RP 468(A)

GENERAL REPORT OF THE MINISTER OF MINES OF THE PROVINCE OF QUEBEC FOR THE YEAR ENDING MARCH 31ST 1961

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Énergie et Ressources naturelles
Québec

GENERAL REPORT

of the

MINISTER OF MINES

of the

PROVINCE OF QUEBEC

FOR THE YEAR ENDING MARCH 31st

1961

P. R. NO. 468

Quebec, October, 1961

To the Honourable
Paul Comtois, P.C.,
Lieutenant-Governor of the
Province of Quebec.

Sir:

I have the honour to submit to you, in accordance with Section 229 of the Quebec Mining Act, a summary report on the work carried out by the Department of Natural Resources during the fiscal year ending March 31st, 1961.

Your respectful servant,

René Lévesque,

Minister of Natural Resources.

Quebec, October, 1961

To the Honourable René Lévesque,
Minister of Natural Resources,
Quebec, Que.

Sir:

In compliance with Section 229 of the Quebec Mining Act, Chapter 196, Revised Statutes of Quebec 1941, I have the honour to present a summary report on the work carried out by the staff of the Department of Natural Resources, during the fiscal year of April 1st, 1960, to March 31st, 1961.

Your obedient servant,

P.-E. Auger,

Deputy Minister.

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GENERAL REPORT OF THE MINISTER OF MINES OF THE PROVINCE OF QUEBEC FOR THE FISCAL YEAR ENDING MARCH 31st, 1961

REVIEW OF THE MINING INDUSTRY IN 1960-61

Preliminary statistics establish the value of the mineral production of the Province of Quebec for 1960 at $449,997,728. This total, which includes many amounts subject to revision, represents the highest value ever received by owners and operators of mines and quarries in the Province.

Of the forty-one products or substances extracted from the mines and quarries of the Province, twenty-four brought their producers larger revenues than in 1959.

The industrial minerals section of the mining industry recorded a gain of $16,565,251 over the total received in 1959. This increase outweighed the losses incurred by the other two sections: the metallics and the building materials.

Metallic Substances

Ten minerals out of the fourteen listed as metallic substances yielded more for their producers in 1960 than they did in 1959. It is worth mentioning that, for the first time in the mining history of the Province, cadmium appears in the list of metals extracted. Among the increased values received are those recorded by the producers of copper, metallic iron, selenium and zinc. As the United States market absorbs most of the surplus of our mineral production, the near parity between the Canadian and the American dollar in 1960 was one of the factors that contributed to those gains.

However, as the steel industry below the border operated at reduced capacity, our iron ore producers were forced to curtail their operations. The iron-ore deficit of $30,744,527, incurred during 1960, was more than sufficient to cancel the gains registered by the producers of other metallic substances.

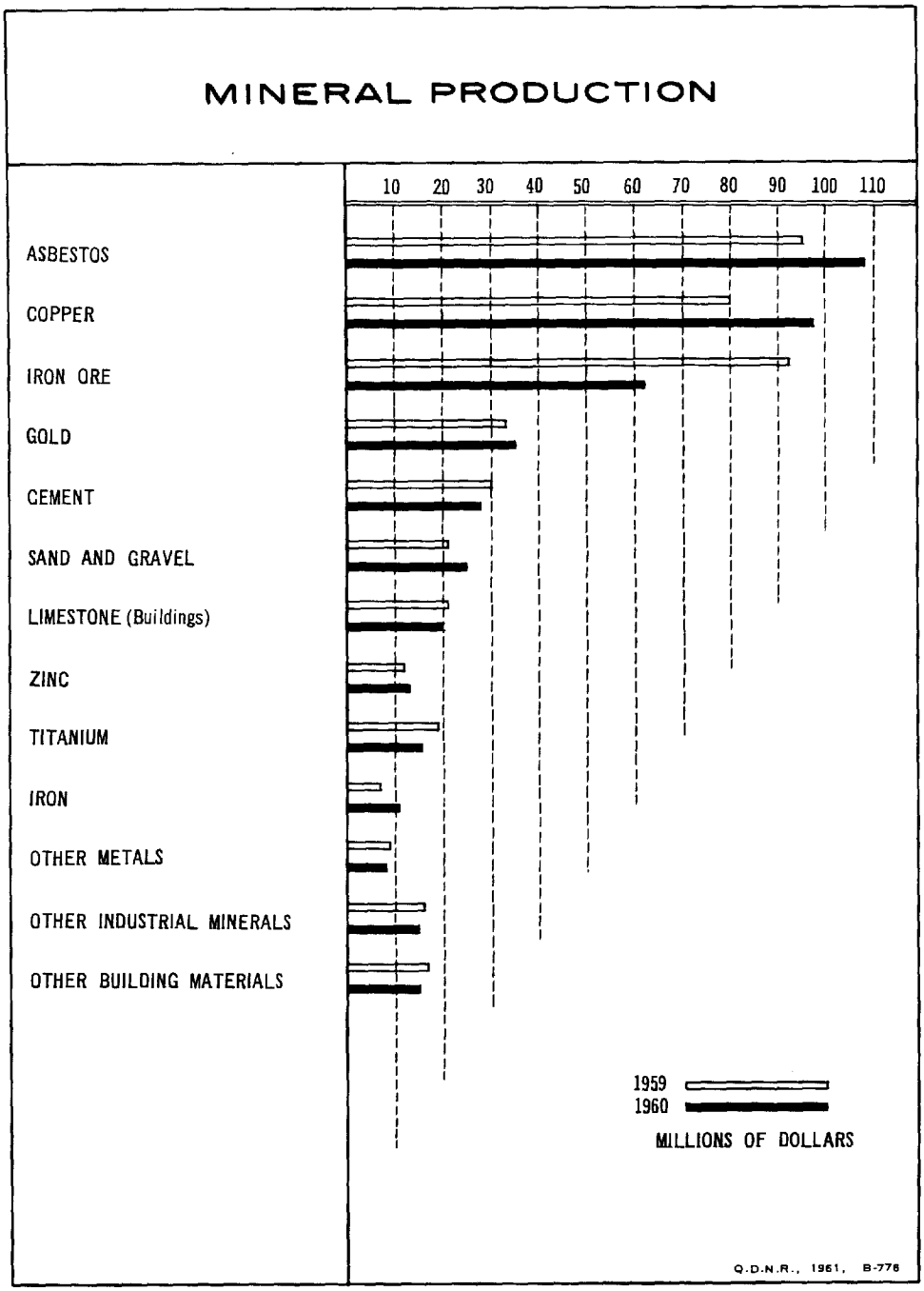


Illustration I

Table I - Value of the Mineral Production of the Province of Quebec for the Calendar Years 1959 and 1960

	Value for 1960 (Subject to Revision)	Value for 1959 (Final)
METALLICS		
Bismuth	$ 297,018	$ 264,228
Cadmium	94,429	-
Copper	96,632,633	79,894,820
Gold (a)	35,058,139	33,472,446
Iron	10,972,979	7,187,434
Iron ore (b)	61,752,485	92,497,012
Lead	570,195	617,412
Magnesium	-	977,123
Molybdenum	1,005,880	940,596
Selenium	1,958,313	1,359,631
Silver	3,830,816	3,607,558
Tellurium	104,738	3,573
Titaniferous iron ore	174,151	214,367
Zinc	13,298,602	11,519,794
Total metallics	$ 225,750,378	$ 232,555,994
NON-METALLICS		
I - Industrial Minerals		
Asbestos	$ 107,788,171	$ 95,226,769
Feldspar	239,273	301,372
Industrial lime	4,053,211	4,040,274
Industrial limestone	2,030,571	1,606,342
Lithium	84,135	1,422,153
Magnesitic dolomite and brucite	3,279,021	3,050,779
Marl	190,500	195,563
Mica	85,154	62,045
Mineral water	199,874	201,033
Ochre and iron oxide	76,640	108,286
Peat (moss and humus)	1,342,338	1,282,081
Quartz	1,804,225	1,533,206
Soapstone and talc	157,611	185,951
Sulphur	1,937,639	1,927,109
Titanium dioxide and other products	12,947,000	8,507,149
Total industrial minerals	$ 136,215,363	$ 119,650,112
II - Building Materials		
Building lime	$ 345,583	$ 486,615
Building limestone	19,642,139	20,660,191
Cement	28,000,000	29,520,710
Clay products (Brick	6,136,723	8,135,595
Clay products (Others	1,975,115	2,238,567
Granite	5,156,231	5,056,980
Marble	103,420	167,789
Sand and gravel	24,940,027	21,269,248
Sand-lime products (Brick	563,675	489,281
Sand-lime products (Others	17,757	30,664
Sandstone	1,062,076	980,324
Slate and shale	89,241	57,591
Total building materials	$ 88,031,987	$ 89,093,555
GRAND TOTAL	$ 449,997,728	$ 441,299,661

(a) Value in Canadian funds. The standard value at the rate of $20.671834 per ounce troy is $21,359,152 for 1960 and $20,611,762 for 1959.

(b) In view of the uncertainty concerning the boundary between Quebec and Newfoundland, it is possible that this does not represent the whole of the production from the Province of Quebec.

Industrial Minerals

Nine out of the fifteen industrial minerals produced brought in larger returns to their producers. Asbestos and titanium products showed a combined increase of $17,001,253 over the total for 1959. The suspension of operations at Quebec Lithium Corporation resulted in a decrease of 94 per cent in the value received for lithium in 1960, compared with that for 1959. However, in November 1960, the company placed in operation a refinery in which the concentrates of its mine will be converted into lithium carbonate. The reported success would indicate a bright future for this latter product.

Building Materials

The products listed under the heading of building materials are those that recorded the greatest loss in 1960. Only five substances out of twelve yielded higher returns. The estimated gain in 1960 of $3,670,779 placed on the value of sand and gravel was not large enough to surpass the combined value of the building materials obtained in 1959.

The trend of the mineral production of the Province of Quebec during the last three months of the 1960-61 fiscal year appears to follow that of the calendar year of 1960 - that is, gains counteracted by losses. For example, production of gold, silver, iron ore, and cement was on the increase, whereas losses were being tabulated for copper, zinc, building materials and lime.

Table II - Subdivision of the Annual Value of the Mineral Production of the Province of Quebec, 1954 to 1960

Year	Metals	Per Cent	Industrial Minerals	Per Cent	Building Materials	Per Cent	Totals
1954	$128,582,455*	46	$ 94,092,032	34	$56,475,399	20	$278,932,718*
1955	184,680,850*	52	105,890,962	29	66,990,217	19	357,562,029*
1956	237,763,816*	56	114,939,075	27	70,301,026	17	423,003,917*
1957	200,853,044*	49	120,606,214	30	85,029,476	21	406,488,734*
1958	176,695,307*	48	104,372,724	29	84,933,871	23	366,001,902*
1959	232,555,994	53	119,650,112	27	89,093,555	20	441,299,661
1960	225,750,378	50	136,215,363	30	88,031,987	20	449,997,728 (a)

* This total differs from the one published in previous reports. It includes only that value of iron ore believed to have been extracted from mines in the Province.

(a) Totals for 1960 are subject to revision.

LEGAL BRANCH

The Legal Branch is under Robert Langevin, lawyer. Its main task is to help and advise the officers of the Department and the public regarding problems arising from the application of the Quebec Mining Act and other related Acts and submitted for its study.

The Branch works in close collaboration with the Deputy Minister in the preparation of documents concerning matters within its field. During the year, the Legal Branch revised and prepared more than seventy memoranda for the attention of the Lieutenant-Governor in Council, under provisions of the Quebec Mining Act.

The Branch examined thirty-seven applications for the revocation of mining concessions, as presented by individuals. It also completed the inventory of mining rights in the seigniories.

In addition, with the help of the Division of Mining Claims Disputes and Investigations, which comes under its jurisdiction, the Branch presented or suggested solutions to forty-four conflicts.

Division of Mining Claims Disputes and Investigations

The function of this Division, which is under the direction of J.-René Dallaire, is to make the inspections and investigations necessary to settle disputes on ground held as mining claims or under development licenses.

The Division has, either as permanent or part-time personnel, four investigators and one stenographer in its Rouyn office, and two investigators and one stenographer in its Quebec headquarters.

The investigators stationed in Rouyn dealt with 27 disputes that arose in the recording districts of Amos, Noranda and Chibougamau. They had to travel some 10,630 miles by plane, railroad or automobile and walked some 620 miles in the woods to inspect claims and to verify the statutory work done, in order to obtain development licenses or to maintain such licenses in force.

The Quebec investigators handled 17 disputes that occurred in the Quebec and Montreal districts. A total of 7,220 miles was travelled by train, autobus and automobile to make investigations and carry out inspections; the inspection of claims and the verification of statutory work entailed the tramping of some 410 miles through woods.

Close relations were maintained with all the claim recorders to improve matters and to study ways and means of preventing disputes and of expediting their solutions. In some cases, the methods devised have proved quite successful.

MINERAL RIGHTS BRANCH

This Branch, in addition to the Quebec office, operates four registrar's offices for the recording of mining claims and four agencies for the sale of miner's certificates only. The former are located in Montreal, Rouyn, Amos and Chibougamau; the latter, in Bourlamaque, Ville-Marie, Hull and Campbell's Bay. F.-U. Roux, registrar of Mineral Rights, is chief of the Branch.

During the fiscal year 1960-61, there was a decrease in the number of recorded claims in the Province of Quebec; the total reached 25,069, whereas 31,788 had been recorded in 1959-60.

There was also a proportional decrease in the number of miner's certificates sold: 8,345 for the year reviewed, compared with 9,149 for the preceding fiscal year.

The number of development licenses, issued and renewed, also declined, the drop being from 9,946 in 1959-60 to 8,449 in 1960-61.

The reports on development work done on mining lands show 1,184,803 man-days worked in 1960-61 and 686,112 feet of diamond drilling done, whereas the respective totals for 1959-60 were 1,552,335 man-days and 741,906 feet of diamond drilling.

Thirteen mining concessions, covering a total area of 5,006 acres, were granted during the fiscal year, whereas only eight concessions covering 2,932 acres were granted in 1959-60.

There were 2,775 transfers of mining rights in 1960-61, compared with 4,511 in 1959-60.

The Mineral Rights Branch issued 21 exploration and special exploration licenses, distributed as follows:

1.- Seven exploration licenses for all minerals in New Quebec;

2.- Eleven exploration licenses for petroleum and natural gas in the St. Lawrence valley and in the Gaspé peninsula;

3.- Three special exploration licenses for all minerals, gold and silver excluded: the first, in Broughton township, Beauce county; the second, in Brome township, Brome county; the third, in Eardley township, Gatineau county.

By Order in Council, dated April 21st, 1960, and bearing number 544, a tract of ground located in Simard township was withdrawn from the staking of mineral claims, by reason of the redistribution of the hydraulic potential of the Shipshaw river.

On February 4th, 1961, the territory of New Quebec was reopened to the staking of mining claims, with the exception of areas M-89, M-103 and M-104, all located in the Cape Smith - Wakeham Bay region, and also that part of the territory east of longitude 68°00', from its southern boundary to latitude 55°30'N. south of latitude 55°30'N. from longitude 68°00' to the axis of the George river and east of the axis of the George river from latitude 55°30'N. to Ungava Bay; the whole enacted by virtue of Orders in Council number 21, dated January 4th, 1961, and number 131, dated January 13th, 1961.

Two other tracts of land were also reopened to the staking of mining claims: the first located in the Rupert river area; the second, North of the Kégashka and Musquaro townships, county of Duplessis. This was enacted by virtue of Order in Council, number 21, dated January 4th, 1961.

