, —
 Coupling for Mine Cars, A Novel, *171-72.
 Cowboy Coal Areas, 635.
 Cow Bay Coal Areas, 635.
 Crawford v. Lawson Mine, 348.
 Cragg Claims, 479.
 Crescent Mines, 56, 89, 90, 252.
 Cripple Creek Output, 59.
 Crown Coal and Coke Co., 27, 30.
 Croesus Gold Mining and Milling Co., 604a.
 Crown Reserve Mine, 154, 184, 250, 314, 319, 378, 446, 546, 636a, 671a.
 Crow's Nest Coal Co., 28, 31, 98, 124, 158, 187, 221, 281, 288, 315, 382, 387, 410, 412, 700, 704.
 Crystal Gold Mine, 284.
 Crystal Stamp Mill, 669a.
 Cumberland Railway and Coal Co., 352.
 Cunningham, Dave, 317.
 Cyanidation of Silver Ores at Pachuca, 537.
 Cyanide Practice at Pachuca, 570.
 Cyanide, Bromo-cyaniding of Gold Ores, 661a.
 Cyanide Treatment, Settling Slimes in, 534.
 Cyaniding at Cripple Creek, 213.
 Danziger, Jos. L., 660a.
 Davis, Harold P., on The Montreal River District, *132-35.
 Davis Silver Cobalt Co., 511, 543, 575, 576.
 Death Rate Among United States Coal Miners, 488.
 De Beers Consolidated Mines, 59, 411, 544, 640.
 De Kalb, Courtenay, 162.
 Deloro Mining and Smelting Co., 156, 220.
 Dennison, Jno. A., on The Working Costs of Mines in the Rand, 365-69.
 Deseronto Iron Co., 123.
 Devlin Group, 219.
 Dewatering in Concentration, 68.
 Diabase and Gabbro, 238.
 Diamond Coal Co., 89.
 Diamond-cutting in Johannesburg, 577.
 Diamond Industry in S. Africa, 640a.
 Diamond Market Depression, 22.
 Diamonds, A Tragedy in, by Alex. Gray, 692.
 Diamond Vale Iron and Coal Co., 58, 701.
 Dick, Alexander, 22.
 D'Israeli Asbestos Co., 510.
 Disaster Report, The Port Hood, 98.
 Dividend-paying Mines and Metallurgical Works in the United States, 637.
 Dominion Antimony Co., 543.
 Dominion Coal Co., 23, 24, 25, 30, 54, 61, 90, 92, 119, 124, 153, 156, 158, 194, 217, 249, 260, 280, 286, 316, 352, 378, 406, 410, 483, 509, 540, 634, 640, 696, 666, 700, 635a, 638a, 666a.
 Dominion Coal Co., Mining Operations of, by F. W. Gray, *57, *291-96, 355-58, 396-98, 550-60.
 Dominion Collieries Co., 281.
 Dominion Copper Co., 26, 125, 283, 315, 316, 317, 349, 380, 408, 409, 445, 448, 449, 480, 512, 519, 542-43, 576, 577, 693, 605a, 635a, 641a, 668a, 670a.
 Dominion Iron and Steel Co., 57, 90, 121, 316, 319, 320, 631, 697.
 Dorsey, John, 51.
 Douglas, Dr. James, 152.
 Dowling, D. B., on Classification of Coals by the Split Volatile Ratio, *143-46.
 Draeger Breathing Apparatus Tested, 510.
 Dredging in the Yukon, 253, 317, 486.
 Dredging in the Yukon, by T. A. Rickard, 499-502.
 Dresser, Jno. A., on Discovery of Gold Near Lake Magentic, 234-35.
 Drill, a Hand-power Rock Drill, by L. B. Orchard, *8-10.
 Drill Contest, Air-hammer, at Nipissing, 244.
 Drill Contest at Cobalt, 119-120.
 Drill Contest, Stope, Transvaal, 130.
 Drill, Hammer, 98.
 Drill, Hammer, Contest, 260.
 Drilling, Diamond, in the Boundary District, by Frederick Keefer, 73-75.
 Drill Shanks, Air-hammer, For Making, *467.
 Drills, Rock, Competition in, 91.
 Drills, Rock, Used in Cobalt, 173.
 Drill Steel, The Problem of, 473.
 Drills, The Sullivan Hammer, *52.
 Drill Trials at Johannesburg, 4, 30.
 Drinnan, R. G., 629.
 Driving, Underground, A Record, 318.
 Drummond Iron Properties, 638a.
 Drummond Mines Co., 28, 123, 631.
 Drummond, T. R., 341.
 Duchesne Mine, 154.
 Dufresne, J. C., 152.
 Dumps, Mine, Sampling of, by Henry S. Munroe, *239-40.
 Dunsmuir, Lieutenant-Governor, 117.
 Dust-allaying in Transvaal Mines, 341.
 Eastern Townships of Quebec, Mining in the, *230-31.
 East Rand Proprietary Mines, 221.
 Echevarri, J. T. W., on Aluminium and Some of Its Uses, 627a, 630a.
 Education, Industrial, 611.
 Education, Mining, Secondary, in Wisconsin, 693.
 Electric Furnace for Sharpening Drills, 638.
 Electric Light Fitted to Draeger Helmet, *233.
 Electro-magnet for Testing the Suitability of an Ore for Magnetic Separation, by L. H. L. Huddart, *240-41.
 Electric Mine Locomotives, 474, 631.
 Electric Power from Blast Furnaces, The Economic Distribution of, by B. H. Thwaite, 624-25.
 Electric Smelting of Iron Ores, Possibilities in the, by Alfred Stansfield, 108-109.
 Electric Steel Works in Germany, 59.
 Electrolytic Separation of Nickel and Copper, 535.
 Electrolytic Gold Refining, —
 Electrolysis of Pipes, 404.
 Elmore Vacuum Oil Plant, 629, 698.
 Emerald Coal Co., 481.

- Enchanted Rod, The, 14.
 Engineer, Consulting Mining, Functions of the, by Allan Hastings Rogers, 40-41.
 Engineering, Mining, Concerning the Profession of, by H. G. V. Adler, 614.
 Engineers and the Spanish Language, 162.
 Engineers, Mining, in Politics, 290.
 Engineers, Mining, Institution of, England, 476.
 Engineers, Mining, Should They Advertise? 453-54.
 Engineer, The Consulting Mining, 34.
 Engines, Turbo-blowing, Plant in Australia, 221.
 Evans, J. C., on Determination of Molybdenum. Erie Cobalt Co., 31.
 Evening Star Mine, 447, 576, 633, 636.
 Exclusion of Fungus in Mexico, 350.
 Exhibit, Canadian, at Franco-British Exhibition, *468-69.
 Exhibition, Canadian National, 228.
 Exhibition, The Canadian National, 455.
 Exhibits, Provincial Mineral at Canadian National Exhibition, *462-67.
 Exposition, Spokane Interstate, 576.
 Explosion at Hanna, Wyoming, 157.
 Explosion at Port Hood, 120-121.
 Explosion at Marianna Coal Mine, 670a.
 Explosion at Washington Glebe Colliery, 436.
 Explosions, Coal Dust, in France, 670a.
 Explosion at Wigan, England, 449.
 Explosion in Cape Breton Mines, 54.
 Explosion in Dawdo Coal Mine, 187.
 Explosion in La Rosita Mine, 91.
 Explosion in McNeil Colliery, 218.
 Explosion in Natal Coal Mine, 59.
 Explosion in Port Hood Collieries, 27.
 Explosion in Radboe Colliery, 639a.
 Explosion in Willumston Colliery, 382.
 Explosion, Norton Hill Colliery, 591a.
 Explosions at Concarriers, France, Report of Commission, 232-33.
 Explosions, Cause and Prevention, 214.
 Explosions, Dust, Cause and Prevention, 481.
 Explosions in Coal Mines, 22.
 Explosions in Coal Mines, Remarks on Some Recent, by C. J. Coll, 146-50.
 Explosions, Investigation in France, 157.
 Explosions, Mine, The Prevention of, 581a.
 Explosions, Report of U. S. Geological Survey, 589a.
 Explosions, Rescue Appliances in France, 151-52.
 Explosives, Permitted in British Mines, 335.
 Fergie, Charles, 445.
 Ferguson Mines Co., 90.
 Ferland, Chambers-, Mine, 154.
 Ferro-manganese, Output in France, 187.
 Fernie Fire, 387, 407, 419, 449, 480.
 Fernie, Visit of C. M. I., 563.
 Fiji Islands Chalcopyrite and Bornite, 637.
 Filter Tube, A New Design, *659.
 Findlay River Gold Prospects, 125, 186.
 Fire Clay and Brick at Drummond Colliery, 697.
 Fisher Maiden Co., 408.
 Flotations, Mining, and the Press, 195.
 Flotation Process, A New, 518.
 Fluorspar, Its Occurrence, Uses, etc., 360.
 Flynn, F. N., 215.
 Forty-nine Creek Co., 408.
 Foster Cobalt Mining Co., 253, 285, 697, 610a, 641a.
 Frank Coal Mine, 221.
 Fraser, Graham, 84, 90.
 Fraser, J. Dix, 51, 215.
 Free Silver Group, 315.
 Frick, H. C., Company, 544.
 Frontenac Asbestos Co., 461.
 Fuel Economy and Its Application to Nova Scotia, by A. A. Hayward, 177-79, 206-08, 508.
 Fulton, T. T., 51.
 Gabbro, and Diabase, 238.
 Galbraith Coal Co., 669.
 Galbraith, Dr. John, 22.
 Garde, A. C., 629.
 Gardell, A. I., 629.
 Gardner, H., 634a.
 Gas, Illuminating, Dannert, 660a.
 Gas Mantles, Improvement of, 635a.
 Gas, Natural, in Quebec, 229.
 Gas Producers, Their Present Limitations, 819.
 Gas Producer Plants and Gas Engines, 19.
 Geochemistry, The Data of, 193.
 Gayley, James, 634a.
 Geological Society of America, the Annual Meeting at Albuquerque, by Cyril W. Knight, *675-78.
 Geological Survey, and the Falls of Niagara, 131.
 Geological Survey, General Index to Reports of the, 1885-1906, 341.
 Geological Survey in the West, 266.
 Geology, Lectures on, 34.
 Geological Survey, Notes on Reports and Maps of Special Economic Interest, 329-30.
 Geological Survey Parties, 330.
 Geological Survey, Summary Report for 1907, 674.
 German Enterprise, 628.
 Germany's State-owned Mines, 91.
 Giant-California Mine, 26.
 Gibson, T. W., Estimated Output of Ontario Mines, 1907, 654.
 Gillespie, G. H., on Concentrating Cobalt Ores, *103-106; on Valuation of Mining Properties, 325-26, 359-60.
 Glamorgan Colliery Co., 125, 411.
 Gloucester, N.S., Mines, 631-32.
 Gold, in Austria-Hungary, 59.
 Gold, Alluvial, in New Zealand.
 Gold Alluvials in Hungary, by A. Van Gernet, 269.
 Gold and Silver, Investigations by the U. S. Geological Survey, 1907, 265-66.
 Gold-bearing Rocks of Wales, 698.
 Golden Cycle Mining Co., 213.
 Goldfield Consolidated 600-ton Mill, 473.
 Gold, Discovery Near Lake Megantic, Quebec, by Jno. A. Dresser, 234.
 Gold Dredging at Lillooet, 117.
 Gold Dredging in Australia, 59, 125.
 Gold Dredging in Calaveras, 412.
 Gold Dredging at Lillooet, 123.
 Gold, Discovery in Sweden, 284.
 Gold Dredging in the Philippines, 350.
 Gold Dredging in the Yukon, 284.
 Gold Dredging in Ural, 91.
 Gold Dredging in Yukon—A Correction, 642-43.
 Golder Reed Mine, 512.
 Golden Zone Mine, 448.
 Goldfield, "High-grading" Perfected, 307.
 Gold, Has the Value Depreciated? 666a.
 Gold in the Amur Region, 188.
 Gold in Australia, 1907, 30, 671, 672.
 Gold in Austria, 607a.
 Gold in British Columbia, 1907, 298-99.
 Gold in California, 544.
 Gold in Colorado, 481.
 Gold in Cripple Creek, 670a.
 Gold in Mexico, 670a.
 Gold in New Zealand, 671.
 Gold Industry of Nova Scotia, How Can It be Assisted? by E. Percy Brown, 172-3.
 Gold in Georgia, 308.
 Gold in Japan, 254, 544.
 Gold in Kamchatka, 698.
 Gold in Portugal, 221.
 Gold in Quebec, 229.
 Gold in Rhodesia, 221, 411.
 Gold in Russia, 91, 317, 411, 449, 481.
 Gold in Spain, 670.
 Gold in South America, 91.
 Gold in the Omineca Country, 316.
 Gold in the Rand, 126, 224, 286, 352, 403, 450, 513, 537, 672, 699, 704.
 Gold in the Restigouche, 217.
 Gold in Uganda, 607a.
 Gold in Victoria, 481.
 Gold in Wales, 669a.
 Gold in Yukon, 519.
 Gold, Johannesburg Main Reef, 481.
 Gold, Juneau District of Alaska, 125.
 Gold Mines of Nova Scotia, A Practical Suggestion for the Testing of the, by Fred. P. Ronnan, 137-39.
 Gold Mining in Waverly, N.S., Fifty-two Years Ago, *533-34.
 Gold Mining, Cost in the Rand, 607a.
 Gold Mining in Cuba, 578.
 Gold in New Zealand, 91.
 Gold Ores, Bromo-cyaniding of, 661a.
 Gold, Output from Congo, 450.
 Gold, Placers in Alberta, 637a.
 Gold, Placers in Haiti, 125.
 Gold, Placers on the Columbia River, 155.
 Gold Production at Afton, 670.
 Gold Production in Canada, 1907, 704.
 Gold Production at Rawhide, 578.
 Gold, Robinson Mine of the Rand, by Ralph Stokes, 114.
 Golden Zone Property, 409, 480, 637a.
 Governments and the Mining Interests, 259.
 Gowanda Lake, 429, 567.
 Grace Mine, 28.
 Granby Consolidated M., S. & P. Co., 26, 28, 56, 89, 90, 106-07, 124, 130, 155, 185, 187, 219, 221, 252, 284, 285, 286, 315, 380, 407, 409, 448, 449, 474, 481, 511, 542, 546, 577, 578, 634, 670, 696, 703, 605a., 606a, 637a, 638a, 642a, 646a, 668a.
 Grand Forks, Visit of C. M. I., 564.
 Granite Poorman Mine, 253, 480.
 Granite, Industry in New Brunswick, 667.
 Granite, Wells in, 117.
 Graphite, Canadian, Modes of Occurrence of, by H. P. B. Brumell, 70-72.
 Graphite, Buckingham Co.'s Mill, *15-18.
 Graphite in Argenteuil and Labelle, by F. Hille, 361-63.
 Graphite, in Quebec, 229.
 Graphite, Treatment of, 142-43.
 Graw, F. W., on Mining Operations of the Dominion Coal Co., *5-7.
 Gray, Alex., on Methods and Morals, 457-58; on A Tragedy in Diamonds, 692.
 Gray, F. W., on The Use of Oxygen Breathing Apparatus at the Hampstead Fire, 165-66; on The Mining Operations of the Dominion Coal Co., *291-96, 355-58, 396-98, 550-60; on The Use of Oxygen Breathing Apparatus at the Sydney Mines Fire, 487-88; on Miners' Clubs, 615; on "Rare Specimens" of Ignorance, 620; on Workmen's Compensation Act, 627.
 Greene-Cananea Copper Co., 157.
 Great Fitzroy Mine, 254.
 Great Northern Coal Co., 615a.
 Great Bras d'Or Gold Co., 406.
 Green Gold and Silver Co., 578.
 Green-Meehan Property, 632, 641a.
 Greening (B.) Wire Co., *665.
 Greene-Cananea Co., 59.
 Greenwood Prospecting Tunnel, 252, 283.
 Greenwood, Visit of C. M. I., 564.
 Grinding Wheels and Other Abrasives, The Manufacture of, *309-10.
 Grondal Process of Concentrating and Briquetting Iron Ores, by P. McN. Bennie, *332-35.
 Guess, H. A., 436.
 Guggenheims in the Yukon, 636.
 Gwillim, J. C., Bibliography of Mineral Resources of Alberta and Yukon, 210-11, 242-43; on Copper Ores of Sudbury-Soo District, 680.
 Gypsum Industry of Nova Scotia, The, 354.
 Gypsum Near Vancouver, 187.
 Haas, J. C., 629.
 Haileybury Silver Mining Co., 119, 635.
 Hall Creek Placers, 58.
 Hall Mining and Smelting Co., 4, 56, 155.
 Hammond, John Hayes, 157.
 Hampstead Mine Fire, 162.
 Hampstead Mine Fire, the Use of Oxygen Breathing Apparatus, by F. W. Gray, *165-66.
 Hardie, Keir, in Nova Scotia, 541.
 Hardman, John E., on a New Iron Field in New Brunswick, 303-05, 336-37.
 Hargreaves Mines, 478.
 Harmon, Floyd, 84, 341.
 Harris, Capt. John, 22.
 Harris-Maxwell Property, 87, 344, 410, 577.
 Harder, E. C., on Manganese Ores, 431-33.
 Hastings Exploration Syndicate, 607-09a.
 Haultain, H. E. T., Review of Beringer's A Text-book of Assaying, 305-07.
 Haultain, H. E. T., 215, 537, *679-80.
 Hayward, A. A., on Fuel Economy and Its Application to Nova Scotia, 177-79, 206-08.
 Heathcote, Elijah, 660a.
 Heckleton Main Colliery, 640a.
 Helmet, The Draeger, With Electric Lamp, *233.
 Henderson Talc Mine, 253.
 Hersey, Dr. Milton L., 215, 474, 665, *679-80.
 Hewitt Mines, 26, 56, 58, 90, 411, 634.
 High Grading, 353.
 Highland Mary and Blue Bell Frauds, 644.
 Hille, F., on Graphite in Argenteuil and Labelle Counties, 361-63; on Criticism of Papers Read at C. M. I., 506-08.
 Hill, Leslie, on C. M. I. Elections, 51.
 Hill, Professor Leonard, on Breathing Apparatus in Mines, *262-65.
 Hind, Dr. Henry Youle, 386, 404.
 Hoisting Cages, A New Safety Device for, *166-67.
 Holmes, Joseph A., 69.
 Homestake Mining Co., 637.
 Hostolepaquilla and the Lerma River, *662a-65a.
 Henderson Talc Mine, 220.
 Hubbard-Elliott Co., 544.
 Huddart, L. H. L., on Electro-magnet for Ore Separation, *240-41.
 Humming Bird Mine, 448.
 Hydraulic Compressed Air Co., 119.
 Idaho Smelting and Refining Co., 607a.
 Ikeda Bay Mine, by A. Ikeda, *584-86a.
 Ikeda Mines in Queen Charlotte Islands, 156, 317, 481, 583a.
 Illinois Steel Co., 669.
 Industrial Education, 611.
 Industrial Pages, 665, 604, 245, 277, 309, 342, 376, 405, 456, 474, 540, 571, 602.
 Ingenica Mining Co., 606.
 International Coal and Coke Co., 30, 93, 186, 218, 222, 251, 255, 281, 316, 349, 409, 695, 700.
 International Coal and Coke Co., Coleman, Alta., by George A. Ohren, *47-48.
 International Strata, Correlation of, 322.
 Inverness Coal Co., 220.
 Iron and Steel Exports of United Kingdom, 29.
 Iron and Steel Institute, 211-12.
 Iron, Annapolis Mines, —
 Iron and Steel Bounties Paid by the Dominion, 703-04.
 Iron and Steel Structures, Correction of Defects, 455.
 Iron, A New Process of Making, 399.
 Iron Deposits of Vancouver Island, 636.
 Iron, Development in Algeria, 317.
 Iron for Railway Ties, 91.
 Iron, Gloucester Deposits, 217.
 Iron Horse Mine, 185.
 Iron in Australia, 350, 513.
 Iron in China, 481.
 Iron in France, 341.
 Iron in New Zealand, 699.
 Iron in Norway, 221, 607a.
 Iron in Quebec, 228.
 Iron in Russia, 670, 670a.
 Iron in Wisconsin, 317.
 Iron Mask Mine, 577, 698, 637a, 669a.
 Iron, Mines in China, 699.
 Iron Mining, Chrome, in Canada, by H. F. Strangways, *42-47.
 Iron Ore Bounties, 616a.
 Iron Ore, Chrome, in Quebec, 229.
 Iron Ore Field in New Brunswick, A New, by Jno. E. Hardman, 303-05, 336-37.
 Iron Ore Industry of Lake Superior, 254.
 Iron Ores, Loon Lake and Beck Siding, 697.
 Iron Ores of Canada, The, by C. K. Leith, 370-74.
 Iron Ores of French Lorraine, 570.
 Iron Ores of Ontario, by A. B. Willmott, *77-84.
 Iron Ores, Progress With the Grondal Process of Concentrating and Briquetting, by P. McN. Bennie, *332-35.
 Iron Ores, Report of Department of Mines, 1908, 393-4.
 Iron, Output of Belgium, 544.
 Iron, Pig, A Canadian Method for the Technical Determination of Silicon in, by Randolph Bolling, *69-70.

- Iron, Pig, Output of Belgium, 157.
 Iron, Pig, Output of U. S., 1908, 644a.
 Iron, Production at Lake Superior, 637.
 Iron, Production in Russia, 284.
 Iron, Production of Pig in Belgium, 29.
 Iron, Prospecting, The Need of, 131.
 Iron River District, 578.
 Iron, Standard Methods for the Analysis of, 660.
 Irving, Captain John, 629.
 Ivanhoe Mine, 639a.
- Jewel Mine, 481.
 Jacobs, E., on Mineral Production in British Columbia, 648, 683-84; on Western Branch of the C. M. I., 694.
 Japan, Metallic Production, 670a.
 Jannison, W. T., 375.
 Jigging, The Separation of Metallic Ores by, *597-601a.
 Johnston, John, on Submarine Coal Mining 135-36.
 Jones, J. E., 50.
 Jones, Leon C., 215.
 Joplin District, Cost of Mining, 214.
- Kansas-Cananea Copper Co., 482.
 Kaslo and Slocan Railway, 345.
 Keefer, Frederick, on Notes on Cost of Diamond Drilling in the Boundary District, 73-75.
 Keely Mining Claim, 154.
 Keremeos Copper Co., 668a.
 Kerr, H. L., on Larder Lake, *489-90.
 Kerr, John, 436.
 Kerr Lake Crown Reserve, 25, 87, 119.
 Kerr Lake Mining Co., 93, 154, 184, 320, 484, 516, 540, 546, 640, 670a.
 King Edward Medal Conferred, 88, 90.
 King Edward Mine, 250, 510, 667, 697.
 Kingston Group, 605a.
 Kirby, Edmund B., 436.
 Kirby, Richard, 445.
 Klondike, The Climate of, 130.
 Knight, Cyril W., Report of Annual Meeting of Geological Society of America, *675-78.
 Kootenay Development Co., 381.
 Kootenay, East, Railway Project, 698.
 Kootenays, Mining in, by Geo. A. Ohren, 688.
 Koppel, Arthur, 247.
 Krao Mining Co., 58, 90, 697.
- Labor, Award of Conciliation at Glace Bay, 118-19.
 Labor, Bituminous Miners of the U. S., 157.
 Labor, Disputes Act Repudiated in New South Wales, 411.
 Labor, Disputes in Nova Scotia, 635a.
 Labor, Eight Hour Act in Nova Scotia, 311-12.
 Labor, Eight Hour and Compensation Bills of Alberta, 55, 669.
 Labor, Eight Hour Bill, 72.
 Labor, Eight Hour Hill, British Agitation Against, 98.
 Labor, Eight Hour Bill in Transvaal, 481.
 Labor, Eight Hour Bill in the U. K., 375.
 Labor, Eight Hour Day for Nova Scotia, 183-84.
 Labor, Indignity to the Dead, 604a.
 Labor, Industrial Legislation in Australia, 435.
 Labor, Lemieux Act Accomplishes Good, 398.
 Labor, Lemieux Conciliation Act, 455.
 Labor, Organization at Saskatchewan, 27.
 Labor, Organization at Souris, 56.
 Labor, Politics in Alberta, Appeal to the Government, 121.
 Labor, Proposed Amendment to British Columbia Law, 123.
 Labor, Reductions in Mexico, 699.
 Labor, Resolutions of Coleman Miners' Union, 27.
 Labor, Settlement at Beinfelt, 281.
 Labor, Situation in Boundary Country, 696.
 Labor, Situation in Nova Scotia, 216, 312-13, 344.
 Labor, Strike at Goldbrook, 205.
 Labor, Strike of Wyoming Coal Miners, 481.
 Labor, The Springhill Board of Conciliation, 270.
 Labor, Troubles at Alberta, 379.
 Labor, Trouble at Beinfelt, Sask., 123.
 Labor, Trouble at Crow's Nest Mines, 281-82.
 Labor, Troubles at Nevada, 637.
 Labor, Troubles at Nova Scotia, 23, 24, 25, 118-19, 280, 311, 570, 666a.
 Labor, Troubles at Port Hood, 220.
 Labor, Troubles at Taylorton, 218.
 Labor, Troubles in Nova Scotia, 406, 573.
 Labor, Troubles in Wales, 577.
 Labor, Wage Scale at Cobalt, 142.
 Labor, Wages in Scotland, 254.
 Labor, Wages in the Rand, 188.
 Labor, White, in the Transvaal, 577.
 La Rose Mine, 28, 250, 285-86, 410, 510, 512, 516, 540, 568, 632, 638a, 669a, 670a.
 Lake Superior Corporation, 187, 669a.
 Lake Superior Power Co., 253.
 Lake View Mine, 253.
 Larder Lake District, 344, 485.
 Larder Lake District, by H. L. Kerr, *489-90.
 Larder Lake District, The, by H. E. T. Haultain, 395-96.
 Larder Lake District, by R. W. Brock, *656-59, 621.
 Lash Process for Making Soft Steel, *520-23.
 Lash Process for Making Soft Steel, 684-85.
 Last Chance Mine, 381, 411.
 Latimer, J. F., Treatment of Graphite, 142-43.
 Laurentian Gold Mine, 694.
 Law, Frank, Trial of, 195, 490-92, 697.
 Lawson and the Yukon, 161.
 Lawson Mine, 348.
- Leach, Norman L., on the Moose Mountain Range, 76-77.
 Lead and Zinc Duties in U. S., 668a.
 Lead Bounties, 26, 58, 155, 258, 381, 636, 674, 696.
 Lead, Output in British Columbia, 1907, 298.
 Lead Receipts at Trail Smelter, 63.
 Lead, White, History of the Industry, 245-46.
 Lead-Wool, Its Manufacture, 630a.
 Leckie Mine, 606a.
 Legal Definition of Mineral and Ore in the United States, 610.
 Legislation, Against Fraud, in Montana, 513.
 Leith, C. K., on the Iron Ores of Canada, 370-74.
 Leasing System in Cobalt, 574.
 Lepage Gold Mining Co., 381.
 Le Roi Mine, 26, 50, 56, 89, 252, 315, 511, 513, 542, 640, 694, 700, 702, 604a, 664a, 667a.
 Le Roi Mine No. 2, by Geo. A. Ohren, *163-64.
 Le Roi Mine No. 2, 29, 89, 188-89, 282, 315, 407-08, 542, 637a, 667a.
 Lethbridge Visit of C. M. I., 563.
 Lifting Magnets, 32.
 Lille Collieries, 221.
 Limestone at St. John, 631.
 Little Nipissing Mine, 25, 87, 154, 250, 313, 575.
 Locomotives for Mines, Electric, *474.
 Londonderry Iron Co., 121, 220.
 Loring, Frank C., 152.
 Los Obates Mining Co., 59.
 Love and Petrography, Poetical, 179.
 Lunenburg Collieries, 669.
- Mahon Coal Mine, 638a.
 Magnesia in Cement, 665.
 Magnesite, Exports from Greece, 382.
 Magnetite, Hematite and Limonite, the Technical Analysis of, by R. Rolling, 363-65.
 Magnesite in Russian Mines, 670.
 Manganese in Deep-Sea Deposits, 205.
 Manganese in India, 91.
 Manganese, in South Russia, 188.
 Manganese, in Russia, 317.
 Manganese Ores, by E. C. Harder, 431-33.
 Manganese, Revival in Business, 671.
 Manitoba and Saskatchewan Coal Co., 27.
 Maple Leaf Mining Co., 89, 408.
 Maritime Coal, Railway and Power Co., 577, 640.
 Marble Bay Mine, 27.
 Marble Output of U. S., 530-32.
 Mashek, G. J., Briquetting of Fuels in British Columbia, *661-64, 685-87.
 Mashek Engineering Co., 704.
 Maxwell-Harris Mine, 87, 154, 185.
 Mayflower Mine, 380.
 MacNaughton, G. F., 629.
 McCallum, A. L., on Scheelite in Nova Scotia, 456.
 McCulloch, George, 670.
 McCallum Syndicate Mines, 543.
 McEvoy, J. E., 209.
 McKinley-Darragh Mine, 26, 96, 119, 189, 315, 448, 640.
 McNab, A. J., 215.
 McNeil, W. K., on the Determination of Cobalt and Nickel, 272-73. On Cobalt Ores, 617-18. On the Assay of Silver Ores, 112.
 Medicine Hat, Visit of C. M. I., 563.
 Megantic Lake, Discovery of Gold, by Jno. A. Dresser, 234-35.
 Meerschaum in New Mexico, 110.
 Merton, Richard, 185.
 Metallic Products of the United States, 1907, 699.
 Metals, Devices for Measuring Hardness of, 633a.
 Metals, etc., Structure of, Encouragement to Study, 220.
 Metals, Exports from U.S.
 Metals, Institute of, 481.
 Mexico, Hostolipaquilla and the Lerma River, *662a-65a.
 Mexican Mining Consolidation, 637.
 Mexico, Exclusion of Foreigners from Mining Rights, 289.
 Miami Copper Co., 161.
 Mica, Amber, in Quebec, 229.
 Mica, a New Variety in France, 382.
 Mickle, George R., 505.
 Mickle, G. R., on Taxation of Mineral Resources, 632a.
 Miller, Dr. W. G., 634a.
 Miller Lake Discoveries, 447, 478.
 Milton, Hersey Co., 183.
 Mineral and Ore, Legal Definitions, in the United States, 610.
 Mineral Collections, Tyrrell Prize, 642.
 Mineral Combustibles in France, 125.
 Mineral Exhibits, Provincial, at C. N. Exhibition, *462-67.
 Mineral Output of United Kingdom for 1907, 127-28.
 Mineral Production in British Columbia, by E. Jacobs, 648.
 Mineral Production of Canada in 1907, Preliminary Report, 94-95.
 Mineral Production of the United Kingdom, 116.
 Mineral Resources of the United States in 1906, 681-83.
 Mineral Resources, Taxation of, in Canada, by O. D. Skelton, 551-55.
 Miners' Clubs, by F. W. Gray, 615.
 Miners' Lamp, a New Design, 399.
 Miners' Relief Societies in Nova Scotia, 132.
 Mine Accidents, in Virginia, Safety Lamps, 629.
 Mine Managers, Alberta, Government Examination for, 427-30.
- Mine Watering, 341.
 Mines, a United States Bureau of, 610.
 Mines, Ontario Bureau, 16th Annual Report, 609, 618, 620, 649-50.
 Mining, Accidents in Great Britain, 29.
 Mining and Industrial Prospects, Review, 257.
 Mining and Metallurgy at the Universities—A Forward Move, 517.
 Mining and Metallurgy, Institution of, Standardization of the Terminology of Mining and Metallurgy, 259, 267.
 Mining and Metallurgical Society of America, The, 323.
 Mining and Milling Costs in South Africa, 665a.
 Mining Areas, Unit, of Different Countries, 534.
 Mining Booms, Psychology of, 21.
 Mining Business in the Dominion, the Old Year and the New, 641, 642.
 Mining Claims, Discovery Before Location, by Dr. R. W. Raymond, 260-62.
 Mining Companies, Operating, List of Canadian, 437-43.
 Mining Developments in Nevada, 664-65.
 Mining Education, Secondary in Wisconsin, 693.
 Mining Engineers' Club at Toronto, 21.
 Mining Engineers, Institution of, England, 476.
 Mining Engineer, the Consulting, 34.
 Mining in New Mexico, 659.
 Mining in Norway, 629.
 Mining Institute, Canadian, Excursion, from Ocean to Ocean, *560-67.
 Mining in Quebec in 1907, by J. Obalski, 646.
 Mining, in the Kootenays, by Geo. A. Ohren, 688.
 Mining Machinery, Free in Argentine, 637.
 Mining Matters, Discussions of Them, 614a.
 Mining Operations of the Dominion Coal Co., by F. W. Gray, *291-96, 355-58, 396-98, 550-60.
 Mining, Operations in China, 350.
 Mining, Professional Examinations, 644.
 Mining Progress in Ontario in the Last Decade, by Phillips Thompson, 650-52.
 Mining Properties, Valuation of, by Geo. H. Gillespie, 325-26, 359-60.
 'Mining Science' of Denver, 611.
 Mining Society of Nova Scotia, Annual Meeting, 136-37.
 Mining, Speculation and, 517-18.
 Mining Stocks, Cobalt, Boom in, 582a, 613a.
 Mint, Canadian Branch, Royal, 156, 669.
 Minto Coal Mines, New Brunswick, 667.
 Mint, Ottawa, the Mechanical Equipment of the, *174-177, *203-05.
 Mint, Ottawa, the Mechanical Equipment of the, by A. H. B. Cleave, *100-103.
 Mount Royal Co., 669a.
 Molly Gibson Mine, 186.
 Molybdenum, 433.
 Molybdenum, Determination of, by J. C. Evans, 18.
 Monarch Mine, 124.
 Mond Nickel Co., 410.
 Monongela Coal Mines, 450.
 Montana Mine Owners' Association, 222.
 Montana-Tonopah Company's Mill, Description of the, 111-112.
 Montreal River District, 25, 87, 119, 154, 314, 378-79, 447, 479, 567, 575, 636a, 645a, 651a.
 Montreal River District, The, by Harold P. Davis, *132-35.
 Montreal, Visit of C. M. I., 562.
 Moose Mountain Iron Range, by Norman L. Leach, 76-77.
 Moose Mountain, Visit of C. M. I., 562.
 Moresby Island, Mineral Locations, 236-38.
 Morinville Coal Mines, 55.
 Mount Lyell Mine, 91.
 Moyie, Visit of C. M. I., 563.
 Muggsley Concentrator, 632.
 Munro, Henry S., on Sampling of Mine Dumps, *239-40.
- Naphtha, Boring in Russia, 670.
 Nancy Helen Mine, 28, 58.
 Nest Egg Mine, 576.
 Nevada Mining Development, 664-65.
 New Brunswick, A New Iron Ore Field in, by Jno. E. Hardman, 303-05, 336-37.
 New Brunswick Iron Mines Co., 121, 631.
 New Brunswick, Special Correspondence, 631, 667, 217, 636a.
 Newfoundland, Mineral Laws of, 505.
 Newman, W. Thos., on Discovery Before Location, 324-25.
 New Zealand Government-operated Coal Mines, 638.
 Niagara Visit of C. M. I., 562.
 Nickel and Copper, Electrolytic Separation of, 535.
 Nickel, Imports in France, 187.
 Nickel, in Northern Ontario, 410.
 Nickel, International Nickel Co., 387.
 Nickel, Neoteric, 583a.
 Nickel-plate Mines, 606a.
 Nicola Valley Coal and Coke Co., 29, 698.
 Nicholas, Frank J., 375.
 Night Hawk Lake Ores, 218.
 Nipissing Mine, 58, 128, 152, 184, 244, 250, 447, 512, 568, 635, 640, 667, 691, 701, 638a.
 Nitrate, Discovery in South Australia, 254.
 Nome Mining Co., 670.
 Northern Customs Concentrator, 575.
 North Atlantic Collieries Co., 445, 448.
 North Cobalt Mine, 119.
 Northern Exploration Co., 640, 770.
 Northern Securities Co., 701.
 Northern Pyrites Co., 410.
 Northland Mine, 695.
 North Star Mine, 512.

