



I



MINISTÈRE
DE L'ÉNERGIE
ET DES RESSOURCES

DIRECTION GÉNÉRALE DE
L'EXPLORATION GÉOLOGIQUE
ET MINÉRALE

MOUNT AUCLAIR AREA

H.S. de Römer

GEOLOGY OF THE MONT AUCLAIR AREA,
GASPE-NORTH

Ministère des Richesses Naturelles, Québec	
SERVICE DE LA	
DOCUMENTATION TECHNIQUE	
Date:	19 JUIN 1972
No GM:	27788

PRELIMINARY REPORT BY H. S. de ROMER

I N T R O D U C T I O N

The Mont Auclair area lies in the Boisbuisson township at about 26 miles SSE of Ste. Anne-des-Monts, county Gaspé-North. Geological mapping was carried out at a scale of 1,000 feet to 1 inch. The work is the continuation of an extensive program inaugurated in 1963 with the view to study the geology and mineralization of the McGerrigle igneous massif and the surrounding areas.

The Mont Auclair area covers about 30 square miles and is bounded by latitudes $49^{\circ}01'$ and $49^{\circ}03'$ and longitudes $65^{\circ}56'$ and $66^{\circ}00'$. The eastern part of the area can be easily reached from Mont St. Pierre on the Gulf of St. Lawrence using the road leading to Mont Jacques Cartier. Access to the northern part is through Marsoui or Rivière à Claude as well as through the Mines Madeleine road.

Physiographically, the area lies within the Gaspé Appalachians. It comprises the northern part of the high Monts McGerrigle plateau flanked to the east by a rolling, heavily wooded upland surface. An abruptly rising ridge of resistant rocks trends NE across the upland. The highest elevation (4,000 feet) is reached on the plateau and the lowest point (1,700 feet) is at the Rivière St. Pierre in the northern part of the area.

Drainage is effected by fast-flowing streams emptying northward through the Rivière St. Pierre and westward through the Rivière aux Cascades and the Ste. Anne River into the Gulf of St. Lawrence.

Bedrock exposures are scarce in the east except in stream beds and along the rugged northern slopes of the above-mentioned ridge. In the west,

outcrops are particularly abundant along the upper sections of the Mont Jacques Cartier road and on the steep flanks of the Monts McGerrigle. The plateau itself is mostly covered by widespread felsenmeer.

GENERAL GEOLOGY

Lithologically, the Mont Auclair area comprises two main units: the Quebec Group and the Monts McGerrigle Igneous Complex. The eastern half of the area is taken up by rocks of the Quebec Group consisting of metasediments and overlying meta-andesites. Rocks of the Quebec Group are also exposed in a small wedge south of the Petit Lac Ste. Anne and in a narrow belt marginal to the northern border of the area. The E to NE striking and southward dipping rocks show superimposed contact-metamorphic effects in the vicinity of the Monts McGerrigle Igneous Complex.

The west-central part of the area is underlain by the batholith making up the Monts McGerrigle. The complex consists of granitic and hybrid rocks containing large inclusions of basic and meta-volcanic rocks, as well as xenoliths derived from the Quebec Group.

The 1 to 2-mile wide aureole surrounding the batholith is made up of an inner zone of hornfels, meta-andesite and skarn and an outer zone of calcareous and silty argillites.

Widespread drift and alluvium in the low areas and extensive rubble on the high plateau hamper geological interpretation.

Quebec Group

Rocks of the Quebec Group occupy a 4-mile wide belt in the eastern half of the map-area. They are also exposed on the northern and western borders of the Mont Auclair area, representing in fact the country rocks that surround the Monts McGerrigle Igneous Complex.

The belt may be subdivided into 6 principal NE-trending units.