Table III - Number of Various Titles Issued

by the Department of Mines

(Fiscal years 1959-60 and 1960-61)

Designation of Titles	1959-60	1960-61
Mining claims registered at Amos	19,345	14,286
Mining claims registered at Rouyn	4,339	3,275
Mining claims registered at Quebec	4,431	5,153
Mining claims registered at Chibougamau	2,697	1,557
Mining claims registered at Montreal ...	976	798
Total	31,788	25,069
Miner's certificates issued	9,149	8,345
Development licenses issued	4,746	5,693
Development licenses renewed	5,200	2,756
Mining concessions granted	8	13
Transfers of titles registered	4,511	2,775
Reports on work: man-days reported	1,552,335	1,184,803
Reports on work: diamond drilling in feet	741,906	686,112
Number of assay coupons delivered	36,019	26,184

Table IV - Mining Titles Issued since 1950-51

Fiscal Year	Number of Miner's Certificates	Number of Mining Claims Recorded	Number of Development Licenses	Concessions		Transfers of Mining Rights
				Number	Acres	
1950-51	6,594	19,787	5,407	9	3,717	1,513
1951-52	7,531	22,807	5,407	8	1,019	2,396
1952-53	7,577	21,912	6,562	9	2,042	2,410
1953-54	10,558	23,667	6,905	8	908	2,154
1954-55	10,987	31,702	6,739	3	211	3,102
1955-56	20,193	60,315	9,564	14	2,674	5,402
1956-57	15,686	51,259	11,180	4	1,318	5,244
1957-58	13,608	45,901	9,395	7	2,220	4,861
1958-59	16,963	60,704	9,208	10	2,500	5,239
1959-60	9,149	31,788	9,946	8	2,932	4,511
1960-61	8,345	25,069	8,449	13	5,006	2,775

Table V - Comparative Statement of Exploration Work on Mining Claims under Licenses during Calendar Years 1950 to 1960

Year	Number of Work Days (Man-days)	Diamond Drilling (In feet)
1950	498,460	317,558
1951	956,451	705,570
1952	871,307	590,788
1953	672,900	394,194
1954	664,447	295,221
1955	1,107,712	417,144
1956	2,338,452	1,321,429
1957	2,298,128	1,511,580
1958	1,335,888	624,106
1959	1,552,335	741,906
1960	1,251,048	730,225

MINING OPERATIONS BRANCH

The Mining Operations Branch is concerned with problems directly affecting the operations of mines and quarries in the Province and includes the following divisions:

1. - Inspection of mines
2. - Collection of dues on mines
3. - Mineral statistics

R.-H. Taschereau is Chief, and E.-E. Bérubé is Assistant Chief of this Branch. In addition to the duties of its three divisions, the Branch is responsible for:

1. - Preparation of periodical reports on the development and operations of mines and quarries and on the state of the mining industry in general.
2. - Application of the Unwrought Metal Sales Act and the regulations enacted thereunder.
3. - Studies and investigations of special problems arising from the operation of mines.

Separate reports on the functions and activities of each Division follow.

Mines Inspection Division

This Division, under M.-O. Lafontaine, Chief Inspector of Mines, and D.A. Farnsworth, Assistant Chief Inspector of Mines, involves the full-time services of fifteen mining, electrical, mechanical and ventilation engineers, four technicians, twelve clerks and stenographers.

Duties:

A - In connection with the safety and protection of workmen in mines and quarries

In accordance with Section 198, Chapter 196, of the Quebec Mining Act, it is the duty of the engineers of this division to make such inspections of mines, quarries and workshops for the reduction of minerals as may be necessary to ensure the observance of all

regulations made under Section 197 by the Lieutenant-Governor in Council, so as to protect the life and health of workmen. These responsibilities involve the following:

1) Co-operation with national and international organizations devoted to the maintenance of the health and safety of workers in the mining industry.

2) Routine safety inspections at mines, pits and quarries.

3) Inspection of electrical installations.

4) Inspection of mechanical installations.

5) Conducting ventilation and dust surveys; testing of samples of dust and poisonous gases or fumes.

6) Enforcement of legislation requiring yearly X-ray examinations of all workmen engaged in dust exposure occupations.

7) Making recommendations regarding revisions to the "Regulations for the Safety and Protection of Workmen in Mines and Quarries" in order that these regulations may be in line with new mine and quarry operating techniques.

8) Investigation of serious accidents, or other unusual occurrences which might affect the health or safety of workmen, preparation of detailed reports thereon and distribution of such reports throughout the industry to assist in the prevention of similar accidents or occurrences.

9) Compilation and interpretation of statistics on accidents at all mines and quarries as a guide to improving accident prevention work.

10) Organization and direction of the Mine Rescue Training Plan and the Annual Mine Rescue Competition.

11) To carry out such other duties as the Minister may from time to time direct.

B - <u>In connection with other relevant sections of the Quebec Mining Act (R.S.Q. 1941, C. 196) as follows:</u>

1) This Division has the responsibility of carrying out regular inspections of all mines and quarries, to gather, on the site, data on current and future mining operations. Technical reports with respect to the fulfilment of the provisions of the Mining Act are made to the Minister (Section 201).

2) Underground plans for the exclusive use of the Inspectors of Mines are obtained once a year from all mines requiring underground work (Section 200).

3) Inspection of mining lands prior to the issuance of letters patent (Section 49).

4) Examination of proposed tailings sites prior to their approval by Order in Council, or by the Minister, and inspection of existing sites to prevent damages to surrounding properties (Sections 37 and 123).

5) Examination of every proposed ore treatment plant site at mines, prior to its approval by the Lieutenant-Governor in Council (Section 13).

6) Smelter plans and specifications should be approved by the Chief Inspector of Mines to avoid damage claims from fumes (Section 122).

7) The Inspector of Mines ascertains that party passages respecting mining, either on public or private land, shall not be abolished without his permission (Sections 118 and 119).

8) The Inspector of Mines shall settle and decide disputes arising between owners of mining claims concerning water courses and excavations (Sections 124-125-126).

9) The Inspector of Mines shall supervise the procedures to allow the owner of mining rights to work on private lands. Failing agreement he has the power to appoint arbitrators and to collect and distribute the amounts of damages (Sections 89 to 109).

Activities:

For administrative purposes, the activities of the Division may be classified under six sections:

1 - Section of Mining Engineering. All problems related to operating mines and quarries of the province come under the direct or indirect jurisdiction of six district inspectors of mines who are mining engineers with at least five years of experience in their profession. They are:-

Geo. Courtemanche, P. Eng., Noranda and Matagami regions.

Guy Duchesne, P. Eng., Val-d'Or and Malartic regions.

Henri Rinfret, P. Eng., Chibougamau region.

C. Moscu, P. Eng., Montreal and Quebec regions.

Guy Dubé, P. Eng., Hull and New Quebec regions.

F. Cloutier, P. Eng., Thetford Mines region and the Gaspé peninsula.

During the year, they have carried out 344 inspections at mines and quarries. In addition, they have investigated 21 fatal mining accidents, as well as numerous investigations of other special occurrences. Detailed reports of such investigations have been prepared and printed for public distribution both in French and in English.

Reports of all compensable accidents are forwarded by the mining companies. Such reports are studied and classified as to their causes by the inspectors to establish the official statistics of our Department.

2 - Section of Electrical and Mechanical Engineering. All problems related to the installation and use of electrical and mechanical equipment in mines and quarries are studied by four specialist engineers: Messrs. Lucien Trudel, Senior Electrical Engineer; V.E. Dawson, Mechanical Engineer, J.G. Bronsard and Jean Desrochers, Electrical Engineers.

Their work involves not only numerous inspections of existing installations, but also the detailed study of electrical and mechanical plans before new mines and quarries proceed with their construction programmes.

During the past year 93 inspections of electrical and 40 of mechanical installations were carried out by these engineers.

3 - Section of Mine Ventilation and Dust Control. Two engineers, namely, M.A. Bock and Bernard-D. Boucher, have continued to investigate the problems of mine ventilation and dust control. Forty-five ventilation surveys were carried out, and a total of 359 dust counts were completed under the microscope from samples obtained from the mines and quarries in the Province. It is gratifying to note that the dust situation throughout the industry has been greatly reduced during the last few years. This is especially true around certain large limestone quarries in the proximity of Montreal. It is a pleasure to acknowledge the co-operation received from the industry on this dust control problem.

Several large operators have hired the services or their own engineers for this purpose.

All workmen exposed to dust in the mines must hold a special medical certificate renewable every year. During 1960-61, we received reports concerning 16,927 X-ray examinations of miners.

4 - Section of Rope Testing. The hoisting ropes used in mines deserve special attention because the lives of numerous workmen may be involved. All mines forward to this Division specifications of new hoisting ropes being put in service and every six months a sample of such hoisting ropes is being sent to a rope-testing laboratory approved by the Chief Inspector of Mines. During the past year we received 258 reports from operators concerning the installation of new ropes and 372 reports on hoisting rope breakage tests from the Rope Testing Laboratory. These reports are studied in relation to their safety factor, their corrosion ratings and other safe operating conditions, by the mechanical engineer and the district inspectors.

During the past year, there were 88 main hoists in operation at mine shafts in the Province having a total combined horse-power rating of 34,550. The individual hoists ranged in size from 50 horse-power to 2,200 horse-power. The continuing improvement in the design and operation of hoist safety devices is ensured by a regular system of inspection and testing of all hoists and hoisting equipment.

5 - Section of Mine Rescue Training. In accordance with Order in Council No. 404 enacted April 25, 1956, key men in all underground mines are being trained once a month in mine rescue and recovery operations. The cost of the plan is paid for by the industry, but the Department of Mines has the responsibility of organizing and supervising the training. Mr. G.S. Grant, P. Eng., Inspector of Mine Rescue Stations, is in charge of this section. He is assisted by Marc Foy, as General Superintendent. Three main stations are located as follows:

a) Noranda Station : W. St-Laurent, Superintendent,

b) Bourlamaque Station : L. Babin, Superintendent,

c) Thetford Mines Station : R. Houde, Superintendent.

Regular sub-stations completely equipped with oxygen-breathing apparatus are located at the following mines:

Normetal Mining Corporation.

New Calumet Mines Limited.

Canadian Johns-Manville Company Limited.

Gaspé Copper Mines Limited.

Campbell Chibougamau Mines Limited.

Opemiska Copper Mines Limited.

Canadian Refractories Limited.

Copper Rand Chibougamau Mines Limited.

Since 1948, 1,087 men have been trained in Mine Rescue operations. The situation during 1960 was as follows:

	Metal Mines	Asbestos Mines	Total
New men trained	70	9	79
Active Mine Rescue Personnel	327	36	363
Number of Mines at which training was given	24	4	28

The majority of the active Mine Rescue personnel receive monthly refresher courses.

The Annual Provincial Mine Rescue Competition was held in Val-d'Or on September 24, 1960. Eight teams qualified for this competition after a preliminary examination of twenty-two teams representing mines in North Western Quebec, the Eastern Townships, the Chibougamau district, Gaspé Copper Mines, New Calumet Mines and Canadian Refractories Mines at Kilmar.

The results were as follows:-

1st Lamaque Mining Company Limited

2nd Gaspé Copper Mines Limited

3rd Johnson's Company Limited

4th East Malartic Mines Limited

5th Manitou-Barvue Mines Limited

6th Campbell Chibougamau Mines Limited

7th Normetal Mining Corporation Limited

8th Quemont Mining Corporation Limited

These competitions have done much to increase the interest of Mine Rescue Personnel and Mine operating staffs in the work of Mine Rescue Training. This is reflected by the satisfactory performance of most of the teams in the preliminary tests and final competition.

6 - General. Preliminary estimates would seem to indicate that for 1960 the accident frequency rate in mines and quarries of Quebec is again one of the lowest in Canada. This low accident frequency reflects the continued efforts and co-operation of the workmen, the officers of the mining companies and our engineers.

This success was officially recognized in Quebec City, in March 1961, during the Annual Meeting of the Canadian Institute of Mining and Metallurgy, when the Dominion John T. Ryan Safety Trophy for Metalliferous Mines was awarded to Sigma Mines (Quebec) Limited for having had the lowest accident frequency for metal mining in Canada.

A summary of the work carried out by this division, for the period under review, is presented in the following table, with comparative figures for the preceding year:

	1959-60	1960-61
Inspections of mines and quarries	340	344
Inspections of electrical installations	79	93
Inspections of mechanical installations	38	40
Underground ventilation surveys	103	45
Dust counts	596	359
Mine rescue certificates issued	56	79
Active mine rescue personnel	359	363
Mine rescue station reports received	176	181
Hoistmen's medical certificates issued	272	321
Hoisting rope records received	245	258
Hoisting rope breakage tests	357	372
Pressure vessel inspection reports	160	213
X-ray examinations of miners	13,880	16,927

Collection of Dues on Mines

Sylvio Drouin, in charge of this Division, submits the following report:

During the fiscal year 1960-61, a total revenue of $4,913,969 was derived from the dues on the net profits of 32 mining companies, as defined under Division III of the Quebec Mining Act.

The companies submitted sworn statements covering their profits, together with supporting vouchers.

In addition, the statutory tax of ten cents per acre was paid by 156 holders of mining concessions who remitted a total of $4,107.94. Affidavits were received from 154 holders of mining concessions, stating that expenditures amounting to at least $200 had been incurred in the performance of development work on each mining concession.

Division of Mineral Statistics

The main function of this Division is to compile yearly and monthly statistics on the activities of the mining industry of the Province of Quebec. To do so it keeps a list of operators of mines and quarries, sends questionnaires, examines the reports submitted and has them completed or corrected, compiles the data received, prepares tables of statistics, etc. It also answers questions related to the information it has on file.

For the main surveys on shipments, manpower, man-hours worked, wages and salaries, electricity, combustible and other supplies used, the Division works in close collaboration with the Dominion Bureau of Statistics, a collaboration dating back for more than 35 years.

For the use of the Department, the Division makes some special annual surveys, such as timber used in mines, funds spent by employers for the welfare of their employees and families, and moneys received by companies through financial transactions.

The main part of the statistics compiled are published in the present report, in the annual report of the Department entitled "The Mining Industry of the Province of Quebec", and in monthly and quarterly bulletins. The rest of the statistics are for the use of the Department and for those of the public requesting information.

During the 1960-61 fiscal year, the Division completed first the work related to the compilation of statistics covering the 1959 calendar year; the major part of that work was done during the last quarter of the previous fiscal year. To prepare these statistics, the Division received the following reports:

	Number
Annual reports on activities of operators of mines and quarries:	
Reports on shipments of products	1,561
Reports on exploration and development work done at non-producing mining properties	462
Reports on inactive mining properties	1,491
Monthly reports on mineral production	718
Annual reports from building contractors on raw materials used	84
Reports from mine operators on timber used in mines	96
Reports on expenditures by mine operators, for the welfare of their employees and families	47
Reports on capital obtained by mining companies, from various sources	916
Total	5,375

During the latter part of the fiscal year, the Division began gathering similar information for the 1960 calendar year. On March 31st, 1961, requests for reports, with appropriate forms, had been sent to 3,800 operators or owners of mineral deposits, 2,700 of whom answered. This work is still in progress and will be completed during the first months of the 1961-62 fiscal year.

The reports mentioned under "Reports on Capital obtained by mining companies, from various sources", are gathered to give an idea of the funds available to the mining industry for exploration and development. They give the amount received by the companies through the following financial transactions: sale of capital stock; sale of bonds or other titles; and long-term loans. Reports submitted for the 1959 calendar year give a total of $57,600,000 received from the above three sources. A similar survey, for 1958, showed receipts totalling $46,700,000. Information for 1960 is not completed yet, but data on hand indicate that the total will be about $64,000,000, some $6,000,000 above the 1959 total.

The number of new mining companies incorporated in 1960 was substantially lower than that recorded in 1959. There were 43 incorporated by Quebec charter. In addition, 18 companies incorporated by Ontario charter and one by Federal charter acquired mining rights in the Province. In all, 62 new companies were organized to operate in the Province; in 1959 there had been 79 new companies, of which 63 had a Quebec charter, 15, an Ontario charter and 1, a Federal charter.

Following is a list of these new companies, with their head office location, date of incorporation and capitalization.

Mining Companies Incorporated

by Quebec Charter in 1960

Company	Head Office	Date of Incorporation	Capital	
			Number of Shares	Par Value
Beauport Granit Ltée.	Sherbrooke	July 25	(a) 500	$ 100.
			2,500	$ 1.
Bélanger Inc., Lucien	St-Eustache	Jan. 9	4,000	$ 10.
Black Hawk Mining Ltd.	Montreal	May 20	5,000,000	$ 1.
B.P.R. Asphalt Paving Inc. ...	Montreal	Apr. 6	5,000	$ 1.
Caron and Théberge Ltée.	St-Athanase, Iberville Co.	Nov. 7	250	$ 100.
			(a) 150	$ 100.
Carrière du Cap St-Martin Ltée	Montreal	May 18	250	$ 100.
			(a) 2,250	$ 100.
Carrière Coteau-du-Lac Quarry Inc.	Pointe Claire	Mar. 5	100	$ 100.
			(a) 2,900	$ 10.
Carrière Langlois Ltée. (La ..	St-Marc-des Carrières	Mar. 3	400	$ 100.
Compagnie Miron Limitée (Miron Company Limited)	St-Michel	June 14	(a) 1,600,000	$ 10.
			4,000,000	$ 1.
Corporation des Gaz et Pétroles du Lac St-Pierre Ltée.	Trois-Rivières	Nov.22	10,000	Nil
Crackingstone Mines (Quebec) Limited	Quebec	Dec. 20	40,000	$ 1.
Demros Mines Co. Ltd.	Montreal	Feb. 19	5,000,000	$ 1.
East Ventures Limited	Montreal	June 8	5,000,000	$ 1.
Entreprises Ste-Philomène Inc. (Les	Ste-Philomène, Beauharnois Co.	Nov. 18	4,000	$ 10.

(a) Preferred shares

Mining Companies Incorporated

by Quebec Charter in 1960 (Cont.)