- Norway, Lead and Silver Mines, 157.
 Norwegian Competition in Coast Navigation, 573.
 Norwegian Mines, 629.
 Nova Scotia, Accidents in Mines of, 280.
 Nova Scotia, an Interesting Occurrence of Scheelite in, by A. L. McCallum, 456.
 Nova Scotia, Annual Report of Department of Mines, 153.
 Nova Scotia, Coal Conditions Enquiry, 57.
 Nova Scotia, Coal Mines Regulation Act, 220.
 Nova Scotia, Eight-hour Day, 183-84.
 Nova Scotia, Eight-hour Controversy—Journalistic Amenities, 227.
 Nova Scotia Gold Mines, A Practical Suggestion for the Testing of the, by Fred. P. Ronnan, 137-39.
 Nova Scotia, Gold mining at Waverley Fifty Years Ago, *533-34.
 Nova Scotia, How Can Gold Industry Be Assisted? by E. Percy Brown, 172-3.
 Nova Scotia, Labor Troubles, 23, 24, 25, 216.
 Nova Scotia, Map of, 416.
 Nova Scotia, Mineral Output for 1907, 126, 621.
 Nova Scotia, Mineral Production, 1907, 97, 672.
 Nova Scotia, Mineral Exhibit at Toronto Exhibition, 486.
 Nova Scotia, Miners' Relief Societies, 132.
 Nova Scotia, Mining Society of, 35, 129.
 Nova Scotia Mining Society, Annual Meeting, *136-37.
 Nova Scotia, Official Enquiry Into Coal Mining Industry Proposed, 85.
 Nova Scotia, Present Status of Technical Education in, by F. H. Sexton, 645.
 Nova Scotia, Relief Funds for Miners, 85-86.
 Nova Scotia, Report of the Department of Mines, 1907, *139-42.
 Nova Scotia, Safety of Mining Investments in, 250.
 Nova Scotia Steel and Coal Co., 35, 61, 120, 311, 316, 319, 454, 480, 546, 671.
 Nova Scotia, St. Lawrence Coal Market, 540.
 Nova Scotia, Special Correspondence, 666, 23, 53, 85, 118, 153, 183, 216, 249, 280, 311, 314, 378, 406, 445, 476, 509, 540, 573, 604a, 635a, 666a.
 Nova Scotia, Submarine Coal Leases Bill, 186.
 Nova Scotia, Waverley Gold District, 614a.
 Nugget Mine, 253, 668a.
 Nystagnus Amongst Belgian Miners, 481.
- Obalski, J., on Mining in Quebec in 1907, 646-47.
 O'Brien Mine, 25, 119, 250, 511, 667, 700.
 O'Dell, C. M., Historical Coal Mine Fires in Cape Breton, 508.
 Ohio Copper Co., 450.
 Ohren, George A., on International Coal and Coke Co., Coleman, Alberta, *47-48. On Le Roi No. 2, *163-64. On Mining in the Kootenays, 688.
 Oil in Colorado, 222.
 Oil in Mexico, 699.
 Oil, Prospecting in Mexico, 640a.
 Oil Shales of New Brunswick, 518.
 Oil, Shale, Industry of Scotland, by R. D. Stewart, 652a-60a.
 O. K. Mine and Mill, 124.
 Old Abe Property, 251.
 Old Town Mine, 671.
 Oliver Iron Mining Co., 544.
 Ontario Bureau of Mines, 635.
 Ontario, Bureau of Mines, 16th Annual Report, 609, 618-620, 649-50.
 Ontario's Estimated Output of Ontario Mines, 1907, by T. W. Gibson, 654.
 Ontario, Inspection of Mining Claims, 151.
 Ontario, Iron Ores of, by A. B. Willmott, *77-84.
 Ontario, Mineral Output of, for 1907, 95.
 Ontario Mining Administration and Politics, 225.
 Ontario's Mining Progress in the Last Decade, by Phillips Thompson, 650-52.
 Ontario Navigation Co., 218.
 Ontario, Special Correspondence, 632, 667, 695, 25, 87, 119, 154, 184, 217, 250, 313, 314, 378, 407, 446, 478, 510, 540, 574, 604a, 636a.
 Opals, in New South Wales, 254.
 Orchard, L. B., The Atikoken Iron Company, *36-40. A Hand-Power Rock Drill, *8-10.
 Ore Analysis, H. E. T. Haultain, 215.
 Ore, Bombshell, the Origin of, by H. M. Chance, 402-03.
 Ore Dressing During 1907, 535.
 Ore, for Magnetic Separation, an Electric Magnet for Testing the Suitability for Magnetic Separation, *240-41.
 Oroville Dredging Co., 637.
 Ores and Rocks of Cobalt Region, by R. E. Hore, 300.
 Ores, Cobalt, by W. K. McNeil, 617-18.
 Ores, Cobalt, Concentration of, 99.
 Ores, Classification of Sizes, 22.
 Ore Shipments, British Columbia, 638.
 Ores, Metallic, Tariff Duty in U. S., 597-601a.
 Ores, Metallic, the Separation of, by Jigging, *597-601a.
 Ore, Silver, Treatment in Mexico, 273-74.
 Ores of Tungsten, Molybdenum, Manganese, Antimony, etc., 674.
 Ores, Tungsten, the Occurrence of, in Canada, by T. L. Walker, 302-03.
 Ore Treatment, Cobalt, by H. G. V. Adler, *655.
 Ore Treatment, Rates for, 213.
 Otisse Claim, 541.
- Parsons, W. F. C., 404.
 Pacific Slate Co., 698.
 Pacific Coal Company's Plant at Bankhead, *661-64.
 Parker, Edward W., on Coal Briquetting in 1907, 530-32.
 Parkes, James, on Treatment of Low Grade Copper Ore, 49.
 Paterson Property, 313.
 Peat, Alcohol Distilled from It, 676a.
 Peat, in East Friesland, 215.
 Peat, in North Cumberland, 221.
 Peat Resources of Sweden, 640a.
 Pelly River Placers, 346.
 Peregrino, Pinguico and Mexican Co.'s., 30.
 Perry Creek Hydraulic Mine, 697.
 Perkins, Frank C., on the Use of Portable Air Compressors, *268-69.
 Peterson Lake Mine, 697.
 Petroleum in Alberta, 638a.
 Petroleum Producers, International Congress, 607a.
 Phalen Seam Dispute, Steel and Coal, 549.
 Phoenix Mines, 219.
 Phoenix, Visit of C. M. I., 564.
 Phosphate Exports of Tunis, 59.
 Phosphate in Quebec, 229.
 Plaster Quarry at Hopewell Hill, N.S., 631.
 Platinum Monopoly in Russia, 355.
 Platinum in Russia, 513.
 Platinum in Urals, 254.
 Platinum, on the Upper Tulameen, 480.
 Platinum Production in United States, 637.
 Plaster of Paris, New Use of, 535.
 Pensions for coal Miners in Nova Scotia, 86.
 Port Hood Disaster, 4, 98, 120, 121.
 Prisk, W. J., 215, 253.
 Prince Edward Island, a Field for Prospecting, 355.
 Progress Mine, 313, 447.
 Prospectors Appreciated, 630.
 Prospectors, Assistance to Them, 673.
 Prospecting, The Need of, 131.
 Provincial Mine, 28, 119.
 Public Affairs, The Canadian Annual Review of, 1907, 417-18.
 Pumps, Desiccating and Steam Air, 632a.
 Pumps, Slow-speed, in the Rand, 631a.
- Quartz and Feldspar, by Edson S. Bastin, 469-73.
 Quebec Asbestos Co., 461.
 Quebec, Discovery of Gold at Lake Megantic, by Jno. A. Dresser, 234-35.
 Quebec, Mining in the Eastern Townships of, 230-31.
 Quebec, Mining in the Province of for Year 1907, 228.
 Quebec, Mining in 1907, by J. Obalski, 646-47.
 Quebec, Special Correspondence, 314, 510.
 Quebec, Visit of C. M. I., 560-01.
 Queen Alexandra Mine, 119, 575.
 Queen Charlotte Islands Minerals, 606a.
 Queen Charlotte Islands, Mineral Land Reserve, 156.
 Queen Charlotte Islands, Mineral Locations on Moresby Island, *196-99, 236-38.
 Queen Victoria Mine, 89, 123, 253, 315.
 Quicksilver in New South Wales, 318.
 Quicksilver, Production in U. S., 519.
- Railway Extension from Toronto to Sudbury, 291.
 Railway Extension in Cobalt District, 313.
 Railway for Larder Lake, 187.
 Rameau, C. L., West Canadian Collieries, 654.
 Rameau, L., 629.
 Ran, the Working Costs of Mines, by Jno. A. Dennison, 365-69.
 Rawhide Mining Camp, 59, 382.
 Rawlins, J. W., Examinations of Well Water at Copper Cliff, 687-88.
 Raymond, Dr. R. W., on Discovery Before Location, 260-62.
 Reco Mine, 448, 576, 638a, 669a.
 Reddick Mine, 87, 154, 185.
 Red Eagle Mine, 90.
 Red Hematite at Lake Nipegon, 22.
 Redmayne, Richard A. S., 254.
 Red Rock Mining Co., 25, 447, 541.
 Rescue Apparatus, 636a.
 Rescue Apparatus Failed, 125.
 Rescue Apparatus in France, 151-52.
 Rescue Apparatus in Sicily, 646a.
 Rescue Apparatus of Helmet Type, 578.
 Rescue Stations in the U. S., 446.
 Rescue Work at Hempstead Fire, 165-66.
 Rescue Work, Draeger Equipment Tested, 485.
 Rescue Work in Coal Mines, A School for, *327-28.
 Rescue Work in South Wales, 254.
 Rescue Work in U. K., 349.
 Revelstoke, Visit of C. M. I., 565.
 Rex Argentite Mining Co., 667.
 Reynolds, S. H., 693.
 Rhodesia, Mining Properties, 125.
 Rhodesian Department of Mines, 254.
 Rice, Harry E., 22.
 Rickard, T. A., on Dredging in the Yukon, 499-502.
 Right of Way Mine, 25, 61, 87, 123, 154, 218, 473, 483, 669.
 Robertson, J. A., 51.
 Robertson, W. F., 308.
 Robinson, A. W., 51.
 Robinson Gold Mining Co., 382, 601a.
 Robins, Thomas, 51.
 Rochester Cobalt M. Co., 313, 511.
 Rochfort, G. C., 251.
 Rock-drilling World's Record, 631a.
- Rock-Breaking with Murphy Drill, *538.
 Rocky Mountain Park, Ground Rentals, 669.
 Rogers, Allan Hastings, on Functions of the Consulting Mining Engineer, 40-41.
 Ronnan, Fred. P., on A Practical Suggestion for the Testing of the Gold Mines of Nova Scotia, 137-39.
 Roof Action in Long Wall Work, 50.
 Roosa, P. J., 349.
 Ross, George J., 375.
 Rossland, Visit of C. M. I., 564.
 Rossland Mines, Activity in, 696.
 Rothschild Co., 154.
 Rothwell Coal Co., 667.
 Royal Collieries Co., 513, 606a.
 Russia, Market for Mining Machinery, 665.
 Safety Blasting Explosives, 601a.
 Safety Lamps, 67.
 Sally Mine, 605a.
 Salmo Camp, 56.
 Salt Deposit in Alberta, 84.
 Salt Monopoly in Venezuela, 699.
 Salt, Purification of, 630a.
 Salt Resources of Sussex, New Brunswick, 113.
 Solutions, Water, Minerals and, 535.
 Sampling, Coal Mine, Uniform and Systematic, 456.
 Sampling Machines, 635a.
 Sampling of Mine Dumps, by Henry S. Munroe, *239-40.
 San Antonio Mine, 350.
 Sanction, Geo. E., on Methods of Concentration at Cobalt, 458-61.
 Sackatchewan, Special Correspondence, 633, 27, 56, 218, 281.
 Scheelite, a Noteworthy Discovery, 352.
 Scheelite, in Nova Scotia, 349.
 Scheelite in Nova Scotia, an Interesting Occurrence of, by A. L. McCallum, 456.
 Schwab, Chas. M., 30.
 Scott, A. P., 634a.
 Seranton Coal Mines Co., 281.
 Seddon, William C., 450.
 Separator, The "Vibracone," *53.
 Sexton, F. H., on Present Status of Technical Education in Nova Scotia, 645.
 Shadforth, J. T., 381.
 Shaft-sinking, Collar at No. 1 Allan Shaft, by H. E. Coll, 208-09.
 Shaft-sinking on the Rand, Cost of, 214.
 Shale-bearing Districts of Australia, 607a.
 Shale Oil Industry of Scotland, The, by R. D. Stewart, 652a-60a.
 Shamrock Mine, 250, 313.
 Sheep Creek Mines, 381, 639a, 669a.
 Short, Prof. Adam, 635.
 Sidney Inlet Copper Mine, 577.
 Silbert Mining Co., 31, 700.
 Silenium, Its Use and Value, 399.
 Silicious Ores, Treatment of, 629.
 Silver Belle Mine, 639a.
 Silver Bar Mine, 184, 478.
 Silver Cup Mine, 220, 221.
 Silver Cliff Mine, 25, 314, 541.
 Silver Cross Mine, 25, 87, 541.
 Silver King Mine, 56, 119, 187, 283, 448, 480, 512, 543, 637a, 668a.
 Silver Lake District, 636a.
 Silver Lake Mining Co., 604a.
 Silver Leaf Mine, 25, 154, 184, 218, 220, 250, 285, 448, 579, 632, 667.
 Silver Ores, The Assay of, by W. K. McNeil, 112.
 Silver Ore, Treatment in Mexico, 116, 273-74.
 Silver, Output in British Columbia, 1907, 298.
 Silver Peak Valcaldia Mines, 640a.
 Silver, Price of, 99.
 Silver Queen Mine, 28, 119, 184, 189, 218, 381, 546, 695.
 Silver Refined in Canada, 643.
 Silver, Shipments from Trail to China, 123.
 Silverton Camp, Largest Shipment, 698.
 Skeena River District, by J. C. Gwillim, 647a.
 Skelton, O. D., on Taxation of Mineral Resources in Canada, 551-55.
 Slate Mining in Wales, 692.
 Smelters at Chihuahua, 126.
 Smelters, Copper, Laboratory Routine in Modern, by H. T. Waller, 621a-626a.
 Smelter, Trail, Silver Refined, 670.
 Smelting at Chihuahua, 254.
 Smelting, Gold, Battery and Cyanide, by A. Thomas, 523-25.
 Smelting, Gold in Rossland Ores, 154.
 Smelting of Iron Ores, Electric, Possibilities in the Electric, by Alfred Stansfield, 108-109.
 Smelting Pyrite, With Hot Blast, 670.
 Smith, Geo. Otis, a Proposed United States Bureau of Mines, 11-14.
 Smoke-density Meter, 467.
 Snowshoe Mine, 56, 411, 512.
 Societe de l'Industrie Minerale, 349.
 Sodalite Property near Bancroft, 543.
 South Africa, Inaugural Address of the President of the C. M. & M. Societ, 497-99, 529-30.
 South African January Returns, 160.
 South African Mining Journal, 65.
 South African Trade with Canada, 628.
 South Africa Option Syndicate, 607a.
 South Africa, Twenty Years' Progress of, 226.
 South Belt Properties, 194, 219.
 Speculation and Mining, 517-18.
 Split Volatile Ratio, Classification of Coals by the, by D. B. Dowling, *143-46.
 Springhill Board of Conciliation, The, 270-72.
 Stairs, George, 152.
 Stamp Batteries, Reinforced Concrete Foundation for, *586-89a.

- Stamp Mills for Crushing Rock, 601a.
 Stamp Mills, Modern, in South Africa, 549.
 Stamp Mills of the World, Some of the Large, 570.
 Stamp Mill Tailings, The Treatment of, at the Richardson Mine, Goldboro, N.S., by E. Percy Brown, *400-01.
 Stamps, "Roaring" in Cobalt, 583a.
 Standardization, 322.
 Standardization of the Terminology of mining and Metallurgy, 259, 267.
 St. Anthony's Reef Gold Mine, 697.
 Stanton Coal Mining Co., 54.
 Statistics and Returns, 638-40, 671-72, 701-04, 31-2, 62-4, 94-6, 126-28, 158-60, 190-02, 222-24, 255, 286-88, 318-20, 350-52, 383-84, 412-16, 450-52, 482-84, 514-16, 547-48, 579-80, 610-12a, 642-44a, 674-76a.
 Steel and Coal, the Phalen Seam Dispute, 549.
 Steel and Iron, Bounties Paid in 1907, 158.
 Steel, a Phenomenon Explained, 519.
 Steel Bands of Belts, 467.
 Steel Ingots, Bessemer, Production in U. K., 1907, 285.
 Steel Plant at Soo Closed, 697.
 Steel, Soft, Lash Process of Making, 684-85.
 Steel, Soft, The Development of the Lash Process for Making, in the Electric Furnace, *520-23.
 Stenwinder Mine, 58, 696, 701.
 Stewart, R. D., on The Shale Oil Industry of Scotland, 652a-60a.
 St. Eugene Mine, 56, 186, 381, 543, 697, 703.
 Stevens, Frank G., 91.
 Stewart, Malcolm, 51.
 Stirling Mine, 314.
 Stibnite, Auriferous, in France, 343.
 St. Lawrence Cobalt Mine, 479.
 Stoddart Mines Co., 30.
 Stokes, Ralph, World's Greatest Gold Producer, Record Working Cost, 114.
 Stope Drill Competition in Transvaal, Rules of, 337-41.
 Storms, Bending of the Land by, 269.
 Strangways, H. T., on Chrome Iron Mining in Canada, *42-47.
 Strata, International, Correlation of, 322.
 Strathcona Coal Mine, 122, 251, 374.
 Sudbury Nickel Deposits, 117.
 Sudbury-Soo District, Copper Ores of, by J. C. Gwillim, 680.
 Sudbury to Toronto by Rail, 291.
 Sullivan Group Mining Co., 57, 124, 155, 157.
 Sullivan Machinery Co., 30.
 Sulphur as a Lubricant, 635a.
 Sulphur, Foreign Sources of, 444.
 Sulphur Industry of Sicily, 449.
 Sulphur in Texas, 607a.
 Sunset Mine, 411.
 Sutherland, H. H., 308.
 Sydney Cement Co., 189.
 Sydney, Visit of C. M. I., 560.
 Tailings, Stamp Mill, The Treatment of, at Richardson Mine, Goldboro, N.S., by E. Percy Brown, *400-01.
 Tantalum, Metallic, Its Uses, 116.
 Tasmania Mineral Production, 637.
 Taxation of Mineral Resources, 551.
 Taxation of Mineral Resources, by G. R. Mickle, 632a.
 Taxation of Mineral Resources in Canada, by O. D. Skelton, 551-55.
 Tax on Coal in British Columbia, 57.
 Tax on British Columbia Coal and Coke, 3-4.
 Tax Revenue in Ontario, 28.
 Taylor, Thos. A., re Discovery Before Location, 474.
 Technical Analysis of Magmita, Hematite and Limonite, by R. Bolling, 363-65.
 Technical College of Nova Scotia, 448.
 Technical Education, Present Status of, in Nova Scotia, by F. H. Sexton, 645.
 Technical Writing, A Guide to, 354.
 Telkwa Coal Mines, 543, 637a.
 Tellurium, Useless Metal, 691.
 Temagami, Visit of C. M. I., 562.
 Temagami Mining Co., —
 Temiskaming and Hudson Bay Mine, 25, 62, 184, 220, 250, 314, 320, 378, 480, 483, 511, 541, 572, 667, 695, 700, 642a.
 Temiskaming Cobalt Mine, 575.
 Templeman, Hon. Wm., 550.
 Theodolite, Wm. Ainsworth & Sons, *115.
 Thomas, A., on Battery and Cyanide Gold Smelting, 323-25.
 Thomas, Kirby, 324.
 Thomson, J. J., 117.
 Thomson, R. W., 87.
 Thompson, Phillips, on Mining Progress in the Last Decade, 650-652.
 Thwaita, B. H., on The Economic Distribution of Electric Power from Blast Furnaces, 624-25.
 Telkwa Coal District, 577.
 Tilt Cove Copper Co., 254, 640.
 Tin Dredging in Tasmania, 221.
 Tin in Australia, 350.
 Tin in France, 221.
 Tin in India, 188.
 Tin in New South Wales, 513.
 Tin in Russia, 670a.
 Tin in South Africa, 157, 513.
 Tin in Tasmania, 382, 544.
 Tintie Smelting Co., 411, 578.
 Timber for Coal Mines in Nova Scotia, 510.
 Tip-Top Mine, 219.
 Tonapah Mine, 671.
 Tool-tempering Apparatus, 630a.
 Toronto, Visit of C. M. I., 562.
 Transvaal, Rules of Stope Drill Competition, 130, 337-41.
 Transvaal Stope Drill Competition, 130.
 Trail, Visit of C. M. I., 564.
 Trail Smelter, 185, 219, 282, 479, 696.
 Treadwell Gold Mining Co., 156.
 Trethewey Mine, 25, 218, 410, 412, 478, 484, 512, 632.
 Trinity Cobalt, 447.
 Tube Mills, *689, 704.
 Tungsten, Discovery in India, 187.
 Tungsten Ores in Canada, The Occurrences of, by T. L. Walker, 302-03.
 Turbine Pumps, Worthington Multi-stage, 32.
 Twin City Coal Co., 379.
 Tyee Copper Co., 91, 156.
 Tyrrell, J. B., on Development of Northern Canada, 612-14.
 Tyrrell Prize for Collection of Ontario Ores, 654.
 United Kingdom, Output of Coal and Other Minerals for 1907, 127-28.
 United Kingdom, Report of Mines and Quarries for 1907, 607a.
 United States Bureau of Mines, Proposed, 11-14.
 United States Geological Survey, Investigations on Gold and Silver, 265-66.
 United States Metallic Products for 1907, 699.
 United States, Report of Mineral Resources for 1906, 681-83.
 United States, Tariff on Metallic Ores, 660a.
 United Verde Mine, 30.
 Unit Mining Areas of Different Countries, 534.
 Vacuum Process, Elmore, 670.
 Vancouver Group, 409, 448, 697.
 Vancouver, Visit of C. M. I., 565.
 Valuation of Mining Properties, by Geo. H. Gillespie, 325-26, 359-60.
 Venus Mine Sold, 670.
 Von Gernet, A., on Gold Alluvials in Hungary, *269.
 Viceroy Cobalt, 447.
 Victoria Falls Power Co., S.A., 577.
 Victoria Mine, 87.
 Walker, T. L., on The Occurrences of Tungsten Ores in Canada, 302-3.
 War Eagle Mine, 156, 252, 698.
 Warren, Chas. D., 152.
 Warring—Deceptive Advertising, 644.
 Water Absorption in Sedimentary Rocks, 330.
 Water in Granite, 117.
 Water, Methods of Sealing Off, 665a.
 Watson, R., 152.
 Watts Mining Co., 640.
 Waverley Gold District, 614a.
 Wayne, Iron Co., 91.
 Wedding, Dr. Hermann, 284.
 Wellington Collieries, 349, 449, 670.
 Western Canada Cement and Coal Co., 51.
 Western Coal Operators' Association, 122.
 Western Dominion Collieries, 218.
 Western Fuel Co., 670.
 Western Oil and Coal Consolidated, 638a.
 West Kootenay Power and Light Co., 637a.
 Westmount Mine, 90, 219.
 Westmoreland Coal Co., 544.
 White Bear Co., 282, 542, 667a.
 White-Hargreaves Mine, 510.
 Whiteside O. E. S., 629.
 White Properties, 185.
 Whitewater Deep Mine, 381, 606a.
 Wilkinson, Sir Henry, 646a.
 Willmott, A. B., 405; on The Iron Ores of Ontario, *77-84; Review of Papers Read at C. M. I., 308-09.
 Willow River Mining Co., 58.
 Winnipeg, Visit of C. M. I., 563.
 Winter Port Coal Mining Co., 631.
 Wire Rope, Preservation of, 572.
 Witwatersrand Deep Mine, 672.
 Woodburn Properties, 283.
 Woodworth, J. B., 84.
 Working Costs of Mines, as Practised on the Rand, by Jno. A. Dennison, 365-69.
 Workmen's Compensation Act, by F. W. Gray, 627.
 Wye Level, New Style, 539.
 Ymir Mines, 155, 219, 409, 637a.
 Youngstown Cobalt Mine, 250.
 Yukon Basin Gold Dredging Co., 84.
 Yukon Coal Supply, 537.
 Yukon, Dredging in the, by T. A. Rickard, 499-502.
 Yukon, Dredging Operations, 284, 345-48, 473, 642-43.
 Yukon, Electric Elevators, 513.
 Yukon, Gold Production, 1907, 519.
 Yukon, Hydraulicizing the Bottoms, a New Method, 345-46.
 Yukon, Mineral Resources, A Bibliography of, by J. C. Gwillim, 210-11.
 Yukon, Mines Require Machinery, 346.
 Yukon Railway Charter, 697.
 Yukon, Special Correspondence, 345.
 Yukon, Work on the Creeks, 639a.
 Zaaiplaats State Mine, 481.
 Zinc at Joplin, 350, 637.
 Zinc and Lead, Metallurgy of, *536.
 Zincblende and Galena in Norway, 90.
 Zinc Corporation of Broken Hill, 382.
 Zinc, Exports from South Kootenay, 606a.
 Zinc in Algeria, 577.
 Zinc in France, 254.
 Zinc in Germany, 125.
 Zinc in Norway, 382.
 Zinc in Slovan, Duty on, 226.
 Zinc in Wisconsin, 317.
 Zinc Ore Imports in the U. S., 352.
 Zinc, Output in British Columbia, 298.
 Zinc, Nelson Electric Smelting Co., 696.
 Zinc, Production of Prussia, 188.
 Zinc Separating Plant at Butte, 699.
 Zinc, Shipments to U. S. Smelters, 513.
 Zinc, Smelting at Nelson, 194.