They are from north to south: 1) calcareous sandstones and siltstones with interbedded grey and black shales and minor slates; 2) impure quartz-sandstones and interbedded grey-green shales; 3) dark-grey, occasionally calcareous, shales, siltstones and slates; grey limestones, shales and minor calcareous siltstones; dark grey and black slates and calcareous shales; 4) andesite. Overlying the andesite west of the batholith are 5) a quartz-feldspar conglomerate with pyroclastic beds; and 6) spotted, pelitic hornfels and banded calc-silicate hornfels. With the exception of the three last mentioned units the stratigraphic sequence is largely uncertain, mainly because of probable multiple folding. Moreover, lithologic similarity and scarcity of critical outcrops make it difficult to separate the units effectively. The subdivision becomes more apparent in the inner alteration zone surrounding the Monts McGerrigle Igneous Complex. Here, the above rocks are altered to an assemblage of pelitic and cherty hornfels, and skarns.

The regional NE strike of the rocks changes abruptly immediately east and west of the Complex due to dragging effects of the intrusive. On the regional scale the dip is moderate and generally to the south. Frequent reversals of dip near the Igneous Complex also suggest that the contact zone is an intensely disturbed belt.

The Quebec Group is represented in the northern part of the area by a 2-mile wide belt of calcareous sandstones and siltstones with interbedded grey and black shales and minor slates. The sandstone and siltstone beds have a rusty weathering surface showing a faint to vigorous reaction with diluted HCl. They vary in width from a fraction of an inch to 1 foot and are typically interlayered with shaly or slaty horizons. The general aspect of the rock is, however, that of a finely stratified material characterized by continuous thin laminae of uniform composition

TABLE OF FORMATIONS

PLEISTOCENE AND RECENT			Alluvial deposits, talus, morainic material and humus	
DEVONIAN (?)		IGNEOUS ROCKS	- porphyritic diabase dikes (3) - younger, red granite; aplite dikes; minor grey, hybrid granitic rock (2e) - porphyritic, contaminated granite (2d) - older, grey, hybrid granitic rock; minor, younger, red granite and felty and vesicular meta-volcanic rocks (2c) - meta-diorite and gabbroid rocks; minor, felty and vesicular meta-volcanic rocks (2b) - felty and vesicular meta-volcanic rocks; hybrid granitic rock; minor red granite (2a)	
CAMBRIAN TO MISSISSIPPIAN	PUGORUGOCEBERHEUQ	CONTACT-METAMORPHIC AUREOLE		REGIONAL METAMORPHIC ZONE
		INNER ZONE	OUTER ZONE	
		Spotted, pelitic hornfels and calc-silicate hornfels (1fM)		
		quartz-feldspar conglomerate with pyroclastic beds (1eM)		
		meta-andesite (1dM)		
		spotted, pelitic hornfels; minor calc-silicate banded hornfels (1c ₃ M)	CALCAREOUS AND	dark grey and black slates and calcareous shales (1c ₃)
		spotted, pelitic hornfels; calc-silicate hornfels; skarn; garnet mica schist (1c ₂ M)		grey limestones, shales and minor calc. siltstones (1c ₂)
		spotted, pelitic and cherty hornfels; minor skarn (1c ₁ M)		dark grey, occasionally calcareous shales, siltstones and slates (1c ₁)
			SILTY ARGILLITES (1cm)	impure quartz-sandstone with interbedded grey-green shales (1b)
		banded, cherty and pelitic hornfels (1aM) with occasional skarn (1asM)	calcareous and silty argillites (1am)	calcareous sandstone and siltstone with interbedded grey and black shales and minor slates (1a)

and texture. At places, slump features and other penecontemporaneous structures normally associated with flysch deposits, are typical of this series.

In the north-central part of the area, the belt swings northwestward as it passes through the outer zone of the alteration aureole. Here, the rock consists of calcareous and silty argillites. Farther west and within the inner zone of alteration, scarce outcrops indicate that the above rocks are further altered to an assemblage of banded, cherty and pelitic hornfels with occasional, discontinuous skarn. A prominent 500-foot wide unit of skarn, consisting largely of calc-silicates, is exposed 0.5-mile north of the northern periphery of the igneous complex. Banding in the skarn and associated cherty layers strikes EW and dips moderately to the north.

