Klondike Gravels, R. G. McConnell on 33
Kootenay, East, (see East Kootenay)
Kootenay, North, Mining in.....278, 302
Kootenay River, Power Development 413
Kootenay, West (see West Kootenay)
Krao Mine, Ainsworth 129

L.

Laborers' Co-Operative Mining Co.. 163
Lamb, H. Mortimer (Review of Mining in British Columbia) 426, 448
Lambly, Charles A. R. (Obituary Notice) 41
Landslide Feared in Crow's Nest Pass 394
La Plata Mines, Nelson.....
.....190, 200, 449, 458
Lardeau Country, Duncan Section of 379
Lardeau Mining Division.....
.....279, 302, 450, 458
Leach, W. W. (Some Notes on the Economic Geology of the Skeena River) 47
Lead—
Bounty on 453
Production of .....
.....216, 249, 257, 292, 410, 452
Lenora Mine, Vancouver Island.... 105
Le Roi Mining Company, Ltd.—
Annual Meeting of 469
Cables and Notes..38, 71, 79, 97, 122
...131, 151, 164, 206, 248, 289, 326, 332
...366, 373, 400, 407, 442, 448, 455, 485
Smelting Works of 470
Le Roi No. 2, Limited—
Cables and Notes..38, 71, 75, 77, 79, 97,
...122, 164, 176, 206, 248, 289, 301, 326,
....359, 366, 400, 442, 448, 456, 485
LeRoy, O. E. (On Surveys in New Westminster District and Texada Island 51, 174
Lethbridge Collieries Company, Ltd. 38
Lightning Creek Gold Gravels and Drainage Company, Cariboo.... 234
Lillooet Mining Division.....280, 450
Lindsey, G. G. S. (President Crow's Nest Pass Coal Company, Ltd.) 411
Livingston, Clermont (Obituary Notice) 376
Lode Mines of British Columbia, Production of 215, 257
Lone Star and Washington Mine.... 44
Lorne Creek, Skeena, Mining on.... 244
Lucky Jim Mine, Slocan District... 67

M.

Machinery and Construction Notes..
...124, 165, 207, 249, 291, 326, 367, 444
Maple Bay Camp, Portland Canal... 10
Maple Leaf Mining Company, Alberta 290, 366
Marble Bay Copper Deposit....62, 174
Marble Bay Mine, Texada Island...
.....45, 54, 104, 276
Marble Bay Mine, Labour Trouble at 89
Marble Quarry at Nootka Sound, V. I. 264
McConnell, R. G. (on High-level Gravels in Klondike District, Yukon) 33
McGill Summer Mining School..... 133
McIntyre, A. W. (on Copper Deposits of Washington, U.S.A.) 28
Metals, Refining in Canada..... 300
Metropolitan Gold and Silver Mining Company, of Lardeau, B.C., Ltd. 485
Mineral—
Exhibits at Nelson Fair 291
Output of Ontario in 1906..... 202
Output of Quebec in 1905..... 201
Production of B. C. in 1906..... 213
Production of B.C. in 1907.....402, 448
Production of Canada in 1906...25, 55
Review of Production in B.C..... 257
Mines Department Act, Dominion.91, 376
Mining—
Coal Mining News (See Coal).
Conditions of in Canada..... 25
Copper, Important in B.C. 32
Developments in Southern Yukon. 26
Important Development in Slocan 90
In B. C. in 1906...213, 216, 241, 244, 260
In B.C. in 1907.....409, 426, 449, 455
In B.C., Prize Essay on..... 344
In B.C., (by H. M. Lamb)....426, 448
In Camp McKinney.....354, 450, 468
Industry and Victoria Exhibition 335
In East Kootenay (see East Kootenay).
In Fairview Camp 108
Information for Schools 451
In Nanaimo District 276
In North Kootenay 278, 302
In Slocan (see also Slocan)...293, 449
In Various Parts of British Columbia....244, 278, 312, 393, 449, 455
On Observatory Inlet, Skeena Mining Division 119
On Vancouver Island.....121, 261, 450
Work of Bureau of Mines in 1906. 284
Minister of Mines of British Columbia, Annual Report for 1906.....
.....212, 260, 312
Mint, Branch of Royal, Ottawa..... 374
Molly Gibson Mine (La Plata)..190, 200
Mount Andrew Mine, S.E. Alaska...
..... 19, 24, 44

N.