Company	Head Office	Date of Incorporation	Capital	
			Number of Shares	Par Value
Fiber and Clay Products Co. Ltd.	Disraéli, Wolfe Co.	Apr. 26	30,000	$ 10.
Granit Charron Inc.	Montreal	July 14	20,000	$ 10.
Hupont Mining and Exploration Corporation	Montreal	Apr. 8	5,000,000	$ 1.
International Drilling Ltd. (La Compagnie de Forage International Limitée)	Montreal	Aug. 22	2,000	$ 1.
			(a) 230	$100.
La Reine Metal Mines Limited	Montreal	Dec. 16	3,000,000	$ 1.
Laurentide Diamond Drilling Limited	St. Jérôme	Feb. 4	(a) 300	$100.
Laviolette Mining and Metallurgical Corporation	Montreal	May 20	5,000,000	$ 1.
Lumau Mining Corporation	Montreal	Mar. 15	5,000,000	$ 1.
Magado Mines Limited	Bourlamaque	Feb. 25	3,000,000	$ 1.
Marbridge Mines Limited	Quebec	July 19	3,000,000	$ 1.
Marmattagami Mines Limited	Quebec	Sep. 27	3,000,000	$ 1.
Metalium Corporation Limited	Montreal	Oct. 14	5,000,000	$ 1.
Mines-Metallurgies-Kebec Inc.	Quebec	Dec. 15	3,500,000	$ 1.
Projets Pa-Ri Limitée	St-Léon-le-Grand, Maskinongé Co.	Nov. 15	5,000	$ 10.
			(a) 5,000	$ 10.
Quebec Chrome Corporation	Montreal	Aug. 17	5,000,000	$ 1.
Rainbow Oil and Gas Limited	Montreal	Nov. 16	100,000	$ 1.
Rocket Petroleum Explorations Limited	Montreal	May 19	5,000,000	$ 1.
Roxford Mining Corporation	Montreal	June 9	5,000,000	$ 1.
Sables Vaudreuil Ltée (Les	Dorion, Vaudreuil Co.	June 7	1,000	Nil
			(a) 1,000	$ 20.
St. Lawrence Columbium and Metals Corporation	Montreal	Sep. 28	5,000,000	$ 1.
St. Lawrence Granite Corp.	Montreal	Aug. 15	500	Nil
			(a) 500	$100.

(a) Preferred shares

Mining Companies Incorporated

by Quebec Charter in 1960(Cont.)

Company	Head Office	Date of Incorporation	Capital	
			Number of Shares	Par Value
Sagittaire Phosphate Exploration Incorporée	Pike River	Mar. 10	15,000	$ 10.
Salaberry Calcaire Inc.	Caughnawaga	June 9	500	$100.
Shelter Bay Mining Corporation	Montreal	Jan. 27	(a) 5,000	$ 10.
			5,000,000	$ 1.
Sun Mining of Montauban Ltd.	Montreal	Mar. 17	2,000,000	$ 1.
Surface Excavating Inc.	Montreal	Feb. 5	200	$100.
			(a) 200	$100.
Tourbière "Clair" Inc.	Montreal	Nov. 3	400	$ 10.
			(a) 360	$100.
Trans-Continental Gas (Quebec) Limited	Montreal	Dec. 6	5,000,000	$ 1.
Waterloo Mines Inc.	South Stukely	Sep. 27	40,000	$ 1.

Mining Companies Incorporated by Ontario Charter in 1960

and Holding Mining Rights in Quebec

Company	Head Office	Date of Incorporation	Capital	
			Number of Shares	Par Value
Amagami Mines Limited	Toronto	Apr. 4	3,000,000	$ 1.
Ambassador Mining Development Limited	Toronto	Jan. 27	3,000,000	$ Nil
Amerel Mining Company Limited	Toronto	Mar. 3	5,000,000	$ 1.
Bonwitha Mining Co. Limited	Toronto	Jan. 6	3,000,000	$ 1.
Denison Mines Limited	Toronto	Mar. 24	6,000,000	$ 1.
Guardian Explorations Limited	Toronto	June 27	5,000,000	$ 1.
Hygold Mines Limited	.....	Jan. 27	3,000,000	$ 1.
Lucky Friday Exploration Company Limited	Windsor	Jan. 25	5,000,000	.50

(a) Preferred shares

Mining Companies Incorporated by Ontario Charter in 1960

and Holding Mining Rights in Quebec (Cont.)

Company	Head Office	Date of Incorporation	Capital	
			Number of Shares	Par Value
Minca Explorations Limited ...	Toronto	Aug. 4	1,000,000	$ 1.
Monarch Gold Mines Limited ...	Toronto	Jan. 22	3,000,000	$ Nil
Natto Mining Corporation Ltd..	Toronto	Mar. 1	3,000,000	$ 1.
Revere Mining Corporation Ltd.	Toronto	Mar. 8	5,000,000	$ 1.
Rexton Mines Limited	Toronto	May 2	4,000,000	$ Nil
Sirmac Mines Limited	Toronto	May 6	(a) 3,000 1,000	$ 10. $ 10.
Triform Explorations Limited .	Toronto	Mar. 29	3,000,000	$ 1.
Tyndall Explorations Limited .	Toronto	June 14	5,000,000	$ 1.
Ver-Million Gold Placer Mining Limited	Toronto	Sep. 27	10,000,000	$ 1.
Villemaque Gold Mines Limited	Toronto	Feb. 4	3,000,000	$ 1.

Mining Company Incorporated by Dominion Charter in 1960

and Holding Mining Rights in Quebec

Company	Head Office	Date of Incorporation	Capital	
			Number of Shares	Par Value
Challenge Development Corporation Limited	Ottawa	Oct. 26	5,000 (a)100,000	$ 10. Nil

(a) Preferred shares

GEOLOGICAL SERVICES

Three branches and two divisions of the Department form the Geological Services under the general direction of I.W. Jones. These branches and divisions are: the Geological Surveys Branch - Chief, H.W. McGerrigle; the Mineral Deposits Branch - Chief, J.-E. Gilbert; the Groundwater, Gas and Petroleum Branch - Chief, Roland DeBlois; the Division of Editing and Printing - Chief, Maurice Brunet; and the Division of Distribution of Publications - Chief, Noé Lamontagne. Reports by these chiefs on the functions and activities of their respective branches or divisions during the fiscal year 1960-1961 follow.

In addition to his administrative and supervisory duties, the Director represented the Government at the Twenty-First International Geological Congress held in Copenhagen and the Scandinavian countries during the latter part of August and the beginning of September, 1960. Scientific conferences such as this one, at which 3,500 geologists were present from all over the world, give opportunities for making better known the Province of Quebec and its mineral possibilities. Furthermore, such an occasion permits an exchange of ideas and information with geologists and administrators of other countries, thus contributing to the solution of geological problems in Quebec and, at the same time, furnishing guides for administration and development of the province's natural resources.

During this year, also, Dr. Jones was asked to serve as an advisor on geological matters to Harvard University, and was placed on the Policy and Administration Committee of the Geological Society of America, the world's largest geological association. Both these appointments are recognition of the high esteem in which is held the geological work done in Quebec.

LIST OF GEOLOGICAL FIELD PARTIES - 1960

(Numbers refer to adjoining map)

A - Geological Surveys Branch

1 - Watts Lake Area, New Quebec	Léopold Gélinas
2 - Port La-Pérouse - Normand Point Area, New Quebec	S.M. Lee
3 - Denys and Fagnant Lakes Area, New Quebec	R.-J.-E. Sabourin
4 - Natel Lake Area, New Quebec and Mistassini Territory	P.R. Eakins
5 - Shigami Mountains Area, Mistassini Territory ..	E.H. Chown
6 - Hippocampe Lake Area, Mistassini Territory	T. Hashimoto
7 - St-Urcisse Area, Mistassini Territory	P. T. Moyer
8 - Manthet - Jérémie - La Forest Area, Abitibi-East and Abitibi-West Counties and Abitibi Territory	J.H. Remick
9 - Brodeur - Basserode Area, Rouyn - Noranda and Témiscamingue Counties	J.-Y. Chagnon
10 - Guay - Bruchési Area, Témiscamingue County	J.L. Robert
11 - Dieskau - Loubias Area, Pontiac and Montcalm Counties	A.-F. Laurin
12 - Lesage - Rivard Area, Labelle County	D.W. Pollock
13 - Cartier - Tracy Area, Joliette, Berthier, and Montcalm Counties	Jean Bérard
14 - Langelier Area - Laviolette and Quebec Counties	Jehan Rondot
15 - Chaumonot Area, Laviolette and Quebec Counties	W.D. Newham
16 - Condé Area, Roberval County	F.-W. Benoît
17 - Castelneau Lake Area (West Half), Saguenay County	Pierre Sauvé
18 - Peppler and Cailleteau Lakes Area (West Half), Saguenay County	A.J. Sinclair
19 - Gras Lake Area, Saguenay County	P.J. Clarke
20 - Michaud Lake Area (West Half), Duplessis County	D.S. McPhee
21 - Granby Area (West Half), Shefford, Rouville, Bagot, St-Hyacinthe, Missisquoi, and Brome Counties	T.H. Clark

22 - Prime Lake Area (West Half), Rimouski County	Jean Lajoie
23 - Matapédia - Rimouski Region, Matapédia and Rimouski Counties (1" = 2 miles)	Jacques Béland
24 - Cuoq - Langis Area, Matane and Matapédia Counties	N.C. Ollerenshaw
25 - Rivière Angers Area (West Half), Bonaventure and Matapédia Counties	W.B. Skidmore
26 - Chandler - Port Daniel Area, Gaspé-South and Bonaventure Counties	W.G. Ayrton
27 - Iles-de-la-Madeleine Area, Iles-de-la-Madeleine County	Rev. Father R. Sanschagrin

B - Mineral Deposits Branch

28 - Lake Montjoie Area, Sherbrooke, Richmond and Stanstead Counties	Pierre St-Julien
29 - Aylmer Lake Area, Wolfe and Frontenac Counties .	Gilles Duquette
30 - Northwest Quarter, Montbray Township, County of Rouyn-Noranda	Camille Thibault
31 - Southeast Quarter, Daubrée Township, Abitibi-East County	L.E. Wolhuter
32 - Southwest Quarter, McCorkill Township, Abitibi-East County	Gaston Pouliot
33 - Glen Almond Area, Papineau County	V.S. Papezik
34 - South Half, Grenville Township, Argenteuil County	A.R. Philpotts
35 - Degrosbois Area, Terrebonne County	J.I. McGerrigle
36 - South Half, Figuery Township, Abitibi-East County	J.I. Sharpe
37 - Southwest Quarter, Cléricy Township, Rouyn-Noranda County	Wm. A. Hogg

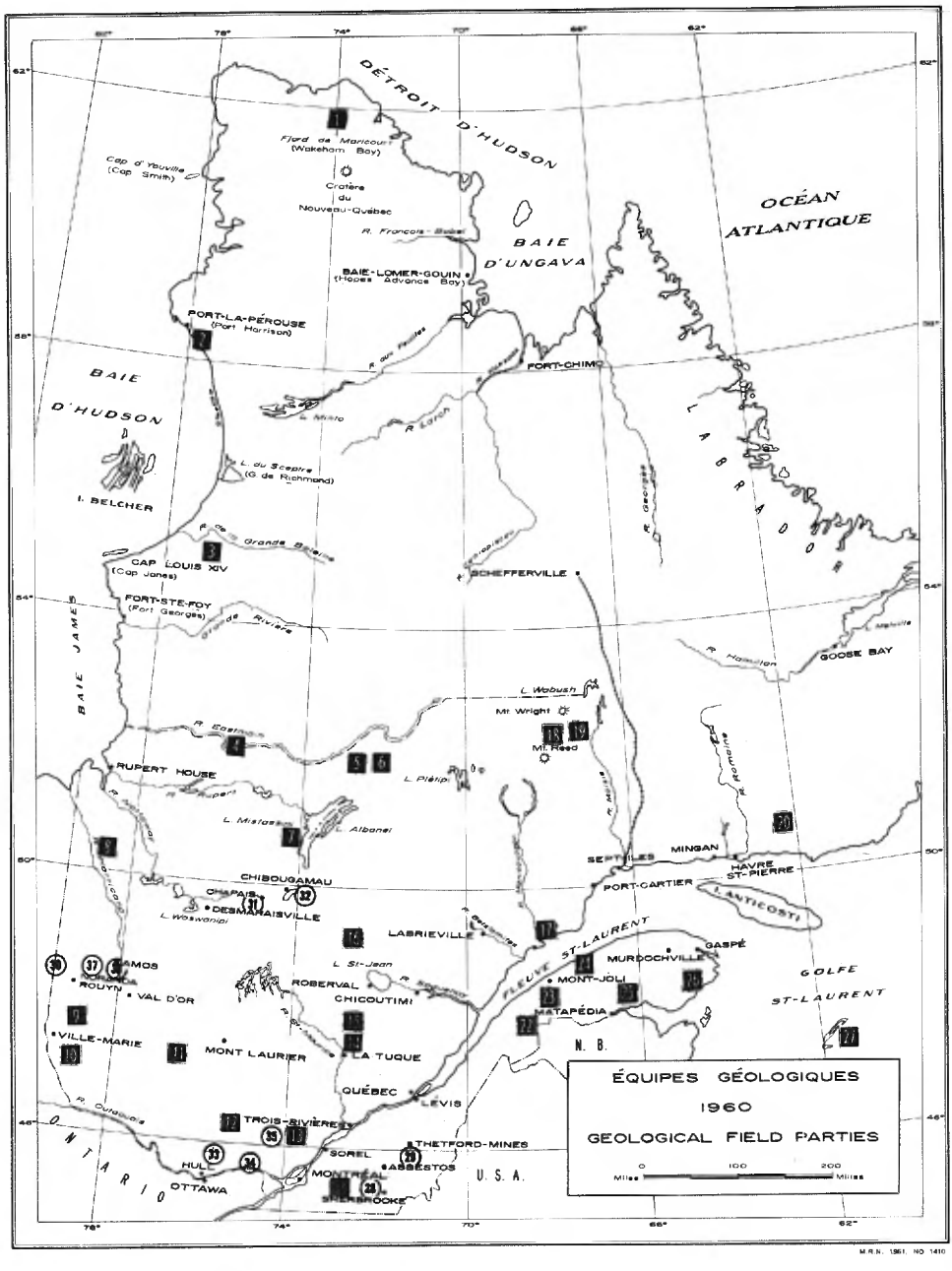


Illustration 2

GEOLOGICAL SURVEYS BRANCH

H.W. McGerrigle, chief of this Branch, reports as follows on the activities of the 1959-60 fiscal year:

At March 31, 1961, the resident staff at Quebec City comprised 14 geologists, three technical assistants and clerks, and five secretaries and stenographers. During the fiscal year, two geologists - Richard Grenier and P.-J. Lespérance - joined the full-time staff. On the other hand, five geologists left the Branch, namely: R.-A. Marleau, transferred to the Mineral Deposits Branch of the Department; D.W. Pollock and Pierre Sauvé, to accept teaching positions at Universities; P.J. Clarke, to continue post-graduate university studies; and Claude Leclerc, transferred to the prospecting division of the provincial Department of Roads. In numerical strength, the Branch's professional body thereby suffered a net decrease of three from the all-time high of 17 attained the preceding year.

The principal function of the Branch is to map the geology and explore the mineral possibilities of the Province, and to prepare geological reports and maps that give the results of these investigations. In this work, qualified geologists examine the nature, distribution, structural relations, and economic mineral possibilities of the rock formations in various sections of the Province. The published results are used extensively as guides by prospectors, geologists, and mining and exploration companies, as well as by those engaged in other activities, such as road and railway builders, hydroelectric and forestry engineers, agronomists, and sportsmen.

The 1960 field programme of the Branch comprised 27 mapping parties, establishing a new record; 26 teams were in the field during both 1959 and 1958.

This year, as in 1959, one party carried out reconnaissance mapping at a scale that will permit the publication of maps at 2 miles to 1 inch. About 600 square miles were covered, a decrease of 150 from the 750 square miles of reconnaissance mapping in 1959.

The other 26 parties mapped a total of about 9,030 square miles (about 1.5 per cent of the Province), at a scale that will allow the publication of maps at 1 mile to 1 inch. This figure, an all-time record, is an increase of 530 square miles over the 8,500 square miles mapped in 1959.

Eleven of the 27 parties were led by geologists of the permanent staff; the other 16 by geologists on part-time employment, mainly ones pursuing post-graduate research at various universities. Besides the regular mapping parties, one geologist on part-time employment supervised and assisted in certain investigations in the southern part of the Province.

In addition to the 28 geologists who headed the above investigations, the field-parties collectively employed 31 other graduate geologists as assistant-chiefs, 84 university and 12 secondary school students as junior assistants, and 70 other men (for varying periods of time) as canoemen, packers, or cooks.

The chief of Branch and four other geologists of the permanent staff were engaged in administrative, supervisory, and other duties. Most of the mapping parties were visited at least once during the field-season by one or another of this group.