Prof. Gwillim

THE CANADIAN MINING JOURNAL

THE OFFICIAL ORGAN OF THE CANADIAN MINING INSTITUTE

VOL. I, No. 20, New Series

TORONTO and MONTREAL, January 1, 1908

Old Series, Volume xxviii, No. 22

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

MINES PUBLISHING CO., LIMITED

Head Office - Confederation Life Building, Toronto.

Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:

J. C. MURRAY, B.A., B.Sc.

Business Manager:

J. J. HARPELL, B.A.

SUBSCRIPTIONS—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

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CONTENTS

	Page.
Editorial.....	609
Development of Northern Canada.....	612
Mining Engineering.....	614
Miners' Clubs.....	615
Notes on Cobalt Ores.....	617
Report Ontario Bureau of Mines.....	618
Specimens of Ignorance.....	620
Larder Lake District.....	621
Electric Power from Blast Furnaces.....	624
Mine Accidents.....	626
Workmen's Compensation Act.....	627
Book Reviews.....	627
Canadian Mining Institute.....	627
Exchanges.....	628
Personal and General.....	629
New Machinery.....	630
Special Correspondence.....	631
General Mining News.....	635
Statistics and Returns.....	638
Company Notes.....	640

THE SIXTEENTH ANNUAL REPORT OF THE ONTARIO BUREAU OF MINES.

This report, noticed at length on other pages of this issue, is a clean and creditable volume. The first part only has appeared so far. The second part, a revision up to date of Dr. Miller's Cobalt pamphlet, accompanied by a new geological contour map of Coleman, is yet in the press. Perusal of Part I. induces several conclusions. Most important of these is the conviction that the Bureau of Mines is overworked and undermanned. Ontario is a magnificently large country. In her northern areas travel and transportation are beset with difficulties. Mineral industries of many kinds and of all degrees of importance and promise are spread all over the Province. In three years Ontario's mineral production has increased by 67 per cent.

It is therefore not inappropriate to suggest that this almost startling growth demands a corresponding expansion of the Bureau of Mines.

The present officials of the Department of men of long experience, of unquestioned trustworthiness, and of more than provincial reputation. Under the Hon. Mr. Cochrane's administration of the Department, a vigorous advertising campaign has been instituted. It is due to this policy that English capital, in large amounts, has been invested and is now being placed in the Cobalt district. In Deputy Minister Gibson the Province has a servant whose unremitting industry and intelligent zeal are fully appreciated only by those who happen to know the magnitude of his labors. Dr. W. G. Miller, the Provincial Geologist, ranks with the most distinguished scientists of the continent. Of the other members of the Bureau's staff it is enough to say that they are thoroughly imbued with the spirit of enthusiasm and loyalty that marks their superiors. The whole staff works together in a manner as creditable as it is unusual.

But neither efficiency nor industry can accomplish the impossible. The work is rapidly assuming proportions far beyond the Bureau's capacity.

We therefore would respectfully impress upon the Provincial Government the present need of strengthening and assisting the Department of Mines.

There are several directions in which expansion can be recommended.

The summer classes, conducted in the mining camps for the benefit of prospectors and others, could be enlarged and, in some districts, made permanent.

The duties of the Provincial Geologist and of the Deputy Minister should be lightened. Much of their time is now wasted on official minutiae, which could be looked after by cheaper men.

The system of inspection should be expanded. It is hardly possible that one official can keep a paternal eye upon all the mines of Ontario. In fact the attempt of one man to cover all the Province implies the waste of a disproportionately large amount of time in travelling. Hence, some arrangement that would give the present inspector the power of appointing local assistant inspectors for the more important mining districts should be considered.

These are a few, possibly quite enough, of the improvements that present conditions and the promise of the immediate future demand.

THE STATUS OF PROVINCIALY INCORPORATED COMPANIES.

A decision of considerable importance in its bearing upon the powers of mining and other companies organized under Provincial charters of incorporation was given by the Supreme Court of Canada on December 13th in the appeal case of the Canadian Pacific Railway Company vs. the Ottawa Fire Insurance Company. The case involved several technical issues, the point raised in connection with the appeal being the right of a company chartered by the Province of Ontario to do business outside of its boundaries. At the trial both the Dominion Government and the leading Provinces were represented by counsel, the Department of Justice upholding the contention of the plaintiffs, that Provincially incorporated companies must confine their operations to the Provinces from which they hold charters. By a majority of four to two the Supreme Court overruled this view and dismissed the appeal, thereby establishing the right of Provincial companies to do an extra-Provincial business. It is fortunate for the mining interests of the country that this conclusion was reached, as otherwise the great majority of the mining companies that are operating under Provincial charters, would have been under the necessity of becoming re-incorporated at Ottawa, and their business would have been subjected to great confusion owing to the raising of questions as to validity of contracts, etc. The effect abroad of such a limitation as was sought to be imposed would have been exceedingly damaging. The loss to the Province of Ontario in annual revenue by forcing companies to take out Federal instead of Provincial charters would have been about \$200,000.

COAL MINE FATALITIES.

One of our Nova Scotian correspondents, Mr. F. W. Gray, has described, in former issues of THE CANADIAN MINING JOURNAL, the introduction of modern rescue apparatus in the collieries of the Dominion Coal Company.

Three terrible coal mine disasters have taken place in the United States within the past month. These might never have occurred had proper precautionary measures been taken.

But as a sad object lesson they must be given deep consideration by Canadians. Canada's coal mining industry is expanding rapidly. The right time to meet the situation is now. It is surely unnecessary to wait until tragedies in our own mines have lent sad emphasis to our responsibilities as a nation.

Nor should this work be left to the humane enterprise of private corporations. As pointed out before, the Dominion Coal Company has availed itself of the latest and best experience and has spared neither time nor money in providing for the safety of its workmen. But, if a private corporation is enlightened enough to recognize its duty, it all the more strongly accentuates the fact that upon the nation as a whole rests the final responsibility.

Neither industrial power, nor political prestige is as important as human life. It were better for Canada to remain forever stationary than by indifference or lust of power to sanction the slaughter of her citizens.

The recognition and investigation of questions such as this, questions vital and immediate, involving the safety of thousands of our fellow-citizens, might most properly engage the attention of the Mines Branch of the Federal Department of Mines.

There would then be no need of duplicating in any respect the work of the Geological Survey.

A UNITED STATES BUREAU OF MINES.

President Roosevelt in his message to the Congress of the United States recommended the creation of a Bureau of Mines.

Commenting upon this, the *Mining and Scientific Press* sounds a note of warning. "It is proposed," says the *Press*, "to put the Bureau of Mines in the Department of the Interior, and this suggests the recognition of geological primogeniture. In any event, we hope that in the effort to make a new departure of uncertain value, nothing will be done calculated to impair the usefulness of an established organization of such unquestioned help to mining development as the Geological Survey. Let us have a Bureau, or a Department of Mines, as may seem best, but let it not further emasculate a technological body, the products of which have been honor to the American application of science to industry."

These sentiments apply aptly to the situation in Ottawa. Miserably regrettable conditions will be sure to follow the lopping off of any of the functions of the Geological Survey.

LEGAL DEFINITIONS OF "MINERAL" AND "ORE" IN THE UNITED STATES.

This is the title of an interesting chapter in an interesting book, reviewed on another page of this issue.

Definitions of the words "mineral," "ores," etc., have been variously affected and effected under the common

law and State statutes, under the Federal mining and land laws and under the United States customs laws.

The meanings of the words "minerals" and "ores" have been fruitful sources of litigation. From the famous case of Hartwell vs. Cammon, decided in New Jersey in 1854, arose the dictum that it is not necessary for a substance to contain a metal to be embraced within the term "mineral."

It is now a settled legal principle in the United States that petroleum and natural gas are "minerals." In conveyances and contracts they are comprised in that term. But for a long time this point was unsettled. In fact at one time the Pennsylvania Supreme Court decided that, since in popular estimation petroleum is not regarded as a mineral substance, therefore in all contracts the view of the mass of mankind should hold. This view did not long obtain.

Coal always has occupied a well-defined place as a mineral. The question of its inclusion in mineral grants and reservations has rarely been a cause of dispute. But, curiously enough, iron pyrites mixed with the coal, if brought to the surface and separated from the coal, belongs to the owner of the land, who can recover the value of the pyrites at such place "less the cost of mining the same and separating it from the coal."

Water, though strictly a mineral, is not included by the law under that term. Clays, of all varieties, considered in England as minerals, have not been legally classified in the United States.

The legal definition of the word "mineral," when used in deeds, leases or other legal instruments in the United States, may be summarized as follows:—

"In the absence of special provisions, it includes all metallic minerals of sufficient value to justify mining and extracting the same, whether for the purpose of reducing the metal therefrom or some other industrial use. It also includes rock used for building material, etc., coal, petroleum and natural gas."

The word "ore" has been legally defined as designating a compound of metal and other substances—a loose and quite valueless definition. Better is this description: An ore is a mineral or mineralized rock than can be profitably mined.

Editorial Notes.

With the December 5th issue of the *Mining Reporter* the name and style of our Denver contemporary will be changed. The two periodicals, the *Mining Reporter* and *Ores and Metals*, have been consolidated. Hereafter, under the name of *Mining Science* the new weekly will appear. THE CANADIAN MINING JOURNAL offers its congratulations and good wishes.

In this issue of THE CANADIAN MINING JOURNAL the whole text of Mr. Brock's report on Larder Lake is reprinted. This has been considered advisable for two rea-

sons—firstly, because the report is one of major importance and of public interest; secondly, because it is so succinct and compressed that further condensing would be unfair to its author.

INDUSTRIAL EDUCATION.

W. L. GOODWIN.

There is one aspect of this important subject which should receive the most careful consideration at the hands of our educational experts. An ever-increasing number of industries are conducted on a scientific basis which demands not only carefully educated managers, but also that the workmen and foremen shall be intelligent, acute and interested in their work through knowing the meaning of it. In the past these matters have been left to adjust themselves; but, with the keen competition and rapid improvements in processes so characteristic of the times, there has come the necessity for more methodical preparation for the life-work of the industrial rank and file. There are a number of directions in which progress can be made in Canada. The public schools may be so related to the industries prevailing in the district as to form a natural road not only to "the three R's," but to intelligent and effective production. The combination classes which are a feature of the Ontario public school system may be extended into the evening so as to keep up the educative process for a few years for those boys and girls whose circumstances make it necessary for them to begin wage earning at a comparatively early age. Doubtless evening schools have a limited value, but, with the shorter hours of work now prevailing, it is possible for bright lads to put in a few hours a week in study without overstrain. This is the right time to give careful consideration to such a subject. Our manufacturing industries are expanding rapidly, and calling insistently for a better supply of skilled labor. It would be hard to find better material for this supply than our Canadian youth, if they are given the opportunities for education which are open to the boys and girls in Germany, France, England, and other countries of the old world. Mr. Eustace Carey, in a recent presidential address to the Society of Chemical Industry, said in this connection: "So keenly do many manufacturers of my acquaintance feel as to the desirability of the continuation classes that they have made it a condition of employment when engaging boys that they shall attend a certain number of evening classes during the winter, the employers, of course, in these cases paying the fees." His reference is to the evening continuation classes of the technical schools. We commend this subject to the Manufacturers' Association.

Mr. Eugene Coste has returned to Toronto from a visit to Winnipeg and Vancouver and many intermediate points.

DEVELOPMENT OF NORTHERN CANADA.*

J. B. TYRRELL.

Northern Canada as here referred to is a title doubtless fairly well understood by all as defining that portion of Canada which lies north of the more thickly settled parts of the Provinces of Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia, and which forms a great land mass stretching for 85 degrees of longitude across the centre of the North Temperate Zone in the Western Hemisphere. It is a country so vast that even those of us who have made a special study of it know little about it, except that its immensity and its vastness so completely overshadow all its other attributes in the mind of the traveller that he has great difficulty in descending to thoughts of the common details of existence, such as surround us in our daily life under ordinary conditions of civilization.

You have all heard the saying many times of late that last century was marked by the great progress of the United States; but that the progress and opening up of Canada will be the distinguishing features of this century.

On the 1st of January, 1901, the first day of this century, in the City of Dawson, during the almost sunless days of a very cold winter, spent within four degrees of the Arctic Circle, and surrounded by that advance guard of adventurous miners, thrown out into one of the coldest and least accessible parts of our northern country, I published a letter in the Dawson *Daily News*, in which that idea of faith in the coming progress and development of Canada was enunciated. Whether it had been stated before or not I do not know, but the idea had impressed itself upon me that while during the past century the United States had become fabulously rich by seizing and making use of its great natural resources, that now the conquest of our own north country had begun in earnest.

Dawson was but an outpost from which civilization would radiate into the surrounding wilderness, and it was but one of many centres which would soon be established by the enterprise of our people. The greatest extent of virgin territory in the world lies in Canada, and before the close of this century we will have learned how to make use of the vast store of natural resources of even the most inhospitable parts of the country.

Let us for a moment consider the value of the products of the whole of Canada at the present time. It is not my intention to weary you with figures and statistics. Any of you can look these up in the census reports for yourselves; but a few figures may be instructive. The total value of the natural products of Canada in 1901 was in round figures \$519,000,000. Of this sum the agricultural and farm products were valued at \$393,000,000; the forest products came next with a value of \$51,000,000, while the mineral products were worth \$48,000,000. Five years before that date, namely, in 1896, the minerals produced had only a value of \$20,000,000; while five years later, in 1906, they had reached the large total of \$80,000,000. Thus farming is as yet by far our most important industry. But mining has assumed a place second to it and is increasing rapidly every year.

Now with regard to Northern Canada, many of you here present will acknowledge that you know very little about it; but at the same time most of you will claim a fairly accurate knowledge of the industries of the Pro-

vince of Ontario. This Province is considered one of the most fertile parts of the North American Continent, with its fields of yellow grain, its orchards loaded with golden fruit, and its splendid stock farms replete with the vitality and energy bred of the Canadian air. You are quite certain of this fact. You have seen it all as you have travelled over the land from Cornwall in the East to Windsor in the West. It is true that the parts of Ontario immediately around us are fertile and well cultivated, but the cultivated lands comprise only about one-seventh part of the whole Province, and form a fringe along its southern side. The remaining six-sevenths of its area, which lies further north, is as yet almost undeveloped and hardly comes into your thoughts when you are considering the Province as a whole.

New or Northern Ontario is as yet practically an unbroken and untilled wilderness, except that it has to a considerable extent been stripped of the richest portion of its natural crop, namely, of its forests of white pine. These pine forests, the natural growth of the unbroken soil, yielded many large fortunes to those who had the good judgment to secure them. Fortunes will still be made from the products of the forest; but in our northern country the forest growth is very slow, so that when the land is found capable of being used for other purposes the forest must needs give way. For instance, we now know that in Northern Ontario, near the Height of Land, between the watersheds of the Great Lakes and Hudson's Bay, there is an area of 25,000 square miles of rich clay land, which is eminently suited to the growth of all the more hardy cereals. Judging from the similarity of the vegetation on this forest area in Northern Ontario to the vegetation in the wooded regions of Manitoba, Saskatchewan, and Alberta, where the best wheat in the world is grown, I am confidently of the opinion that this great clay belt of the north, with its 16,000,000 acres of rich land, will, when cleared and drained, be the wheat-growing region of Eastern America, and that the wheat that it will grow will be No. 1 hard. This statement, that there is within this Province, within a day's journey of us, land now lying waste which is capable of producing 150,000,000 bushels of hard wheat every year, may seem hardly credible; but such seems to me to be the case. The model farms which the Government will shortly establish in that region will prove the value of this land, and the character of the crops which can be raised to the greatest advantage, whether these crops are wheat or some other grain. This land is one of the assets of Canada, and its cultivation and use will be one of the reasons why this century will belong to Canada.

I might speak for the whole evening of the vast areas of fertile land as yet uncultivated, that lie between the western border of this Province and the Pacific Ocean, the largest areas of rich unbroken agricultural land in the world. But you have heard of that Western country very often of late, and so anything that I might say here would be tiresome and uninteresting. Only those of you who have travelled through it and have seen it can begin to comprehend its possibilities. We all, however, feel certain of the great agricultural development that is in store for Canada.

My purpose in coming before you to-night was not to dilate on Canada's agricultural greatness. Around and beyond the agricultural land are vast stretches of rocky country, which are not suited to the needs of the farmer.

*A paper read before the Canadian Institute.

Parts of this country will probably be kept for the growth of forest, for the time is at hand when trees will be grown systematically and carefully by the foresters, just as hay and grain are now grown by the farmers, and probably the cultivated forests will grow far larger crops of trees than every grew in the natural forest. But still the development and progress of very much of Northern Canada will depend not so much on what it produces from the surface upwards, but on the valuable minerals that will be dug by miners from beneath the surface.

Now the figures quoted above indicate to some extent the value of what has already been done in the way of unlocking this great treasure house of nature and taking out the ores and metals that are so necessary to the welfare of mankind. Last year ores and metals to the value of \$80,000,000 were recovered. Ten years ago the mineral production of Canada had a value of \$20,000,000—a very satisfactory increase in the time.

But let us look at the record of the mining industry in the United States. In the year 1905 the mineral products of the United States had a value of \$1,623,000,000, or about twenty-one times as much as the production of Canada in the following year. This gigantic figure should make us very modest in talking about our present mining enterprises, and it shows us what we must attain to if we are to claim this century as in any way belonging to us. I believe we can produce as much as the figure last stated before the close of this century, but you can see that Canada must advance with tremendous strides in the discovery and development of her mineral resources if she is to attain to any such results, and such results are quite unattainable unless the people of this country take a far more general interest in mining than they are doing at the present time.

Probably one-half of the whole of Canada is limited to minerals and ores for the production of its wealth, and consequently its national progress depends to a very large extent on the discovery and development of these sources of wealth. Such being the case, it becomes the duty of all good Canadians to take an intelligent interest in mining affairs. Possibly some of you may say that you do take a great interest in mining, that you own so many shares in such and such mining companies, and that you are much interested in the market value of your stocks. Whether the mine will ever pay back the capital invested in it, whether it is producing an adequate quantity of ore to enable it to pay good dividends on what you paid for the stock, or whether the property has to rely entirely on the verbosity and persuasive powers of the brokers to give it a value, you perhaps do not know or do not care as long as the market holds up until you have disposed of your stock at a handsome profit. Now, gentlemen, I wish to tell you that in such cases you are not acting as the friends of the mining industry at all. You are introducing into what should be considered an industrial enterprise the worst methods of the real estate agent. In many cases you are piling up on that enterprise a financial burden greater than it is able to bear, and it will sink in consequence. If you wish to be a true friend of the mining industry and—considering its vital importance to the welfare of the country—every honest-hearted Canadian must wish to be ranked among its friends, you should devote a certain reasonable amount of time to the study and investigation of the conditions under which the mining industry is carried on, by reading standard books on mining and on the modes of the occurrence of ore deposits, and by including among the magazines which you regularly glance over each week or each month one or more that

treat especially of mining. No one in this city can urge the excuse that such magazines are not available, for there is here published one of the brightest and most informing mining journals on the continent, one that deals strictly with Canadian affairs, and that is full of good reliable information about the mines of Canada.

This is a matter which affects the welfare of the country, not only to-day and to-morrow, but for centuries to come, and for this century at least much of the progress will depend on the children of to-day. It is therefore your duty and the general duty of the people of Canada to see to it that the children know something of the great heritage of mineral wealth that is awaiting them, of the ways in which it is being worked, and of some of the possibilities for its future extension. For this purpose the readers in use in the public schools should be revised, and a number of articles should be included which would be descriptive of the mines and mineral industries of Canada, with brief and interesting accounts of their discoveries, growth and progress up to their present conditions. An account of the discovery of nickel at Sudbury and the growth of the nickel industry up to its present enormous proportions would make a most interesting and instructive story; and the history of Silver Islet, that little rock lying out in Lake Superior, should be made known to all the children of this Province. Accounts of many romantic incidents might be chosen from the lives of prospectors who have travelled in canoes and on foot with packs on their backs through the northern forest, in discovering the deposits of ore from which the metals, so necessary to the welfare of mankind, can be extracted. All such accounts might be made very interesting, and, at the same time, they would furnish instruction which would become part of the mental equipment of the men and women of the future.

The CANADIAN MINING JOURNAL should also be placed in the schools, and the older students should be encouraged to read it, as in many cases they would take more interest in accounts of incidents that were transpiring at the present time, and which possibly their parents might be talking about at home than in matters of history. Lessons such as these would be quite as entertaining and far more instructive than most of the lessons that are now read in the schools, and the boys and girls, both old and young, would be taught to know something of the mines which have already been discovered and the mining and smelting work that is now being performed in Canada. Thus from their earliest years the children would know that mining is an integral part of the life of Canada; they would have given it a permanent place in their mental landscape, and consequently would be able to think of it more intelligently and study it more easily in after life.

In view of the enormous importance of mining in the future life and progress of the Dominion, it is certainly not too much to require that some knowledge of it should form part of the education of all our children, and the beginnings of that education can be most easily imparted through the school readers. I trust that very soon not only Ontario, but all the other Provinces of the Dominion will see to it that the children are taught something about the mines and mining possibilities of Canada, and to that end will incorporate in their school readers interesting and accurate accounts of their mines and ore deposits.

Besides educating the children in the public and high schools on some of the elementary principles of mining and of the laws that govern the occurrence of ore deposits, lectures on mining should be given to the people generally throughout the country, not so much in the

mining communities themselves as in cities and towns, for the people must necessarily spread from the towns into the wilderness, and the towns in turn will be beneficially affected by the additional trade developed as more new country is opened up or as country already settled becomes more thickly populated. In addition to such lectures, which would be mostly delivered in winter, the summer schools regularly conducted by the universities and the higher seats of learning should be open not only to those who are anxious to take advantage of them and who intend to devote their lives to the business of mining, but to all who can be induced to attend in order that as many as possible should learn something of the industry which is to be the main source of wealth of so large a part of the Dominion. In such ways as these the people might be taught something about the character of the ores that the country is producing or is likely to produce, and of the many ways in which those ores are mined and reduced to commercial products for the use of mankind, and they would consequently be able to consider more intelligently any mining schemes which might be placed before them. We would not then hear so many stories about men having found silver at Cobalt years ago and not knowing what it was; or, on the other hand, about people spending large sums of money in buying properties stated by unprincipled parties to contain mineral wealth but which have no value whatever. Ignorance of the first principles of mining makes it possible for such men to sell to the people worthless stocks in so-called mining companies and interests which they would never have bought if they had been in a position to know their value. The money that has thus been wasted in the past 12 months would more than pay for the improvements in education here suggested for the next 20 years.

I would also suggest that both the Dominion and Provincial Governments be asked to introduce and establish Information Bureaus, perhaps in connection with their Geological Surveys, from which information would be freely distributed as to the character of the different parts of the north country or routes of travel through it, the character of the rocks that might be met with in any part of the district, the significance of those rocks from a miner's standpoint and what useful minerals are to be looked for in them. Let this Bureau collect information from the geologists, engineers, surveyors and others who have travelled over and explored the country and put it in such form that it will be accessible and interesting to the general public, and particularly to persons who may wish to visit any particular locality. The Government might also make arrangements with the railroads, or possibly the railroads, if asked, would themselves agree to grant fares at very low rates to students and prospectors who might wish to visit the mining districts or to go out prospecting into any parts of the north country where ores are likely to be found, and in this way great numbers of young men who necessarily take holidays from their regular occupations for a few weeks each year might be induced to spend their holidays in searching for ore deposits somewhere up in the north country instead of hooking harmless little fish or shooting beautiful wild birds and animals. Make prospecting fashionable and popular like fishing and hunting and you will see at once a very rapid increase in the knowledge of the resources of the north country. Such fares as are here suggested are now given by the railroads to homeseekers who wish to inspect the agricultural lands in the West, and surely they might be given with more reason to men who are willing to en-

deavor to open up the much less inviting and rocky country of the north.

In addition to such tickets, prizes might be given to the men who would bring in the best collections of minerals each year. In this way many useful minerals might be discovered, many new localities for other minerals might be made known, and the students and prospectors would be given a very great incentive in their search for minerals and ores. To start this matter at once, I will here offer a prize of \$100 for the best collection of minerals made in the Province of Ontario next summer, and the collections to be judged by the Professors of Mineralogy at Toronto and Queen's University, if they will accept the charge. The full particulars of this prize will be stated later after consultation with these professors. I trust that other men will also offer prizes, so that possibly they might be divided up for different sections of the country.