Nanaimo District, Mining in..... 276
Nelson District....84, 120, 200, 442, 460
New Westminster District.....51, 276
New Zealand—
Improvements in Gold Dredges... 139
Scheelite Mining in 355
Nicola—
Coal at.....146, 284, 439, 450
Mining in 1906 282
Mountains Between, and Hope.... 352
Noble Five Group, Slocan District.. 187
Northern Mines, Shipping Trade of 358
North Pacific Coast, Copper Ore on. 62
Northport Smelting Works, Washington 44, 470
North Star Mining Co., Ltd..288, 442, 460
Dividend of 442

O.

Observatory Inlet, Mining on..... 119
Omar Mining Company, S.E. Alaska 20
Omineca Country 50, 449
Ontario, Mineral Output in 1906... 202
Ore Production Notes...40, 166, 216, 249
.....292, 331, 349, 409, 462
Osoyoos Mining Division 281
Outsiders Group, Portland Canal....
.....10, 218, 449

P.

Pacific Coal Company's Anthracite Breaker at Bankhead, Alberta.. 177
Pay Roll Gold M. and M. Co., Ltd... 207
Peace River District 219, 221
Petroleum in Western Canada..... 15
Pintledanne Group, Skeena Division 13
Portland Canal District, Report on. 9
Portland Canal Mining and Development Company, Limited..332, 337, 366
Report on Company's Property.....
.....406, 437
Powell River 51
Power Development on Kootenay River 413
Princeton, Similkameen 146, 246
Providence Mining Company, Ltd..4, 401

Q.

Quatsino Mining Division.....261, 315
Quebec Province, Mineral Output of 201
Queen Charlotte Islands..109, 255, 449
Queen Victoria Mine, Nelson.....
.....2, 44, 129, 331, 460
Quesnel Mining Division....239, 238, 449

R.

Railway Cars for Fuel, Shortage of. 398
Rambler-Cariboo Mines, Slocan District 90, 247, 449, 452
Raymond, Dr. R. W. ("Sez Jonathan") 37
Reco Mine, Slocan District..... 187
Registrations—
Extra-Provincial Companies.....
.....80, 123, 165, 248, 367, 485
In England...39, 80, 165, 249, 401, 485
(See Certificates of Incorporation).
Revelstoke & McCullough Creek Hydraulic Mining Company, Ltd.. 485
Revelstoke Mining Division.....
.....244, 302, 274, 450
Reward Gold and Silver Mining Co., Ltd. 290, 366
Richard III Mining Co.....
.....66, 104, 128, 247, 450
Dividend of 442
Robertson, W. F., (Provincial Mineralogist)—
On Cowichan Lake and Vicinity.. 318
On Hudson Hope on Peace River. 221
On Peace River Valley District.. 219
On Progress of Mining in 1906.. 216
Rosella Hydraulic M. and D. Co.... 80
Rossland—
Copper Mining at 95, 217, 348
Good Feeling at 133
Operations at (by R. W. Brock).. 70
Ore Production at.....40, 166, 216
.....297, 428, 450, 455
Rossland-Kootenay Mining Co., Ltd.. 365

S.

St. Eugene Mine, East Kootenay....
.....278, 347, 448, 460, 482
Salmo, Nelson District....84, 449, 460
Sandiford, W. H. (Obituary Notice) 172
Scheelite in Cariboo..... 355
Shining Beauty Group, Golden..... 163
Sidney Inlet, Vancouver Island..... 265
Silver, Production of ...57, 217, 257, 410
Silver Refinery at Trail 300
Silverton Camp, Slocan, Zinc Mines in 193, 449
Similkameen—
Coal in 146, 398, 439, 450
Lode Gold, Production of..... 255
Mining in 246, 281, 362, 450
Report of Chas. Camsell..... 142
Report of Mining Recorder, 1906.. 246
Skeena District—
Conditions in the 359
Economic Geology of (W. W. Leach) 47
Kemano River, Gardner Canal.... 13
Mining on Lorne Creek 244
Mining on Observatory Inlet.... 119
Production of in 1907 445
Skylark Development Co., Ltd....78, 130
Slocan District—
Antimony in 240
Extra-lateral Rights Litigation... 419
Important Mining Development in 90
Ore Production of 166, 449
Whitewater Camp in....195, 449, 458
Zinc at Lucky Jim Mine..... 67
Zinc Resources of 185
Slough Creek Gravel Gold, Limited.
.....46, 75, 122, 164, 206, 235, 248
.....289, 290, 401, 442
Snowshoe Mine..197, 247, 366, 442, 450, 482
Snyder Electric Treatment of Ores 452
Spitzee Mine, Rossland.....86, 97, 151
Southern Cross Group, Vancouver Island 263, 271
Star Mining and Milling Company vs. Byron N. White Company...
.....131, 419, 449
Stemwinder Gold and Coal Mining Company 108, 173, 450
Stockett, Lewis, and Warden, B. R. (on Pacific Coal Company's Anthracite Breaker at Bankhead.. 177
Stone Quarries on Coast 54, 75
Sullivan Group Mining Co., East Kootenay 80, 128, 249, 253, 378
.....400, 454, 460