The geologists in charge of investigations in 1960 and the areas mapped are as follows:-

Northern Ungava (New Quebec)

*Léopold Gélinas mapped the Watts Lake Area, which covers 425 square miles between latitudes 61°45' and 62°00' and longitudes 73°30' and 74°15'. The map-area lies almost at the northern extremity of the Province, about 30 miles south of Hudson strait and some 325 miles northwest of Fort Chimo. It straddles the northern boundary of the Cape Smith - Wakeham Bay mineralized belt near its central extent. Within the area is a large deposit of asbestos, which is being investigated by private interests with a view towards possible production.

S.M. Lee investigated the Port La-Pérouse - Normand Point area, a strip from 10 to 20 miles wide extending along the east coast of Hudson bay for some 30 miles between Harrison island and Normand point. About 400 square miles lying within the limits of latitudes 58°05' and 58°27' and longitudes 77°22' and 78°10' were mapped, although part of this work was first done by Lee in 1959 under the auspices of the McGill Carnegie Arctic Institute. Iron-bearing rocks containing widely-varying amounts of magnetite occur in the central part of the area, and small showings of asbestos are present also. It is of interest to note that small deposits of soapstone have been used extensively by the local Esquimaux as material for sculpture, of which they make a specialty.

* Indicates full-time, staff geologist

R.-J.-E. Sabourin mapped the Denys and Fagnant Lakes area which lies about 500 miles north of Val-d'Or and 40 miles southeast of Great Whale River settlement on the east coast of Hudson bay. The 250 square miles covered lies between latitudes 54°52' and 55°15' and longitudes 76°45' and 77°00'. Of most interest economically are some magnetite-bearing sedimentary rocks, but indications of copper, nickel, gold, and asbestos were noted also.

P.R. Eakins covered about 325 square miles of Natel Lake area, which is bounded by latitudes 52°00' and 52°15' and longitudes 75°30' and 76°00'. The map-area lies about 165 miles north-northwest of Chibougamau, and straddles Eastmain river about 120 miles east of its mouth in James bay. Most of the area is in New Quebec but that part south and west of the Eastmain is in Mistassini territory. Mineralization was observed at several places and, lithologically and structurally, the area appears favourable for base metal discoveries.

Mistassini Territory

As in 1959, three parties were assigned to investigate areas in the vicinity of Mistassini lake; two of these lie some 40 miles northeast of the lake, and the third borders the west shore of the lake towards its southern end. There are indications of base metal mineralization in some of the rocks of the region.

E.H. Chown mapped the Shigami Mountains area, which comprises 370 square miles bounded by latitudes 51°45' and 52°00' and longitudes 72°30' and 73°00'. The area is about 160 miles northeast of the town of Chibougamau.

T. Hashimoto covered the Hippocampe Lake area, which lies between latitudes 51°45' and 52°00' and longitudes 72°00' and 72°30'. It includes 370 square miles, and is some 170 miles northeast of Chibougamau.

P.T. Moyer investigated the St-Urcisse area, which is limited by latitudes 50°30' and 50°45' and longitudes 74°00' and 74°15'. The map-rectangle comprises 190 square miles but some 45 square miles in the southeastern part is occupied by Mistassini lake. The area lies about 50 miles north of Chibougamau.

Matagami Region

*J.H. Remick continued a programme of mapping, begun in 1959, of the westward extension of the Chibougamau - Matagami greenstone belt. This year some 1,800 square miles of the northern part of the belt and adjacent granite to the north were examined. Mineralized zones containing small amounts of pyrite, pyrrhotite, and chalcopyrite were noted at places in the greenstone rocks.

The ground investigated is in the northern part of Abitibi-East and Abitibi-West counties and the southern part of Abitibi territory. A strip - designated the Manthet - Jérémie - La Forest area - lying between latitudes 50°00' and 50°15' and extending from longitude 78°00' westward to the Ontario boundary near longitude 79°31', includes about 1,200 square miles. In addition, some 600 square miles lying within the limits of latitudes 50°15' and 50°30' and longitude 78°30' and the Ontario boundary were also mapped. Moreover, a brief reconnaissance survey was made of Palaeozoic rocks exposed to the north, chiefly along Harricana river.

The operations were supported by a Bell 47G-2 helicopter chartered for a period of 3 1/2 months during which nearly 280 hours were flown. The work was carried out from a base-camp in Martigny township, with six two-man teams working from separate fly-camps. In addition to the chief, the party included four other geologists, nine students, and four other men.

Rouyn - Noranda and Témiscamingue Counties

J.-Y. Chagnon examined the Brodeur - Basserode area, covering about 430 square miles of the 500 included within the limits of latitudes 47°25' and 48°00' and longitudes 78°45' and 79°00'. Its centre is about 40 miles south-southeast of Noranda and 25 miles northwest of Belleterre. Parts of Basserode, Beaumesnil, Caire and Clérion townships are in Rouyn - Noranda county, and parts of Bauneville, Brodeur, Blondeau, Latulipe and Villars are in Témiscamingue. Copper and lead minerals occur locally in Brodeur township, a little molybdenite was seen in Beaumesnil, and some disseminated gold and copper occur in Latulipe township.

J.-L. Robert mapped the Guay - Bruchési area, which extends between latitudes 47°00' and 47°15', from longitude 79°09' eastward to Ostaboningue lake. The map-area is about 25 miles north of the

town of Témiscamingue. It covers some 220 square miles of Témiscamingue county, including all of Guay and Bruchési townships and parts of Laperrière and Shehyn.

Pontiac and Montcalm Counties

*A.-F. Laurin mapped the Dieskau - Loubias area, between latitudes 47°15' and 47°30' and longitudes 76°15' and 76°55', about 150 miles northwest of Hull and 60 miles southeast of Val-d'Or. The map-area covers 550 square miles, of which one-third or more is occupied by the waters of Cabonga reservoir, a storage basin in the Gatineau river drainage-system. Most of the area is in Pontiac county including all of Dieskau and Loubias townships and portions of nine others, but a small part of its northeastern corner is in Montcalm.

Labelle County

D.W. Pollock investigated the Lesage - Rivard area, which lies about 60 miles north-northeast of Hull and is bounded by latitudes 46°15' and 46°22' and longitudes 75°00' and 75°30'. The area occupies 190 square miles, including parts of Bouthillier, Dudley, Rivard, Montigny, Loranger, Lesage, and La Minerve townships. Small deposits of mica, iron, sulphides and graphite were noted in the area.

Joliette, Berthier, and Montcalm Counties

*Jean Bérard examined the Cartier - Tracy area, between latitudes 46°15' and 46°30' and longitudes 73°45' and 74°00', about 60 miles north-northwest of Montreal. The area covers 210 square miles, including parts of Cathcart, Cartier, Tracy, Tellier, Gamelin, Chilton, Courcelles, and Provost townships. Traces of copper, nickel, lead, zinc, and silver occur, and also a little ilmenite.

Laviolette and Quebec Counties

*Jehan Rondot investigated the Langelier area, covering about 335 square miles of the 405 included within the limits of latitudes 47°30' and 47°45' and longitudes 72°30' and 73°00'. The map-rectangle lies about 15 miles north of La Tuque. It comprises Langelier township and parts of Payment, Adams, Dumoulin, Vallières, Malhiot, Bourgeoys, Bickerdike, and Chasseur townships. Small concentrations of iron and titanium minerals occur at the border of a massive anorthosite body.

W.D. Newham mapped the Chaumonot area, between latitudes 47°45' and 48°00' and extending from longitude 73°00' eastward to Criche river, about longitude 72°42'. The area is about 30 miles north of La Tuque and covers some 210 square miles, including Chaumonot township and parts of Papin, Lavoie, Tourouvre, Adams, and Cadieux townships. Some copper mineralization occurs at one place.

Roberval County

*F.-W. Benoit examined the Condé area, bounded by latitudes 49°00' and 49°15' and longitudes 72°30' and 73°00'. It lies about 35 miles northwest of Lake St-Jean, and covers 390 square miles, including Condé and Bourbon townships and parts of Lauberivière, Dosquet, Hubert, Damville, Hémon, Chomedey, Ramezay, Girard, and Beaudet townships. Indications of columbium and titanium minerals in some pegmatite dykes resulted a few years ago in the staking of a number of claims which have since been dropped.

Saguenay County

Pierre Sauvé mapped the west half of Castelneau Lake area, which covers 200 square miles bounded by latitudes 49°15' and 49°30' and longitudes 68°15' and 68°30'. The map-area lies some 15 miles northwest of Baie Comeau and straddles Manicouagan river not far upstream from its mouth in St. Lawrence river. Dr. Sauvé also mapped some 50 square miles of the west half of Baie Comeau map-sheet, adjacent on the south.

A.J. Sinclair mapped the west half of Peppler and Cailleteau Lakes area, which includes 305 square miles limited by latitudes 52°05' and 52°30' and longitudes 67°45' and 68°00'. The map-area lies about 145 miles north-northwest of Sept-Iles and some 25 miles northeast of the new town of Gagnon and of Jeannine lake, where the first exploitation of the huge concentrating-type iron-ore reserves of the Mount Reed - Mount Wright district has been commenced by Quebec Cartier Mining Company. The area includes most of Thury and Beaudoin townships and smaller parts of Menneval, Sevestre, Boucault, Claudel, Laussedat, and Tilly townships. Several occurrences of iron-bearing rocks in the area are large enough to be of economic interest. These are held by Quebec Cartier Mining Company, with the exception of one on claims held by Jubilee Iron Corporation Limited.

P.J. Clarke mapped the Gras Lake area, which covers 390 square miles bounded by latitudes 52°15' and 52°30' and longitudes 67°00' and 67°30'. This area is 160 miles north-northwest of Sept-Iles and about 50 miles northeast of the town of Gagnon and of Jeannine lake. It includes all of Bergeron township, most of Leduc, and smaller parts of Faber, Gueslis, Esmanville, Malapart, Cabanac, Hind and Legal townships. The area contains a number of deposits of concentrating-grade iron, most of which are held by one or another of the following companies: Quebec Cartier Mining Company; Bellechasse Mining Corporation Limited; Canadian Javelin Limited; and Conwest Exploration Company Limited.

Duplessis County

D.S. McPhee examined the west half of Michaud Lake area, which comprises 190 square miles bounded by latitudes 50°30' and 50°45' and by longitudes 62°15' and 62°30'. The map-area lies about 25 miles inland from the north shore of the St. Lawrence at a point about 180 miles east of Sept-Iles.

Shefford, Rouville, Bagot, St-Hyacinthe, Missisquoi, and Brome Counties

T.H. Clark commenced the mapping of the west half of Granby area, covering about 100 square miles of the 210 bounded by latitudes 45°15' and 45°30' and longitudes 72°45' and 73°00'. The area is in the Eastern Townships region, about 15 miles south of St-Hyacinthe. It straddles the geological boundary between flat-lying Palaeozoic rocks of the St. Lawrence lowland to the northwest and folded strata of the Appalachian uplands on the southeast.

Rimouski County

Jean Lajoie mapped the west half of Prime Lake area, which is bounded by latitudes 48°00' and 48°15' and longitudes 68°15' and 68°30' and covers 200 square miles. He also mapped about 40 square miles of the west half of Wild Goose Lake area, limited by latitudes 47°55' (the New Brunswick boundary) and 48°00' and longitudes 68°15' and 68°23'. The area lies in the Appalachian uplands some 25 miles south of the city of Rimouski, and includes Varin township and parts of Flynn, Macpès, Duquesne, Laroche and Chénier townships. The map-area is underlain almost entirely by folded sedimentary strata of Ordovician, Silurian, and Devonian ages. It is possible that some of the rocks may have structures favourable to the retention of oil or gas.

Matapédia - Rimouski Region

*Jacques Béland continued a programme, begun in 1958, of one-inch-equals-two-miles reconnaissance mapping in territory lying south of St. Lawrence river between Gaspé peninsula and the Témiscouata Lake valley. This investigation was initiated in order to obtain an overall picture of the geology of the Silurian and Devonian sedimentary rocks of that part of the Appalachian sub-province, knowledge of which was previously somewhat limited. A preliminary report on the work done in 1958 and 1959 has been issued. During the 1960 field-season Dr. Béland mapped some 600 square miles in the Ste-Blandine, Lac Prime, and Wild Goose Lake map-sheets; in addition, he revisited certain sections of the ground mapped during the preceding two years.

Dr. Béland also gave comprehensive supervision to three other parties that carried on one-inch-equals-one-mile mapping assignments in the eastern part of the Province, namely: those led by Jean Lajoie, N.C. Ollerenshaw, and W.G. Ayrton.

Gaspé Peninsula

N.C. Ollerenshaw completed the mapping, begun in 1959, of the Cuoq - Langis area, which comprises 395 square miles between latitudes 48°30' and 48°45' and longitudes 67°00' and 67°30'. During 1960 he covered about 235 square miles of the above rectangle, and mapped an additional 30 square miles in the southeastern corner of the map-sheet adjacent on the west. The map-area lies at the western end of Gaspé peninsula, some 20 miles southeast of Matane on St. Lawrence river. It includes parts of Cuoq, St-Denis, Tessier, Leclercq, Lagrange and Matane townships of Matane County, and parts of Blais, Casault, Langis, and Lepage townships, and of Lac Matapédia seigniory, all within Matapédia county. The area lies towards the northeastern end of the Appalachian uplands belt, and is underlain by two main northeast-trending units of, respectively, Ordovician and Silurian-Devonian rocks.

*W.B. Skidmore mapped the west half of Rivière Angers area, between latitudes 48°15' and 48°30' and longitudes 66°15' and 66°30'. The map-area covers 200 square miles in the southwestern part of Gaspé peninsula, some 15 miles north of Nouvelle on Chaleurs bay. It includes most of Dugal and Pilote townships and a small part of Clapperton, in Bonaventure county, and parts of Gravier and Catalogne townships in Matapédia county. The area is underlain mainly by folded sedimentary strata ranging in age from Ordovician to early Devonian, including a considerable thickness of previously unrecognized Silurian rocks.

W.G. Ayrton investigated the Chandler - Port Daniel area, which borders the coast in the southeastern part of Gaspé peninsula. It extends inland from Chaleurs bay for distances ranging from 20 to 5 miles to a northern boundary at latitude 48°25', between longitudes 64°40' and 65°00', and also includes a strip extending west to longitude 65°05', between latitudes 48°15' and 48°25'. In all, it covers about 350 square miles. It includes Newport township and parts of Raudin township and Pabos seigniory in Gaspé-South county, and parts of Port-Daniel and Weir townships in Bonaventure county. Small amounts of copper, nickel, manganese, iron, chromite, asbestos, and talc occur in various showings within the area mapped.

Iles-de-la-Madeleine

Rev. Father Roland Sanschagrin, O.M.I., mapped these islands which lie in the gulf of St. Lawrence centred near latitude 47°30' and longitude 61°45', about 130 miles southeast of the tip of Gaspé peninsula. They form a closely associated group extending in a northeasterly direction for some 60 miles, although the 7 principal islands, which are linked by sand-bars, form a chain only 40 miles long. The latter, from south to northeast, are: Havre-Aubert, Meules, Havre-aux-Maisons, Loup, Coffin, Grosse, and Est. In all, the islands comprise approximately 75 square miles. Mineral occurrences that have attracted some attention include manganese and gypsum.

Other Work

F.F. Osborne served in a supervisory and advisory capacity for geological investigations in the Appalachian region northeast of Quebec City, and also for those in regions of Grenville rocks. He also critically reviewed certain of the geological reports and maps.

The following four other geologists assisted the chief of Branch in administrative, supervisory, editorial and other duties: *Robert Bergeron, *Marcel Morin, *M.M. Ritchie, and Claude Leclerc.

During the course of the field-work, many of the mapping parties were visited by geologists, engineers and prospectors. Throughout the year many others interested in the mining industry visited the Branch's offices in Quebec City. From the staff they were able to obtain much valuable information concerning the geology of many different sections of the Province. Moreover, many inquiries and requests for information were answered by correspondence.

Some of the Branch's geologists rendered assistance to the Mineral Deposits Branch by examining and reporting on various mineral occurrences, prospects and showings in different parts of the Province.

Geologists of the Branch represented the Department and presented papers at meetings of geological, engineering, prospecting and other scientific organizations. Some of these contributions, as well as other articles, have been published in a variety of scientific journals.

Three geologists of the Branch - H.W. McGerrigle, M.M. Ritchie, and R. Bergeron - were members of the Organizing Committee for the Seventeenth Annual Conference of the Provincial Ministers of Mines which convened in Quebec City during October 16 - 19, 1960. Three staff geologists - J. Béland, M. Morin, and R. Bergeron - assisted in the organization required for the 63rd Annual General Meeting of the C.I.M. held in Quebec City from March the 19th to the 22nd, 1961.

In November, 1960, A. Laurin and J. Bérard were elected to the executive of the Geological Society of Quebec. In March, 1961, R.-J.-E. Sabourin was chosen as chairman of the Quebec City branch of the C.I.M. and W.B. Skidmore was voted a director of the same society.

MINERAL DEPOSITS BRANCH

J.-E. Gilbert, chief of this Branch, presents the following report on the activities of the Branch during the fiscal year 1960-61.