Succeeding the above belt to the south are impure quartz-sandstones with interbedded grey-green shales. These are exposed in a short 0.5-mile wide wedge in the NE corner of the area. The white-weathering sandstone is greenish when fresh and is made up of subrounded quartz and feldspar grains embedded in a fine-grained matrix of similar composition. At places, the thick beds give way to pockets of coarse polygenous conglomerate containing subangular sandstone and shale fragments, in addition to quartz and feldspar.

The fact that the above rocks are confined to a hill suggests that it is an erosional remnant of a possibly more extensive unit. Sedimentary and structural features indicate that it forms the core of a gentle synclinal fold trending NE. Its appearance is remarkably similar to that of the quartz-feldspar conglomerate overlying the andesite south of the map-area. On the other hand, stratigraphic considerations suggest that the quartz-sandstone of the present area underlies the andesite and may be part of a largely eroded basal conglomerate sheet overlying uncon-

formably the abovementioned calcareous sandstones and siltstones.

The next unit to the south comprises three sub-units: dark grey occasionally calcareous shales, siltstones and slates; grey limestones, shales and minor calcareous siltstones; and dark grey and black slates and calcareous shales.

East of the Monts McGerrigle Igneous Complex, the 3,000 - 4,000-foot wide belt departs from its regional EW and NE trend and swings NW as the contact with the batholith is approached. No effective separation of the subunits could be made in the outer alteration zone. Scattered, angular debris indicate that it is underlain by calcareous and silty argillites. It is in the inner zone of alteration, adjacent to the batholith, that the subunits can best be identified, mainly because superimposed contact-metamorphic effects accentuated their original compositional differences.

The contact-metamorphic equivalent of the dark-grey shales, siltstones and slates in the inner zone of alteration are spotted, pelitic and cherty hornfels. The mauvish, spotted hornfels is usually soft and consists of 0.5 to 1 mm large euhedral crystals (cordierite?) embedded in a fine-grained matrix. It is generally interbedded with banded, green and mauve, extremely hard hornfels. Massive, fine-grained, cherty hornfels is also present. Patches of both pelitic and cherty hornfels, varying from 400 - 1000 feet in length, are found as giant xenoliths within the batholith.

The second subunit comprises grey limestones, shales and minor calcareous siltstones, which are particularly well exposed at Ruisseau à Galène, south of Lac St. Pierre. The 1 to 5"-wide pinching and swelling limestone beds and shales are intensely folded and fractured. In the inner zone of alteration these are altered to an assemblage of spotted, pelitic hornfels, some calc-silicate hornfels and skarn. The skarn is composed essentially of calc-silicates, calcite, scapolite, garnet and

magnetite. Near the contact with the batholith, the rock becomes a garnet-mica schist interlayered with bands of skarn. A lithologically identical and stratigraphically equivalent garnet-mica schist and skarn are exposed 0.5-mile S and SE of Mont Auclair. It is a continuous, 100 - 200-foot wide belt underlying a thin quartz-feldspar sandstone of equal width. Together with the overlying meta-andesite, they form large inclusions in the batholith.

Scattered exposures of calc-silicate hornfels and minor skarn south of Petit Lac St. Anne suggest that this subunit is also present west of the batholith.

Succeeding to the south is the third subunit consisting of dark-grey and black slates and calcareous shales. Thin quartz-sandstone beds may be present, as attested by occasional debris found on the steep slopes east of the Rivière Madeleine-Nord. The 0.5-mile wide belt is separated from the overlying andesite by a 5-foot wide baked zone. Passing through the outer zone of alteration, the belt swings NW pinching out near the contact with the batholith. Its continuation west of the igneous complex is questionable. Here, scattered debris consist largely of spotted, pelitic hornfels and subordinate calc-silicate, banded hornfels.

The overlying rocks, approximately 3,000 feet thick, are of andesitic composition. They are mainly exposed east and west of the igneous massif. A large inclusion of meta-andesite within the batholith south of Mont Auclair further indicates that the originally continuous belt of volcanic rocks was injected and cut off by intrusive rocks of the Monts McGerrigle Igneous Complex.