T.

Tamarac Group, Highland Valley... 184
Tantalus Coal Mine, Yukon.....157, 433
Telkwa Mineral Belt 359
Tel-Kwa Mines, Ltd., Annual Meeting 204
Texada Island—
Copper Ore on 62
Labour Trouble at Marble Bay Mine 89
Mining on in 1906 .....276, 346
Report on (by O. E. LeRoy)....53, 174
Thistone, Discovery of in Canada.. 24
Trail, Smelting Work at....300, 348, 456
Trout Lake Mining Division..... 279
Tulameen River, Similkameen 150
Tyee Copper Company, Limited—
Annual Report of 321, 363
Cables and Notes..38, 79, 122, 164, 207
.....248, 289, 326, 366, 400, 442, 485
Dividend of 290
Smelter of....16, 105, 316, 323, 332, 450
Tyee Mine ..65, 104, 317, 322, 448, 450

U.

Union Mine, Ainsworth 189

V.

Valdes Island, Mining on 317
Vancouver Group, Slocan 75
Vancouver Island—
Coal Mining on 121, 242, 346, 412
Copper Mining on 62, 104, 450
Cowichan Lake and Vicinity..... 318
Mining on West Coast of.....261, 314
Vernon Mining Division 246
Victoria Exhibition and Mining..... 333

W.

Wages Agreements 198, 389, 406
Walker, Geo. L., (on Copper prices)
.....6, 37
Washington State, U.S.A.—
Copper Deposits of 28
Production of Coal and Coke..... 33
Watson and Wheaton Rivers, Yukon 156
Watson's Improved Smelting Furnace 203
Wellington Colliery Company's Coal Production 39, 412
Western Branch of Canadian Mining Institute 435
Western Fuel Company's New Agreement With its Men 389
Western Fuel Company, Notes of.. 39
West Kootenay Power and Light Company's New Power Development 5, 468
West Kootenay, Mining in.....
.....185, 279, 347, 379, 449, 455
West Kootenay, Zinc Resources of. 185
Whitehorse, Yukon.....26, 62, 156, 434
Whitewater Camp, Slocan...195, 449, 458
Wild Horse Creek, East Kootenay... 351
Windy Arm, Southern Yukon .....
..... 27, 154, 434

Y.

Yale Mining Division 246
Ymir District 469
Ymir Gold Mines, Limited—
Annual Meeting of 247, 288
Mine Developments and Prospects 360
Notes of 3, 15, 122, 248, 435, 485
Young, D. R. ("Windy") and British Empire Mine 5, 212, 331
Young, R. Watson (Prize Essay on Mining in British Columbia).....
.....323, 344
Yukon Territory—
Copper Placers in Western 201
Developments in Southern 26
Explorations in (D. D. Cairnes)... 152
Guggenheims in 297, 320
High-Level Gravels (McConnell)... 33
News of 254, 274, 276, 478
Official Reports, March 31, 1907.. 430

Z.

Zinc—
At Lucky Jim Mine, Slocan..... 67
Duty on in United States..90, 218, 452
Ores, Electric Treatment of 452
Production in 1906-7.....218, 410, 457
Resources of West Kootenay..... 185
Smelter at Frank, Alberta...26, 58, 452
Smelting, New Processes 89, 484

This Month: KETCHIKAN MINING DISTRICT, SOUTHEAST ALASKA—Illustrated.
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two formations. The lower is largely volcanic and is made up of altered ash rocks, chlorite and hornblende schists, porphyrites, and agglomerates. The upper formation is limestone and has a limited distribution along the northeast shore of Texada Island, between Van Anda and Blubber Bay. It has a length of seven and a half and a maximum width of two miles. Both formations are of economic importance, especially the limestone. The Vancouver series is cut by numerous dykes of porphyry, greenstone, felsite and garnetite, and also by larger bodies of granite, which are extensions from the coast range batholith. Sandstones of Cretaceous age occur along the shore of Gillies Bay on the south side of Texada Island.