On March 31st, 1961, the permanent professional staff of the Branch comprised 15 geologists and mining engineers. To assist them, there were 39 technical assistants, clerks, draughtsmen, secretaries and stenographers. During the fiscal year, R.-A. Marleau, a graduate geologist, was transferred from the Geological Surveys Branch and took over the post of resident geologist for the district South of the St. Lawrence. Dr. P.-E. Grenier, who formerly held that post, was promoted to that of chief of the resident geologists and took up administration duties within the Branch.

The main responsibility of the Mineral Deposits Branch is to carry out detailed studies of mineral occurrences, mining properties and mining districts with a view to helping the development of the mining industry in the Province. To facilitate this work, eight

graduate geologists are stationed in the five resident geologists' offices located in Bourlamaque, Chibougamau, Montreal, Quebec and Rouyn; two mining engineers and one geologist, specialized in industrial minerals technology, are stationed in Quebec and eight part-time geologists were engaged during the year in detailed geological mapping of economically important mineral-bearing areas or on other projects. Two geologists, in the Quebec office, help with the technical editing of the reports submitted by the geologists and engineers working in the field and with the administration of the Branch.

The quantity and the value of the technical assistance given by the geologists and engineers of the Branch, to organizations and individuals engaged in exploration and development, is increasing from year to year and appears to be greatly appreciated. For instance, there were 536 calls made by geologists, engineers, prospectors and other people interested in the mining industry of the area to the office of the resident geologist of the Noranda district between March 1st, 1960, and March 1st, 1961.

The Mineral Deposits Branch is also responsible for the study of prospectuses and reports officially requested by governmental or other agencies; for the acceptance of reports, plans and diamond drill logs submitted for credit towards statutory assessment work; for the study of reports submitted in support of applications of mining concessions; and for the examination of mining properties in connection with revocation of mining rights.

The Division of Technical Documentation also comes under the jurisdiction of the chief of this Branch. A report of the functions and activities of this Division during the 1960-61 fiscal year appears under a separate sub-heading. The Technical Library Section is also attached to its jurisdiction and the report of the activities of that Section is given on page 70.

The 1960 field work of the Branch consisted of 18 different projects: geological mapping, mining properties examinations and special duties. Eleven of these were undertaken by members of the permanent staff and the seven others, by part-time geologists, mainly post-graduate students doing research work in various universities. This work enabled the geologists and engineers of the Branch to make a detailed geological survey of more than 300 square miles of important mining territory in the province, and to visit and report on 125 mining properties where exploration and development work were done in 1960.

The surveys permit the publication of maps at the scale of one inch equals 500 feet or 1,000 feet, or one inch equals one-half mile or one mile, depending on the nature of the ground and the area covered. The field work programme provided employment, in addition to the geologists and engineers mentioned above, to seven graduate geologists and engineers, 40 students employed as assistant geologists and seven other men employed as cooks or canoemen.

J.-R. Assad, resident geologist for the Chibougamau district, continued the gathering of geological data in his district in addition to visiting and mapping certain key areas in the vicinity of Chibougamau. He also visited and reported on eleven properties where exploration and development work were done in 1960. Moreover, he supervised the work of a party doing detailed geological mapping in his district and helped in the technical verification of reports prepared previously by other geologists of the Department that had done some surveys in his district.

P.-E. Bourret, senior mining engineer in charge of the Industrial Minerals Technology Division, visited 35 quarries or mining properties in the exploration, development or production stages. He collected information and advised prospectors on the value of their deposits, their production, ore dressing or marketing problems.

A.-N. Deland, resident geologist for the Montreal district, did a detailed geological survey of the ground that will be inundated by the Outaouais river, once the Carillon dam is completed. He visited and reported on five mining properties in his district and supervised the work of two geological parties operating in the Grenville and Buckingham areas. During the 1960-61 fiscal year, he also compiled data on some mineral deposits of the Montreal district such as deposits of asbestos, apatite, beryl, feldspar, titanium, chromite, etc., on the mineral resources of the Outaouais river watershed and of other sections of his district.

Jean Dugas, resident geologist for the Rouyn - Noranda district, reported on 17 mining properties in his district, where exploration and development work were carried out during the year. He also completed the geological maps of the northwest quarter of Beauchastel township, at the scale of 1,000 feet to the inch. In addition, he supervised the work of a geological party doing detailed mapping in his district and visited many areas in his district to gather geological data.

Gilles Duquette continued, during the summer of 1960, a programme of geological mapping at the scale of 500 feet to the inch, in the general area of Weedon Centre. That programme was started two years ago. Duquette mapped an area of 45 square miles in the vicinity of Aylmer lake, in Wolfe and Frontenac counties. This work gave him the opportunity to study the ore deposits discovered in the area by Solbec Copper Mines Limited and by other mining companies and to improve our knowledge of the geological, structural and mineralogical features of this section of the Eastern Townships.

W.A. Hogg, geologist attached to the office of the resident geologist for the Rouyn - Noranda district, made a detailed survey of the southwest quarter of Cléricy township during the year and mapped it at the scale of 1,000 feet to the inch. In addition to helping the resident geologist in his work, he reported on four mining properties he visited, he completed the compilation of maps, at the scale of 1,000 feet to the inch, on the west half and the southeast quarter of Preissac township, and of the southwest quarter of Duprat township.

Maurice Latulippe, resident geologist for the Val-d'Or district, completed, during the 1960 field season, the detailed geological study of a 475 square-mile area in the Amos - Barraute region, a study begun by other geologists of the Department. In addition, he visited ten mining properties and completed the compilation of the following geological maps, at the scale of 1,000 feet to the inch: Northeast Quarter of Bourlamaque Township, Northwest Quarter of Fiedmont Township, Northeast, Northwest and Southeast Quarters of Lamorandière Township, and Northwest Quarter of Louvicourt Township.

J.I. McGerrigle, geologist attached to the Montreal office, continued the detailed geological survey of the ilmenite-bearing area north of Montreal. During the 1960 summer field season, he covered the Degrosbois area in Terrebonne county, where an important titaniferous iron deposit is located. He also compiled data and worked on some mineralogical maps in his district.

R.-A. Marleau, transferred in May 1960 from the Geological Surveys Branch to the post of resident geologist for the district south of the St. Lawrence, reported on his visits to 18 mining properties located in his district and on the North Shore. He also supervised the work of two parties doing geological surveys in the Eastern Townships, helped in the technical editing of the reports of these missions, and began the compilation of mineral maps of the Gaspé Peninsula and the North Shore.

V.S. Papezik began, in 1960, a detailed geological study of the Buckingham - Derry area, in Papineau county. The area contains pegmatites, some of which may turn out to have some economic possibilities. In 1960, he covered the area between latitudes 45°40' and 45°45' and between longitudes 75°25' and 75°30', about 10 miles north of the town of Buckingham. In the map-area are located the largest feldspar deposits now being mined in Canada; there are also other industrial mineral deposits in the area that are of economic value.

Raymond Paquet, geologist attached to the Division of Industrial Minerals Technology, reported on 12 building materials quarries he visited; he also advised operators of such establishments on their production and marketing problems. In addition, he prepared a list of nickel occurrences in the Province of Quebec and organized and supervised the series of elementary courses given annually in various localities throughout the Province. He gave a course and took part in an exploration study at the camp at Les Jeunes Explorateurs, located at St-Fulgence, Chicoutimi county.

Conrad Paré, mining engineer attached to the Division of Industrial Minerals Technology, reported on 13 properties he visited during the year. His other main task was to begin a compilation of all the sand deposits of the Province and to study the beneficiation of aggregates.

A.R. Philpotts did some detailed mapping at the scale of 500 feet to the inch in a 41-square-mile area in the south half of Grenville township in Argenteuil county. This region is most interesting,from a scientific point of view, for its gneiss formations that are at the origin of the Grenville series. Graphite and mica deposits were mined in the past.

Gaston Pouliot mapped, at the scale of 1,000 feet to the inch, the southwest quarter of McCorkill township, east of Chibougamau. The area examined by Pouliot has the same rock formations as those where most of the Chibougamau copper deposits are located; there is an increased alteration in these formations as one progresses eastward toward the gneisses of the Grenville sub-province.

Pierre St-Julien continued, in 1960, a programme of detailed geological mapping in the vicinity of Magog, in the Eastern Townships. This programme was initiated in 1956. During the field season, he covered the Fraser Lake area (latitudes 45°20' to 45°25'

and longitudes 72°05' to 72°10'), in Shefford and Stanstead counties. The discovery of some fossils and of some mineralized zones in the area added a most fascinating interest to St. Julien's survey.

J.I. Sharpe, geologist attached to the Bourlamaque office, made a detailed geological survey of the south half of Figuery township and of the southwest quarter of Landrienne township, in Abitibi-East. In the fall of 1960, Sharpe's services were loaned to the Montreal office to enable him to pursue his post-graduate studies toward the obtention of his Ph.D. degree.

Camille Thibault completed, in 1960, the detailed geological mapping of Montbray township in Rouyn - Noranda county. This study has supplied valuable information on the geological formations, the structure and the mineralization of this township.

L.E. Wolhuter continued during the year the mapping, at the scale of 1,000 feet to the inch, of the geology of the vicinity of Chapais, in the Chibougamau district. He covered the southeast quarter of Daubrée township. His work made possible the differentiation of various units in the Opemisca series and made available some new information on the structure and the mining potential of the area.

Two geologists, P.-E. Grenier and G.-G. Grondin, and a mining engineer, G.W. Waddington, the latter in the service of the Branch for a six-month period, helped the Chief of the Branch during the year by doing the technical edition of some reports and by taking over some administrative and supervisory duties. All the survey parties were visited during the summer by either the Chief of the Branch or by Dr. Grenier; the resident geologist offices were also visited at least once.

The Chief of the Branch, Dr. Grenier, and a few other employees were engaged in the organization of the General Annual Meeting of the Canadian Institute of Mining and Metallurgy that was held in Quebec in March 1961. Other members of the staff contributed to the organization of the Provincial Mines Ministers Conference held in October 1960.

Division of the Economy of the Laws

J.-L. Pouliot, mining engineer, Chief of this Division, reports that, during the year under review, 126 geological plans and reports, 293 geophysical plans and reports and 251 diamond drilling

reports were examined for credit towards statutory assessment work. In addition, the Quebec Securities Commission sent in 83 reports and prospectuses for study and comment. Ten reports submitted by engineers in support of applications for mining concessions were also examined. The following table, giving the annual inflow of reports since 1957, shows that there has been a marked reduction in the mining exploration in the Province during the 1960-61 period.

Table VI - Comparative Totals of the Number of Reports Received during the Years 1957 to 1961

Types of Reports	1957	1958	1959	1960	1961
Geological	194	93	121	71	126
Geophysical	567	270	301	458	293
Diamond drilling	491	312	236	288	251
Quebec Securities Commission	207	144	189	139	83
Mining concessions	3	4	4	8	10

Prospecting Courses

To arouse greater interest in the search for economic minerals throughout the Province, the Department has charged the Mineral Deposits Branch with the responsibility of presenting a series of elementary lectures, in either French or English, on general geology and prospecting in nine different localities in the Province.

These courses, organized by Raymond Paquet, consisted of nine lectures given in each locality; four lectures dealt with the identification of rock and minerals. The lecturers were: J.-R. Assad, G.-G. Grondin, A.-N. Deland, Wm. A. Hogg, Maurice Latulippe and Raymond Paquet, all members of the staff.

The following list gives the average attendance in each of the localities where the course was given:

Cabano	6	Noranda	22
Chandler	12	St-Adolphe (Argenteuil)	13
Jonquière	30	Ste-Hélène (Kamouraska)	32
Morin Heights	20	Val d'Or	18
La Tuque	32		

P.-E. Grenier gave four lectures on the Quebec Mining Act at the Faculty of Sciences, Laval University, to a group of prospectors following the annual advanced prospecting course.

Division of Technical Documentation

The Division of Technical Documentation supplies prospectors, mine operators and the general public with technical information related to the mining industry of the Province and to the operations of producing mines. It is responsible for the gathering, classification and indexing of all the technical data concerning the mineral deposits, the development work and all other information related to the mining industry of the Province.

François Baby, chief of the Division, submits the following report for the fiscal year 1960-61:

a) Number of requests for information on mine operators	1,261
b) Number of requests for information concerning the mining industry of the Province	533
c) Number of requests pertaining to mineral technology	128
d) Number of requests pertaining to mining properties in the Province	820

During the period under review, the personnel continued the reclassification of the already filed reports and plans pertaining to exploration and development work done in the Province, a task undertaken in 1957; 1,800 of these documents were reclassified.

For the purpose of obtaining a collection as complete as possible of the publications prepared by mine operators for the benefit of their shareholders, requests were sent to 2,061 operators who, directly or through subsidiary companies, hold mining rights in the Province.

A system of examination of technical magazines was implemented during the year. This allows the Division to check quickly the technical information pertaining to new developments in the field of mineral technology.

The Division has continued the compilation and edition of monthly summaries of the progress of the mining industry. These

summaries are sent to the officers of the Department for their personal information. A system of compilation of information on punched cards was set up during the year.

There was a considerable increase in the number of documents received by the Division during the year. This number is made up of the following:

a) Documents pertaining to mining properties		
	reports	1,361
	plans	2,746
b) Mining company annual reports to shareholders .		1,306
c) Reports of inspection by officers of the Department		366
d) Documents pertaining to mineral technology		836
e) Newspaper clippings on mining companies		3,264

Members of the Division have also prepared, in 1960-61, the texts of advertisements and articles published in various technical newspapers and magazines, in the national and the foreign press.

GROUNDWATER, GAS AND PETROLEUM BRANCH

Roland DeBlois, chief of this Branch, submits the following reports for the fiscal year 1960-61.

At March 31st, 1961, the technical personnel at the Quebec office comprised five engineer-geologists and three technical assistants. In addition, a geologist, employed on a part-time basis, examined samples collected during drilling operations for gas and petroleum. Also, an inspector supervised,in the field, the various works involved in the search for gas and petroleum and made a survey of private water and gas wells in regions. He also met a large number of well drillers who collaborated closely with him by filling our drilling forms, through which we have already acquired a knowledge of certain general hydrological characteristics of a few regions of the Province.

Re-classification of all the already-filed reports and plans was initiated during the year.

Hydrogeology

This Division of the Branch did some surveys and conducted some experimental and theoretical research work in hydrogeology. Three engineer-geologists, specialists in hydrogeology, and three technical assistants form the personnel of this Division.

The main function of this Division is to help municipalities, aqueduct operators and public institutions find an adequate underground water supply, whether for new installations or for existing ones that no longer satisfy present needs.

In order to give the required services, the personnel follows, in the field, a two-step procedure;

a) A geological map of the areas concerned is compiled in order to find adequate water-storing strata, with emphasis, in most cases, on the study of Pleistocene formations.

b) Tests are then conducted to assess the water potential of these formations, such as permeability, porosity and transmissibility tests, drilling and pumping tests, etc.

The Division has kept up during the year its experimental and theoretical research work, by studying mainly the partial penetration of aquiferous formations. Results of last year's studies on transmissibility were successfully applied in the field.

Raymond Roy, Claude Grenier and Roland DeBlois made 51 hydrogeological surveys in the following counties: Abitibi-West, Arthabaska, Bellechasse, Berthier, Bonaventure, Chambly, Champlain, Charlevoix, Dorchester, Frontenac, Iles-de-la Madeleine, Kamouraska, Laval, Lévis, L'Islet, Lotbinière, Montmagny, Missisquoi, Portneuf, Quebec County, Rimouski, Rivière-du-Loup, Roberval, Rouville, Stanstead, Terrebonne and Yamaska.

Petroleum and Natural Gas

The main function of this Division is to help, in their research, all those who are drilling for petroleum and natural gas. To this end, drill cores and samples are studied to establish some correlation between the various geological formations encountered. Engineers

measure all important flows of gas, both as to volume and pressure. They follow the operations closely and make sure that the regulations are adhered to. All the important drilling data is recorded and card-indexed: thus it becomes possible to obtain, in a minimum of time, all the essential information on one or all the drilling operations.

The Division has prepared a report giving all the pertinent information on the wells drilled to date, for petroleum and natural gas, in the Gaspé peninsula, and a map showing the well sites.

During 1960-61, five companies drilled eight wells, for an aggregate of 4,495 feet of drilling. In addition, three companies had geological parties working in the Gaspé - Rimouski region. There was an intense revival of interest in the search for natural gas in the St. Lawrence Lowlands, following the discovery of a very large gas flow on the property of the Fathers of the Sacerdotal Brotherhood, at Pointe-du-Lac.

Paul-P. Simard and Michel Houde followed drilling, gave all the technical assistance requested and also examined the samples of many drilling operations and indexed all the data covering the work done. During the winter season 1960-61, Paul-P. Simard was granted leave of absence to complete his studies in Petroleum Engineering, at the University of Tulsa, Oklahoma. Michel Houde completed the revision of the geological map of the St. Lawrence Lowlands, a region that has a particular interest for petroleum companies.