East of the batholith, the arcuate belt follows the regional pattern of the other members of the Quebec Group as it swings NW in a concave curve and is cut off abruptly at the contact with the intrusive rocks. The andesite is a typically dark to light green, massive rock with occasional epidote veins. Small irregular concentrations of hematite-rich material are observed

on the steep slopes SE of Lac St. Pierre. There is no apparent alteration of the volcanic rocks in the outer zone of alteration. Within the inner zone, however, the normally massive andesite is characterized by numerous oval spots 2 to 10 mm. in diameter, consisting largely of chlorite. At places, such as in the patch of meta-andesite SSW of Mont Auclair, bands of mica-chlorite-rich material suggest altered pyroclastic beds at the base of the andesite flow.

West of the batholith, the 1000-2000-foot wide belt of meta-volcanics strikes NE and is cut off abruptly by granitic rocks SSW of Mont Ste. Anne. Occasional banding in the andesite and pyroclastic beds in the upper part of the flow immediately outside of the map area show a steep SE dip.

Overlying the andesite on both sides of the batholith is the fifth unit of the Quebec Group consisting of quartz-feldspar conglomerate and occasional pyroclastic beds. The rocks of the 600 - 800-foot wide belt are particularly well exposed on the cliff 1000 feet west of the area. The beds strike NE and dip 55° SE. Continuity of this belt east of the batholith is evidenced by scattered outcrops and debris NE of Lac Vieillard, described earlier (P.R.....).

Finally, the sixth unit of the Quebec Group is exposed in an 800 - 1000-foot wide belt west of the batholith. The pelitic hornfels is soft and characteristically peppered with 0.5 to 1 mm. large cordierite porphyroblasts. The overlying calc-silicate hornfels is extremely hard and consists of alternating whitish and grey-green, 0.25 to 0.5 inch wide, continuous bands. At places, a faint reaction with diluted HCl suggests the presence of skarn.

The structural picture of the Quebec Group rocks is largely uncertain because of superimposed folding and insufficient outcrop. The prevalent S-plane is a late S_2 cleavage striking NE and dipping $10-45^{\circ}$ to

to the SE. It is the axial plane cleavage to northwesterly overturned F_2 folds, plunging $5 - 10^\circ$ east and northeast. At places, kink planes offset the S_2 cleavage suggesting a possible third phase of deformation, the lineation of which trends ESE.

Monts McGerrigle Igneous Complex

The intrusive rocks of the Monts McGerrigle Igneous Complex occupy the mountainous western part of the area, covering approximately 11 square miles. Representing the northern part of the McGerrigle Mountains, the complex is in contact with rocks of the Quebec Group. Cross-cutting, dragging effects and contact-metamorphic alteration of the country rocks indicate the intrusive nature of the batholith. Although the contact itself was nowhere observed evidence from south of the area suggests a steep attitude.

The term complex was chosen, because there is evidence of multiple intrusion and resulting mixing of rocks. Although the relationships between the intrusive fractions are extremely complex and could not be fully clarified, six main rock types could be tentatively established. They are in order of abundance: older hybrid rocks of granitic composition; younger red granite; inclusions of basic rocks of dioritic or gabbroid composition; inclusions of meta-volcanic rocks in various stages of alteration; grey, porphyritic granite; and finally, inclusions of meta-sedimentary and meta-volcanic rocks belonging to the Quebec Group.

It seems that the larger part of the batholith is taken up by hybrid rocks of very variable composition. Although a granodioritic variety prevails, granite, syenite and monzonite fractions are also present. Generally, the rock is grey to pink, fine- to medium-grained and quartz-poor. It frequently contains irregular concentrations of mica and amphibole and sporadic patches of largely digested xenoliths. In fact, the composition is a very erratic one depending on the degree of alteration of assimilated rocks. It may best be

described as a largely contaminated granitic rock.

The inclusions vary in size from hand specimen to patches several thousand feet in diameter. The inclusions comprise largely meta-volcanic rocks, slightly contaminated diorites and gabbroid rocks, and Quebec Group hornfels, skarn and meta-andesite.