Open Quarry Face—Texada Iron Mine.

Sandstones also occur on the mainland east of Grief Point, between Wolfsohn and Scow Bays. From information received it would seem that the formation has a considerable distribution inland. Small seams of impure lignite coal have been found but no beds of any value have been discovered.

Glacial deposits are of limited extent in the coast range. Boulder clays occur at the head of Howe Sound on the east side, on Anvil Island, where they are used in the manufacture of brick, on Gambier Island, and in the vicinity of Gibson landing.

In the region embraced by this season's work there are, in addition to numerous isolated mineral claims, three areas of special importance. They are the Lynn Creek camp, the Britannia mineral zone and Texada Island.

LYNN CREEK.

The Lynn Creek camp is about eight miles north of North Vancouver. It has an area of five square miles, and about 35 claims have been staked. The rocks are banded silicious and massive hornblende and epidote schists surrounded by syenites and granites. The ores are zinc blende, pyrite, chalcopyrite, molybdenite and magnetite. Very little development work has been done beyond the actual assessment work required by the provincial mining regulations.

HOWE SOUND.

The Britannia mineral zone lies on the east side of Howe Sound 23 miles from the entrance. The zone has a width of one and one-half miles along the shore and extends inland about eight miles. The rocks are conglomerates, quartzites, slates and sericite schists. The mineralization is confined almost wholly to the silicified sericite schists. The ores are mainly chalcopyrite and pyrite, the former occurring in lenticular areas and masses while the latter is finely disseminated through the schist and quartz. Both carry appreciable values in gold and silver. On the western half of the zone there are three principal groups, the Goldsmith, Britannia and Empress.

The Britannia Copper Syndicate's mines are 3.8 miles from the beach, and 3,300 ft. above sea level. The company has 8,500 ft. of lode which has a maximum width of 600 ft. The deposit is essentially a low grade proposition, but the enormous amount of ore in sight, and its situation, present most favourable advantages for economic mining and large output. At present the ore is mined only on the Jane claim at the Jane bluff and Mammoth bluff. The method of mining is by tunnels, crosscuts and stopes, and glory holes. The ore is conveyed to the beach by a Riblet aerial tramway, the shipping ore going directly to the bunkers and the concentrating ore to the mill. About 350 tons a day are mined at present, but it is the intention of the company to greatly increase the output at an early date. The ore is shipped to the Britannia Smelting Company's smelter at Crofton, Vancouver Island.

The Empress mine lies east of the Britannia, across the divide, in South Valley. Development work, principally by tunnelling, is being carried on with a view of reaching the shipping ore as soon as possible.

The Britannia West Copper Company's property is situated on the west side of the sound and almost due north of Britannia Beach. The ore body is 1,500 ft. square and consists of an impregnated zone in granite porphyry. Small quartz veins are numerous and carry bornite.

At present the company is engaged in building a tram line from the mine to the beach, and in constructing a concentrating mill and other mine buildings, and no ore will be mined until these are completed.

TEXADA ISLAND.

On Texada Island the more important ore deposits are either in the limestone formation, or along its contact with eruptives or with the schists of the underlying series.

High grade bornite and chalcopyrite associated with felsitic and garnetite dykes occur in shoots in the limestone. Smaller bodies of these sulphides, together with those of lead and zinc, are found along greenstone and diorite dykes, and also in brecciated zones in the limestone.

At the south end of the limestone band, along its contact with granite, porphyrite and chlorite schist, there are about 20 outcrops of magnetite distributed over half of one square mile. The surface showings indicate extensive ore bodies. A considerable part of these deposits, especially along their borders, is largely impregnated with pyrite and chalcopyrite, and in places the magnetite could be mined for the copper content.

The contact between the magnetite and chlorite schists and the limestone is marked by a series of small but high grade deposits of chalcopyrite and copper carbonates. They are, however, only superficial and have been nearly all worked out.



Cornell Mine, Texada Island.