T.H. Clark made a detailed geological analysis of the samples obtained from drilling operations, in the St. Lawrence Lowlands, and collaborated in the revision of the geological map of the region.

One inspector watched the drilling operations and collected information on gas flows in many localities.

DIVISION OF EDITING AND PRINTING

Maurice Brunet, chief of this Division, submits the following list of the publications edited and printed during the fiscal year 1960-61. All the publications have been issued in French and in English; the Division is responsible for the translation of these publications.

Geological Reports

No. 95 - South Half of McKenzie Township, J.R. Smith and G. Allard

No. 96 - Wacouno - Waco Area, Roger-A. Blais

Preliminary Reports

No. 421 - Raimbault River Area, J.V.G. Bray

No. 422 - Stukely Area, John I. Sharpe

No. 423 - Pommeroy - Bellefeuille Area, R.-J.-E. Sabourin

No. 424 - Turquetil - Emard Area, André Laurin

No. 425 - Southeast Quarter of Barlow Township, Edwin E. Gaucher

No. 426 - Chomedey - Paquet Area, F.-W. Benoit

No. 427 - Guyon Area, P.T. Moyer

No. 428 - Southeast Quarter of LaMotte Township and Southwest Quarter of Lacorne Township, P.R. Brett

No. 429 - Antoine Area, J. Berrangé

No. 430 - Rimouski - Matapédia Area, J. Béland

No. 431 - Ste-Adèle Area, J.I. McGerrigle

No. 432 - Gould Area, Gilles Duquet

No. 433 - Geology of Mount Megantic, A.M. Reid

No. 434 - Southeast Quarter of Lévy Township, L.E. Wolhuter

No. 435 - Laflamme Lake Area, G.H. Beall

No. 436 - General Report of the Minister of Mines of the Province of Quebec for the Year Ending March 31st, 1960

No. 437 - Southwest Quarter and Part of the Southeast Quarter of Lemoine Township, P.-A. DeMontigny

No. 438 - Hippocampe Lake Area, T. Hashimoto

No. 439 - Fraser Lake Area, Pierre St-Julien

No. 440 - Shigami Mountains Area, E.H. Chown

No. 441 - Lesage - Rivard Area, D.W. Pollock

No. 442 - Lomer Gouin Bay Area, D.P. Gold

No. 443 - Description of Mining Properties Visited in 1959, Geologists of the Department of Mines

No. 444 - Glen Almond Area, V.S. Papezik

Preliminary Reports (Cont'd.)

No. 445 - Port-la-Pérouse - Normand Point Area, S.M. Lee

No. 446 - South Half of Figuery Township and Southwest Quarter of Landrienne Township, J.I. Sharpe

No. 447 - Chandler - Port Daniel Area, W.G. Ayrton

No. 448 - Prime Lake (West Half) Area, Jean Lajoie

No. 449 - Cartier - Tracy Area, J. Bérard

No. 450 - Langelier Area, J. Rondot

No. 451 - Peppler and Cailleteau Lakes Area, (West Half), A.J. Sinclair

No. 452 - Dieskau - Loubias Area, A. Laurin

No. 453 - Gras Lake Area, P.J. Clarke

Special Series

S-53 Information on Wells drilled for Petroleum and Gas in the Gaspé Peninsula, A. DeBlois, P.-P. Simard and M. Houde

S-54 Descriptive Notes to accompany the Compilation of the Geology of the Southwest Quarter of Duprat Township, Wm. A. Hogg. (Bilingual)

S-55 Descriptive Notes to accompany the Compilation of the Geology of the Northwest Quarter of Preissac Township, Wm. A. Hogg. (Bilingual)

S-56 Descriptive Notes to accompany the Compilation of the Geology of the Southwest Quarter of Preissac Township, Wm. A. Hogg (Bilingual)

S-57 Regulations for the Safety and Protection of Workmen in Mines and Quarries (Bilingual)

S-58 List of the Principal Operators and Owners of Mines and Quarries in the Province of Quebec, 1961 (Bilingual)

S-59 Descriptive Notes to accompany the Compilation of the Geology of the Northwest Quarter of Beauchastel Township, Jean Dugas (Bilingual)

The Mining Industry of the Province of Quebec in 1959.

This Division was also responsible for the printing of 468 forms, circulars, and special reports on fatal accidents. These totalled 406,730 copies.

DIVISION OF DISTRIBUTION OF PUBLICATIONS

The personnel of this Division, under Noé Lamontagne, sent out 58,203 publications upon requests for information on the geology and the mineral resources of the Province, 49,747 publications to exhibitions, and 16,840 publications distributed according to the regular mailing lists. The total distributed aggregated 124,790 publications.

This last figure exceeds, by nearly 10 per cent, the total of 113,099 publications distributed during the fiscal year 1959-60.

LABORATORIES BRANCH

The Laboratories Branch comprises the following divisions:

I - Laboratories for mineralogical and metallurgical research;

II - Laboratories for analyses and assays, established at Quebec and Montreal;

III - Elementary courses in prospecting given to university students in the Province.

The director of this Branch is Maurice Archambault and his assistants are: Henri Boileau, chief chemist; Jean Girault, mineralogist and chief petrographer; and Fernand Claisse, chief physicist, employed on a part-time basis.

I - Mineralogical and Metallurgical Research Laboratories

The mineralogical and metallurgical research laboratories have been established "to favour the utilization of the mineral wealth with which the Province is endowed, and the establishment, in the Province, of plants for processing same". In conformity with the dispositions of the law, the research work carried out during the fiscal year was centered on:

a) technical assistance to prospection;

b) perfection or improvement of methods of chemical or physical analyses;

c) chemical extraction of columbium;

d) dust removal in asbestos fibres;

e) various processes of extracting lithium from its ores;

f) use of ultrasonic vibrations in flotation;

g) decrepitation of spodumene;

h) valorization of peat;

i) valorization of the tailings obtained in the treatment of lithium ores;

j) production of zinc hydrosulphite;

k) elimination of chromium, vanadium and magnesium present in ilmenite.

Project No. 8:- Claude Frémont pursued his theoretical study and his construction of a magnetometer small enough to be lowered into a drill hole. This instrument would make it possible to measure the variations of the earth's magnetic field at various depths. During the year, his work was centered on:

a) the theoretical and practical study of new transistorized electronic circuits to supply power to the detector;

b) the suspension of the detector in the magnetometer;

c) a particular system of wiring the exciting, amplifying and detecting circuits so as to limit their interaction. This work, in progress since October 1949, is very complex because of the very small size of the proposed apparatus.

Project No. 116:- Fernand Claisse, with the help of Claude Samson, did a mathematical and experimental study of the relations between grain sizes and the intensity of the X-rays they emit under fluorescence. They concluded that, whenever the samples submitted are powdered, very accurate results could not be expected.

Project No. 122:- Paul-E. Gagnon, Yvon Laflamme and François Simonyi pursued their study on the chemical extraction of columbium from ores found in the Oka region; their report includes 58 new references.

Drs. Gagnon and Laflamme having left the Department during the year, François Simonyi is continuing the work alone. At present, he is using ion exchanger resins.

Project No. 128:- Ls-P. Bonneau obtained new patents on an air separator that he invented, the property of which he transferred to the Department. This apparatus can serve either to remove the dust from the asbestos fibres before bagging or to sort solids according to their sizes, densities or shapes.

Project No. 129:- Maurice Archambault and Charles-A. Olivier continued their work on the pyrometallurgical treatment of lithium ores by means of metallic sulphides, sulphur or their derivatives. Their invention is protected by patents in Canada, the United States, England, Germany, France and Belgium. They have other patents pending to cover improvements to the original process.

Project No. 130:- Maurice Archambault and Charles-A. Olivier pursued their research on the sulphurization of lithium ores. They investigated a pyrometallurgical process of lithium extraction that would have the economic advantage of utilizing the heat given by the basic reactions of the process or that spent to transform the Alpha spodumene to the Beta.

Project No. 131:- Henry V. Zaruba did some research work to improve the emulsions used in conditioning ores before their flotation. Using ultrasonic vibrations, he was able to produce stable emulsions that are more efficient than those produced by conventional methods.

Project No. 132:- Jean Girault and Frederic Abesque studied various synthetic products obtained from the same reactive mixture used in replacing lithium by sodium in lithium-bearing minerals.

Project No. 133:- Jean Girault investigated the behavior of spodumene during calcination and looked for new means to determine the degree of transformation of Alpha spodumene into Beta spodumene. He found that the two could be separated by centrifugal action in liquids having suitable densities.

Project No. 141:- Silien Dessureaux and Jean Girault studied the effect of various substances, and in particular that of 8-hydroxyquinolein, on the valorization of a pyrochlore-bearing ore sent by St. Lawrence River Mines Limited.

Project No. 142:- Joseph Risi, helped by Raymond Brindamour, pursued his research work bearing on the outmost valorization of the peats of the Province. Experiments have established that the oxidation mechanism of peat, under fixed conditions of temperatures and time, is entirely different from that of coal. On the other hand, they have obtained an almost pure aliphatic bicarboxyl acid, with a recovery of 20 per cent. From this stems the totally unexpected possibility of using our peat as the raw material for our chemical industry.

Project No. 143:- Maurice Archambault, Charles-A. Olivier, J.J. Panneton and P. Fortier continued their research on the transformation of lithium ores into carbonate, fluoride, phosphate and stearate. Two series of patents have been applied for, one for the group and the other in the name of Maurice Archambault.

Project No. 144:- Maurice Archambault, Charles-A. Olivier, Henri-Paul Lemay and Michel Savard continued their research to find an economic process to extract the sodium contained in some residues of the chemical treatment of lithium minerals, in order to regenerate and utilize again the chemical products used in this treatment. Two processes have been found, for which two series of patents have been applied for in various countries: one, a group patent, the other, in the name of Maurice Archambault.

Project No. 145:- Maurice Archambault and Charles-A. Olivier pursued their tests to extract gallium and alumina from certain residues of the treatment of lithium-bearing minerals. They have also completed an investigation on the possibility of obtaining directly lithium tetraborate by the hydrothermal treatment of certain lithium-bearing minerals. This process is presently protected by applications for patents in Canada and the United States.

Project No. 146:- H. Boileau and N. Zaprianoff kept up their research on the devising of quick and accurate methods for the chemical analysis of silicates. In spite of considerable difficulties brought about by a reduction in personnel, they succeeded in perfecting a new method, as accurate as the conventional ones, by which lime, magnesia and manganese can be determined in less than six hours, and soda, potash and lithia, in less than one hour.

Project No. 147:- Maurice Archambault and Charles-A. Olivier have instituted a research programme on the production, either directly or indirectly, of zinc hydrosulphite, using, as raw materials, sulphide concentrates produced in the Province. There is a large demand for zinc

hydrosulphite as a whitening agent in the manufacture of certain types of quality paper.

Project No. 149:- Maurice Archambault and Henri-Paul Lemay examined the ilmenite concentrate and the titanium slag produced by Quebec Iron and Titanium Corporation, at Sorel, to find means of eliminating the chromium, vanadium and magnesium present in them.

Services to Other Departments

As it has been done for the past few years, the division of physics has analysed, during the year, 72 dust samples submitted by the Department of Health. With the results, specialists of that Department can ascertain whether these industrial dusts contain harmful substances and can take steps to protect persons exposed to them.

In co-operation with the Agricultural Research Council of the Department of Agriculture, our laboratories tested a certain number of soil samples during the year. This work is included in our research project No. 139. It is part of a comprehensive testing of all soils of the Province by the most varied methods and this could lead to most interesting results in the fields of agriculture, animal breeding, industry and perhaps even in prospecting.

Upon request from the Department of Industry and Commerce, the services of François Simonyi were placed at the disposal of a manufacture where cast iron pipe will be made by centrifugal action to help this industry, which is new in the Province, get off to a good start.

II - Laboratories for Analyses and Assays

This Division includes the main laboratories located at Quebec, and the laboratory at Montreal located in École Polytechnique, 2500 Guyard Avenue. During the fiscal year reviewed, the laboratories received a total of 14,459 samples which were subjected to 66,753 analyses and tests. This last figure represents quantitative chemical and flame photometric analyses, determinations by microscope, optical spectrograph, and X-ray fluorescence, radio crystallographic determinations and radioactivity measurements. The work was distributed as follows:

Table VII - Summary of Analyses and Assays

	Laboratories		Total
	Quebec	Montreal	
Samples received	12,671	1,788	14,459
Quantitative analyses	27,516	3,928	31,444
Semi-quantitative analyses	5,067	-	5,067
Research analyses	8,783	-	8,783
Mineralogical and petrographic determinations	17,752	-	17,752
X-ray examinations	3,673	-	3,673
Radioactivity tests	34	-	34
Total	62,825	3,928	66,753

Laboratories at Quebec

In addition to the mineralogical and metallurgical research division mentioned above, the laboratories include: 1) a Division of Mineralogy and Petrography; 2) a Division of Physics; 3) a Division of Chemistry; 4) a Division of Metallurgy.

Division of Mineralogy and Petrography

The functions of this Division are to study and to do the mineralogical and petrographic identification of specimens sent to the laboratories and the preparation of reports thereon; to channel the samples received towards the appropriate laboratory according to the nature of the samples and the work requested; to supply information on mineral substances to persons requesting it; and to collaborate in certain research projects. The following list summarizes the activities of the Division:

Mineralogical determinations	17,752
Letters sent	1,072
Answers to verbal inquiries	507
Thin sections and polished sections studied under the microscope	115

It should be noted that several hundreds of mineral and rock samples were identified at the request of various schools of the Province.

The preparation of rock and mineral collections, under René Bureau, is also a responsibility of this Division. The requests for and the preparation of these collections remained at a high level again, as shown in the following table.

Table VIII - Collections of Minerals and Rocks

	Years 1952-60	Year 1960-61	Total
Mineral collections	6,379	1,100	7,479
Rock collections	3,453	601	4,054
Small fragments of minerals	3,133	400	3,533
Small fragments of rocks	2,955	250	3,205
Total	15,920	2,351	18,271

Attention is constantly given to the highest quality of samples. Every time a mineral or rock sample is found to be highly satisfactory, efforts are made to obtain it in as large a quantity as possible (even a few tons of it) to ensure an adequate supply for many years to come. This year, 16,262 pounds of minerals and rocks was added to our reserves. Part of this total was sent in by mining companies; the remainder was gathered in the field by Stephen Lakatos.

Special Assignments

The mineralogists collaborated in various research projects, namely Nos. 132, 133 and 141, and gave assistance in certain projects carried out by the Pilot-plant Branch. When needed, mineralogical and petrographic studies are done for other divisions. Thus, the chemical study of a sample will help the sender to establish its genetic relations with the other rocks of the area.

Division of Physics

This Division performed 14,641 analyses distributed as follows:

Spectrography	10,296
Radiocrystallography	3,673
Radiospectrography	638
Radiometry	34

Included in the above figures are 2,368 analyses related to various research projects and 72 analyses of dust samples submitted by the Department of Health.

As in the past, part of the activities of the Division was aimed at the improvement of some methods of analysis. For example, the personnel of the spectrographic laboratory tackled the problem of the quantitative determination of elements present in extremely small quantities (as low as 0.0001 per cent). The radiospectrography laboratory studied the perfection of a method to determine quantitatively the amount of elements present in small quantities; it also studied the influence of the type of instruments used on the accuracy of the analyses.

Division of Chemistry

The level of activity of this Division was sensibly the same as it had been during the previous fiscal year. There were 22,363 quantitative analyses performed, most of them in duplicate. Of this total, 6,020 were routine analyses, 8,174 research analyses, and 8,169 analyses for precious metals. Among the special analyses, mention should be made of the complete analysis of a rock specimen and one of crude petroleum.

As mentioned under the heading "Research Laboratories", Henri Boileau and N. Zaprianoff perfected a rapid and accurate method of quantitative analysis, for lime, magnesia, manganese, soda, potash and lithia.

Division of Metallurgy

This Division is pleased to report its contribution to the installation and the tune-up of the first lithium refinery in Canada, the third one in North America, that of Quebec Lithium Corporation, near Barraute. This plant is presently in operation at the rate of 1,500 tons of lithium carbonate per year, producing an extremely pure substance. Paul Fortier and J.-J. Panneton spent a few months with the company technicians, to help them. In the meantime, Charles-A. Olivier, P.-H. Lemay and M. Savard, in Quebec, did the laboratory tests necessary for the proper operation of the refinery. The process involved was found and perfected in the laboratories at Quebec.

III - University Courses on Prospecting

Nearly every year, the Department sponsors six-week courses on prospecting, given either at Université Laval or at École Polytechnique in Montreal, or at both institutions. The aim of these courses is to give those following a full university course a good grounding in geology, mineralogy and chemistry, and to make them familiar with prospecting methods. Since the inception of these courses in 1947, 617 persons have received diplomas attesting that they have completed the course in a satisfactory manner. The knowledge acquired by the graduates has profited either them or their employers. The accompanying graph shows that the number of students has been on the increase during the last few years.