Now Mr. President, ladies and gentlemen, I wish strongly to impress upon you the fact that the mining industry must be the staple industry for very large portions both of this Province and the Dominion. The Government that holds the control of that great northern country in trust for the benefit and welfare of the people should see to it that the country is developed along the best possible lines, and for the greatest benefit of the people, both by teaching the children mining in the schools through the medium of the school readers, and the older people by popular lectures on mining and summer classes. In this way it could enlist the sympathies of the whole people and build up a sound mining sentiment.

An Information Bureau should be established which would collect and systematize the knowledge that is now stored away in Government reports and other places not easily accessible or attractive to the people and presented to the people in interesting and readable form.

The people should be induced by cheap railroad fares, prizes, etc., to visit the north country for themselves to see its mines and to spend some of their holidays in trying to find its mineral and ore deposits.

Northern Canada is part of the Dominion, and Canadians cannot get rid of the responsibility that rests on them for its proper development.

CONCERNING THE PROFESSION OF MINING ENGINEERING.

H. G. V. ADLER.

THE CANADIAN MINING JOURNAL deserves the thanks of all interested in mining for the work it has done in exposing the fraudulent practices of certain company promoters. In connection with this movement there has been considerable discussion as to the status and reliability of many alleged mining engineers. This is not a new question. It has been considered and dealt with in most countries where mining is extensively developed.

In the United States the policy followed is that of the open door, and I am unable to speak from experience of its working. But I judge, from the position taken by my friends from that side, that it has not proved satisfactory.

In South Africa and Australia, on the other hand, the hall mark of the mining engineer is the membership of the Institute of Mining and Metallurgy, and that membership is reserved for the technical and practical man who can give the Institute proofs as to his honesty and ability, and for whom any member of the Institute will stand sponsor.

In addition to this the Governments of the Transvaal and of the Australian States safeguard the mining industry and the lives of the workmen by certificating mine managers and underground managers. No person not holding a certificate can operate a mine. This is enforced by fine or imprisonment.

In Australia there is an examining board, consisting usually of the Chief Inspector of Mines a mining inspector and a boiler or machinery inspector. This board considers applications for examination, which must be accompanied by proofs and records of mining and underground work. If satisfied with the length of experience shown, the board will examine the applicants and issue certificates to those who pass the tests.

In addition to a knowledge of the actual working of mines and familiarity with machinery commonly used, a rough knowledge of field geology and compass surveying is necessary, as well as a good working acquaintance with the mining acts and regulations.

In the Transvaal the test is much more severe. The board consists of a chairman—the State Mining Engineer—one mining inspector and one boiler inspector ap-

pointed by the Government, and one member each chosen by the Chamber of Mines and the Mine Managers' Association. Proofs of seven years' actual mining work have to be given (graduates of certain mining schools are remitted two years of this term), before the candidate is allowed to sit for examination. The examination is oral and is conceded by all those who have submitted to it to the most searching test of mining knowledge yet instituted.

I believe that if the Ontario Government will add to their Mines Act a provision for the examination and certificating of mine managers that it will result in enormous benefit to the State. I would suggest that all mines employing over 20 men be required to employ a certificated manager, and that all mines employing more than 100 men be required to have certificated underground managers as well.

Such a step will help in pointing a way to the formation of an Institute of Mining Engineers that will protect the honest and able engineer and the public from the depredations of the "Mike MacDonalds," who are always at the service of the "Laws" and "Russells."

MINERS' CLUBS.

F. W. GRAY.

The Mechanics Institute movement that had such a vogue in the latter half of the Nineteenth Century has, within the last two decades either spent its force or evolved along divergent lines.

The original impulse was largely educational, but in this day of cheap and good books, of magazines and periodicals in bewildering and wasteful profusion, of free libraries endowed by millionaires, of locomotion the speed and luxury of which has ceased to astonish us, the problem is not how to educate and improve our intellects, but rather how to find peace and quietness and a surcease from the eternal racket of man's noisy inventions, from the unremitting concentration of mind that modern life demands from those who work.

The debating society, which loomed so largely in our grandfather's days, has also ceased to attract, although the desire of the workingman to measure his wits against those of his fellows and to discuss in public the social problems of the day as affecting him and his, has in no wise abated. Nowadays the lodge room of the trades union society affords an outlet for the argumentative and oratorical longings that have been associated with British citizenship of all grades ever since the Witenagemote met beneath the village oak. The budding labor member finds in the activities of trades unionism abundant opportunity to sharpen those oratorical darts which he hopes someday to discharge in the legislative chamber.

For these and many other reasons the old type of workmen's club as represented by the Mechanics Institute has been gradually displaced by institutions, where the desire for amusement and the relaxation of social intercourse can be gratified, where, in a sentence, a man may cultivate cheerfulness of soul, apart from all questions and shades of politics and religion, apart from the interminable discussions of the rights of man or the world-old strife between him that hath, and him that hath not.

Among no class of workmen is the need of such institutions as pronounced as it is amongst miners. The surroundings of a mining town or camp are as a rule

of the unloveliest or the rudest. The monotony of a carboniferous formation landscape is well known, and nature appears to delight in placing her treasure houses of silver and gold and precious stones deep in the mountain fastnesses or in some cheerless land of arctic cold or torrid heat. The miner loves to talk "shop" as everybody who has lived and worked with miners will testify. This tendency is to be noticed amongst the rising generation of miners, for the raw schoolboy after two days work in the mine talks "shop" as readily and as persistently as his father does. It is difficult for a person who has never worked underground to realize the absorption of the miner in his daily toil, and to realize also that underneath the surface is a network of roads and passages which the miner traverses daily, the names and "scenery" of which (if one may be allowed that term) are as well known to him as the streets and scenery of the upper world. The life and conversation of the miner therefore is underground, almost wholly detached from that of the rest of the world, and for this reason the society and institutions in which he is interested partake of the same detachment and have a tendency to become exclusive, for the true miner has a secret contempt for every trade but his own, and there is in consequence a kind of freemasonry between miners, and a strong line of demarcation between them and the rest of mankind.

The same characteristics mark the miner in Westphalia who greets his comrade going to work with "Gluckauf!" as mark the miner in Wales or in Cape Breton. The men who descend into the depths of the earth have an individuality as strong as the men who go down to the sea in ships, and the true miner is born, not made.

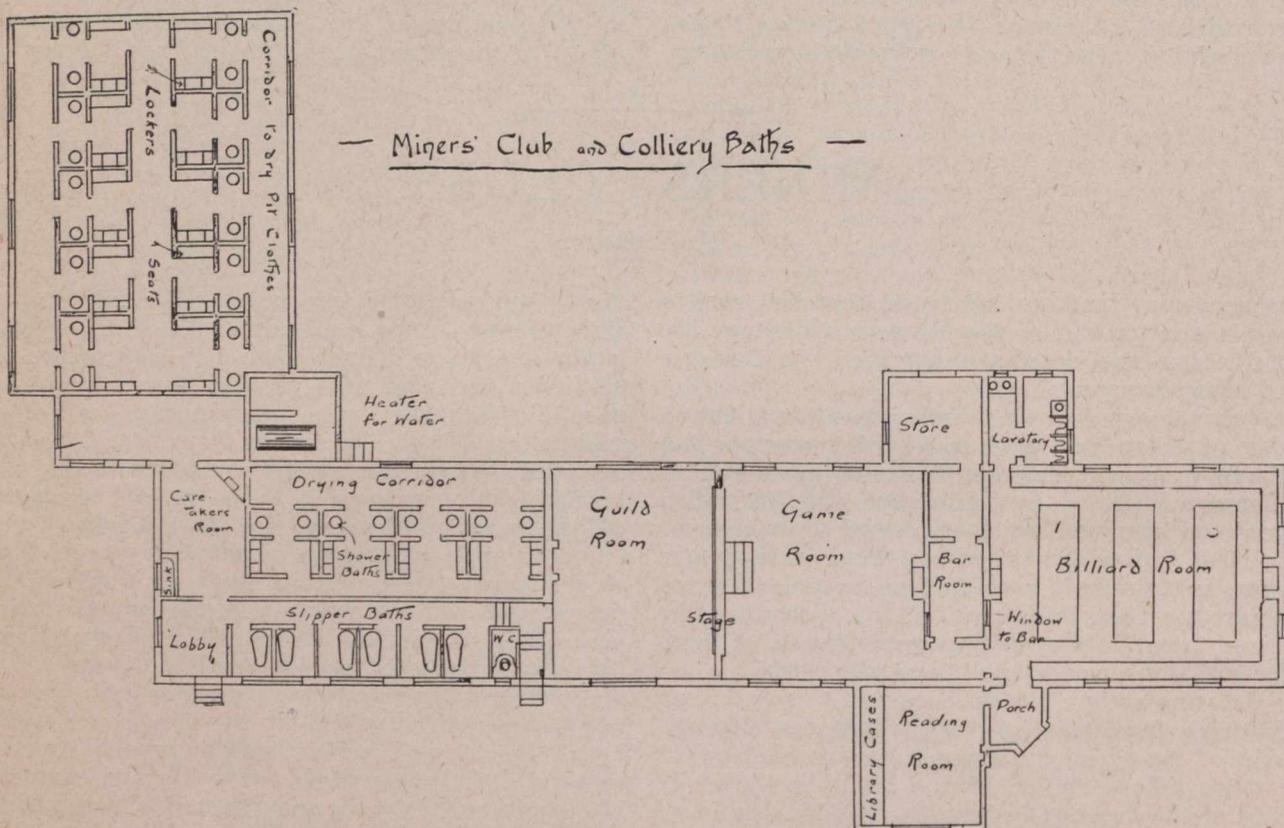
In most of the colliery towns of Great Britain, Europe and in the United States a "colliery club," "reading room," "institute," or by whatever name it is distinguished, the miners' club is a centre around which a great deal of the social life of the mining community revolves, and it is rare to find a colliery in European

mining centres, at least, that has not attached to it something in the shape of a workman's club.

A typical institution of this kind is to be found at a South Yorkshire Colliery employing from 1,500 to 2,000 workmen with which the writer is familiar, and a description of which will serve as an illustration of the general run of these clubs.

A large number of the employees at the colliery referred to, reside around the pit mouth, and the club is situated in the midst of the colliery village. It is well built erection of brick and stone. It contains a large billiard room, fitted with billiard tables and having upholstered seats running the full length of the walls, to accommodate the spectators at the billiard tournaments, which frequently take place between visitors from other collieries and the home team. Another room (see ground plan accompanying) is used for games of cards, checkers, etc., the stakes being limited within certain very small sums. Between these two rooms is situated the bar,

heated corridor for drying the pit clothes, and lockers are provided for pit boots, soap and towels, which the men provide themselves. When first installed the baths were looked upon as a doubtful experiment, and all kinds of dreadful things were predicted of those persons who were so venturesome as to wash their backs, there being a superstition in this district, that ablutions weaken the back. To-day a further extension is contemplated as the lockers are in great demand. It will be noticed that the arrangement of the showers gives more privacy than the great "Waschkaues" of the German collieries, of which these baths are a modest imitation. In some respects the British collier is a very backward person, and it is surprising to know that the baths we have described are the only ones of their kind in England, notwithstanding the fact that cleanliness is a necessity to the miner, and the conveniences for bathing in their own houses are generally lamentably deficient, a state of affairs, however, that is by no means confined to



where light beers and mineral waters are sold. The landlord of the colliery will not allow saloons on his property, the nearest one being at least a mile away. The amount of liquor sold is limited to a certain number of glasses to each member, and is not sold to any person under twenty years of age. This arrangement has been found to work very satisfactorily, and has kept the men at home. Between the game room and the baths (see plan) there is what is known as the guild room, which is devoted to the use of the boys working at the colliery, and this room is so arranged that it can be thrown open to the game room by folding doors, and can be then used as a stage for concerts, entertainments and illustrated lectures of various sorts. The baths are a novel feature, being the only ones of their kind outside the Continent. As will be seen there are six slipper baths, and twenty-eight showers. As first installed there were only eight showers, the additional twenty having been put in after the others had proved financially successful. The shower baths are used by the men after work. There is a steam

England. Attached to the club is a good permanent library and a reading room, which is kept well supplied with the daily papers and periodical literature. This room is well attended and strict silence is enforced.

The club is perfectly self sustaining and pays a dividend of about 8 per cent. on its shares. The buildings are the property of the Coal Company, but the management of the club's affairs and finances is entirely in the hands of the members. The club is a member of the Working Men's Club & Institute Union, which consists of 1,120 clubs all over the British Isles.

It cannot be disguised that the chief financial support of these clubs comes from the sale of exciseable goods, chiefly beer and tobacco, and at the present moment a red hot agitation is being conducted by the clubs against certain proposals of the present Government, among which is police supervision of clubs that sell drink to their members. It is difficult to understand a certain type of temperance agitator, and it appears likely that these clubs will have to suffer for the sins of disreputable

associations for the sale of liquor outside of licensed hours, that have sheltered themselves under the guise of clubs.

In the United States prohibition in mining camps has proved a ridiculous failure, of necessity, while the restricted club has proved the best aid to sobriety that the mine owner has been able to call to his assistance. In Germany a colliery without its bierhalle or casino would be a nine days' wonder. In many English colliery villages institutions like that just described have kept whole populations sober, who would otherwise have gone afield to get drunk every week end. In Canada the writer is only acquainted with Cape Breton collieries, where they have a ridiculous enactment that prevents the sale of liquor within one mile of any mine, on paper that is, for sad to relate every payday the outputs drop down and remain down for three and four days. The only virtue of this enactment is that it gives the colliery companies power to root out an obnoxious saloon keeper if necessary. It is admitted by everybody, but the temperance crank, that a workman's club cannot be successfully run to-day unless the sale of liquors and tobacco is permitted, and as to which is the better, the restricted and properly regulated club, or the long bar behind locked doors where a man takes his liquor, pays his dollar or more, gets no change, and is straightway "paralyzed"; no one but the said crank would hesitate to say. But under existing laws the man who wishes to drink must do so in some such hole and corner way.

We think it can be safely asserted that a well managed club somewhat on the lines of the one described in this article where men can enjoy some little relaxation of mind and body after their day's work, a place not too Puritanical in its rules nor too lax on the other hand, where men can take refuge from wash-day and other domestic turmoils without the risk of getting "loaded" and losing a week's pay, is a useful adjunct to any colliery, and the subject is one that should commend itself to coal corporations and their officials.

NOTES ON COBALT ORES.

W. K. McNEIL.

Owing to the complex nature of the ores of the Cobalt District, certain difficulties are encountered by the chemists who attempt their assay. A few hints on the method and apparatus employed are here noted.

The ores of this district comprise mainly, smaltite, niccolite, native silver, argentite, all associated more or less with calcite. The rarer minerals such as ruby silver, dyscrasite, etc., do not play any important part.

Owing therefore, to the richness of many veins the sampling of these becomes a question of the first importance; and even in the smallest assay office a power crusher should be employed. The jaw crusher has been found to do excellent work, the crushed product being very uniform, and only a small amount of fines resulting. Here may be mentioned the absolute necessity of a plate glass quartering or sampling table. By its use the smallest danger of salting is avoided. As said before the richness of the ore in many instances must put the chemist ever on his guard against this danger, as very often he unconsciously salts the sample by using screens of very poor shape. Such unfortunately are sold by many of the supply houses.

To grind the sample to a suitable mesh for assaying many use the disc grinders made of hardened steel.

These may be used with impunity on ores that are low grade. But on high grade, or any grade ore, the final grinding should be done on a buck board, which can be easily cleaned. And here may be stated the necessity of having two boards, so that rich samples will not be ground on the same surface as poorer ones. Any metal surface will in time absorb silver.

The preparation and charging of the samples differ not materially from other silver bearing ore, except that scorification takes precedence; and here there is great room for research work to show the relative values of crucible and scorification assay. Taking for granted that the scorification process is used, the main point to be noticed is the fact that arsenical ores such as are found in this district will not stand roasting, as silver is lost by volatilization. Hence the charge must be so mixed and the temperature of the furnace so regulated that the roasting is entirely eliminated. Many assayers complain of the bumping of the assay during scorification. This can be overcome by having:—(1) The scorifiers thoroughly dry; they absorb moisture readily if stored in a damp place, the battersea particularly showing this defect; (2) the charge well mixed; (3) the scorifier not too deep; (4) having the furnace at the proper temperature. A small covering of litharge is here found to be advantageous.

When very accurate work is required a large number of samples should be taken. It is found to be almost an impossibility to duplicate exactly any result in a smaltite or niccolite bearing ore, and check assays should always be run to determine the error of volatilization in the furnace.

The comparative value of a litharge charge in a crucible assay was discussed in an excellent paper written by Mr. Large, and read before the American Society of Chemists which held its annual meeting in Toronto in 1907. There are still many interesting points left for original work in connection with the smaltite and niccolite ore.

An excellent standard flux, that may be used for general low grade work, consists of soda carb., borax, and argols in the proportion of 12: 8: 1. This has the advantage that it can be used as a standard and any change necessary is one of addition.

Muffle fusion for crucible work is to be preferred when a large number of samples are to be run; as the heat can be more easily regulated. In the assay of these ores the correct temperature is one of the main features to be watched.

The construction of a suitable furnace is a point that invites considerable discussion, as it seems to the writer that the present style of furnace does not meet all the requirements of the case.

The assay of nickel and cobalt is now done entirely by the electrolytic process where it is possible to extract all metal. The solution of the ore is very readily accomplished in nitric and hydrochloric acids, with sulphuric as an indicator. One of the main points to be observed is the difficulty in extracting all the arsenic. The solution must be reduced thoroughly and H_2S passed in for a considerable time. The writer found it advantageous to pass the gas through the solution which was at a boiling temperature, and continue until the solution cooled, and then boil the solution for some time. After filtering off the sulphide, repeat the operation, to see if any arsenic still remains unprecipitated. Another difficult matter is to prevent the cobalt and nickel being precipitated with the iron, for this several precipitations

are necessary; although if the solution be thoroughly oxidized and the precipitant added slowly to the hot solution, separation is omre easily obtained. Many chemists have spoken of the difficulty in using potassium nitrite as a precipitant. This is really a matter that experience in the use of any one method must decide. It seems to be a question of the exact amount of re-

agents used and of the exaet temperature at which they are to be used.

In closing, the writer wishes to suggest that letters discussing the laboratory treatment of cobalt and other ores would be most beneficial to all concerned. It is hoped that the brief notes above given will open the way.

THE SIXTEENTH ANNUAL REPORT OF THE ONTARIO BUREAU OF MINES.

Deputy Minister of Mines Thos. W. Gibson, in his introductory letter states that the sixteenth report is the first to be issued since the changes in the status of the Bureau of Mines made by the Mines Act, 1906. The Bureau is now an integral part of the Department of Lands, Forests and Mines. Mr. Gibson is no longer entitled Director, but Deputy Minister. The change has no effect upon the functions of the Bureau other than that of giving it a more dignified position.

The first forty-eight pages are occupied by the Deputy Minister's statistical review. Condensed within these limits is a large amount of valuable information. Only upon a few points will space permit us to touch.

Statistical Review.—The total minerals production of the province of Ontario for the year 1906, is valued at \$22,388,383. The basis of this estimate is the selling prices of the products at the mines or works. On this basis, of course, comparisons instituted between Ontario's and that of other provinces is unfair to the former.

The value of mineral production in 1905 was \$17,854,296. The following table displays the chief factors in the increased output of 1906:—

Product.	1905.	1906.	Change.
Metallic—			
Silver	\$1,372,877	\$3,689,286	I. \$2,316,409
Nickel	3,354,934	3,839,419	I. 484,485
Copper	688,993	960,813	I. 271,820
Lead	9,000	93,500	I. 84,500
Iron ore	227,909	301,032	I. 73,123
Pig iron	3,909,527	4,554,247	I. 644,720
Non-metallic—			
Brick, common	1,937,500	2,157,000	I. 219,500
Brick, pressed	234,000	337,765	I. 103,765
Cement, Portland	1,783,451	2,381,014	I. 597,563
Corundum	152,404	262,448	I. 109,984
Natural gas	316,476	533,446	I. 216,970
Petroleum	898,545	761,546	D. 136,999

Adopting the system of valuation in vogue in British Columbia, Ontario's total 1906 mineral production attains a value of \$33,905,574.

As compared with 1902, the figures for 1906 show an increase of 67 per cent.

Gold.—The output of gold has declined steadily since 1902. During 1906, 3,926 ounces were produced valued at \$66,193; the St. Anthony Reef, Laurentian, Sultana, Shakespeare, Olympia, Rush Bay, Golden Horn and Craig mines being responsible for nearly all of this, 11,791 tons of ore were crushed, being an average gold tenor of \$5.60. It is somewhat discouraging to note that wages paid amounted to \$152,011.

Silver.—Under this section appears a short sketch of Cobalt's beginning and subsequent history. It is noted

that Cobalt yielded 5,401,766 ounces in 1906. Outside of the Cobalt region silver was produced at the West End Silver Mountain mine, west of Port Arthur, operated by the Hanson Consolidated Mining & Smelting Company, and from the Bessemer mattes refined for the Canadian Copper Company.

A description of the Provincial silver mine, owned and operated by the Province of Ontario, is included here. This is a unique enterprise so far as North America is concerned. The mine is situated within an area or 100 square miles, known as the Gillies Limit, lying on both side of the Montreal River and penetrating the township of Coleman with its northern apex. This land was reserved by the Government when the Cobalt excitement was at its height. The Legislature approved of the proposal to prospect and work the mineralized section of the Limit. The necessary funds were granted and work was begun in the spring of 1906, under the supervision of Professor Miller, the Provincial Geologist. A heavy over-burden of soil made prospecting difficult. To encourage systematic search, a bonus of \$150 per inch of width for the discovery of rich silver-bearing veins was offered. On July 19, 1906, a seven-inch vein of smaltite, niccolite, and native silver was discovered by Messrs. T. Brown and G. R. McLaren, two mining students. Between them was divided the amount of \$1,050. The native silver occurred in sheets, nuggets, and small particles disseminated throughout the vein.

A shaft, sunk 10 feet from the vein, is down 120 feet. At 75 feet a cross-cut was run to the vein. Drifting northeast to the extent of 110 feet and southwest 75 feet is reported. The vein continues rich and of constant width so far as worked.

A suitable shaft house, an ore house, a power house, office, bunk house, dining room and blacksmith shop have been built. Two No. 42 Rand drills and two 2 3-4-inch Mac drills are operated by the high pressure half of a B-3 Rand compressor capable of delivering 450 cubic feet of air per minute. One 7 by 10-inch double cylinder Jenckes hoist, a duplex Worthington pump and a Cameron sinking pump are included in the equipment. In the power house is a 100-h. p. Jenckes return tubular boiler. A spur line of the T. & N. O. Railway, from Cobalt, to Kerr Lake, will pass close to the Provincial mine. The future working of this mine will be watched with intense interest.

Value of Ore.—The average value of ore shipped during 1904, 1905 and 1906 was \$704 per ton. In 1904 the ore averaged \$862. During 1905 much low-grade stuff was shipped and the average fell to \$687 per ton. But the year 1906 saw the average jump up to \$705 per ton. Although much of the ore in 1906 was second or third class, still there were many carloads of exceptionally

high silver tenor. The minimum limit of profitable shipping is approximately 100 ounces of silver per ton. It is probable that the numerous concentration plants now in operation or nearing completion will have the effect of cutting out low-grade shipments almost entirely.

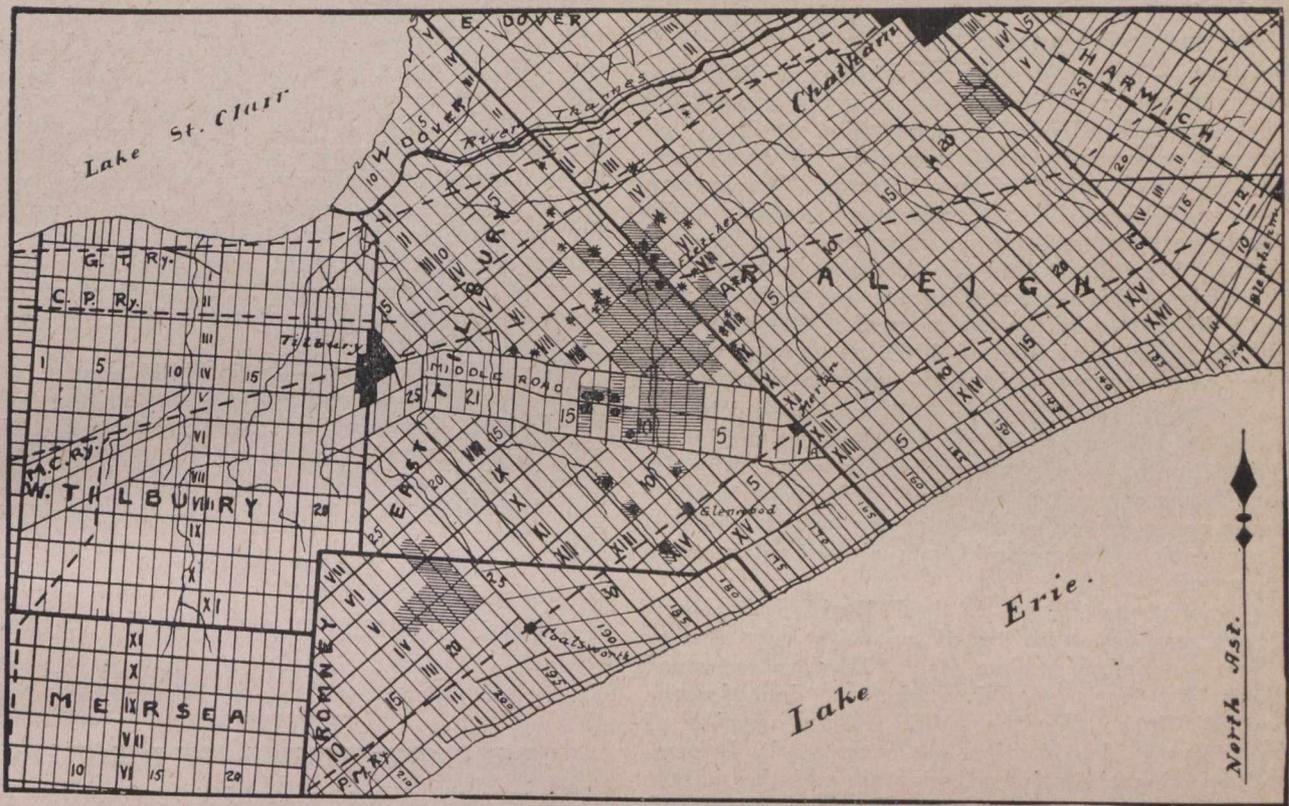
Excepting the element cobalt, silver is the only constituent of the ores that is of value to the shippers. In silver-bearing ores cobalt is paid for if in excess of 6 per cent.; in non-silver ores, cobalt is paid for at the rate of 60 cents per pound if present to the extent of over 16 per cent, lower percentages are paid for at almost the same rate. British manufacturers of cobalt oxide are the principal consumers. They advance 75 per cent. of the value upon shipment and settle for the balance on umpire assay in Great Britain.

From a tabular statement of dividends paid, up to 30th June, 1907, we gather these facts:—

A total of \$1,805,938 was paid in bonuses and dividends up to December 31st, 1906. During the first half of 1907 the corresponding amount was \$917,741.40.

Nipissing paid \$950,000 up to the end of 1906, and \$400,000 during the first 6 months of 1907. T. & H. B. paid \$746,120 during 1906; Coniagas \$200,000 in the former half of 1907; Cobalt Silver Queen, \$120,000 in the same period. Other mines with less amounts to their credit are: Buffalo, Foster, McKinley-Darragh, Right of way and Trethewey.

Adding to the total amount given above, the returns of what are practically close corporations, such as La Rose, Kerr Lake, Drummond and O'Brien, the net



Plan showing East Tilbury and Romney Oil and Gas Fields, Kent County, Ontario.

Shaded Parts—Approximate oil and gas area. ◆—Gas wells. *—Dry holes.

The principal purchasers of the ore produced in Cobalt are:—

The American Smelting & Refining Company, Perth Amboy, N.J.

The Balbach Smelting & Refining Company, Newark, N.J.

The Orford Copper Company, Copper Cliff, Ont.

The Anglo-French Nickel Sydicate, Swansea, Wales.

The last named company purchases only silver-free cobalt ores.

To the above list may be added the Deloro Mining & Reduction Company, Limited, whose plant at Deloro is now in full working. The Kirkpatrick-Kirkegaard process is being used there.