In the volcanic series underlying the limestone the ores occur principally in fissure veins in porphyrites and chlorite schists. Galena, chalcopyrite, zinc blende, pyrite and magnetite associated with quartz and calcite gangue are the principal ores. Many of these deposits lack permanence in depth, and their gold and silver values are very much lower than in the similar sulphides in the limestone.

At present the only producing mines on the island are the Marble Bay, owned by the Tacoma Steel Company, and the Cornell, operated under lease by a Seattle syndicate. The Puget Sound Iron Company's magnetite deposits, and the Copper Queen mine, both of considerable promise, have not been worked this (1906) season. The Loyal and Commodore mines are still engaged in development work, and have not yet reached the shipping stage.

The Mining Record Magazine January 1907

Small faults are numerous, and the seams are likewise cut by a number of dykes, usually accompanied by faulting, from the nearby granitic areas.

In regard to the size of the individual seams the following section was measured at the Cassiar Coal Company's property on Goat Creek; this is the most complete section to be found anywhere in the district.

		Feet.
Clay shales		
Top seam	Coal with a few small clay partings	12.0
	Clean coal	7.7
	Clay	2.0
	Gray sandy shale and covered, about	30.00
Middle seam	Coal	1.5
	Clay shale	2.7
	Coal with a few irregular clay partings	14.5
	Shale with ironstone nodules	3.3
	Coal	2.0
	Gray clay shale, with nodular ironstone bands, about	50.0
Bottom seam	Carbonaceous shale and coal	2.0
	Coal	1.5
	Shale	0.5
	Coal with small irregular clay partings	9.0
	Clay shale	

Several small seams overlie these. A short distance up the creek beyond these exposures, the two upper large seams have been burned leaving thin beds of slaggy material; the overlying clay shales are burned to a brick red, forming a very noticeable feature in the landscape where exposed in a high cut-bank. The burnt area, however, does not appear to be of any great extent.

In the Transcontinental Syndicate's openings, a few miles higher up Goat Creek, five seams 4 ft., 3 ft. 3 in., 4 ft., 6 ft., and 4 ft., respectively, in thickness were cut in about 130 ft. of measures; while on the property of the Telkwa Mining, Milling and Development Company on the head of the Morice River at least four seams of the following thicknesses—4 ft. 2 in., 4 ft. 6 in., 4 ft. and 7 ft. 3 in.—have been stripped.

Practically all the coal land in this vicinity is controlled by four companies, the three above-mentioned and the Kitamat Development Company.

On the Bulkley River, from a short distance above Moricetown to Sharp Creek (about 12 miles), coal outcrops at intervals, but no workable seams have as yet been uncovered. At Sharp Creek nine small seams were stripped varying from 15 to 40 in. in thickness, but they all proved too high in ash to be of value (an analysis of one of these is given above).

Near the head of the Skeena, about 150 miles north of Hazelton, is situated another important coal field which has been prospected in some detail by the Western Development Company, controlling about 16 sq. miles of coal lands here. In this field the coal-measures occur near the top of a great thickness of sedimentary rocks which probably represent the porphyrites to the south. The rocks here are not so highly disturbed, and there is apparently a greater thickness of overlying strata than at the Telkwa areas. The coal-bearing rocks occupy the trough of a syncline with gentle dips on either side, the Skeena cutting diagonally across it. At the southern edge of the basin, however, the strata are more disturbed, being often tilted at high angles. At least one seam of good coal, from 5 ft. 6 in. to 6 ft. thick, has been opened up at several places; an analysis of this has already been quoted. Other and smaller seams are known to exist and it is quite possible that the larger one does not represent all the workable coal in this area. The physical qualities of this coal are all that could be desired, it being extremely hard, resists weathering well and is bright and lustrous in appearance. Although no recent volcanic rocks are known of in this neighbourhood, still evidences of volcanic action are not wanting, as the rocks of the coal-measures and the coal itself are found in places to be cut by small quartz veins sometimes more or less mineralized with iron pyrites.

In most of the other coal districts mentioned no workable seams have as yet been found, the coal being either too thin or too highly disturbed to be economically worked. Taking into consideration, however, the difficulties of prospecting already alluded to, there is no reason to suppose that larger and more favourably situated seams do not exist, at least in some of the localities in question.

Although placer miners were the first to prospect the Skeena country, the results so far have not been encouraging, Lorne Creek being today about the only producing locality. This creek has afforded annually a small output of gold since about 1884.