Reverend J.-W. Laverdière, at Université Laval, and Professor Pierre Maufette, at Montreal, were given charge of these courses.

GRADUATES OF UNIVERSITY PROSPECTING COURSES
FROM 1947 to 1960

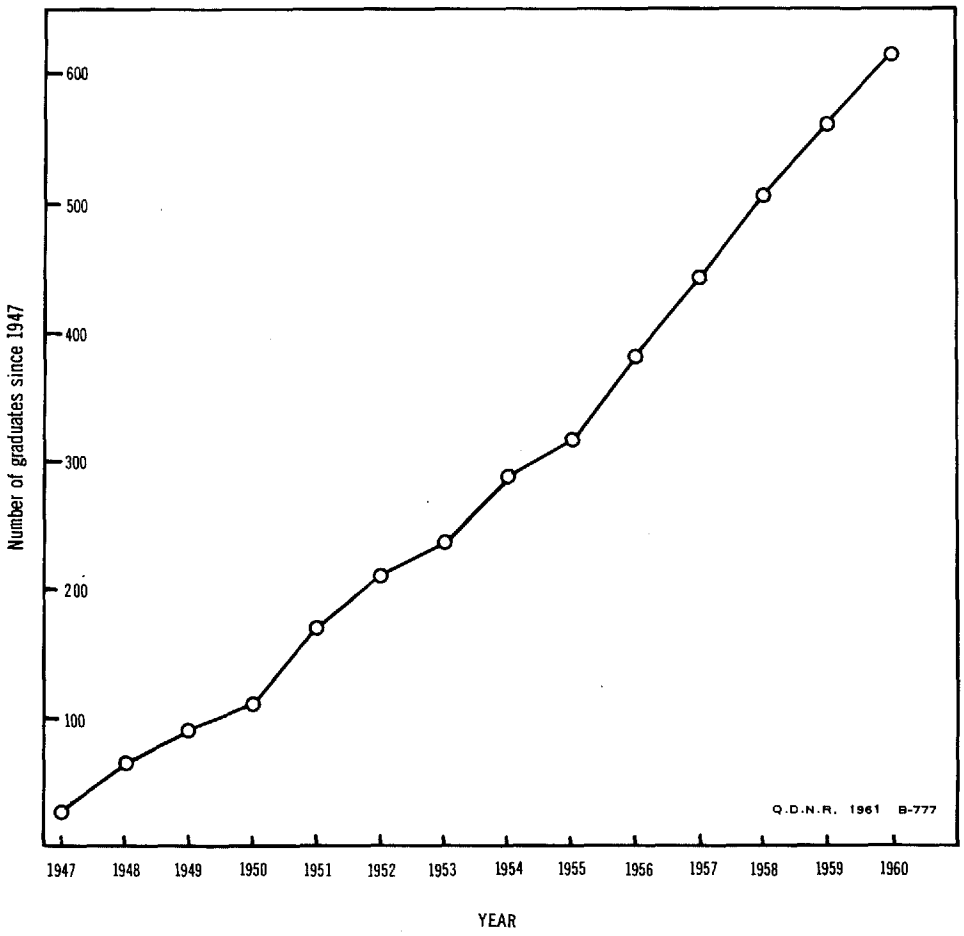


Illustration 3

CIVIL ENGINEERING BRANCH

This Branch, under L.-A. St-Pierre, P. Eng., is made up of two divisions:

a) Division of Mine Roads; b) Division of Mine Villages.

a) Division of Mine Roads

During the fiscal year 1960-61, the Department of Mines signed an agreement with the Federal Government allowing participation in the federal-provincial aid programme for access roads to natural resources. This agreement resulted in the quickening of the work tempo on construction projects in progress and made it possible to complete 78.8 miles of new roads. The total length of gravelled roads, built to date by the Department, has grown to 1,695.8 miles. The expenses incurred during the year, including the amounts received for the construction, improvement and completion of mine roads, together with bridges, amounted to $7,317,507.30, for a total expenditure of $42,379,641.42 since 1925.

Budget for 1960-61

Ordinary budget	$ 2,500,000.00
Supplementary budget	3,570,000.00
Amount received from Mattagami Lake Mines Limited	500,000.00
Amount to be received from the Federal Government	747,507.30
	$ 7,317,507.30

Table IX - Summary of Projects of the Mine Roads Division for the Last Three Years

Designation of Projects	1958-59	1959-60	1960-61
New construction, distance in miles:			
a) gravel roads	24.2	52.3	78.8
b) winter roads	50.0	40.0	-
Improvement to roads: distance in miles	-	15.6	6.3
Permanent bridges, number	-	-	3.
Maintenance by the Department, distance in miles	278.2	309.0	350.0

Table X - Construction of New Gravel Roads (before federal-provincial agreement)

Name of road	Total Length (Miles)	Total Amount of Contract	Payments 1960-61	
			To Contractor	Supervision and Materials
Chapais to Desmaraisville Dolomieu and Saussure townships	12	$ 735,000.00	$ 734,998.93	$ 17,212.86
Amos - Lake Matagami	49	3,269,673.29	3,269,673.29	111,493,94
Murdochville - Lake Ste-Anne	4.5	300,000.00	299,996.05	31,682.05
Big Town Copper mine road Courville township	1	3,500.00	3,221.73	-
Cameron mine road Lots 27-B and 28-B, Range IX, Buchingham (West) township	1	2,519,00	2,519.00	-

Table XI - Construction of Northeast Approach to Permanent Bridge on the Bell River

Length of Approach	Total Amount of Contract	Payments 1960-61	
		To Contractor	Plans and Supervision
57 feet	$ 39,740.96	$ 19,661.19	$ 4,531.12

Construction of two dwellings for the Department in Chibougamau.

Total amount of contract	$ 48,574.00
Payments to contractor, 1960-61 ...	48,574.00
Payments for professional fees	1,280.00

Table XII - Construction of New Gravel Roads in Co-operation with Federal Government

Name of Road	Total Length (Miles)	Total Amount of Contract	Payments 1960-61		Progress of Work (Per Cent)
			To Contractor	Plans and Supervision Materials	
Amos - Lake Matagami	60	$2,132,190.06	$1,064,944.83	$131,814.27	60
Access road to future village of Matagami	5.3	243,247.40	203,911.07		90

Note: Amount receivable from Federal Government for 1960-61: $ 578,818.35

Table XIII - Construction of Permanent Bridges

(Federal-provincial agreement: access roads to natural resources)

Name of River	Length of Approach	Total Amount of Contract	Payments 1960-61		Progress of Work (Per Cent)
			To Contractor	Plans and Supervision	
Harricana	292	$ 151,512,95	$ 38,655.40	$ 6,736.10	20
Coigny ..	275	329,445.63	206,173.42	35,622.09	60
Allard ..	493	263,898.00	98,474.53	9,441.54	40

Note: Amount receivable from Federal Government: $ 159,737.75 (1960-61)

List of roads maintained in 1960-61

a) Continuous maintenance from April to December

County	Designation of roads
Abitibi-East and Roberval	Chibougamau and vicinity
Abitibi-East	Senneterre - Waswanipi river road, via Desmaraisville, from Taschereau river
Abitibi-East	Amos - Matagami Lake road, a 20-mile length
Gaspé-North	Link road from Murdochville to the Ste-Anne-des-Monts - Cascapédia road

b) Occasional maintenance

County	Locality	Designation of roads
Mégantic	Tring Junction	Carey Asbestos mine road
Abitibi-East	Obalski Township	Obalski mine road
Labelle	Guenette	Melrose granite quarry road
New Quebec	Fort Chimo	Road from Fort Chimo to Stewart Lake
Mégantic	Thetford Mines	Flintkote mine road

Projects under study (Federal-provincial agreement: access roads to natural resources)

Reconnaissance, preliminary and final surveys were made for the following projects for roads and bridges by the Division in co-operation with consulting engineers.

a) Projects for roads

Desmaraisville - Chapais road: a length of road between the Chibougamau and Waswanipi rivers.

Access road to the future village of Matagami.

Completion of the Amos to Matagami Lake road.

b) Projects for bridges

Across Waswanipi river	(Desmaraisville - Chapais road)
Across Chibougamau river	(Desmaraisville - Chapais road)
Across Renault river	(Desmaraisville - Chapais road)
Across Little Waswanipi river	(Desmaraisville - Chapais road)
Across St-Dominique river	(Amos - Matagami Lake road)
Across Panache creek	(Amos - Matagami Lake road)

A project for a bridge across Two Moose river was also prepared. This bridge is located in an already-completed section of the Chapais - Desmaraisville road.

Division of Mine Villages

As a whole, the economic situation in the mine villages improved to some extent during the year reviewed. The following is a short summary of their situation:

Belleterre

Since the cessation of mining operations at Belleterre Quebec Mines in March 1959, the population of Belleterre has been greatly reduced. Many houses are boarded up, and about a hundred have been moved to the residential centers of the surrounding farming communities.

Bourlamaque and Val-d'Or

The combined population of the twin cities of Bourlamaque and Val-d'Or is more than 13,000. Val-d'Or has 9,870 inhabitants, of whom 86 per cent are of French descent, 2 per cent, of British descent and the remaining 12 per cent, of various other racial origins.

In Val-d'Or, home building was rather active and consisted of 30 new buildings providing accommodation for 46 families. A new street was opened. In Bourlamaque, 30 new buildings were erected.

Cadillac

The important developments taking place at Preissac Molybdenite Mines Limited could give rise to renewed activity in the town of Cadillac.

In addition, the town council built a recreation center and a park with an artificial pond. It improved the appearance of the vacant lots at the entrances of the town, thus stimulating the townspeople's pride. Only one new residential building was constructed. It is worthy of note that the municipal debt contracted for municipal work will be completely liquidated in March 1961. The population numbers 1,197 souls.

Chapais

The town population of Chapais is still on the increase, numbering presently 2,800 souls. Home building was maintained at a satisfactory rythm: about twenty homes for the employees of Opemiska Copper Mines (Quebec) Limited, a few private dwellings, two commercial buildings and a new school, the Dominique Savio College.

In accordance with the stipulations of Act 1-2, Elizabeth II, Chap. 24, the Chapais town council appointed in 1955, ended its term of office in February 1960, and the first election by ballot took place to choose a mayor and four councillors. In addition, during the year, the Chapais Hydroelectric Commission was established.

To serve the new buildings, three streets were opened and two old ones were lengthened. The Town Council also purchased the pumping station of Opemiska Copper Mines (Quebec) Limited.

Chibougamau

The help of Central Mortgage and Housing Corporation was a big factor in the very active home-building programme undertaken during the year at Chibougamau. A new 22-room Catholic High School was built. The municipality kept up its sidewalk-construction programme. Mining activities in the area were rather stable, thus contributing to the progress of the town. The population has now reached a total of 5,300 souls.

During 1960, 89 residential buildings, providing accommodation for 129 families, were built, and the forecast for 1961 is for an equally active building programme. Construction of a residential quarter for the personnel of the nearby radar station will continue. It is interesting to note that the municipal valuation roll attained a total of $9,910,080.

Malartic

The population of Malartic remained stable and home building has been inactive for the last few years.

Murdochville

The population of Murdochville is increasing steadily, and has reached a total of 3,200 persons. Gaspé Copper Mines Limited is continuing its programme of home building for its employees, adding 16 new dwellings. In addition, four new private homes were built and two stores were enlarged. The Murdochville hospital was completed and has been occupied since November 1960.

Rouyn-Noranda

There were a large number of residential dwellings built during the year in Rouyn - Noranda, together with new lots being offered for sale in these twin cities.

In Noranda, 67 home-building permits were granted, in addition to a permit for an English Catholic High School costing $600,000. In Rouyn, home building was concentrated on vacant lots on streets already in existence.

Noranda has 11,300 inhabitants, of whom 60 per cent are of French descent, 27 per cent are originally from the British Isles,

and 13 per cent are of various other racial origins. With Rouyn's 17,800 souls, the combined population of the twin cities stands at 29,100.

Pascalis

The mine village of Pascalis, administered by a municipal manager in accordance with the dispositions of Chap. 246, R.S.Q. 1941, is in a difficult position owing to the closing of the mines in its vicinity. The existing situation has made it necessary to extend the present mode of administration until January 1st, 1966. (Bill 70).

Schefferville

The New Quebec town of Schefferville, which is linked to Sept-Iles by a 357-mile railroad, is still progressing. During the last session of the Legislative Assembly, the town had (Bill 221) the Lieutenant-Governor in Council empowered to extend annually the term of office of the present council. As a matter of fact, even with a population of more than 5,000, the number of property owners legally qualified to hold municipal offices is not large enough to permit a choice and an election.

Peat Bog Drainage

During the year, peat bogs were operated in the following counties: Bellechasse, Charlevoix, Chicoutimi, Matane, Portneuf, Rimouski and Rivière-du-Loup.

A total contribution of $15,000, as appropriated in the budget, was distributed among the various peat-bog operators, who completed a total of 192,436 cubic yards of drainage.

During the calendar year 1960, more than 56,600 tons of peat was extracted. This production was valued at $1,415,000.

DRAUGHTING AND CARTOGRAPHY BRANCH

Léon Valois, P. Eng., is chief of this Branch, and A. Blanchette is assistant chief. The personnel employed numbers twenty, including fourteen draughtsmen, a secretary, two clerks and a messenger.

The Draughting and Cartography Branch supplies the documents needed by the geological survey parties of the Department, namely, aerial photos and compilations, to the desired scale, of base maps made from topographical surveys and aerial photos. In some instances, areas are photographed and mapped to supply an adequate basis of information to these geological parties.

The Branch keeps up to date two sets of tracings on linen of the various townships. On one are drawn all the stakings of the mining claims; on the other, all the boundaries of lands held by mining companies. The first series, showing the staked claims, consists of 1,030 tracings on which were outlined the boundaries of the 25,069 new claims staked during the fiscal year; the second series contains 667 tracings. From all these tracings, 15,244 blue prints were struck off to fulfill requests from the public.

The following geological maps were prepared by the Branch, which also supervised their printing.

Final Maps (coloured)

a) Completed during the year:

No. 1292 - Southwest of McKenzie Township
No. 1293 - Southeast of McKenzie Township
No. 1299 - Wacouno River Area
No. 1300 - Waco Lake Area
No. 1328 - Grenville Sub-province
No. 1350 - Index map of geological maps

b) In the press:

No. 1349 - Petroleum and Natural Gas, Gaspé 1960

c) In preparation:

No. 1327 - Shawinigan Area
No. 1345 - Amos - Barraute Area, West Sheet
No. 1346 - Amos - Barraute Area, Central Sheet

No. 1347 - Amos - Barraute Area, East Sheet
No. 1372 - Malartic gold-bearing zone
No. 1388 - Noranda - Belleterre mining zone

Preliminary Maps

a) Completed:

No. 642 - St. Lawrence Lowlands (5th Edition)
No. 1319 - Southwest of Lévy Township
No. 1326 - Raimbault River Area
No. 1329 - Stukely Area
No. 1333 - Southeast of Barlow Township
No. 1334 - Turquetil - Emard Area
No. 1335 - Pommeroy - Bellefeuille Area
No. 1336 - Chomedey - Paquet Area
No. 1337 - Guyon Area
No. 1338 - Southwest of Lacorne Township
No. 1339 - Southeast of LaMotte Township
No. 1341 - Antoine Area
No. 1342 - Rimouski - Matapédia Area
No. 1343 - Sainte-Adèle Area

b) In preparation:

No. 1344 - Gould Area
No. 1351 - Laflamme Lake Area
No. 1352 - Sainte-Perpétue Area
No. 1360 - Southwest of Lemoine Township
No. 1363 - Fraser Lake Area
No. 1364 - Hippocampe Lake Area
No. 1365 - Tichegami Mountains Area
No. 1366 - Glen Almond Area
No. 1367 - Lesage - Rivard Area
No. 1368 - Lomer-Gouin Bay Area
No. 1369 - Port La Pérouse - Normand Point Area
No. 1370 - South-Half of Figuery Township and Southwest of Landrienne Township
No. 1382 - Chandler - Port Daniel Area
No. 1383 - Prime Lake Area
No. 1384 - Cartier - Tracy Area
No. 1385 - Aylmer Lake Area

Our draughtsmen traced on linen other geological plans, figures to illustrate reports published by the Department, and various other plans, such as graphs, special maps, etc. A few of these documents were lithographed for the use of the Department.

During the fiscal year 1960-61, the Branch acquired a "Vari-Typer", a true composing machine specially adapted to cartographic work. This new departure in lettering work will result in a marked saving of time and will give to maps and figures a much neater appearance.

PILOT-PLANT BRANCH

The Pilot-plant Branch is under the direction of P.-E. Pelletier, with B.J. Walsh and J.-P. Bolduc assisting.

During its first full year of activity, the 1960-61 fiscal year, the Pilot-plant received, for sampling and treatment purposes, 76 lots of ores weighing 839,488 pounds, distributed as shown in Tables XIV and XV.