Dividend-paying Mines.—The remarkable case of the Temiscaming & Hudson Bay Mining Company, which on a paid up capital of \$8,110, has paid in dividends 92 times that amount, is mentioned. Most of these dividend payments were from the proceeds of the sale of the Silver Queen.

total returns up to June 30th, 1907, will approximate to four millions of dollars.

Mining Revenue.—Hurrying over the returns for copper, nickel, iron-ore, salt, petroleum, etc., etc., we notice under the heading "Mining Revenue" that the gross receipts of the Mines Department in 1906, stand thus:—

Sales.....	\$118,244
Leases.....	46,621
Miner's Licenses and Fees.....	70,256
Royalties.....	15,000
Total.....	\$250,121

It is noted, while the law of 1891 required the expenditure of a certain amount of money per acre within a given time by the lessee of mining lands, the law of 1906 requires the applicant, after staking and recording his claim to perform 240 days work upon it. Prospectors also are required to hold a miner's license, renewable annually or or before March 31st. Many companies

must hold a miner's license, the fee for which is proportionate to the amount of capital stock.

The item of "Royalties" will be many times larger during 1907.

Mining Companies.—263 mining companies were organized, during 1906, under the laws of Ontario. Their total capitalization was \$184,677,000. 18 companies of foreign incorporation were licensed to do business in Ontario. Their united capital was \$12,536,000.

Diamond Drills.—Of the diamond drills, owned by the Province and rented out to prospectors, note is made of only one—the Sullivan "S" drill. One hole 123 feet deep, sunk in diabase, was put down at a cost of \$598.96, or \$4.87 per foot. The gross cost of diamonds was \$210.80, or \$1.71 per foot. The Department stands 35 per cent. of the total cost. Other figures of drilling costs are \$11.91 gross cost per foot through conglomerate, and loose and broken ground.

Accidents.—Two men more were killed in 1906 than in 1905. Eleven were killed, eleven slightly injured, five seriously injured. Five of the men killed received their injuries above ground, six below ground. Dynamite was responsible for the death of but one man. This is cause for congratulation. The Department has taken pains to disseminate information on the use and care of dynamite. We take it that the fact that but one man was killed from this cause was largely due to the interest taken in the matter by the Government. When one considers the larger activities of 1906, as compared with previous years, the record is all the more satisfactory.

Mining Divisions.—The year 1906 was marked by the extension of the principle of decentralization in the administration of the various mining Divisions. The aim of the Department was to place a competent officer wherever necessary, who would, as far as possible, deal with applications for mineral lands without reference to headquarters.

Provincial Assay Office.—At the Belleville Laboratory, 1,838 ore samples were tested quantitatively during 1906 for one or more elements. 191 were examined qualitatively. Much special work was done for the Bureau of Mines. For the public a large number of assays, analyses, identification, etc., were made. Information concerning the value of minerals and the market was supplied to many owners. Umpire assays and analyses were also done. Mr. A. G. Burrows, M.A., B. Sc., Provincial Assayer, reports altogether a most successful year.

Summer Mining Classes.—This educational enterprise, recently the subject of warm commendation from an English journalist, has for some years been in the of Dr. W. L. Goodwin, Director of the School of Mining, Kingston, Ont.

Dr. Goodwin, who was assisted for a time by Mr. J. Watson Bain and later by R. Y. Fitzpatrick, confined his attention largely to the Temiskaming district. 30,000 mineral specimens were distributed to prospectors, of whom 930 attended classes. Dr. Miller's "Minerals and How they Occur" was largely used by many of the men as a basis upon which to work. Classes were held in Latchford, Cobalt, Haileybury, New Liskeard, Tomstown, Giroux Lake, Boston and intermediate points.

The importance of this peripatetic summer school is recognized more by outsiders than by Ontarians. It is one of the outstanding educational features of the Province. Much more of it is needed. Although it is impossible to estimate the benefits resulting from this instruction, it may confidently be stated that Ontario's mineral output would have been much less than it is to-

day had these summer classes not existed. The idea is a good and practical one. It is yet in the germinal stage and could most profitably be expanded. Dr. Goodwin's brief report is by no means the least important section of the volume.

Mines of Ontario.—The comprehensive report of Inspector E. T. Corkhill, on the mines of Ontario can be noted but briefly. It will be the subject of extended attention in a later number of the CANADIAN MINING JOURNAL.

Mr. Corkhill mentions the small amount of development work done at Larder Lake and the impossibility of forecasting the future of that camp. Sturgeon Lake and the Upper Manitou region were the scenes of the principal activity in gold. The Abitibi country also came in for attention.

Referring to the erection of expensive plants on improved properties Mr. Corkhill writes thus:—"This has been Ontario's great drawback, namely, the installing of expensive machinery before the ore bodies have been tested, and it is to be hoped that the majority of the companies will prove up their ground before going to the expense of erecting costly works on the surface.

The Inspector alludes to the activity in prospecting for iron ore; to the development of copper properties during the last two years, especially along the north shore of Lake Huron; and to the need of strict observance of the regulations of the Mines Act, regarding the handling of dynamite.

Oil and Gas in Kent.—Mr. Corkhill's report is followed by a paper on oil and gas in Kent, written by Mr. C. W. Knight, Assistant Provincial Geologist. This excellent monograph demands all the space that can be spared. It is carefully written, is simple and direct in style and diction and presents some new and interesting facts.

The Kent fields, Tilbury and Romney, are named after the townships in which they occur, and lie between Lake St. Clair on the northwest and Lake Erie on the southeast.

(To be Continued.)

"RARE SPECIMENS"—OF IGNORANCE.

We take the following *verb. at lit* from the *Toronto World*, as published under Cobalt date, November 22nd:

"They have also a vein of iron pyrites, carrying \$7 in nickel, \$3 in silver, and the quartz carries \$4 to \$5 a ton in gold. A large calcite vein which has been traced for about 2 miles varying in width from 10 to 25 feet, one of the rare irons have been found in this calcite, namely calum balite, or tantalite on the same vein, directly north. A claim owned by Maneaux and Daly assayed \$105 in galena and \$6.95 in silver. This claim is under option for \$55,000."

Considering that galena is a sulphide of lead and that lead is worth 4.75 cents per pound, or \$95 per ton, the contents of this rock, irrespective of silver values, are conclusively exceptional. And as "a claim" is represented as assaying this the silver by-product is an Ossa piled upon a Pelion of profit. Then again, the existence of "calum balite"—the "rare tantalite"—is a discovery meriting the award of the Nobel prize for assurity to the writer, if not the editor, who published the fact. If Wendigo Lake is at all buoyant on the strength of such reports its residents should give their authors the iced bath treatment. Nor should the lay journalists of Toronto be exempt.

ALEX. GRAY.

THE LARDER LAKE DISTRICT.*

R. W. BROCK.

NOTE.—This report is based on field work which occupied about two weeks' time. The rocks have not yet been subjected to microscopical or laboratory examination. Consequently, the report must be considered tentative and subject to revision.—R.W.B.

SITUATION AND MEANS OF ACCESS.

Larder Lake lies about 34 miles north of the head of Lake Temiskaming, two and a half to three and a half miles west of the inter-Provincial Boundary Line between Ontario and Quebec, and a few miles south of the height of land separating the Ottawa and St. Lawrence waters from those flowing northward to James Bay. The location of the corner posts of the townships of McGarry, McFadden, Hearst and McVittie would fall in the main body of the lake near the north shore, so that the northeast arm lies in McGarry, the southwest in McFadden and most of the western part of the lake in Hearst.

Access to the lake may be had by several routes. Those most frequently followed are via Tomstown, on the Blanche River, which may be reached from Haileybury and New Liskeard either by steamer up the Blanche River, a twice-a-day service, or by two and three-quarter miles by waggon road from Tomstown.

From Tomstown a canoe route or a waggon road may be taken. The river from Tomstown to Wendigo Lake on the east or Abitibi branch of the Blanche is swift, and three portages are necessary, the last one being a mile and a half long, so that the best part of a day is taken in covering this distance. As it is only about seven miles by wagon road to Wendigo, this is usually made the starting point for the canoe journey. This canoe route leads northwestward through the Wendigo Lakes and a connected chain of eight small lakes to Raven Lake, across the south end of Raven Lake to Larder creek and up the creek to Larder Lake. This route can be easily followed and the portages are short and light. The only portages of any length are the one into Raven Lake and the one from Raven Lake, round the falls of Larder creek. These two are each about one-third of a mile long. The trip from Wendigo to Larder can be made in a day, and at present this forms the best summer route for travellers and supplies.

There is also a wagon road from Wendigo to Larder Lake. A little beyond the half-way house this road forks, the west branch followed by the telephone line running to Spoon's Bay, and the east branch connecting with Fitzpatrick's Bay, about sixteen or seventeen miles from Wendigo.

While a good route in winter, and not too difficult for foot passengers at any time, the wagon road is next to impassable for horses at the Larder Lake end except during the winter season. A trail runs from Boston on the Temiskaming and Northern Ontario Railway to Larder Lake city, a distance of about twenty miles. A good wagon road is now under construction by the Government between these two points, which when completed will afford the readiest means of transportation into Larder Lake.

The first exploration of Larder Lake was by Prof. W. G. Miller, now Provincial Geologist, who in 1901 made a reconnaissance survey of the Blanche River, in search of iron ore formations. He ascended the Abitibi branch and crossed Larder Lake or Present Lake, as it was then

called. In his report, published in the Report of the Bureau of Mines, 1902, he called the attention of prospectors to the mineral possibilities of the region.

In 1904, after the discoveries at Cobalt, W. A. Parks made a geological survey of this portion of the country for the Geological Survey of Canada. His report was published in the Summary Report of the Geological Survey for 1904. The main object of this survey was the delimitation, north of Lake Temiskaming, of the rock formation which at Cobalt had been proved to be silver bearing. He notes the discovery of gold during the summer, along the chain of lakes between Wendigo and Raven Lakes, and expresses the opinion that this region is worth prospecting for gold.

DISCOVERY OF GOLD.

During the summer of 1906, the great demand for mining property in Northern Ontario, created by the Cobalt boom, caused prospectors to extend their operations far beyond the limits of the Cobalt field, and a number of parties found their way into Larder Lake. It is said that gold has long been known to occur at Larder Lake by an Indian, Tonene, in whose hunting ground the lake lies, and that when prospectors began to approach his territory he located the first claim, thereby attracting their attention to this as a gold district. The writer has not verified this story. Before the end of the season a number of prospectors had staked claims on the lake which furnished specimens of free gold. The samples which they brought down at the end of the season caused a winter stampede to Larder Lake, and practically all the ground in its vicinity and for some miles north was speedily staked. Something like four thousand claims were recorded. Necessarily a large number of them were snows-stakings of doubtful value. Companies were formed during the winter, to prospect and develop Larder Lake claims, but only a portion of the necessary supplies reached Larder Lake before the break up of the winter road, and since then it has been impossible to get them in so that little development work that would prove the value of a property has been done or may be done this season.

TOPOGRAPHY.

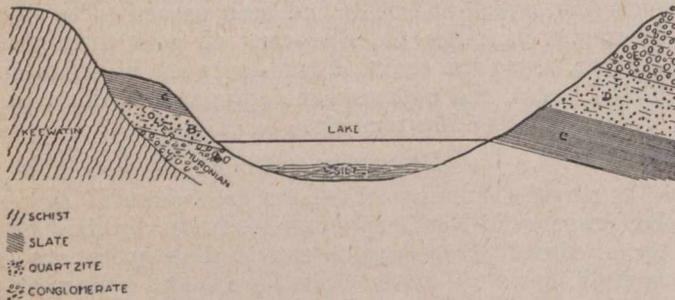
The country about Larder Lake is on the whole of low relief, having the typical glaciated form of the Laurentian peneplain. Its surface is uneven, being broken by depressions occupied by lakes and muskegs, by knolls of sand or gravel, and by protruding knees or elbows of rocks. The skyline, viewed from the higher hills, is very regular and even, but is occasionally notched by a valley or by a monadnock hill of more resistant rock. Along the southeast and east of the lake, a range of hills rising 500 or 600 feet above the lake, separate Raven Lake valley from that of Larder Lake. At the north end of this range, cut off from it by a pass, is an isolated, mesa-like hill, call Shiminis.² This hill has an elevation of about 750 feet above Larder Lake, and is about three miles from the head of the northeast arm. It forms the most striking object in the topography of this region.

The lake in many respects resembles Temagami on a small scale, with its arms and numerous islands. As a rule the shores are rocky, often steep, and in a few places rise abruptly as cliffs. High cliff faces, both round the lake and on the hills away from the lake, are almost invariably formed by vertical joint planes in the

*Sixteenth Annual Report of the Ontario Bureau of Mines.

conglomerate formation, which will usually be found on the higher elevations. The average of barometer readings for June gives an elevation of about 1,100 feet for the lake. The shores reach an extreme height, at the head of Fitzpatrick's Bay, of 200 feet above the lake. The depth of the basin occupied by the lake could not be determined, as there was no means of estimating the extent to which it had been filled with silt. The deepest sounding obtained was in the narrows where the depth was 94 feet.

The rocks of the district present considerable variety. While a good deal of the territory is covered with drift—and contacts between the various rocks are particularly



Ideal section showing relationship of rocks on Northwest Arm of Larder Lake.

liable to be covered with this recent, unconsolidated material—the relationship between the chief groups of rocks may be determined with considerable certainty. An inspection of their general characteristics, without consideration of the relationships exhibited leads naturally to a subdivision of the rocks into several formations. A similar subdivision into the same groups is arrived at by classifying them according to their relationship to one another.

West and north of the lake is a complex, consisting of phyllites, schists, cherts, ferruginous dolomites and greenstones, cut by igneous rocks. These rocks as a rule are lying on edge and are characterized by the disturbances and metamorphism to which they have been subjected. Cutting them at various points about the lake are pegmatite and quartz porphyry dikes, evidently connected with a granite intrusion. From the number of granite boulders scattered over the surface, it is evident that not very far away the granite is exposed. While later than the rocks of the complex, the rocks of the granite family are undoubtedly older than the sedimentary rocks mentioned below as overlying the old complex, since these sedimentaries contain fragments of the granites.

Lying unconformably upon the preceding complex is a series of sedimentary rocks consisting of slates, quartzites and conglomerates. These are for the most part undisturbed, with gentle dips, except in the immediate vicinity of a later igneous intrusion, where they may show considerable local metamorphism. In such cases differentiation from the earlier complex may be somewhat difficult, but the undisturbed condition of these rocks affords the readiest criterion for their recognition. This series is exposed on most of the islands of the main body of the lake, on the north shore near the narrows, and on the east shore of the lake.

Later than and intrusive in the rocks above mentioned, is an igneous rock which in places presents a gabbro facies, and in others a diabase, and also a series of usually small, basic, mica dikes.

The rocks of the basal complex correspond perfectly, in position and in lithological character, in their dis-

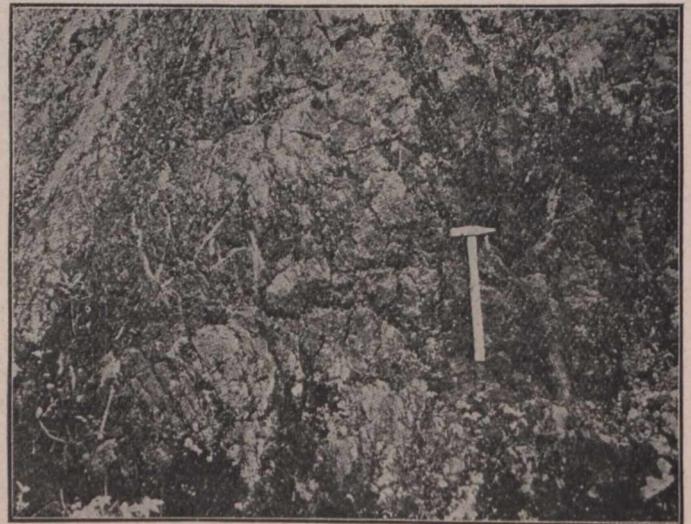
turbed and metamorphosed condition, to the oldest formation in the Lake Superior and Lake Huron districts, which the International Committee on Geological Nomenclature recommended should be called Keewatin. The rocks of the granite family correspond to the Laurentian as defined by this Committee, and the sedimentary series to the Lower Huronian. As no rocks newer than the diabase or gabbro were seen, it can be classified only as Post-lower Huronian.

Above the solid formations are glacial and post-glacial deposits of clay, sand and gravel. There are, then, in descending order the following formations:—

Name	Rocks.
POST-GLACIAL—	Clays, sands, gravels.
GLACIAL—	Boulder clay.
GREAT UNCONFORMITY.	
POST-LOWER HURONIAN—	Diabase, gabbro, mica lamprophyres.
IGNEOUS UNCONFORMITY.	
LOWER HURONIAN—	Conglomerate, quartzite, slate.
UNCONFORMITY.	
LAURENTIAN—	Granite, pegmatite, porphyry.
IGNEOUS UNCONFORMITY.	
KEEWATIN—	Greenstone, lime, silicate rocks, schists, dolomites, cherts, etc.

It will be noted that the rocks here bear a strong resemblance to those at Cobalt, the chief difference being that none of the upper members of the Huronian are represented, but on the other hand the Keewatin contains a more varied assemblage of rocks.

It is interesting to find at such widely separated points as Lake Superior, Lake Huron, Cobalt, and the



Keewatin "Greenstone," which may represent altered limestone. The dark portions are green lime-silicate minerals; the light are calcite.

Height of Land, the same rocks, showing the same relationship, falling into the same scheme of classification; thus confirming the idea that the rocks are grouped represent great widespread systems, separated by profound alterations of geological conditions during great time intervals.

KEEWATIN.

The Keewatin, as above noted, consists of a complex group of rocks of both igneous and sedimentary origin,

highly disturbed and metamorphosed. Possibly the commonest rock is a green chlorite schist, which probably represents an old, squeezed, eruptive rock. Sometimes this is thinly fissile, and sometimes rather massive. Hornblende schists are rather common. A soft grayish-weathering schist with green chlorite seams is also of frequent occurrence. These schists are often charged with pyrite in well formed cubic crystals.

Bands of soft micaceous schists, phyllites or slaty rocks, and a rusty weathering dolomite (?) are in places conspicuous members of the series. With the latter rock on Pancake creek is a thinly banded chert, like the jasper bands of the iron ore formation. A banded green and white cherty rock on the east shore of Fitzpatrick's Bay, also bears a strong resemblance to Keewatin iron ore formation, a resemblance strengthened by the folding and faulting to which it had been subjected. From the number of its boulders in the Huronian conglomerate, typical banded red jasper and magnetite iron ore must occur near here, possibly buried under the Huronian. It is exposed in the township of Boston to the west.

Greenstones, some highly altered, and some showing original textures, cut the older rocks of the system. These greenstones often exhibit the typical spheroidal markings, torsion cracks, quartz and calcite seams that characterize the Keewatin in the Cobalt and Lake Superior districts. On the southeast corner of Fitzpatrick's bay, near the point west of the Golden Thorn, and on Haycock hill where Brunne's trail to Boston turns west round the bend of Pancake creek, is a rock consisting of boulder-like masses of green, calcium-magnesium-iron silicate, cemented by crystalline calcite. All stages from this pseudo-conglomerate to massive green-silicate rock with seams of calcite occupying gashes like torsion cracks, are to be found. The green silicate rocks present the characteristics of typical Keewatin greenstone. Where the rock consists of boulder-like masses of silicate in calcite, it bears a strong resemblance to a limestone partially altered to green silicate rock by contact metamorphism, and the massive greenstone to the more completely altered limestone. The numerous old intrusive rocks in the Keewatin would account for the metamorphism.

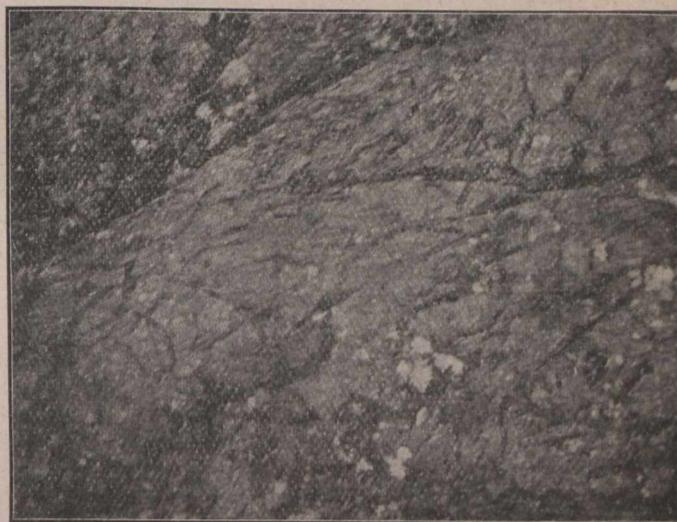
While it would require more detailed work to establish the truth of this hypothesis, there are several facts which make it quite possible that some of the Keewatin "greenstones" may have had this origin, although the majority of the greenstones, without doubt are altered eruptive rocks. The Keewatin certainly contains a considerable amount of sedimentary material which must have been metamorphosed by the extraordinarily numerous intrusions of igneous rocks. Limestones or ferriferous dolomites are included in these sedimentaries, and would be expected to be altered to green silicates. This would explain the remarkable richness in lime-carbonate which some of the Keewatin "greenstone" has been shown to possess.

THE GOLD-BEARING ROCK.

The most interesting rock from an economic standpoint near Larder lake is the rusty weathering dolomite (?). About 60 per cent. of the rock consists of lime-magnesia-iron carbonate, the remainder of quartz and a soft green talcose silicate, probably serpentine. The origin of the rock is as yet a little uncertain. Certain dikes, when squeezed and altered, produce a rock which bears a strong resemblance to it, but its occurrence with slates and phyllites and with the cherts—undoubted sedimentary rocks—as a conformable band with them, over a wide stretch of country, and its apparent composition, render

it much more probable that it is an altered, stratified, ferriferous dolomite, probably forming a member of the Iron Ore formation. This rock, especially where cut by the porphyry or pegmatite mentioned in the Laurentian on a later page, is traversed by innumerable stringers of quartz which in places are gold-bearing. This rock was seen northeast of Reddick's at the head of the Northeast arm, extending southwest, about parallel to the arm, to about the Proprietary Company, where it gets back a short distance from the lake, past Bear and Tonene lakes, Pancake creek, Bluebell and Maxwell claims, north of Larder City and around Pancake lake. A similar band seems to occur south of Spoon's bay, and at one or two points on Fitzpatrick's bay. The Keewatin rocks are folded, contorted and faulted. They are generally on edge. That this represents the true dip, and not merely schistosity, is shown by the succession of sedimentary bands on going across the strike.

The Keewatin rocks form the oldest and most disturbed formation at present recognized. These rocks were formed during a very extended portion of geological time and under changing geological conditions. It is more than probable that this series should be subdivided into several formations, for some of the rocks are very much newer than others and have been subjected



Spheroidal markings on metamorphosed Keewatin, north shore of Larder Lake.

to much less alteration. Some disturbed and squeezed conglomerates intimately related to the Keewatin, as on the west shore of the main lake about a mile below the narrows, seem to belong to this formation, and if so mark unconformities which might be utilized to subdivide the Keewatin. The subdivision is rendered difficult, however, by the degree of metamorphism, and the disturbances through igneous intrusions.

The Keewatin is not only cut by eruptives belonging to this period, but by later intrusions as well. As will be shown below, mineralization on an extensive scale took place during Keewatin times.

A long time interval elapsed between the Keewatin and Lower Huronian during which the Keewatin was a land surface subjected to heavy erosion. This erosion produced a topography not unlike that of this country at the present day. Some of the old Keewatin valleys are now present-day valleys, as the northeast arm of Larder lake, which, as the contact between the Keewatin and Lower Huronian shows, was a valley at the close of the Keewatin. Erosion and transportation must then have great-

ly exceeded atmospheric weathering, for the Keewatin surfaces and hills were swept bare of rotted rock before the Huronian was deposited on them.

LAURENTIAN.

Included in this formation are the pre-Huronian granites, and related rocks, which are intrusive in and therefore later than the Keewatin, but which antedate the Huronian. In many places in Ontario these rocks cover large areas. Often they have been mashed to gneisses. Around Larder lake, in the areas examined by the writer, the only possible representatives of this formation are the pegmatites and quartz porphyries that cut the Keewatin more or less frequently wherever it is exposed. Erratic boulders of granite are, however, abundant, and similar boulders are held in the Huronian conglomerate, so that it is reasonably certain that pre-Huronian granite occurs in the neighborhood.

The pegmatite dikes are numerous in the Keewatin. The quartz is apt to be segregated, and to contain more or less "mineral" such as pyrite and specularite. The country rock in the neighborhood is apt to be somewhat

silicified and mineralized, and occasionally gold is found, as in the Gold Hill claim. The pegmatite becomes porphyritic in places, and passes insensibly into porphyry.

The porphyries are quartz-bearing rocks with distinct phenocrysts of feldspar. Sometimes the base is reddish and sometimes gray. These porphyries are also associated with mineralization of the neighboring country rock. At the Peerless Mining Company's claims on Fitzpatrick's bay the gray porphyry is mineralized with pyrite, and occurs as fragments in a quartz vein.

The dikes of porphyry are numerous in the Keewatin. There were extensive disturbances following the Laurentian and previous to the deposition of the Huronian, and the former rocks were eroded extensively before the formation of the latter.

REFERENCES.

¹ Reprinted from the Sixteenth Annual Report of the Ontario Bureau of Mines.

² See 11th Rep. Bur. Min., 1901, pp. 218, 219.

(To be continued.)

THE ECONOMIC DISTRIBUTION OF ELECTRIC POWER FROM BLAST FURNACES.

By B. H. THWAITE, Assoc. M. Inst. C.E. (London).

(Continued from last issue.)

Another and important argument in favor of the pooling policy is the fact that some 4,000 to 5,000 kilowatts of energy is the minimum demand of many of the most desirable of the electro-chemical and other operations, so that in a single works, without a drastic re-organization of the plant, it would be impossible to secure this output of electric energy; whereas, by the pooling of the available power from several works, this power would be obtained with little change from existing conditions. Of course the power available entirely depends upon the extent the gas engine displaces the steam engine to satisfy the internal power demands of the works.

The following table gives an impression of the power available from several works in a district, without any change of plant and operations, to secure the fullest possible economy of the water gases. The works, although in one district, are scattered:—

	Kilowatts available for external services.
District A, one furnace always available	1,490
District B, two furnaces	2,700
District C, one furnace	1,700
Total available	5,890

By the pooling system a minimum total power potential of 5,890 kilowatts is available, and this would justify the setting up of electro-chemical and electro-metalurgical apparatus.

One of the advantages of this policy of pooling is obvious: it would not only permit such an association of power production as to justify the cost of mains to

central stations, but it would provide an irresistible incentive to the thorough electrification of all the iron and steel power machinery, and justify the expenditure in securing the maximum possible efficiency of the blast furnace gas.

The axiom that unity is power could not be more appropriately demonstrated than by the pooling of the power from the furnaces of several works, which, individually, would be too small to justify the establishment of a central distributing station and its associated transmission mains.

The policy of pooling furnace gases is the basis of an Act of Parliament which received the royal assent last year, and applies in an area some 400 square miles in extent, including in the area many furnaces belonging to separate firms. The full description of this pooling scheme may constitute the object of a future paper by the author, who is one of the engineers of the Parliamentary bill.

It is very likely that there are iron-making districts where it would not be necessary to incur the expense of securing Parliamentary powers for rights to lay down the electrical transmission mains, or where it would be possible to sell the whole of the pooled and available power to satisfy the demands of one electrical industry: for instance, that of producing calcium carbide (the basis of acetylene gas production), which, as the author has frequently pointed out in 1898 and since, is an ideal associate for an iron works, because the agents of production are coke, limestone, and electric energy. Again, the production of aluminium, the operating process of which is now common property, involves the production of many thousands of kilowatts of energy.

In the promotion of the Act of Parliament above referred to, the one objection met with was, that supposing the market for iron does not justify the manufacture of pig, and it became financially imperative to blow out the furnaces, what about the supply to the pooling station under these circumstances? Of course it was admitted that the profit secured from the furnace gas would reduce the risk in making the stock; but supposing it did not, what then? The author has solved this difficulty by designing a generator that, harnessed to the furnace gas cleaning plant, produces gas of more or less exactly the composition of furnace gas.

The combustible portion of a typical example of this gas is chemically constituted as follows:—

	Per cent.
Carbon monoxide	32.4
Marsh gas	0.4
Hydrogen	1.6

The cost of this apparatus is small, because the cleaning plant and associated gas mains are those installed for the furnace gas. Such a generator, of the generating capacity of the pooled gas proportion from a given furnace, would be available within three hours' notice, and the simplicity of the apparatus makes the question of depreciation during standby periods of little or no economic importance. The fluid slag from this generator can be readily converted into slag wool. This furnace type of gas generator, designed by the author, is being adopted by one of the most important of continental iron firms to compensate for the vagaries of furnace output, and is also to be used in the above-mentioned parliamentary proposition. It was illustrated on page 262 of the "Journal of the Iron and Steel Institute," 1906, No. III.