The Omineca country to the east, and reached *via* the Skeena and Hazelton, has long been a producer of placer gold. The old diggings are now nearly all abandoned to Chinamen, but there is said to be a large amount of ground there which can be profitably hydraulicked when transportation facilities shall have been improved and the cost of working lessened correspondingly. The presence of argentiferous galena in that district has also been known for some years as well as that somewhat rare mineral arquerite, a native amalgam of silver, which has been found in the creek gravels.

In the neighbourhood of Kitsilas Canyon, a number of quartz claims holding gold and copper have been located, but the writer is ignorant as to the conditions prevailing there.

In conclusion, it may be said that lack of transportation facilities has prevented the exploitation of a country rich in possibilities, and until the advent of the railway, nothing can be done to open up and develop its latent resources. The present means of communication are highly unsatisfactory, Hazelton, the distributing point, being reached either by pack trail, 400 miles from Quesnel on the Cariboo road, or by river steamer from Port Essington, and as the Skeena is navigable only at certain stages, and then only with difficulty, this route cannot always be depended on. Away from the river, trails are few and bad, and much trail- and bridge-building will have to be done before even the best known camps will be made easily accessible.

ON SURVEYS IN NEW WESTMINSTER DISTRICT AND TEXADA ISLAND.

By O. E. LeRoy.*

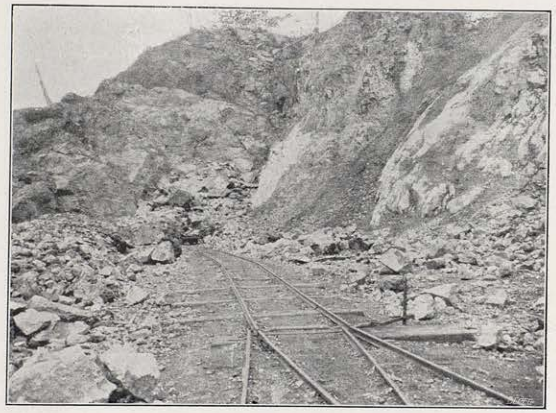
THE AREA comprised by this season's work extends from the 49th parallel to the mouth of Powell River, a distance of more than 90 miles along the main coast of British Columbia. This includes Burrard Inlet, Howe Sound, Jervis Inlet, the island adjacent to the coast, and Texada Island.

From Burrard Inlet to the International Boundary the country is underlain by conglomerates, sandstones and shales of Miocene age. These rocks are but slightly disturbed and have low dips to the south. In a few of the sandstone beds small irregular seams of lignite coal are found, but so far no bed of any value has been discovered. The whole area is covered to a considerable depth by glacial and alluvial deposits, and it is only along the south shore of the inlet that the rocks outcrop. In Stanley Park and on Fairview heights, Vancouver City, these sedimentaries are cut by dykes of basic lava, but are of very limited extent.

North of Burrard Inlet lies the Coast Range, and in its northern extension as far as Powell River it is composed of a series of subordinate ranges which run approximately at right angles to the trend of the main coast. The elevation of these ranges is from 3,000 to 5,000 ft., with individual peaks of 1,000 to 3,000 ft. higher.

A dense forest growth occupies the gentler slopes and the relatively narrow valleys, the principal woods being the Douglas fir, cedar, hemlock and spruce. The steeper slopes are either bare or support a sparse growth of stunted pine.

The streams are nearly all steep grade, and will furnish power as local conditions demand. The stream draining the Clowhom lakes into Salmon Arm and Powell River are of special importance. The former has a fall of more than 60 ft. and the estimated horse power is 12,000; the latter has a total fall of about 120 ft. and it is estimated that 30,000 h. p. could be developed.



Showing Contact of Magnetite with Lime—Texada Iron Mine.

The coast range is an enormous batholithic mass of plutonic rocks which vary in composition from the most acid granite to a basic gabbro.

Lying on this batholith and usually occupying depressions are areas of older rocks. These consist of a great variety of massive and schistose rocks of igneous origin, together with limestones, conglomerates, quartzites, and slates representing remnants of the ancient roof of the batholith. These areas are of great economic importance, as nearly all the mineral deposits of any value are either in them or along their contact with the batholith. Both the granite-gabbro batholith and the associated rocks are cut by a large series of dykes which are mainly diabases.

Thormanby, Merry, and Texada Islands are underlain by rocks of the Vancouver series, consisting of

*In "Summary Report of the Geological Survey of Canada for 1906."