Table XIV - Ores Received for Sampling at Pilot-plant

Shipper	Number of Lots	Weight (Pounds)	Type of Ore
Blackhawk Mining Limited	6	86,528	Gold
Kelly Mining Exploration Ltd...	1	14,932	Iron, titanium
Les Granites Laurentiens Enrg..	7	49,045	Granite
J.-L. Tanguay	1	10,000	Limestone
Edmond Whissel (Cheneville) ...	1	135	Iron
Total ...	16	160,640	

Table XV - Ores Received for Treatment at Pilot-plant

Shipper	Number of Lots	Weight (Pounds)	Type of Ore
Anglo American Molybdenite Mining Corporation	2	35,892	Molybdenite
Asbestos Corporation Limited	3	69,700	Asbestos
Canadian Johns-Manville Co. Ltd...	1	284	Asbestos
Central Asbestos Mines Limited ...	2	1,445	Asbestos
J.-L. Côté (Quebec)	1	68	Iron, titanium
Empire Asbestos Limited	1	67	Asbestos
Flintkote Mines Limited	1	28	Asbestos
Frontenac Mining Corporation	1	231	Molybdenite
Ghislau Mining Corporation Ltd. ..	1	20,959	Lead, zinc, gold, silver
Hedman Mines Limited	7	16,790	Asbestos
Jefferson Lake Sulphur Company ...	1	176	Asbestos
Victor Kendler (Montreal)	1	2,128	Mica
Lumau Mining Corporation Limited .	1	613	Iron
L.-A. Marleau (Dept. of Mines) ...	1	55	Iron
Molybdenite Corporation of Canada Limited	1	13,223	Bismuth
Murray Mining Corporation Limited	17	8,714	Asbestos
Nicolet Asbestos Mines Limited ...	2	14,222	Asbestos
Portage Island Mines Limited	2	436	Copper, gold
Portneuf Mineral Corporation Ltd..	1	4,356	Mica, molybdenite
Quebec Clay Mining	1	18,580	Clay
Quebec Lithium Corporation	1	50	Lithium
Russell and Landry (Cap Chat)	1	2,219	Copper, lead zinc, gold, silver
Paul-E. Grenier (Depart. of Mines)	1	234	Iron
Stanford Research Institute	1	530	Asbestos
St. Lawrence River Mines Limited .	1	160	Columbium
Sulphur Converting Corporation ...	1	222	Iron, sulphur
Ungava Iron Ores Company	4	467,106	Iron
Viau, Armand (Quebec)	1	256	Copper, lead, zinc, gold, silver
Young Davidson Mines Limited	1	104	Asbestos
Total	60	678,848	

Research on asbestos was in the forefront, with 37 projects or 13 per cent of the total and, because those interested have requested it, the pilot-plant is in the process of establishing a research laboratory to study the physical properties of the asbestos fibers to assess their commercial value according to their quality. Thanks to the exclusive technical assistance supplied to them by the pilot-plant, two companies are planning to go into production in the near future.

The big project of the fiscal year was the study of the treatment of iron ores submitted by Ungava Iron Ores Company. This study included comparative tests on flotation and gravity concentration on more than 230 tons of ore. During the tests, it was positively shown that a gravity concentration method developed at the pilot-plant did have a definite economic advantage over flotation.

To complete its facilities, as planned, the pilot-plant purchased, during the fiscal year, a one-ton capacity dryer, a heavy media (sink-and-float) separator and a large-capacity electrostatic concentrator.

SECRETARIATE

This Branch, which is under the direction of Raymond Cormier, assistant deputy minister, is responsible for the personnel and the publicity of the Department, as well as for the divisions of Equipment and Purveyor.

Library

Librarian A. Champagne reports that 5,307 items were added to the library stock during the fiscal year. These included: 501 books, 1,624 periodicals or magazines, 576 reports and bulletins, 12 manuscripts, 494 pamphlets and 485 maps. The library stock grows from year to year; from 20,533 units in 1959-60, it reached 25,840 at the end of the 1960-61 fiscal term.

The purchase of 255 books brought the total number of volumes on hand to nearly 8,000. The library is the recipient also of books and of some thirty reports and publications through an exchange system with other governments.

The technical personnel of the Department can keep abreast of the latest mining developments through the library's collection of newspapers, periodicals, reviews, magazines and other mining publications. Through the library subscription services, 48 persons received 24 newspapers or periodicals, and 153 received 107 reviews or magazines. More than 25 employees (mostly geologists and engineers) are members of 24 societies or associations.

During the fiscal year, the library received 485 maps that were more of a topographical than a geological nature. The map section of the library now contains 3,111 units.

Four books, 35 reviews and nine publications were bound and 121 maps were mounted on linen.

The main purpose of the library is to help the technical personnel of the Department. A measure of the resources of this division may be inferred by the number of items loaned during the year. There were 1,388 loans in addition to a large number of consultations in the library itself. The public is always assured of a warm welcome, either to look up our reference books on the mining industry or to consult with our engineers and geologists. The library stock is not available for loan to individuals, but items may be examined at leisure. Mining subjects seem to interest the general public as much as ever, for more than 225 visitors came to consult our sources of information.

The library contains publications, reports and maps published by the Department of Mines of Quebec, of Ottawa, of various provincial governments, and similar items originating in the United States, Europe and many foreign countries. In addition, it is stocked with excellent technical books on mining, geology, mineralogy, chemistry and metallurgy.

To facilitate the search for material, everything is classed, according to the Dewey system, by subject, title and author.

A library committee holds regular meetings to select and approve purchase of books, subscriptions, and to attend to various administrative matters.

Division of Equipment

C.R. Staniforth, chief of this Division, reports that, during the fiscal year 1960-61, forty-one parties were equipped for the Geological Surveys Branch, the Mineral Deposits Branch, and the Resident Geologists Division, as well as four parties for the Civil Engineering Branch. The Division equipped 329 men and supplied them with instruments for field work, and all the material necessary for camping such as tents, outboard motors, kitchen utensils, etc.

The Department of Mines operated a fleet of 50 motor vehicles, and all these, comprising station-wagons, jeeps, trucks and tractors, were kept in good condition for the staff of the Department.

Each year, the Department of Mines takes part in various industrial and regional exhibitions held in the Province. During the fiscal year 1960-61, displays of minerals were presented at:

The Sainte-Thérèse (Terrebonne) Fair	May 1960
The Lachute Fair	June 1960
The Industrial and Commercial Exhibition, Mont-Joli	July 1960
The Val d'Or Fair (Kiwanis)	July 1960
The Rouyn Fair	August 1960
The Trois-Rivières Exhibition	August 1960
The Sherbrooke Fair	August 1960
The Granby Fair	August 1960
The Malartic Fair	August 1960
The Mont-Laurier Fair	October 1960
The Montreal Exhibition	October 1960
The Winter Fair (Agriculture), Montreal	February 1961

Division of Purveyor

The Assistant Purveyor of the Department, Eric Aubin, acts as liaison officer between the Department of Mines and the Purchasing Division of the Executive Council. He is responsible for the work necessary for the issuance of purchasing orders.

Through the Purveyor's office, the Department of Mines issued purchasing orders, payable by its own accounting division, valued at $590,218.99.

In addition, the Department issued other purchasing orders payable by the accounting division of the Executive Council, for an amount of $203,395.79.

The total value of the purchasing orders issued for the Department during the fiscal year 1960-61 amounted to $793,614.78.

Division of Publicity

To keep the public abreast of the latest developments in the fields of the mineral resources and the mining industry of the Province, members of the Department prepare talks and papers that they present at various meetings of societies. They also write articles that are published in technical reviews, magazines and in the daily press. In fine, the numerous publications of the Department on the geology and the mining industry of the Province help to keep the public informed on the progress made from year to year.

Speeches delivered by Honourable Paul Earl, Minister of Mines

1960

August 25th - Closing banquet of the 25th Annual Congress, Army, Navy and Air Force Veterans of Canada, Quebec.

September 28th - Celebration in honour of the pulp and paper industry, Trois-Rivières.

October 13th - Westward Rotary, City Hall, Montreal-West

October 17th - Official opening, 17th Conference of Provincial Ministers of Mines, Quebec.

1961

February 1st - Banquet of the 48th International Bonspiel, Quebec.

Other Articles and Lectures

By Maurice Archambault, Director, Laboratories Branch

"Organisation et fonctionnement des laboratoires du Département des Mines": Conference presented to the Canadian Institute of Chemistry, Quebec, April 5th, 1960.

By Maurice Archambault, Charles-A. Olivier, J.U. McEwan

"Nouveau procédé d'extraction du lithium". Paper presented by Charles-A. Olivier to the 28th Congress of "Association Canadienne-Française pour l'Avancement des Sciences, Quebec, October 29th, 1960.

By J.-R. Assad, resident geologist, Chibougamau district

"The Origin of the Chibougamau Ore Deposits": talk given before the Chibougamau branch, Canadian Institute of Mining and Metallurgy, April 1960.

By Jacques Béland, geologist

"Tectonique et Sédimentation dans la Région de Rimouski - Matapédia": paper presented at the 28th Congress of l'Association Canadienne-Française pour l'Avancement des Sciences, at Quebec, October 29th, 1960.

"Geology and Petroleum Possibilities of the Rimouski - Matapédia Area": paper presented at the 63rd Annual General Meeting of the Canadian Institute of Mining and Metallurgy, at Quebec, March 21st, 1961.

By Jacques Béland, R.-A. Marleau, D.W. Pollock and J. Rondot

"Geology of the Grenville Sub-province of Quebec - Southern Part": papers presented in symposium at La Société Géologique de Québec, at Quebec, May 4th, 1960.

By Jacques Béland, geologist, with E.R.W. Neale and R.R. Potter

"A Preliminary Tectonic Map of the Canadian Appalachian Region": paper presented at the 63rd Annual General Meeting of the Canadian Institute of Mining and Metallurgy, at Quebec, March 22nd, 1961.

By F.-W. Benoit, P.J. Clarke, A.-F. Laurin and M. Morin, geologists

"Geology of the Grenville Sub-province of Quebec - Northern Part": papers presented in symposium at La Société Géologique de Québec, at Quebec, May 12th, 1960.

By Robert Bergeron, geologist

"L'âge de la Terre": interview on the programme 'La Science et la Vie', on CFCM-TV, Quebec, December 8th, 1960.

"Le Nord du Québec": interview on the programme 'La Science et la Vie', on CFCM-TV, Quebec, February 16th, 1961.

By Robert Bergeron, geologist, with Gordon Gastil, Roger Blais and David M. Knowles

"The Labrador Geosyncline": paper published in "Report of the International Geological Congress, XXI Session, Norden, 1960, Part IX - Precambrian Stratigraphy and Correlation".

By J.-P. Bolduc, chemical engineer

"The Pilot Plant of the Department of Mines of the Province of Quebec": paper presented to the 63rd Annual Meeting of the Canadian Institute of Mining and Metallurgy, Quebec, March 21st, 1961.

By A.-N. Deland, resident geologist, Montreal district

"Rôles du prospecteur, de l'ingénieur des mines et du géologue dans l'industrie minière": talk given at Léo Clement school, Ayersville, March 24th, 1960.
"Quelques problèmes de la région minière d'Oka": talk given to La Société Géologique de Québec, December 15th, 1960.

By Jean Dugas, resident geologist, Noranda district

"A quoi servent les géologues": talk given to the members of the Rouyn Richelieu Club, October 24th, 1960.

"L'avenir de nos mines": article prepared for the souvenir programme of the Rouyn Regional Fair, June 1960.

By Léopold Gélinas, geologist

"Geology of the Cape Smith - Wakeham Bay Belt, New Quebec (with special reference to the Watts Lake Asbestos Area)": paper presented to the 29th Annual Convention of the Prospectors and Developers Association, at Toronto, March 8th, 1961.

By P.-E. Grenier, chief resident geologist

"Mining prospects as they should be viewed by the speculator": talk presented to the University Woman's Club of Quebec, February 1960.

"Notes sur la géologie de la sous-province de Grenville": talk given May 12th, 1960, before La Société Géologique de Québec.

By P.-J. Lespérance, geologist

"The Silurian and Devonian Rocks of the Temiscouata Region, Quebec": paper presented to La Société Géologique de Québec, at Quebec, October 27th, 1960.

By A.-R. Marleau, resident geologist, Quebec district

"Géologie de la partie méridionale de la sous-province de Grenville": paper presented to La Société Géologique de Québec, May 4th, 1960.

By H.W. McGerrigle, chief, Geological Surveys Branch

"Careers in the Field of Geology": participating in 'Forum on Career Opportunities', talk to senior students of Quebec High School, at Quebec, March 8th, 1961.

By Charles-A. Olivier, chemist

"Traitement des minerais de lithium": Conference presented to the Canadian Institute of Chemistry, Quebec, April 5th, 1960.

By F.F. Osborne, part-time staff geologist

"On Turbidites": presidential address to Section IV (Geological Sciences) of the Royal Society of Canada, at Kingston, Ont., June 6th, 1960.

"The Role of Resistant Units in Metamorphism": paper presented at the 28th Congress of L'Association Canadienne-Française pour l'Avancement des Sciences, at Quebec, October 29th, 1960.

By J.H. Remick, geologist

"Exploration in the Harricana - Turgeon Area, Western Quebec": paper presented to the Thetford Mines Branch of the Canadian Institute of Mining and Metallurgy, at Thetford Mines, January 26th, 1961.

By R.-J.-E. Sabourin, part-time staff geologist

"Le Kaolin de Château-Richer, un Paléorégolite ?": paper presented at the 28th Congress of L'Association Canadienne-Française pour l'Avancement des Sciences, at Quebec, October 29th, 1960.

By Pierre Sauvé, geologist, with G.H. Beall

"Age Investigations in New Quebec and Labrador": contributary paper published in 'Variations in Isotopic Abundances of Strontium, Calcium and Argon, and Related Topics', Dept. of Geology and Geophysics, Mass. Inst. Tech., December 1st, 1960.

By J.I. Sharpe, geologist

"Distribution of Sulphide Deposits in the Val-d'Or - Mattagami Area, Quebec": paper presented to the Adams Club, McGill University, December 1960.

Scholarships

The Legislative Assembly placed at the disposal of the Minister of Mines a sum of $60,000.00 to enable him to grant scholarships to students in geology, metallurgy and mining, for the 1960-61 scholastic year.

The committee appointed by the Minister to recommend to his attention the most deserving candidates was composed as follows:

Chairman: Eugène Larochelle, General Secretary, Quebec Metal Mining Association;

Paul Riverin, Director, Department of Mining and Ore Dressing, École Polytechnique;

J.U. MacEwan, Director, Department of Metallurgy, McGill University;

Gérard Letendre, Director, Department of Mining and Metallurgy, Laval University;

H.G. Young, Inspector General, Protestant School Board;

The Secretary, who is not a member of the committee, is Miss Gisèle Landreville, secretary of the Department.

Following its well established practice, the committee studied, first, applications of students wishing to pursue advanced studies for a doctor's or a master's degree, second, applications for renewal of scholarships and, lastly, requests of new candidates.

The Minister of Mines granted in 1960-61, 104 scholarships distributed as follows:

Candidates to post-graduate courses	26
Students entering final year in science faculties	36
Students in less advanced years	42

The members of the scholarship committee wish to express to the Government of the Province, and in particular to the Minister of Mines, the gratitude of the recipients of these scholarships.

Table XVI - Comparative Statement of Revenue Collected by the Department of Mines during the Fiscal Years 1958-59 to 1960-61*

	1958-59	1959-60	1960-61
Miner's certificates	$ 167,545.00	$ 94,490.00	$ 83,350.00
Development licenses	764,252.16	773,239.46	747,326.82
Exploration licenses	162,257.16	180,443.15	150,126.96
Exploitation leases	100,000.00	100,000.00	100,000.00
Sales of mining concessions	9,784.54	71,368.18	68,144.27
Acreage tax on mining concessions	3,587.79	4,522.81	4,107.94
Fees for transfer of mining titles	68,897.00	43,994.00	27,361.00
Rights on townsite lots	12,899.82	15,085.64	13,857.86
Annual rental on townsite lots	1,817.00	2,657.00	2,149.50
Lot rentals:			
a) village lots	100.00	1,150.00	1,350.00
b) others	7,994.00	20,968.81	10,759.44
Dues on yearly profits	4,161,604.57	3,360,680.44	5,020,276.13
Sales of permits for unwrought metals	6.00	4.00	6.00
Sales of maps, blue prints, etc.	8,607.88	2,653.49	2,565.28
Sales of mineral collections	3,165.00	2,965.50	3,127.25
Fees for assays	4,788.50	1,773.65	2,532.57
Fees for abstracts of records	1,001.10	799.15	681.10
Provincial tax on gasoline	6,419.76	5,982.70	7,932.70
Sale and excise tax	5,384.08	9,235.97	8,582.84
Exchange on cheques	35.27	11.85	13.51
Casual revenue	2,960.08	10,417.89	844.00
	$5,493,106.71	$4,702,443.69	$6,255,095.17

* Prepared by J. Fortier, chief accountant.