The advantages of the pooling policy will, of course, depend upon the individual circumstances of different works. The mills are probably standing some 23 per cent. of the total hours of a week, and the power waste associated with this idle week-end period will be available. Besides, the displacement of the steam rolling and other machinery by gas and electric motors will provide power all the week, and the auxiliary gas generators can be drawn upon to balance the power required for the mills.

The great change in the attitude of the Board of Trade in relation to electrical transmission schemes makes the pooling policy more economically desirable in England than it would have been when the Government department insisted that the electric mains should be placed underground, involving a heavy expenditure in way-leaves and in construction and maintenance.

The permission, under reasonable restrictions, to transmit by aerial cables means a reduction in cost of no less than one-fifth that of an underground transmission line. This means for the same expenditure on underground mains an increase of length of aerial transmission line of five times, and as with the modern experience of high-pressure transmission systems the loss of energy in transmission is comparatively of little consequence, it is obvious that the area of the field of demand for the pooled power is increased, say, directly as the square of the diameter.

To understand the progress in the efficiency and unit porportion of electrical power-generation and transmission systems, the following comparison may be quoted, in which the author's original proposition of 1892, prepared in collaboration with Mr. James Swinburne, F.R.S., supported by estimates, etc., from the leading

continental experts, is compared with the state of affairs to-day:—

Year of 1892—Unit power of gas engines, brake horse-power, 300; thermal efficiency, per cent., 20; electric generators, kilowatts, 1,500; pressure of transmission line, volts, 20,000; economic distance, miles, 100.

Year of 1907—Unit power of gas engines, brake horse-power, 3,000; thermal efficiency, per cent., 30; electric generators, kilowatts, 10,000; pressure of transmission line, volts, 88,000; economic distance, miles, 250.

The harnessing of the gas-engine to the blast-furnace resulted in the almost immediate increase of its unit power capacity proportions. The author was prepared to design a 2,000 indicated horse-power single unit multiple cylinder blast-furnace gas-engine in 1899.

The flywheel type of electric alternating current generators of immense capacity assisted in the gas-engine increased power-unit evolution. The foregoing tabulated improvements all point in the direction of the policy of pooling or concentration of the power output.

The irresistible incidence of this pooling policy in even a modest way will be to ultimately displace steam by gas electric power for blowing and other furnace power requirements, for driving the rolls in the mills, and for satisfying the general power requirements, because the capital expenditure of the ironmaster will be mostly confined to the provision of the electric motor. This pooling policy should eventually lead to the suppression of all preventable wastes in the use of the furnace gases.

Recapitulating the advantages of pooling, it may be said that besides facilitating the electrification of the rolling mills by the reduction in capital cost of plant, it will secure, in addition to the advantages of electrical driving, a substantial increase in the proportion of the furnace power gas, available by the suppression of the mill steam boilers. The pooling proposition will constitute an ideal combine, securing an all-round benefit to the ironmaster and the power consumer, and tend to promote the establishment of new electrical industries and thus enlarge the field of demand for power; it will financially justify expenditure in apparatus and on technical changes to secure the fullest possible economy in the use of furnace gas in the works. Of course, any available gas from associated coke oven plant, subject to certain mixing operations as will reduce the proportion of hydrocarbon in the combined gases, will be available for the pooling station. The economy resulting from the direct production of power with a rationally devised plant has been abundantly proved. A well-designed and built gas-engine, using pure and waterless furnace gas and associated with a high-class electrical generating machine, is claimed to be able to develop the hours of a kilowatt year for 6 6s. 8d., assuming, of course, that no charge is made for furnace gas. This economic figure of cost to an ironmaster is unapproachable by any other system of power generation, barring water power, which is often located in such awkward, if not, almost inaccessible positions as to destroy the economic advantages of such power, per se.

As the author pointed out in 1897, few iron-making countries can benefit to the extent available to British ironmasters, because of the geographic advantages possessed by Great Britain, and because of the fact that British manufacturing industries are so well concentrated geographically as to permit electric energy to be distributed under the most advantageous conditions, assuming always that the policy of the British Government is as beneficent in its attitude to the iron and steel industry as other governments are.

COAL MINE ACCIDENTS—THIER CAUSES AND PREVENTION.

The shocking calamities that have of late occurred in West Virginia and Pennsylvania have stirred this continent profoundly. That such wholesale loss of life is preventable is demonstrable. In Europe careful Government restrictions and inspection have reduced the rate of fatalities annually. The official control of the use of explosives, both as regards quality and quantity; the introduction of improved safety lamps; the use of breathing apparatus to assist in fire-fighting and life-salvage—these are the chief factors in the prevention of accidents and in meeting accidents when they do occur.

A recently issued preliminary statistical report, published by the United States Geological Survey, proves conclusively that present conditions are inexcusably bad.

During 1906 there were 6,861 men killed or injured in the coal mines of the U. S.; the total number killed was 2,061. The total number of men killed since 1889 is 22,840. During the last six years as many fatalities have occurred as during the preceding eleven years. That is, there are almost twice as many men killed annually now as there were before 1901. The great growth of the industry is not altogether accountable for this. As shown below, the number of men killed for each 1,000 employed has increased alarmingly and almost uniformly within the last decade.

Number of Men Killed in the Coal Mines of the United States for Each 1,000 Men Employed.

1895	2.67	1901	3.24
1896	2.74	1902	2.49
1897	2.34	1903	3.14
1898	2.57	1904	3.38
1899	2.98	1905	3.53
1900	3.24	1906	3.40

Contrasting these figures with corresponding returns for European coal-producing countries, it is found that the United States occupies a most unenviable position.

Number of Men Killed for Each 1,000 Employed—Averages for Five Years.

France (1901-1905)	0.91
Belgium (1902-1906)	1.00
Great Britain (1902-1906)	1.28
Prussia (1900-1904)	2.06
United States (1902-1906)	3.39

Within the last 75 years the Belgian rate has fallen from 3.19 to 0.94 lives lost per 1,000 men employed. The rate in Great Britain has been uniformly low since 1891. Prussia in 1891 recorded 2.89 fatalities per thousand. In 1904 the figure was 1.80. France in 1905 had the extraordinarily low figure of 0.84. The Courrieres explosion in 1906 brought up this rate materially.

The improvement in European coal mining conditions is obviously attributable to restrictive legislation and to the establishment of testing stations for the study of problems bearing upon the safety of coal miners. The extensive experiments carried on by the Belgian Government which, by the way, leads the world in these matters, have reduced the casualty rate from 3.2 per 1,000 men employed to the present figure of less than one-third of that number.

In passing it is pleasant to note that a Canadian company, the Dominion Coal Company, has established a life-saving corps and is training its employees in the uses of breathing apparatus. The articles by Mr. T. W.

Gray, appearing in recent numbers of THE CANADIAN MINING JOURNAL, have attracted widespread attention. It is a matter of congratulation that a Nova Scotian coal mine is setting the pace in providing for rescue work in case of accident. No other coal mine on the continent is so equipped.

The causes of coal mine accidents in the United States during 1906 are thus reported:—

Cause.	Killed.	Injured.
Gas and dust explosions	228	307
Powder explosions	80	215
Falls of roof and coal	1,008	1,863
Other causes	732	2,193

Comparison with foreign coal-producing countries again is detrimental to the United States:—

Deaths from Falls of Roof and Coal per 1,000 Men Employed.

Belgium	0.40
France	0.47
Great Britain	0.64
Germany	0.92
United States	1.70

The same contrasting tendencies are again marked. The death rates from these causes are constantly discussed in Europe, and growing larger in the United States.

In Europe the use of excessive charges of explosives is prohibited by law. No such control is exercised by the United States Government. The consequences are that the disturbing and jarring effects of heavy charges weaken the walls and roofs and are directly and indirectly the principal cause of falls.

Imperfect and unsafe types of lamps and the use of bare flames are also fruitful sources of disaster. Their use causes nearly all explosions of fire-damp.

In the United States during 1906, of all the deaths in the coal mines, 11 per cent. were due to explosions of gas and dust. In this direction again, Europe is far ahead. The systematic testing of safety lamps and the thorough testing of all explosives have, for instance, so reduced the Belgian death rate from these causes that they are now but one-tenth of what they were thirty years ago.

Although natural conditions are more favorable for mining coal with minimum danger in the United States than in any other country, yet the number of men killed for each million tons of coal raised is shockingly high.

Comparative figures for 1905 and 1906 are:—

	1905.	1906.
Great Britain	4.64	4.31
France	4.17	....
Belgium	5.64	4.96
United States	5.97	5.57

Prussia alone shows a higher rate of fatalities.

It is distinctly cause for honest pride to note that Nova Scotia, Canada's principal coal-producing Province, has the lowest death rate per million tons of coal raised. For the sake of comparison we quote it:—

Nova Scotia, 1905, 3.96

The official pamphlet, referred to above, concludes by indicating the principal directions in which the work of investigation and control must proceed. These are, briefly:—

(1) The compulsory use of safety lamps in gaseous mines and the employment of relighting stations or of approved relighting devices.

(2) The use of permitted explosives in regulated amounted and the exercise of rigid control of the handling and storage of the same.

(3) The employment of competent certificated shot-firers.

(4) The introduction of rescue devices that will enable persons to enter mine workings immediately after a fire-damp disaster, or to combat mine fires.

(5) The equipment of all coal mines with the proper appliances provided for first aid to the injured.

(6) The provision of penalties in case of non-compliance with regulations.

WORKMEN'S COMPENSATION ACT.

F. W. GRAY.

Apropos of an article that recently appeared in the JOURNAL, the following statements may be of interest as showing the truth of the contention that the effect of the Workmen's Compensation Act, will be to kill the Friendly Societies in Great Britain. At a recent meeting of the Independent Order of Druids, the president said that the sick experience of the Society had exceeded all their expectations, but added that it was really not sickness as the result of loss of health they had to complain of, but sickness as the result of accident. The cost was 41 per cent. above actuarial tables, and had exceeded the expectancy by 44 per cent. The Society of Druids is composed almost exclusively of artisans, miners and steel-workers. The Rechabite Society is also feeling the same pinch. This is a temperance society and is composed of the more saving and religious class of workmen, but all the same the Compensation Act seems to have sapped the morality of its members. In the four years preceding the Compensation Act, £14 out of every £100 was paid in accident claims, and during the four years after the passing of the Act £28 out of every £100 was disbursed. The officers of these societies are now advocating the abolition of accident benefits. However, the truth is that under the Compensation Act as it is now drawn the occupation of friendly relief societies is gone, for under the grandmotherly legislation which is now making England the paradise of the working classes, the employer becomes general provider, friendly society and poor laws all combined in one poor individual.

A recent decision in the Merthyr (Wales) County Court has laid down the principle that where a miner is allowed free or cheap coal for household purposes, as is the case in many colliery districts, it must be reckoned in as part of his wages in adjusting claims for disablement under the Compensation Act. This decision has been appealed, and the final judgment will be one of much importance to colliery owners.

CANADIAN MINING INSTITUTE.

At the meeting of the Council of the Institute, held in Montreal on December 7th, a committee was appointed to make all necessary arrangements for a summer excursion in 1908, to include visits to the iron mines, steel works and coke ovens of Eastern Canada, including the Maritime Provinces, Quebec and Ontario. Invitations are to be issued to European engineers, especially interested in these industries.

The following new members were elected:—Thomas R. Drummond, M.E., manager Nipissing Mining Company,

Cobalt, Ont.; Cosmo T. Cartwright, B.Sc., Trail, B.C.; Geo. H. Barnhardt, M.E., P.O. Box 687, Nelson, B.C.; Heinrich Ries, D.Sc., Professor of Economic Geology, Cornell University, Ithaca, N.Y.; W. E. Segsworth, M.E., 103 Bay street, Toronto; Chas. Merry, M.E., Ferguson, B.C.; F. N. Flynn, metallurgist, Cobalt, Ont.; R. R. Cormack, M.E., Le Roi No. 2, Limited, Rossland, B.C.; D. J. Browne, A.R.S.M., Le Roi No. 2, Limited, Rossland, B.C.; L. P. Silver, B.Sc., 420 St. Paul street, Montreal; W. H. Hannay, Le Roi No. 2, Limited, Rossland, B.C.; Robert H. Stewart, M.E., chief engineer, Consolidated Mining & Smelting Company of Canada, Rossland, B.C.; A. G. Hill, A.M.I.M.E., 168 Huron street, Toronto, Ont.; L. J. Lockwood, Cobalt, Ont.; L. B. Burns, 478 Front street west, Toronto, Ont.; W. A. Davidson, B.Sc., West Canadian Collieries, Limited, Blairmore, Alta.; W. R. Askwith, M.E., Haileybury, Ont.; Nicholas Richardson, M.E., general manager, North Atlantic Collieries, Port Morien, C.B.; James Hargreaves, M.E., superintendent, Reliance Mine, Taber, Alta.

Associates: Alfred Tarut, Outremont, P.Q.; N. P. Bryant, 84 St. Francois Xaxier street, Montreal.

Corresponding Members: C. B. Going, editor, "Engineering Magazine," New York; J. D. Kendall, consulting mining engineer, London, Eng.

BOOK REVIEWS

MINING, MINERAL AND GEOLOGICAL LAW. A TREATISE ON THE LAW OF THE UNITED STATES, INVOLVING GEOLOGY, MINERALOGY AND ALLIED SCIENCES, ETC., ETC. BY CHAS. H. SHAMEL, M.S., LL.B., A.M., PH.D., OF THE ILLINOIS AND MICHIGAN BARS. HILL PUBLISHING COMPANY, 505 PEARL STREET, NEW YORK. PAGES, 627, 6 x 9. OVER 100 ILLUSTRATIONS. BOUND IN DURABLE BUCKRAM, WITH LEATHER LABEL. \$5.00 POST-PAID.

The value of a knowledge of mining law is readily acknowledged by mine owners and operators. Litigation, as costly as it is useless, is often plunged into by mining men ignorant of the alphabet of mining laws of their country.

Very few text-books exist on the subject. The Canadian works of McPherson and Clark on "Law of Mines in Canada" and Justice Martin's "Reports of Mining Cases" are not designed as guides to the laity. Indeed, Canadians need just such a treatise on Canada's laws as Dr. Shamel has written on the mining legislation of the United States.

It will convey some conception to the reader's mind of the design and comprehensiveness of Dr. Shamel's book if we mention a few of the sources from which he has drawn his information.

Dr. Shamel's first acknowledgement is made to Professor James F. Kemp, the head of the geological department of Columbia University. Of Dr. Gratan, Professor of Paleontology at the same seat of learning, grateful mention is made by the author. Numerous other professors of metallurgy, chemistry, mineralogy, etc., are thanked for assistance. The writings of Dr. Rossiter W. Raymond, the distinguished and learned secretary of the American Institute of Mining Engineers, are also specifically mentioned.

From these and other specialists and scholars information and help have been derived. All the standard text-books Dr. Shamel called into requisition. In his preface he advises his legal brethren to read Chamberlin and Salisbury, Kemp, Graban and other technical writers, that they may thus equip themselves to expose the pseudo mining experts, who "cloak their own ignorance by a profuse flow of misused technical terms."

The principal chapters of the book deal with these title subjects:—

Geology and Allied Sciences—Definitions.
Property in Minerals.
Legal Definitions of Mineral and Ore.
Theories of Ore Formation and Classification.
Right of Extralateral Pursuit of Vein.
Public Domain and Mining Laws Applying.
Acquisition of Mining Rights.
Scientific Definitions of Veins.
Legal Definition of Vein or Lode.
Miscellaneous Uses of Geology in Law.

American (United States) writers are proverbially inaccurate in their references to Canada and things Canadian. It does not flatter us to notice in an appendix that THE CANADIAN MINING JOURNAL is given an incorrect address. Despite Dr. Shamel, the JOURNAL is published in Toronto, not in Ottawa.

In conclusion, we cannot refrain from expressing our astonishment at the author's familiarity with modern mining, metallurgical and geological literature. The task of co-ordinating so vast a bulk of heterogeneous facts must have been Herculean. Its successful accomplishment implies that the author is thoroughly familiar with several exact and several speculative sciences, has a working knowledge of the professions of the mining engineer and the metallurgist and, in short, is both versatile and erudite.

RECENT CYANIDE PRACTICE. EDITED BY T. A. RICKARD. FIRST EDITION. PUBLISHED BY "THE MINING AND SCIENTIFIC PRESS," SAN FRANCISCO, 1907. PAGES, 334.

This volume is a judicious compilation of articles on cyanide practice. The writers are men of unquestioned standing. Under Mr. Rickard's careful handling "The Mining and Scientific Press" has become the battle ground of experts for the threshing out of problems in this branch of metallurgy. The utterances of Mr. Rickard himself may be taken as *ex cathedra*. He is, in the opinion of many, better qualified to speak upon all phases of cyanide practice than any other metallurgical engineer.

Hence the book before us has every claim to merit.

The range of subjects covered is a wide one. Fine grinding, filter press practice, cyanidation of concentrate, re-grinding, assay of cyanide solutions, tube mill lining, tube milling in Korea, the action of oxygen in cyanide solutions—these are but a few of the topics treated. All of the articles are reprinted from "The Mining and Scientific Press," and, in this form they constitute an excellent *vade mecum*.

While in every compilation of this sort there must of necessity be bare spots, yet because of the variety of subjects touched upon and the constant change in diction and viewpoint, "Recent Cyanide Practice" is more desirable than the average handbook. One can open the book anywhere and start reading without reference to any other section.

For instance, opening at page 296, we find an article by T. A. Rickard, entitled "Old and New Methods at Guanajuato, Mexico." As outlined here, one of the Guanajuato problems was the conveying of the tailings from the cyanide plant to the river, one mile away. This was effected by means of a cast iron sewer pipe at grades of 3 per cent. and 2 1-4 per cent. As water was a not too plentiful commodity, the tailings were fed to the waste pipe with as small an amount of water as possible. Experiments proved that at a dilution of 2.5 of water to 1 of sand the pulp would flow rapidly without clogging the pipe. Normal dilution, the condition of the pulp when leaving the concentrator tables, was found to be about 8 to 1.

Opening again at random at page 198 we read in a paper by Alfred James, reviewing progress in cyanidation during 1906, that the use of coarser screens in stamp mills, the separation of the coarse product from the slimes and the regrinding of the former was a growing tendency. African tube mill costs were reduced from 8 1-2d. per ton ground to 5 1-2d. On hard ore a duty of slightly more than 2 tons per day per horse-power appears to be an average. Tube mill practice generally has improved the extraction by amalgamation from 5 per cent. to 7 per cent. and has saved 75 per cent. of screening expense.

The book is replete with practical working results and modern instances such as the above. Naturally, it is cosmopolitan in the variety and character of the articles included.

As a handy reference book it will supplement admirably the more exhaustive standard works. It is, of course, much more up-to-date than any text-book, written by a single author, could possibly be.

The omission of certain little personalities between two authorities on cyanidation would not have detracted from the value of the book.

We notice, with a feeling of respectful unease, that Mr. Rickard has carried into practice his reforms in terminology. Completely as we may bow to the distinguished editor's judgment in these matters, it may still be allowed us to protest that "concentrate" does not fill one's mouth half as satisfactorily as does "concentrates." Similarly, "tailing" and "slime" sound quite as unfinished as they look.

EXCHANGES.

South African Mines, Commerce and Industries, in its issue of October 26th alludes to the desirability of developing Canadian trade with South Africa. Already Canada buys South Africa's minerals. Tobacco may soon be added to the list. In return, it is pointed out, Canada may sell her mining machinery to South Africa. Canada now produces the best agricultural machinery in the world.

The *Iron and Coal Trades Review*, December 6th, discusses lucidly and forcefully the outlook in Germany. "A great many of the enterprises there [Germany], while profitable enough, are of quite recent origin, and there has been no time to form reserves. The majority are financed by the banks, which in a crisis would probably become anxious and call their money in, with disastrous results to the borrowers. In fact, the great business fabric, which the Germans have raised with so much perseverance, ability and courage, is based to what many economists consider a dangerous extent upon credit, and if that credit should be seriously disturbed disaster

Writing of the Monangah disaster, the *Mining World* refers to the laxness of the larger coal mines of West Virginia in carrying out the letter of the laws for the prevention of accidents. In August last the new mining law went into effect in West Virginia. By its provisions safety lamps must be used in gaseous mines; powder must be carried in five pound canisters; solid shooting may be done only as directed by the Inspection Department; doors must be avoided in gaseous places; and not over 60 persons are allowed in any one split.

The *Colliery Guardian*, December 6th, alludes editorially to safety lamp relighters. The necessity of minimizing loss of time in relighting is emphasized. Lamps burning mineral oil are especially liable to become extinguished in a strong current. There are strong objections to the use of either fulminate or yellow phosphorus as a relighter. Particles of the former may penetrate their way through even a double gauze and cause an explosion; while the viscous phosphorus, by coating the glass, causes a loss of light. The subject is a most important one and is engaging the attention of Continental and English experts.

might easily follow. In this respect, therefore, we have an important advantage over Germany, while our national finances are in a much better position, the necessities of life are cheaper, and altogether we have much less to fear from a reaction in trade or stringency in the money market."

In an editorial entitled "Treatment of Silicious Ores," the *Mining and Scientific Press* points out that the problem of treating high grade silicious ores will solve itself. "In every camp the growth of mining and the development of individual mines leads to a lowering of the assay value of the average output. Cripple Creek and Kalgoolie, the two great gold fields of the last decade, were high grade camps during their early years. Cripple Creek shipped its rich silicious material to the Denver and Pueblo smelters, while at Kalgoolie the mills extracted the gold at a cost not a bit less than the usual smelter rate. In the course of time some of the high grade ore bodies were exhausted, and the output became less rich, per ton, simply because a general cheapening of operations enabled the managers to exploit ore bodies formerly unprofitable, and to mix the poorer stuff with what remained of the bonanzas. As much profit was made on medium grade ores as was made in the early stages of mining from the high grade product. At Goldfield the bonanzas yet remain, in large part, but steady improvement in methods of mining and milling will gradually eliminate the smelter problem. Cyanidation on the spot will follow in the wake of smelting at a distance. History repeats itself."

An article entitled "Mining in Norway" appears in the *Mining Journal* (London), November 30th. The writer is Joseph Ralph. Among other companies operating in the north of Norway is a Norwegian-American company. Their property, the Varran copper mine, has been but recently opened. The ore carries 5 per cent. of copper. Concentration is effected by the Elmore vacuum system. Referring to Norway's reactionary legislation of 1906, Mr. Ralph states that, although Norway merely intended to prevent charter mongers from securing a monopoly of her water powers, the law passed by the Northing is a barrier to all foreign investors. No foreign mining company can secure a mining concession in Norway unless its operations are governed by a board sitting in Norway and controlled by Norwegians. Under the contract system of mining in Norway the miner, for the first fortnight, may be discharged without notice. After

this period he is entitled to fourteen day's notice and can claim his wages for that length of time, no matter how little work he has done, so long as he has not positively refused to work. A striking feature of the Norwegian mining law is that, on the complaint of any discharged miner, as regards the safeness or unsafeness of working conditions, the Government inspectors will visit a mine and examine it. This is the cause of very grave abuses.

PERSONAL AND GENERAL

Mr. A. C. Garde, of Nelson, B.C., has been appointed manager of the La Plata Mines, Limited, in that neighborhood.

Mr. R. G. Drinnan, of Fernie, B.C., has been appointed general superintendent of the Pacific Coal Company at Hosmer.

Mr. L. Rameau, a French engineer, has been appointed manager of the West Canadian Collieries, Limited, at Blairmore, Alta.

Mr. C. P. Nash, of St. Paul, Minn., recently visited Vernon, B.C., on business in connection with the rehabilitation the Cherry Creek Mining Company.

Mr. A. I. Goodell, formerly manager of the Northport smelter, Wash., has been appointed manager of the Sullivan Company's lead smelte rat Marysville, B.C.

Mr. G. F. MacNaughton, formerly manager of the Fifteen Mile, Blue Nose, Cochrane Hill and other Nova Scotian gold mines, has accepted the position of manager of the Trethewey mine, Cobalt.

Mr. J. C. Haas, a well-known mining engineer of Spokane, Wash., has been retained by a Philadelphian syndicate to examine and report on a group of copper claims an Lynn Creek, near Vancouver.

Mr. O. E. S. Whiteside has resigned the managership of the West Canadian Collieries, Limited, at Blairmore, Alta., to accept the general managership of the International Coal Company, at Coleman.

Mr. H. H. Claudet, of Rossland, has been visiting Golden, where he is directing the installation of an Elmore vacuum oil plant, having a daily capacity of forty tons, at the Giant mine. It is expected that the plant will be completed and in operation within two months' time.

At Whithorse last month Capt. John Irving, who has identified himself with mining in that section, was tendered a complimentary dinner by the residents of the town, "in appreciation of his unceasing efforts to make of this district one of the most promising mining camps of the great Northwest."

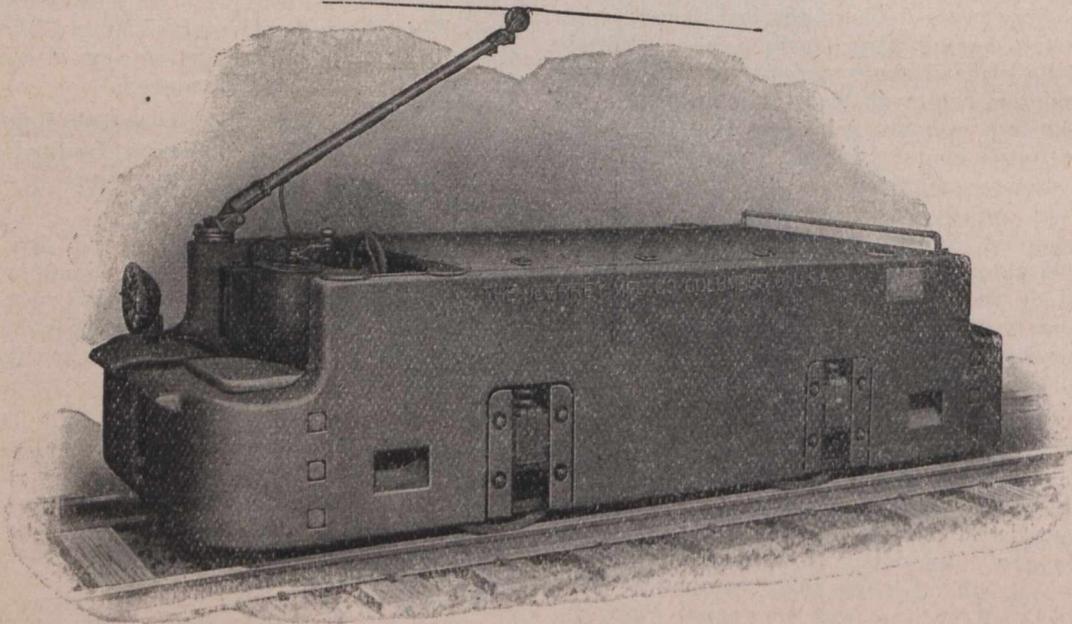
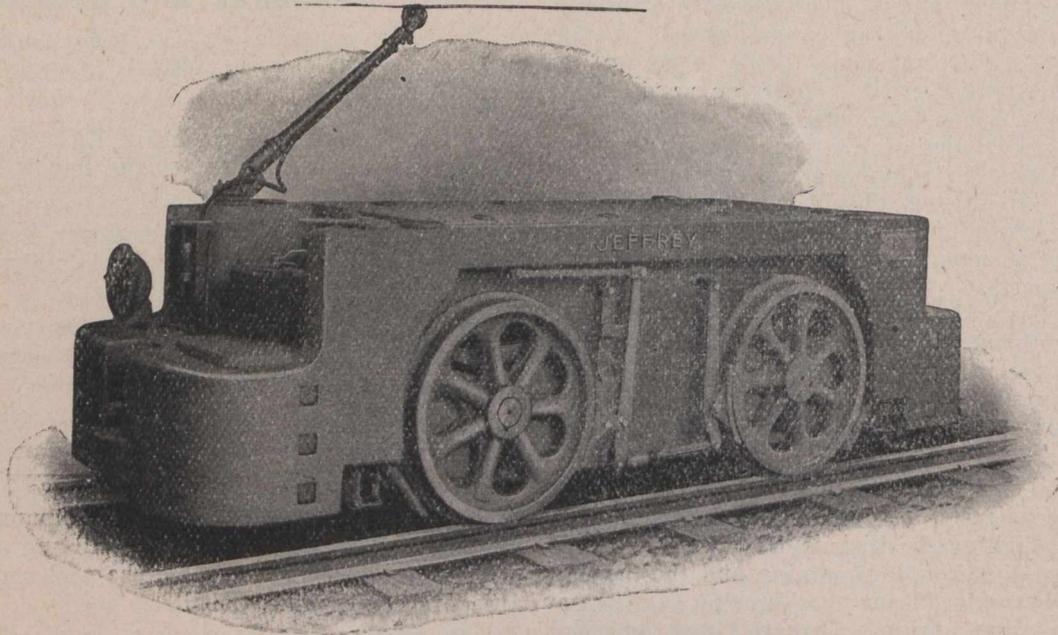
Mr. A. N. Galer, who recently retired from the general managership of the International Coal Company, operating at Coleman, Alta., was banqueted by the staff at Nelson last week, and presented with a testimonial in mark of appreciation and esteem on the part of his subordinates.

It is stated that appeal will be taken to the Privy Council of the now celebrated mining suit of the Star M. & M. Company vs. the Byron White Company, to determine the ownership of veins of high grade ore encountered in the development of the Rabbit's Paw claim in the Sandon district, B.C. The case hinges on the defendant's privileges under the old law of extralateral rights.

A circular issued by Mr. C. E. Rhodes, president of the Institution of Mining Engineers, Newcastle-upon-Tyne, England, announces the sudden death, which occurred on the 22nd ultimo, of Mr. M. Walton Brown, who since 1891 has acted as secretary of that Institution. Mr. Brown had a number of friends in Canada who will regret his loss. The announcement is made that Mr. Percy Strzelecki will act as secretary pro tempore.

The pioneers of the Bishop, Inyo County, California, realizing the services rendered to the prospectors of early days by the patient and hardy burro, have decided to

raise a monument in testimony thereof. A life size representation of the burro is hence to be cast in bronze, and on the pedestal will be inscribed: "In acknowledgement of the debt of gratitude from the mining industry of the world to the burro, whose sagacity, patience and endurance have made possible great achievements in mines and finance. This tribute of tardy justice has been erected by the miners of the Bishop Mining District." And it may be added that statues have been erected to the memory of the less deserving though possibly greater asses.



NEW MACHINERY.

The accompanying illustration show recent types of electric mine locomotives as built by The Jeffery Manufacturing Company, of Columbus, Ohio. The designs embody the latest ideas in mine locomotives and street railway motor construction. Every part has been made amply strong and simplified as far as possible without eliminating any of the desirable features. The design is such as to secure the smallest over all dimensions and at the same time allow access to all of the parts. The motors represent the latest ideas in railway practice, such as drum armatures with form wound coils, laminated

pole pieces, ribbon wound field coils impregnated with solid compound, oil lubrication with auxiliary grease boxes, and liberal wearing surfaces. The magnet frames are arranged so that the complete motor may be removed from the locomotive by taking off the axle caps, or the frame can be taken apart and the armature removed with very little trouble.

The inside wheel type is to be preferred where the mine entry is wide enough to accommodate the increased width; as the wider locomotive allows more space for the electrical equipment and consequently easier access to the motors, rheostat, controller, etc.

SPECIAL CORRESPONDENCE

NEW BRUNSWICK.

St. JOHN.—The Drummond Mining Company have great confidence in the future of the iron industry at Bathurst and are now planning to develop the big deposits near that place, which they have recently taken over.

It has been learned that the Provincial Government has given assurance of all reasonable aid. The company will be granted a New Brunswick charter in the course of a few weeks. Diamond drills will be put on the property this winter, mining will be under way early next year and in two years from now, it is expected that 100,000 to 150,000 tons of ore will be annually produced.

It is difficult to say just at present, how many men will be employed, but there should be work for 250 or 300 when the mine is in full operation, and many others will find occupation in other lines developed because of the mines. This is no speculation but a business proposition. The ore deposits are rich and there are some millions of tons of ore in sight.

Mr. John J. Drummond, of the Drummond Mines Company, was in St. John recently, accompanied by Mr. F. C. Parsons, the company's engineer. They had interviewed the local Government, placing their proposition before Hon. Mr. Robinson and his colleagues.

They asked the Government for the right to take power from the Grand Falls of the Nepisiquit River, for conducting their mining operations and for sufficient land actually necessary for their buildings. Mr. Drummond, in putting forward the proposal, said that the company asked only to develop the power along lines to be approved by the executive council and should it be necessary to dam the river, it would be done so as to conserve the power. The plans for the dam and other works would be submitted to the Government for approval and the dam would be so arranged as not to interfere with the work of the lumbermen, or with the fishing interests. The company also asked for surface rights in fee simple on 640 acres over the iron deposits and a grant of 3,000 acres of timber land, under the Mining Act, for mining purposes only; all of the merchantable timber on the property has already been cut over, and the company hopes to be able to make satisfactory arrangements with the lumbermen holding leases. Mr. Drummond also pointed out that the Drummond corporations would be able to use all the ore produced by them at their own blast furnaces.

From \$150,000 to \$200,000 would be expended in starting developments. Relative to Londonderry, he said they had promised to expend \$150,000 there, and now had \$1,000,000 to invest in the place. He would not assert positively that blast furnaces and steel works would be established at Bathurst, but said that the natural order of things was that a blast furnace followed upon iron ore mining and that a blast furnace led to steel works. The Drummond corporations, he said, have industries in several places in Canada, and at the outset, the ore raised in Gloucester county would be shipped to supply these. But the output would soon be more than required and there would be shipments of ore to the United States and the old country, as the market offered.

With blast furnaces and steel works established at Bathurst and the mines in operation, he said, probably 1,000 men would find work as a result of the development of these deposits. The I. C. R. is arranging to run a branch line to the mine, and to tide water at Bathurst, and harbor. Stores would of course follow the development, and in all it meant much for Bathurst and, indeed, for the entire province.

The New Brunswick business will be practically in charge of Mr. Drummond and his brothers and the estate of the late Dr. Drummond.

Advices from Campbellton are to the effect that a company of Miramichi men, headed by James Robinson, ex-M. P., intend developing an iron property in Gloucester County adjoining the Burns property, and owned by W. E. Fish, of Newcastle.

The property is believed by those interested to be fully as valuable as that now controlled by the Drummond people, and is five miles in length.

Messrs. James S. Gibbon, Charles S. Gibbon, William E. Vroom and N. S. Springer, of St. John, and Charles I. Spasker, of Newcastle, are incorporated as the "Winter Port Coal Mining Company," with a capital of \$99,000. The object is to acquire certain lands of the Messrs. Gibbon, fronting on the Grand Lake, for carrying on a coal mining business.

The quarrying of limestone, which used to be an important industry in the vicinity of St. John, has every appearance of reviving. William Ryan, of Brookville, is quarrying on quite a large scale, the product of the quarries being sent to points on the Miramichi, for use in the pulp mills.

Information from Hopewell Hill is to the effect that James Blight, of Hillsboro has a crew of men at work at the old plaster quarry near the village. This quarry was worked about seventy years ago or more, when a tram road carried the output to the shore, where it was placed aboard small schooners. J. E. Dickson was among those interested in the quarry at that time, but the work had to be abandoned on account of the heavy expenditure involved in keeping the quarry drained. The plaster is of a good quality and to be found in large quantities.

The Dominion Iron & Steel Company in addition to leasing the property of the New Brunswick Iron Company, have purchased 2,000 shares of the company's treasury stock, at \$25 a share.

They will bear the entire cost of the work of development which will involve a very large expenditure.

As stated in the last issue of the CANADIAN MINING JOURNAL, Axel Andenberg, the expert mining engineer, went to Lepreaux late in November, and has since made a thorough examination of the property, which will be opened up on a large scale. The Iron & Steel Company's representatives are now on the ground. The ore, which is magnetite, is said to be equal in quality to the celebrated Swedish ore, being very high in iron and very low in sulphur.

There could be no better indication that the proposition is one of big value, than the fact that the Dominion Iron & Steel Company have taken hold of it, and, with their immense resources a great industry will no doubt be built up at Lepreaux. The logical outcome is the erection of smelting works and the manufacture of iron at the seat of production.

The New Brunswick Iron Company had expended some \$40,000 on the property, but owing to lack of capital were obliged to abandon the work about a year ago. The Dominion Iron & Steel Company have been aware of the value of the deposit and only awaited an opportunity to interest themselves in it. Their lease is for eighty years.

Mr. Andenberg has for the past year been engaged with the Lackawanna Iron Company, at Lebanon, Pa., and resigned his position to go with the Dominion Iron & Steel Company, when they leased the property.

The directors of the New Brunswick Iron Company, are James F. Robertson, St. John, N.B.; J. S. MacLennan, Sydney; E. P. Jones, manager of the Dominion Iron & Steel Company; F. A. Crowell, Sydney; and C. V. Wetmore, also of Sydney. Mr. Wetmore is president, Mr. Crowell, vice-president and Peter Clinch, of St. John, secretary-treasurer.

A writer of old times notes, published in a St. John daily, refers to an item from the "Miramichi Gleaner" of June 2nd, 1838, showing that the mining area in Gloucester County, which was recently procured by representatives of the Drummond Mines Company, of Londonderry was known to exist and was developed to some extent by an English company at that time. The item referred to reads as follows:—

"Gloucester Mines.—Mr. Stevens, the gentleman who has purchased the privilege of working the mines in this country, and who proceeded to Great Britain last fall with several specimens of ores, which he had collected, arrived in the Queen, accompanied by a number of miners, for the purpose of prosecuting his researches. They proceeded to Bathurst in the steamer Cape Breton on Monday last. Mr. Stevens has been so far successful in the mother country as to form a company, with ample capital to work the mines, should the ore on further inspection prove sufficiently rich and abundant. The specimens of copper ore, more especially which he procured, we understand are unusually rich."

On Saturday, December 7th, Dr. A. O. Earle, K.C., engaged as commissioner, took the evidence of Peter Clinch, secretary of the New Brunswick Iron Company, in a suit in connection with that company.

The suit is between Mr. Charles W. Young, of St. Stephen and Mr. C. V. Wetmore, of Sydney. Both were directors of the company and in order to raise money for development work, these gentlemen endorsed notes for the company. When it became necessary to take up these notes Mr. Young became responsible for paper to the amount of some \$3,000 and Mr. Wetmore for about \$6,000. Mr. Young now seeks to hold Mr. Wetmore liable, and Mr. Wetmore in a counter-claim contends that Mr. Young should share in the \$6,000 for which he became responsible. Hon. H. A. McKeown is acting for Mr. Wetmore and L. P. D. Tilley for Mr. Young. The evidence of Mr. T. B. Blair, manager of the St. John branch of the Royal Bank, of Canada, was taken by Mr. Belyea on Monday, December 7th.

ONTARIO.

COBALT.

City of Cobalt Mining Company.—One car of No. 1 ore and one car of No. 2 ore were shipped to the American Smelting & Refining Company on November 13. Their weights were 37,000 pounds and 64,000 pounds respectively. The No. 1 will probably run 4,000 ounces per ton and the No. 2 400 ounces per ton. The shaft is now down 125 feet and will be sunk to 150 before the second level will be started.

Trethewey.—A car of first class ore was shipped from here to Copper Cliff on December 8th, weighing 60,000 pounds. This will probably run 3,000 ounces to the ton.

The No. 2 shaft is now down 95 feet.

Coniagas.—3 cars have been shipped this month. One of ore, one of mixed concentrates and ore, and one of concentrates.

Green Meehan.—This property has closed down temporarily while the compressor is being repaired.

Elk Lake.—The winter road from Earleton to Elk Lake was completed on December 19th, and by Xmas the stage will be making regular trips.

Silver Leaf.—The shaft sunk on the new vein is now down 58 feet. Here there are 5 pay streaks. The general average across the vein is better here than it has been at any other point.

On Thursday, December 19th, the La Rose Mining Company, put up bonds to ensure payment of \$168,000, the amount awarded to the Right of Way by the commission of engineers who examined and sampled the drift from which the ore was taken, subject to the decision of the Courts respecting title.

All the parties concerned have accepted the decision of the engineers.

A remarkable proof of the correctness of their estimate is the fact that immediately after the estimate was made, 2 cars of ore were shipped from the drift sampled and the returns were within 5 ounces of the estimated value.

Muggsley Concentrator.—Work on this concentrator is proceeding very satisfactorily. It is expected that they will be ready to crush in February or March. The mill will handle 100 tons per day of the low grade ores of the camp, by what is known as the combination process of silver mining, which consists of concentration, pan amalgamation and cyaniding. The concentrator consists of jigs to take out the coarse native silver and smaltite. The entire jig tailings will be crushed by stamps and the product classified by a Richards classifier. This spigot or coarse material, will be treated on Wilfley tables, the overflow of the classifiers going into tanks. The product of the tanks is treated on Frue vanners. The tailings of both tables and vanners will be treated by cyanidation and pan amalgamation.

The company are convinced (having made a number of practical tests) that to treat the ores of this camp successfully, something more than simple concentration is necessary. They intend to separate as much as possible, the native silver from the cobalt and niccolite, retorting and melting the silver at the concentrator.

The American Smelting & Refining Company have now a local representative in the camp, who is attending to the shipments to the various plants of the company, and also purchasing ore. In speaking of the difficulty of smelting cobalt ore in quantity, he says, "This ore is difficult to reduce and can only be used in small quantities, so it is common for smelters to be overstocked. To avoid this and to prevent delays to shippers, the company are now receiving carload lots at their different plants, notably at Perth Amboy and Denver, and are prepared to receive this ore at Chicago, Omaha and Pueblo.

The high grade ore is paid for by us, in cash, as soon as the ore is run into the silver bars. The low grade is cash at thirty days.

ALBERTA.

EDMONTON.—Owing to the continued mild weather the price of coal has dropped from \$4.00 per ton to \$3.50 per ton.

There is quite a glut of coal on the local market due to the "farmers' mines" as the numerous small mines in the district are called, opening up for the winter trade. There has practically been no snow yet and the thermometer has never yet reached the zero point this winter, hence the consumption of domestic coal has not been large enough to take up the production.

The Edmonton Board of Trade has issued a statement regarding the coal mines in the Edmonton district. This statement gives the number of mines as 26, with a daily output of 2,620 tons. Edmonton during last winter exported coal to Winnipeg, Dauphin, Prince Albert, Saskatoon, Regina, Battleford, Vermilion, Vegreville, Daysland, Wetaskewin, Calgary and intervening points and is doing the same this winter.

The name and location of the various mines in the Edmonton district according to the records of the Provincial Government are as follows:—

Crafts & Lee, Tofield; Byers Bros., Cloverbar, 8-53-23.4; C. G. Carnegie, Namao, 17-55-25.4; C. F. Carnegie, Namao, 4-55-24.4; Connell Spencer Coal Company, Namao; Cardiff Coal Company, Edmonton, 25-55-23.4; Daly & Lindsay, Cloverbar, 7-53-23.4; Edmonton Coal Company, Edmonton, 18-53-23.4; Edmonton Standard Coal Company, Edmonton; Fraser & Freeman, Strathcona; Frank Coal Mine Company, Edmonton; Wm. Humberston Company, Edmonton, 7-53-23.4; P. F. Ingram, Tofield; Keith & Dulton, Cloverbar; Ketchum Coal Company, Cloverbar; Lindsay Bros, Namas, 9-55-24.4; John Milner, Edmonton; Milner-Benner Coal Company, Edmonton, Bush Mine; Rosedale Coal Company, Edmonton, R.L. 28-30; P. Otewell, Cloverbar, 17-53-33.4; Parkdale Coal Company, Edmonton; Strathcona Coal Company, Strathcona; United Collieries Lia, Edmonton; Western Coal Company, Edmonton, 7-53-23.4; Watson Bros., Namao, 16-53-24.4 and White Star Mine Company, Strathcona, 25-51-25.4.

Geo. H. Shaw, traffic manager of the Canadian Northern Railway, when on a recent business trip in the Edmonton district, in speaking of the coal mines, said: "At the Morinville mine, about 20 miles north of Edmonton, they have a shipping capacity of about 750 tons daily. Other mines around Edmonton have at present a shipping capacity of 250 tons daily. As yet these mines are being worked on a small scale, but there is a great future before them, and the coal is good. We have enough power and cars to take the fuel away as fast as it is ready for shipment. It is taken south as far as Calgary and east as far as Regina, and in fact almost to the border of Manitoba.

STRATHCONA.—For some time past there has been a slight difficulty between the Strathcona Coal Company and their employees, resulting in an application being made to Ottawa for a Board of Arbitration to be appointed under the Lemieux Act.

The miners in the employment of the company belong to the labor organization of the United Mine Workers of America. The men are paid a lump sum of 90 cents per ton for all coal mined, this price to cover timbering and car pushing. The men want extra remuneration for car pushing, over and above their tonnage rate. The company claims that if car pushing has to be paid for then the tonnage rate will have to be reduced.

FRANK.—During the past week examinations held by the Examining Board of the province has been conducted at Frank for the purpose of examining candidates for 1st, 2nd and 3rd class certificates of competency to act as coal mine officials. Over 40 candidates presented themselves for examination. This is by far the largest number of candidates ever examined at one time in the province, and is a clear index of the growth of the coal mining industry along the Crow's Nest branch of the C.P.R.

The examining board consisted of the two Provincial Mine Inspectors and two other members—one representing the miners and the other representing the operators in the province. These examinations are held yearly, according to the Coal Mines Regulation Act. Before anyone can become a mine official in Alberta, it is necessary that he shall hold the proper Alberta certificate of competency, qualifying him for such position. Certificates from Great Britain, United States, or from other provinces in the Dominion are not recognized, and all mining officials must take the Alberta examination, no matter what their other qualifications may be.

LEZHBRIDGE.—The Board of Arbitration appointed under the Lemieux Act to investigate the dispute between the Alberta Railway and Irrigation Company and their employees in the Galt mine, has given its decision in favor of the company. It will be remembered that the point in dispute was the interpretation of a clause in the mine workers agreement, as to whether a pony driver should be paid from the time he harnessed his horse or from the time he commenced to haul coal.

Although the Board found in favor of the company, General Manager Naismith announced that the offers made to the men previously will still hold good. By agreement the men will work eight hours at the place of work, but will be allowed pay for half an hour extra for the time spent in going to and from work.

TABER.—The Arbitration Board investigating the disputes between the operators and miners in this district is being held in obedience for the present, as there have been changes in the management of some of the mines, and offers are being made to bring about a settlement with the new managers, without having recourse to arbitration.

SASKATCHEWAN.

REGINA.—Representatives of two of the largest coal firms in the province—Whitmore Bros. and Smith & Ferguson Company are back from a trip to the mines at Bankhead, near Banff, Alta, and the Galt miners at Lethbridge, and confirm the report of a possible coal shortage this winter. Both representatives state that the

mines are running half shift, owing to the scarcity of skilled labor, and that the present supply is only about equal to the demand during the mild weather. One firm is now completely out of coal in the city, and the mines cannot fill orders. With cold weather for a few days suffering from lack of fuel would be distinctly felt throughout this province.

The C.P.R. officials at Winnipeg state, however, that hundreds of farmers in Manitoba and Saskatchewan, especially in the districts which suffered most last year, have a year's supply of coal in their barns now, and this will relieve the situation to a great extent.

SASKATOON.—When coal was discovered a few months ago near Eagle Lake the Provincial Government sent out an expert to examine and report on the quality and quantity of the mineral. The report they received was to the effect that the coal was a lignite, and although continuous over a considerable area was rather thin.

On receipt of this report the Provincial Government approached the Department of the Interior, at Ottawa, with a view to securing a coal field at Eagle Lake. Arrangements have now been completed between the two Governments, and the Provincial Government has undertaken to open up and work a mine on the property, to supply the needs of the settlers in the surrounding country.

The Eagle Lake district lies about 60 miles, in a westerly direction, from Saskatoon, and is entirely devoid of timber except for a small patch of scrub here and there. Last winter the settlers experienced great hardships for lack of fuel. The roads were all blocked with snow, and even when fuel was obtained at railway points it could not be hauled in. Saskatoon is the nearest railway centre to the coal fields. The only other known coal being worked in the province at the present time, is in the Souris Coal Field, which lies in the southeast corner of the province. Here too we find a lignite coal, but the veins are all of a fairly good thickness, and are fortunately situated close to the Soo Line and its branches.

The Provincial Government have secured the services of Mr. J. Davies, who is a prominent Welsh mining engineer, and has been in the West for some time, in the interests of Welsh capitalists, who have invested heavily in coal lands in the Crow's Nest Pass.

Mr. Davies is at present in Saskatoon procuring the necessary wagons, tools, timber and labor, and when he has his outfit ready will proceed at once to Eagle Lake and commence mining operations. Mr. Davies will bring to bear on the work a long experience as a colliery manager and mining engineer in Great Britain. There will be a considerable difficulty experienced in obtaining the necessary timber for roof supports in the mine, as there is no timber grown in the neighborhood, and all the mine props will have to be hauled a distance of 60 miles in wagons, from Saskatoon, which is at present the nearest railway point.

BRITISH COLUMBIA.

Things have gone smoothly during the past two weeks with the Rossland mines and nothing of an unusual nature has cropped up. The men seem satisfied with the wages they are now receiving, and the mines are shipping good quantities of ore. The Evening Star mine has been leased by a local man, and from the present outlook it is hoped by the lessees to ship about 1,000 tons of ore from that property during the next six months or so. A car of ore has already been shipped. There is some talk of one or two of the other small properties being taken up and worked under lease. Those who have leased the smaller properties around this camp, heretofore, seemed to have lost interest after shipping a car or two of ore, and have invariably stopped work. The fact of the matter is, it takes a lot of money and work on a large scale to handle the low grade ores of this camp, at a profit.

For the week ended December 14th, Consolidated Company shipped 4,235 tons; Le Roi 2,555 tons; Le Roi 2, Limited 630, total for week 7,420; for year to date, 259,579 tons, of ore.

In the Boundary Country the issue of the day is the stand the miners have taken in the matter of a reduction of wages by the Granby Company. As mentioned in last letter, the Granby Company posted notices that they would begin work December 5th, and would pay the same scale of wages then prevalent in Rossland, Butte and elsewhere; that is \$3.50 for miners, \$3.00 for shovelers, for eight hours; blacksmiths \$4.00, carpenters \$3.50 for nine hours, and so on down the line. On December 7th, the whistles blew at the Phoenix mines as a signal of the resumption of work but none of the miners applied for their old positions at the lowered wage scale. It is stated that about forty men presented themselves at the smelter, at Grand Forks, and that around twenty were put to work. Since that date many different statements have been made, contradictions were published, meetings of the miners and smelters, have been held, the business men have had convocations, the mine owners have been approached by various interests, but despite all this, up to the time of this writing the situation was just about where it was on the seventh instant. While there is no particular ill feeling manifested it is thought that if the Granby Company bring men in from the outside to work their properties, that there will be more or less friction. However, everyone in the Boundary district is in hope of an amicable settlement being reached, probably before this article is published.

Mr. Wm. Waldie, of the Queen mine, in Ymir district, who has recently purchased an addition to his stamp mill is now about to place a larger hoisting engine and a twelve drill compressor on his property. The mine is looking better than it has ever before.

The people who have the Hewitt mine, near Silverton, under bond are showing great activity and have placed orders for compressor plant, machine drills, etc. There is lots of ore in sight in the mine and as soon as possible an output of about 100 tons per day will be made.

Work is proceeding steadily on the Vancouver, which belongs to Le Roi 2, Limited, Rossland, and the Wakefield, in the same district.

La Plata mine, above Kokanee, is now milling 375 tons of ore per week. Mr. A. C. Garde is in charge of the property at present. Mr. Garde is also superintending the work being done on the Argenta.

The St. Eugene mines and the coal mines along the Crow's Nest Line are working industriously and making a good output. There is an over abundance of labor along "The Crow" just now, but the coal mine operators claim that there is no abundance of cars for coal. New strikes of very good coal of bituminous and semi-bituminous grades are reported regularly. One can hardly realize the amount of coal there is in the Crow's Nest district. The fact is the whole country there is traversed by seam after seam of good coking and domestic coal.

The wave of financial disturbance has not hit this country very hard so far. Money seems plentiful and most of the men now out of work have sufficient capital ahead to carry them over until spring, when it is hoped that the mining, lumbering and other local industries will be running full force again and, if anything, that conditions will be on a better basis than heretofore.

NOVA SCOTIA.

GLACE BAY.—On the 5th December immediately after our last fortnight's correspondence was written, the Dominion Coal Company posted the schedule of revised rates then referred to. The company's notice read as follows:—

DOMINION COAL COMPANY, LIMITED.

The present Three Years Contract with our mine workers of the P.W.A. terminates 3rd JANUARY, 1908.

SCHEDULE ONE shows rates and conditions that will come into effect on the termination of the present contract unless a new contract is made.

SCHEDULE TWO shows the ADVANCED rates offered if a NEW CONTRACT is made on or before 16th December, 1907.

THE ADVANCE is offered for the sake of having a CONTRACT BY 16th DECEMBER on which to base our programme and sales, and after that date a new contract will not be discussed nor will any advance be made in the aggregate outlay for labor called for by Schedule One.

The offer of the advance in Schedule Two is made WITHOUT PREJUDICE TO OUR RIGHT to establish Schedule One if the offer is not accepted.

G. H. DUGGAN,

2nd V.P.

The Schedules are too long to reproduce here, and in detail they have only local interest. Briefly the alterations proposed are as follows. The machine cutting rates show the following increase:—1 1-2 cent per ton at No. 1 Colliery and No. 7, and 1 cent per ton at Reserve. Reductions are Nos. 3 and 4 mines, 6 cents and 1 cent at No. 9. The loading rate is increased by about 3 cents per ton at all the mines. All pillar rates are reduced 4 1-2 cents. Mine mechanics and shiftmen getting over \$1.65 per day are to be increased 3 per cent. The rate of day wages for laborers now \$1.38 will be made, minimum \$1.38 maximum \$1.52, men to be graded by managers.

Under Schedule 2 no reductions are made in machine cutting rates, and the following increases are shown, No. 1 and 7 mines 2 cents, reserve 1 1-2 cents, No. 2 mine 3 cents, Nos. 6 and 9 mines 1-2 cent, Nos. 3 and 4 no change. Loading rates are increased as follows:—No. 1, 5 and 7 mines 4 cents, No. 2 mine 3.7 cent, Nos. 3 and 4 mines 3-4 cent, No. 6 mine 3 cents and No. 9 mine 2 cents. An extra 2 cents is given on the shearing and the pillar rate is reduced 3 1-2 cents only as compared with 4 1-2 cents on Schedule 2. All hand mining at No. 8 mine is increased one cent per ton, and 5 per cent. increase is given to mine mechanics and shiftmen. On both Schedules the price of house coal is to be \$1.00 for slack coal and \$1.50 for run of mine exclusive of hauling.

Under the scheme of rates proposed in Schedule 1 the company calculate an increased payroll to the extent of about \$16,000. Under Schedule 2 the increase to the company would be about \$70,000 per year.

The men decided at their lodge meetings on the 14th, to reject the company's proposals, and the company were informed on the 17th, that the P.W.A. definitely rejected the company's proposals and asked their original demands of a 15 per cent. increase to mechanics and shiftmen, and a minimum rate of \$2.44 per day for miners working by day wages, when out of working place. In the meantime—on the 16th—the company had posted notices to the effect that the option of making a contract under Schedule 2, having expired they would put Schedule 1 into effect on the 6th day of January 1908.

The Grand Council of the P.W.A. meet on the 27th inst., at New Glasgow, and it is expected they will then decide on what form their opposition will take. They have instructed the Grand Secretary to write the coal operators of Nova Scotia demanding by the first of May next a 15 per cent. increase for mechanics and laborers and \$2.44 for miners out of places.

It is conceded by everybody that the increased rate for loading coal is a good move, but the P.W.A. as a body are not inclined to look with favor upon any adjustment of wages that reduce any one class of men. In the present case their attitude is quite

natural because the pillar men has a good deal to say in the Councils of the P.W.A. and the loader is unrepresented.

The new schedule will therefore become effective on the 6th January and there is every reason to believe that it will result in improved conditions for everybody concerned. It is expected that the new rate for loading will attract enough men to prevent any loss of output through want of loaders, and that in consequence the machine runner will be able to work full time. The reduction on the pillar rate will not affect these men so hardly as one would think, for if the contentions of the company's officials are correct these men have only to work the hours the other men work to still retain their supremacy in the matter of wages earned. The Coal Company state that their mining costs have

increased about 27 per cent. in the past three years and that they cannot afford to make any general increase in wages, but are willing to make adjustments to get a more equitable division of the payroll. They asked for the co-operation of the men and their advice in doing this. This was refused, and the new schedule embodies what the management of the company think is a better scale of wages than the one now in force.

It is not probable that anything further will transpire until after the new rates have gone into effect, and as these rates are an increase to a majority of the company's employees, it is not anticipated that any very strenuous opposition will be made by them, and nothing in the nature of a stoppage of work is likely to happen.

GENERAL MINING NEWS

NOVA SCOTIA.

SYDNEY.—It is reported authoritatively that the Dominion Iron & Steel Company has consummated a deal whereby it acquires the coal areas of the Cumberland Coal & Railway Company at Cow Bay Cape Breton.

The Cow Bay coal areas, leased by the Dominion Iron & Steel Company, are owned by the Cumberland Railway & Coal Company. This last named company's largest shareholders are the Cowan's Estate, Sir George A. Drummond, the Macdougall Estate, David Morrice and Crossen's Estate. The Cumberland Company is to receive a royalty of 10 cents per ton on all coal mined. The areas are ten miles east of the steel plant and comprise about 30 square miles of land.

GLACE BAY.—About 1,600 tons of coal are now banked at the Bridgeport Colliery.

The Dominion Coal Company is erecting four new batteries of boilers at New Aberdeen No. 2 Colliery. A self-oiling system is also being installed on all the engines. The bankhead is being repaired and new dwellings built.

HALIFAX.—The arguments on the appeal of the Dominion Coal Company against the decision of Mr. Justice Longley are now almost closed. The case for the Dominion Steel has been opened. The point on which the case hinges is whether the contract did or did not call for a supply of coal suitable for the uses of the Steel Company. The case is now adjourned until after the Christmas holidays.

ONTARIO.

TORONTO.—The approximate returns to the Bureau of Mines for the nine months ending September 20th, 1907, are as follows:—Silver, 6,919,987 ounces; copper, 5,111 tons; nickel, 8,087 tons; iron ore, 141,719 tons; pig iron, 180,663 tons; steel, 120,077 tons; zinc ore, 400 tons. The silver is valued at \$4,212,000. The 1906 production was 5,401,766 ounces, worth \$3,667, 551. The copper produced in 1906 (12 months) was 6,072 tons; nickel, 10,926 tons; iron ore, 128,049 tons.

OTTAWA.—The Board of Conciliation in the McKinley-Darragh mine dispute has agreed upon Professor Adam Shortt of Queen's University as chairman.

CRAIGMONT.—The Canada Corundum Company has closed down its works for the winter on account of the business depression in the United States, resulting in a reduction in the orders for prepared corundum. A considerable stock of corundum is being held at Craigmont and orders will be filled throughout the winter. A small staff is being retained at the works to attend to the

shipping and repairs. It is the company's intention to resume full operations next March.

LARDER LAKE.—The government road between Boston and Larder Lake has been completed. The water front has been reserved by the Government, also certain blocks of the town site.

COBALT.—Cobalt Lake mine is progressing. The north shaft is down 65 feet. A drift from this shaft has been started west. Shaft No. 4 is down 158 feet. Here also a drift is being started under the lake. A total of 1,256 feet of drifting, cross-cutting, sinking and raising had been done up to December 10th. More than 150,000 pounds of ore was then ready for shipment.

A rich vein of silver 16 to 18 inches wide is reported to have been struck at a depth of 263 feet on the Temiskaming property.

Concentrators are now at work at Coniagas, McKinley-Darragh and Cobalt Central properties. The Nipissing concentrators will, it is expected, be in operation by January 15th.

Two cars of ore were recently shipped from the Foster, averaging 42,000 ounces of silver each.

The Mahow-Brough property is said to have been taken over by the Haileybury Silver Mining Company.

It is estimated that the Nipissing Mining Company has about 75,000 tons of ore on the dumps. The average assays will run from 20 to 50 ounces to the ton. The company has not, as a rule, shipped ore running below 200 or 300 ounces to the ton.

The number of workmen employed on the Nipissing has been reduced from 300 to about 240. Very little surface work is being done. Underground development will be the principal form of activity during the winter.

On the 100-foot level of the Red Rock a vein of cobaltite, carrying some silver, has been struck.

The new compressor plant is now in operation on the Cobalt Central. The new strike on the second level is a vein 12 inches wide. It is reported to be very rich.

COPPER CLIFF.—Shipments from the Creighton and Crean Hill mines are reduced. Rumours of new finds of copper to the south, near the line of the Canadian Northern, are current. More news will shortly be forthcoming.

PORT ARTHUR.—Because many of the contracts made by foundries west of Port Arthur for Scotch pig iron have not yet expired, and because of the present stringency of the money market, the blast-furnace of the Atikokan Iron Company is shut down temporarily. While work is suspended many improvements will be installed. The systems of handling coke and pig iron are to be changed and devices installed for handling and granulating the slag. The pig iron now in stock amounts to 3,000 tons.

BRITISH COLUMBIA.

VANCOUVER.—Johann Wulffsohn, German Consul accompanied by O. Gerle, M.E., is examining the Swede group of copper claims on Moresby Island. Near the Portland Canal district, a molybdenum prospect will be looked into.

VICTORIA.—Mr. E. Lindeman, appointed by the Dominion Government to look into the iron deposits of Vancouver Island, has made a tentative press report to the local papers. Mr. Lindeman is a Swedish expert and is well-versed in the study of iron ore deposits generally.

Mr. Lindeman started on his mission in June 1st of this year. His instructions were to cover the field generally. The task is a large one and it kept Mr. Lindeman moving to accomplish as much as he has. He began by examining the Sooke river deposits. Then he made his way north by the west coast and returned by way of Texada Island. He found very little development work done. On Texada Island, however, he found what he considered the best deposits. These were situated on the Quinsan River, on the Kla-anch River and at Head Bay on Nootka Sound.

Mr. Lindeman especially emphasizes the fact that all of these properties are yet in the category of prospects. Very little has been done, although more has been accomplished on Texada Island than elsewhere.

Speaking of this last named property Mr. Lindeman mentioned that considerable shipments had been made to Irondale, Wash., by the Puget Sound Iron Company.

A magnetic survey of the Kla-anch River deposits indicated the existence of large bodies of iron ore, 50 to 60 feet wide, and extending over 500 feet in length.

The diamond drill is recommended by Mr. Lindeman as the most satisfactory means of exploring. In summing up the possibilities of the country, he is confident that iron ore of good quality exists here in commercial quantities.

Except at Quatsino Sound the ore is magnetite. At that place a low-grade limonite is encountered. Much of the ore will probably average more than 60 per cent metallic iron.

Limestone there is in abundance and coke is readily available at a moderate price. The local market for pig iron should be good. There is, further, the chance of developing a trade with China and Japan.

Finally, Mr. Lindeman recommends the erection of a small blast furnace and a rolling mill. Charcoal could here be used instead of coke. This might be the nucleus of a large and thriving industry.

Bituminous coal has been discovered in the northern Cariboo district. Twenty square miles have been located on the main line of the Grand Trunk Pacific, about ten miles from the Grand Canyon of the Fraser River. Many thin seams have been discovered along with one or two of workable size.

ATLIN.—The steam shovel of the Atlin Consolidated Gold Mining Company, which started work on June 7th, stopped for the season on October 18th. The output of the season amounted to \$80,000. A new sluicing station will be made next season farther up Pine Creek.

ROSSLAND.—A. K. Idler has secured a lease of the Evening Star mine. Twenty tons of ore are ready for shipment to Trail.

NELSON.—Excepting the Boundary region, the mining districts are in good shape. Zinc is attracting attention. If the lead bounty is removed there will be large developments in Slocan and East Kootenay. The Vancouver mine, Slocan district, has shipped 900 tons of zinc ore to Antwerp and is selling its lead concentrates to Trail smelter.

The Nelson Board of Trade has put itself on record as being entirely in favor of a renewal of the lead bounty for a further period of five years. The mine owner's memorial is in part as follows:—

“That said lead bounty has, by insuring a stable minimum price, been most effective and beneficial to the lead mining industry, with it to the smelting and manufacturing industries, and consequently to the general commerce of the Dominion.

“That such results have been produced by a relatively small expenditure, as was anticipated, and as was represented when the original request for consideration was made to the Government. Out of \$2,500,000 originally voted to be expended in the period of bounty terminating 30th June next, but \$616,976.02 have been expended up to 1st December, 1907.”

YUKON.

DAWSON.—The Guggenheims will employ many men and teams this winter in hauling 3,000 tons of pipe-line material from Twelve-Mile Landing, on the Yukon below Dawson, to points on the line of the big Twelve-Mile ditch. 4,000,000 feet of lumber will be hauled from the Twelve Mile mill in the spring. The work on the large dam on Bonanza Creek has been finished. From here electrical power will be distributed to the new electric lifts, new devices for working creek bottoms.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The use of coal-cutting machines is steadily increasing in the United Kingdom. Thus the statistics show that in 1906 there were 333 collieries employing coal-cutting machines as against 295 in 1905. The total number of machines in use was 1,136 (as against 946 in 1905), of which 451 were worked by electricity and 685 by compressed air; the total quantity of coal obtained in 1906 by the aid of these machines was 10,202,506 tons, an increase of over two million tons as compared with the returns for the preceding year.

For the ten months of the present year, ending October 31st, exports of coal from Great Britain amounting to 54,816,190 tons were made, the value of which is placed at £34,516,460, an increase in value of over eight million pounds sterling above that of the total exports during 1906. This increase is attributed to heavier shipments to France, Germany and Italy.

The thirteenth annual statement of the coal production and consumption in the principal countries of the world has been issued by the Board of Trade. Production was made as follows: United Kingdom, 251,068,000 tons; Germany, 134,914,000 tons; France, 33,762,000 tons; Belgium, 23,232,000 tons; United States, 369,672,000 tons. Consumption is shown in the following statement: United States, 361,492,000 tons; United Kingdom, 174,329,000 tons; German, 119,282,000 tons; France, 50,298,000 tons; Russia, 25,786,000 tons; Belgium, 22,509,000 tons; Austria-Hungary, 21,181,000 tons.

FRANCE.

The Government has increased the annual grant for the pensioning of aged miners, from a million to a million and a half francs.

An attempt is being made to group all French importers of foreign coal into one organization, the purpose being to act on the public powers, the railway companies, the Chambers of Commerce and others interested in the regulation of the foreign trade conducive to the interest of French buyers.

A decree signed by the President of the Republic, establishes, in the event of military requisitions necessitated by war, that the military authority, aided by the mining engineers, shall summon coal companies to supply whatever quantities of coal, coke and manufactured fuel as might be required.

GREECE.

The mineral production of this country last year was valued at £843,648, a very substantial advance over the 1905 returns. The chief mineral products of Greece are argentiferous lead, iron, calamine and magnesite.

UNITED STATES.

The production of platinum in the United States last year was 1,439 ounces, which owing to the abnormally high prices then ruling was valued at \$45,189. Thus while in January, 1906, the price was \$20.50 per ounce, in November it had risen to \$38. Platinum rich in iridium was valued at \$41 in February of this year and remained at that figure until April, since when there has been a steady decline, the price to-day being \$26.50 for ordinary and \$29 for hard platinum.

Production of pig iron in the United States last month was 1,828,000 tons, the smallest of any month in two years. In all 78 furnaces were blown out during the month, reducing the number to a hundred and eighty-seven.

The November production of copper of the Butte district is placed at 8,376,200 pounds, a slight increase over October. Meanwhile the directors of the Amalgamated Copper Company have ordered that all the mines of the subsidiary companies, with the exception of the three mines of the Boston & Montana Company, be closed, and by the end of the month in consequence, operations will be suspended at the Anaconda, Butte, Boston, Washoe, Parrot, Trenton, North Butte and Butte Coalition mines, and the Washoe smelter.

The "Mining World," (Chicago), publishes a compilation showing that 114 mines and metallurgical works in the United States have paid dividends aggregating \$81,601,426 during the eleven months of the present year, and in addition distribution of profits to the aggregate amount of \$14,461,491 has been made by corporations such as the Amalgamated Copper owning interests in subsidiary companies.

It is computed that shipments of iron from the Lake Superior region will total 42,000,000 tons for the season of 1907, thus very considerably exceeding all previous records in this respect.

The report of the Oroville Dredging Company, just issued, for the year ending July 31st, shows net profits amounting to \$502,362. The company paid a dividend of 10 per cent. and placed \$94,774 to reserve.

The report of the Homestake Mining Company, of Dakota, shows that the proceeds realized from the sale of bullion amounted to \$4,541,096 from 1,264,177 tons of ore milled, having an average value of \$3,592 per ton.

In a paper read before the American Mining Congress, Joplin Meeting, costs of operations in the Joplin District, Dr. E. R. Buckley expressed the view that under present conditions an ore body of ordinary size must contain at least 3 per cent. of zinc

blende to be worked at a profit and pay a royalty of 15 per cent. with 60 per cent. zinc at \$45 and lead at \$80 a ton.

A general strike has been ordered in the Goldfield district, Nevada, the miners refusing to accept payment of wages in the form of script. The Union instructs its members as follows:—"All employers of labor not paying cash or satisfactorily guaranteeing their paper will be declared unfair, and all men are warned not to work for them."

MEXICO.

A consolidation of the Fay-Cananea and Cananea eastern properties has now been effected, but the basis on which the arrangement was made has not been announced.

ARGENTINE.

A new law exempts from Customs duty, during a period of ten years, machinery, tools, and materials necessary for the installation and working of mining and metallurgical establishments, and also machinery for well-boring. In order to obtain the exemption in question, written application must be made to the Customs House through which it is desired to effect the importation.

FIJI ISLANDS.

Valuable discoveries of chalcopyrite and bornite are reported to have been made on the west side of Vita Leoua, south of the Mandi River. The Fiji Government has granted a prospecting permit to the discoverers for nearly 300 square miles; and a mining lease at the rate of \$1.25 per acre. Specimens of ore from this locality are said to assay as 20 per cent. copper with gold and silver values.

AUSTRALASIA.

The annual report of the Secretary of Mines of Tasmania, recently issued, gives the completed totals of the mineral production for last year. The gold production was 60,023 fine ounces; blister copper, 8,708 tons; copper and copper ore, 2,234 tons; tin ore, 4,473 tons; silver-lead ore, 87,118 tons; iron ore, 2,600 tons; wolfram ore, 20 tons; bismuth ore, 6 cwt., and coal, 52,896 tons. The returns for the first half of 1907 show a falling off in all items except those of gold and coal which show a relative increase.

Queensland possesses very extensive coal areas. At present coal mining operations are confined to the West Moreton and Wide Bay districts, and two smaller centres, but the coal measures are by no means limited to these localities. Coal has been proved to underlie a large portion of the southern part of the State. Fine seams have also been tapped in the central districts, and it is generally believed that deposits of coal extend along the whole eastern seaboard. Operations are being steadily increased year by year, the production last year of 906,772 tons establishing a record.

The Commonwealth output of gold for the first ten months of the present year amounted to 2,620,771 ounces, a decrease of 272,589 ounces compared with the output in the corresponding period of 1906.

In connection with the recent coal miners' strike in New South Wales it is pointed out that "there is probably no industry conducted in the State that has been uniformly more unprofitable than coal mining." And from the figures published it appears that this statement is not an exaggeration, since of fifteen leading companies none has succeeded in paying over 6 per cent. in dividends, while the general average is not 3 per cent.

NEW ZEALAND.

A correspondent in the *Colliery Guardian* remarks that the combined action of the Dominion Government as producer, distributor and retailer of coal, does not appear to have been attended with encouraging results as anticipated. It is contended that the intervention of the New Zealand Government in the local coal trade has not reduced the cost to the consumer one iota, the prices at the various ports remaining the same as before the Government depots were established. Thus, although the Government has been enabled to hamper private enterprise, it finds its efforts to supercede it wholly unsuccessful, and it is not improbable that in the

near future the experiment will become regarded as a costly mistake, conveying its own moral.

SOUTH AFRICA.

An interesting experiment is being made by the Village Deep mine, on the Rand, with a new electric furnace which is to be employed in sharpening drills underground. The advantages claimed for this unique furnace are reduction in cost of sharpening, in the saving of labor and delay incidental to carrying drills to the surface to be sharpened, and of overcoming the customary difficulties of overheating and burning the steel.

STATISTICS AND RETURNS.

Cobalt ore statement for the month of November, 1907:—

Nova Scotia Mine, to Copper Cliff, Nov. 28th, 46,730; Nov. 30th, to Copper Cliff, 45,500; total, 92,230.

Tem. & H. B. Mine, to Canadian Copper Company, Copper Cliff, Nov. 30, 67,000; Nov. 30th, 67,000; total, 134,000.

Townsite Mine, to Canadian Copper Company, Copper Cliff, Nov. 28th, 42,000.

Buffalo Mine, to American Smelting & Refining Company, Denver, 40,000.

Grand totals, 5,009,315 pounds.

Cobalt ore statement for the week December 7th to 14th, 1907:—

Nipissing Mines, to New York, Dec. 7th, 63,200; Dec. 7th, 66,090; Dec. 14th, 60,360; total, 189,650.

McKinley-Darragh, to American Smelting & Refining Company, Perth Amboy, N.Y., Dec. 9th, 44,630; Dec. 12th, 97,740; total, 142,370.

Right of Way Company, to Canadian Copper Company, Copper Cliff, Dec. 14th, 59,610; Dec. 14th, 63,080; total, 123,690.

Kerr Lake Mining Company, to American Smelting & Refining Company, Perth Amboy, Dec. 9th, 61,420.

Nova Scotia Mines, to American Smelting & Refining Company, Perth Amboy, Dec. 13th, 63,770.

Grand totals, 580,900 pounds.

SCOTIA COAL SHIPMENTS.

Coal shipments of the Nova Scotia Coal & Steel Company for November and for the 11 months compared with a year ago, were:

Shipments, November, 1907	56,951
Shipments, November, 1906	69,229
Decrease, November, 1907	12,278
Shipments, 11 months, 1907	585,701
Shipments, 11 months, 1906	612,655
Decrease, 11 months, 1907	36,954

The stock of copper in England and France, being consigned to those countries during November, amounted to 15,789 tons. The figures for November of the two preceding years were 14,243 tons in 1906 and 13,690 tons in 1905. The London price of copper, 30th November, 1907, was £63, as compared with £102 12s. 6d. on the same date in 1906 and £77 15s. in 1905.

Outputs of the Dominion Coal Company for the first half of December, 1907:—

No. 1	21,730
No. 2	29,500
No. 3	15,000
No. 4	19,900
No. 5	21,920
No. 6	10,040
No. 7	1,730
No. 8	6,300
No. 9	15,720
No. 10	4,160
	146,000

BRITISH COLUMBIA ORE SHIPMENTS.

Following are the ore shipments and smelter receipts of the mines in Southeastern British Columbia districts for the week ending December 14th and year to date in tons:

Mine.	Week.	Year.
Boundary	35	1,141,052
Rossland	7,155	210,625
East of Columbia River	3,634	167,556
Totals	10,824	1,579,233
Smelter:		
Trail	6,151	254,180
Northport	2,171	96,231
Marysville	600	30,000
Others . . . . .	.....	1,110,079
Totals	8,922	1,490,490

Arrangements were made at the custom house for the shipment of 900 tons of zinc ore from the Vancouver mine to the Slocan district, to Antwerp. This is the first zinc shipment from this district to Europe. The rate given is \$13 a ton.

BRITISH COLUMBIA ORE.

Appended will be found the ore shipments and smelter receipts in detail for the week ending December 14th and year to date in tons:—

Boundary shipments—Week, 35; year, 1,141,052.

Rossland shipments—Week, 7,155; year, 270,625.

Slocan-Kootenay shipments—Week, 3,684; year, 167,556.

The total shipments from the mines in the above districts for

the past week were 10,874 tons, and for the year to date 1,579,233 tons.

Trail smelter receipts—Week, 6,151; year, 254,180.

Le Roi smelter receipts, Northport, Wash.—Week, 2,171; year, 96,213.

Marysville smelter receipts—Week, 600; year, 30,000.

The total amount of receipts reported from the local and foreign mines for the past week here 8,922 tons, and for the year to date 1,490,490 tons.

The output of the Crow's Nest Pass collieries for the week ending December 13 was 24,536 tons, or a daily average of 4,089 tons.

BRITISH COLUMBIA ORE FIGURES.

The following are the shipments and ore receipts from the Southeastern districts of British Columbia for the past week and year to date:—

Shipments—	Week.	Year.
East of Columbia River	3,453	163,872
Rossland	7,090	263,470
Boundary . . . . .	.....	1,141,457
Total	10,543	1,568,799
Receipts—		
Trail	5,407	248,029
Marysville	600	29,400
Northport	2,670	94,060
Others . . . . .	.....	1,110,079
Total	8,677	1,481,568

Bar silver in London has made a new low level for the year, dropping to under 25d. per ounce. The decline is said to be due largely to conditions in India.

The subjoined table shows the range of silver prices, quoted in cents, since 1900:—

Year	70 1/8	53 7/8
1907	70 1/8	53 7/8
1906	71 3/4	62 5/8
1905	65 5/8	55
1904	62	53 3/8
1903	61 3/4	47
1902	56 1/2	47
1901	64	54 1/4
1900	65 1/8	58 7/8

The highest price since 1900 was attained on November 17th, 1906, when it reached 71 3-4 cents. The low record, 47 cents, was made on three occasions, November 28th, 1902, and January 22nd and 29th, 1903.

Returns to the Bureau of Mines show that the output of the metalliferous mines and works in the Province of Ontario for the nine months ending September 30th, 1907, was as follows:—

	Quantity.
Silver, ounces	6,919,987
Copper, tons	5,111
Nickel, tons	8,087
Iron ore, tons	141,719
Pig iron, tons	180,663
Steel, tons	120,077
Zinc ore, tons	400

Last year's total silver output was only 5,401,766 ounces, so that the product for nine months this year is greater than for the whole previous year. The value of silver has declined. The total last year was worth \$3,667,551. This year nine months' product is worth about \$4,312,000. Last year's copper production was \$6,032 tons, and nickel 10,936 tons.

The following table, which shows the net profits, dividends and surplus after dividends of the Standard Oil Company, from 1902 to 1907, inclusive, the profits for 1907 being estimated, gives a good idea of the Standard Oil Company's tremendous earning power and the large surplus available for distribution to stockholders:—

Year.	Profits.	Dividends.	After Dividends.
1907	\$85,000,000	\$39,335,320	\$45,664,680
1906	83,122,251	39,335,320	43,786,931
1905	57,459,356	39,335,320	18,124,036
1904	61,670,110	35,188,206	26,381,844
1903	81,326,904	42,877,478	38,459,516
1902	64,618,363	43,861,966	20,761,397
	\$439,202,074	\$239,923,670	\$193,678,404

The above table includes only the surplus accumulated over the last six years and not the surplus since the time the company was organized, to Dec. 31, 1901. Until 1902, the Standard Oil Company apparently made it a point to distribute to shareholders each year a very large percentage of the net profits, but this policy was abandoned at the close of 1901.

The output of the collieries of the Crow's Nest Pass Coal Company for the week ended December 20th totalled 22,051 tons, a daily average of 3,675 tons.

COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from January 1 to date:—

	Week ending Dec. 21.	Since Jan. 1
	Ore in lbs.	Ore in lbs.
Buffalo . . . . .	.....	2,208,820
City of Cobalt . . . . .	.....	101,230
Coniagas . . . . .	.....	4,798,710
Cobalt Central . . . . .	.....	101,360
Colonial . . . . .	.....	74,250
Drummond . . . . .	.....	108,920
Foster . . . . .	.....	611,806
Green-Meehan . . . . .	.....	196,780
Hudson Bay	64,000	243,170
Imperial Cobalt . . . . .	.....	37,530
Kerr Lake	43,700	644,890
La Rose	43,730	5,706,875
McKinley-Darragh . . . . .	.....	1,407,935
Nipissing	130,599	4,788,249
Nova Scotia	181,000	493,000
O'Brien . . . . .	.....	2,666,360
Red Rock . . . . .	.....	91,443
Right of Way . . . . .	.....	258,220
Silver Leaf . . . . .	.....	93,618
Silver Queen . . . . .	.....	957,157
Trethewey . . . . .	.....	1,648,438
Townsite . . . . .	.....	234,278
Temiskaming . . . . .	.....	430,611
University . . . . .	.....	61,383

The total shipments for the week were 463,029 pounds, or 231 tons. The total shipments since Jan. 1, 1907, are now 27,956,760 pounds, or 13,978 tons. In 1904 the camp produced 158 tons, valued at \$136,217; in 1905, 2144 tons, valued at \$1,473,196; in 1906, 5129 tons, valued at \$3,900,000.

Company Notes.

The Tilt Cove Copper Company, Limited, at a meeting of the members of the Committee of Management, held in London on November 28, 1907, passed the following resolution:—

“That in interim dividend of 2s. 9d. per share be and is hereby declared on the shares of this company, free of income tax, payable on the 3rd day of December, 1907, to the shareholders on the books of the company on the end of December, 1907, and that the transfer books be closed during the said 2nd day of December, 1907.”

Holders of share warrants to bearer are informed that Coupon No. 11 will be paid at the above rate, free of income tax, on presentation at the company's office.

In sending this notice of interim dividend the committee desire to point out that this dividend is based upon the profits for eight months, namely, from 31st December, 1906, to 31st August, 1907.

The directors of the Dominion Coal Company have declared a regular quarterly dividend of one per cent. on the common stock, payable in January.

A special general meeting of the Maritime Coal, Railway & Power Company was held at the Windsor Hotel on December 7th. An issue of new bonds was formally ratified. They replace the old bonds of the companies now amalgamated. The company's Chignecto colliery is being developed rapidly, and its output has materially increased. The power plant is supplying three large Amherst manufacturing concerns. In future, large water shipments will be made and a saving in freight is assured.

The Kerr Lake Mining Company has declared a regular quarterly dividend of 2 per cent., payable January 31st. Books close December 31st and re-open January 8th.

The statement of cash and cash assets of the Nipissing Mines Company, on December 16th, shows a total of \$860,000. After \$180,000 is deducted to pay the dividends there will be a balance of \$680,000. It is said that between now and the time the dividend is payable the company will have received almost enough to pay the dividend, thus leaving the total of \$860,000 practically intact.

The annual meeting of the Rochester Cobalt Mining Company is called for December 27th at Cleveland, Ohio.

DE BEERS DIVIDEND PASSED.

London.—The deferred dividend of the De Beers Consolidated Mines, Limited, the diamond syndicate, was passed to-day.

Owing to the unfavorable outlook in the diamond trade, the restriction of purchases in America since the financial disturb-

ances and dumping of large quantities of stones in recent months before the agreement with the De Beers Company demoralized the market, the company has decided that it is necessary to strengthen its reserves in order to maintain prices. A telegram received from Kimberley says the company has ordered work in the diamond mines to be restricted to five days a week.

In his address to the shareholders of the Cleveland-Cobalt Silver Mines Company, the president, J. M. Smith, reported that the company had \$33,307.70 in the bank, \$48,554.50 in accounts receivable, being the balance unpaid on shares under option, and \$749.90 worth of supplies on hand. The assets also comprise power house plant, tools, machinery and miscellaneous equipment, valued at \$48,989.56; power house and other buildings, including real estate and telephone plant, \$13,375; railway siding, \$1,168.31; office furniture, \$156.93, and development work, \$9,804.13.

WATTS MINE ANNUAL MEETING.

The annual meeting of the Watts Mining Company will be held at the offices of the company, 54 Victoria street, Toronto, on January 15th.

The Northern Exploration Company has declared a dividend of ten per cent.

Directors of Nipissing have declared a regular quarterly dividend of 3 per cent., payable January 21. Books close December 27 and re-open January 22.

The statement of cash and cash assets of December 16 of the Nipissing Mines Company shows a total of \$860,000; deduct \$180,000 to pay dividends, leaving balance of \$680,000. It is said that between now and the time the dividend is payable the company will have received almost enough to pay the dividend, thus leaving the total of \$860,000 practically intact.

The annual profits of Le Roi mine have fallen from £37,000 in 1906 to £3,600 for the current year, owing to the drop in copper.

The Buffalo Mines, Limited, have declared a regular quarterly dividend of 3 per cent., payable January 1st, to shareholders on record December 17th.

The McKinley-Darragh Mines of Cobalt have declared a dividend of 4 per cent., payable January 15th. Books close at noon, December 31st and re-open January 10th.

On December 10th the Kerr Lake Mining Company declared a dividend of 2 per cent. and a bonus of 1 per cent., payable on or before January 31st, on all the capital stock of the company. This is the regular quarterly dividend.

MARKET NOTES.

Silver.—December 5th, 57 3-4; December 6th, 57 1-8; December 7th, 56 1-2; December 9th, 55 3-4; December 10th, 55 1-2; December 11th, 56 1-4; December 12th, 55 1-2; December 13th, 54 7-8; December 14th, 53 3-4; December 16th, 54 1-8; December 17th, 53 1-2; December 18th, 52 1-2.

Copper, 18th December, New York.—Lake, 13 1-8 cents per lb.; electrolytic, 12 7-8; London, £58 per ton.