The grey-greenish meta-volcanic rocks include two types: a massive rock of felty texture with microscopic to 2 mm. long, slender needles of sodic feldspar distributed at random in a finer groundmass. The other type, associated with the former, contains, in addition, oval 5 mm. large vesicles filled with holocrystalline red feldspar, hornblende, sphene and occasional epidote. Both rock types grade into each other and could not be effectively separated from each other. The contacts between the xenoliths and the granitic material are irregular and gradational, and, at places, the total aspect is that of a granitized meta-volcanic or contaminated granite. Large patches of such largely granitized and assimilated meta-volcanic rocks lie east of Petit Lac Ste. Anne and also along the Jacques Cartier road.

Several large patches of diorite and gabbroid bodies are located within the batholith. The rock is usually dark-grey to black, very coarse and of uniform texture. Fine-grained portions from the marginal parts have also been observed. At some places, it is a typically contaminated and hybrid rock characterized by irregular clusters of evidently recrystallized feldspar and amphibole fractions. At others, the rock seems to grade into a coarse-grained variety of the vesicular meta-volcanic type described above. Field observations suggest that some of the patchy diorite is probably of metamorphic origin derived from the vesicular meta-volcanic rock. This is well shown in the large bodies of dioritic rocks S and SSE of Mont Auclair. North of Petit Lac Ste. Anne, however, coarse diorite cuts across and includes felty and vesicular meta-volcanics suggesting thereby a separate intrusion or

remobilization of the former.

Coarse dioritic and gabbroid rocks have a clear-cut relationship with the Quebec Group meta-andesites and -sediments. A large body of basic rocks cuts across the belt of meta-andesites 3,500 feet SE of Mont Auclair. Similar relations are observed in the complexly injected zone 6,000 feet SE of the above mountain and in a small patch of meta-andesite 2 miles SE of Mont Ste. Anne.

Age relationships between the dioritic and grey, hybrid granitic rocks are less clear. It is fairly certain, however, that a basic intrusion preceeded the grey granite injection.

Inclusions of Quebec Group meta-sediments in the batholith are small and surprisingly rare. Two types are observed: a well-layered biotite-rich schist and occasional spotted, pelitic hornfels; and a banded, green-mauve, very hard calc-silicate hornfels. Both are readily recognized as such in the field. At places, they are associated with the felty meta-volcanic inclusions and are then differentiated with difficulty.

The batholith comprises also a granitic rock of porphyritic texture exposed along the Jacques Cartier road and the slopes to the south. Characteristically, the grey to pink rock contains irregular clusters and discontinuous streaks of biotite and occasional amphibole. At places the mafic minerals are irregularly distributed among euhedral, distinctly zoned feldspar crystals $1/8$ to $3/4$ " in size. Traverses in the vicinity of Mont Jacques Cartier, approximately 1 mile south of the area, indicate that the porphyritic granitic rock is an important constituent of the Monts McGerrigle Igneous Complex. There, its streaked and hybrid appearance, probably due to partial contamination by xenoliths, is strongly reminiscent of a paragneiss.

Finally, the sixth major rock type of the Monts McGerrigle Igneous Complex is a younger granite, mostly confined to the marginal parts of the batholith. It is generally a red, medium to coarse-grained, granular rock,

made up of quartz, sodic and potassic feldspar and accessory biotite and amphibole.

The rock looks remarkably fresh and uncontaminated, although it may contain at places some inclusions of biotite schist, hornfels, diorite, but mostly of meta-volcanic rocks. Generally, the contacts of the xenoliths are sharp and clear-cut indicating little reaction between the granite and the xenoliths. It also suggests that the red granite intrusion occurred after contact-metamorphic alteration of the xenoliths had taken place. The granite also cuts across older hybrid rocks of granitic composition mentioned above.

Several large areas of largely younger granite are outlined on the map. It has to be kept in mind, however, that they also comprise in part patches of hybrid rocks that could not be effectively separated.

Occasional porphyritic diabase dikes were observed within the batholith and also in the area underlain by the Quebec Group rocks. They trend NW and NNE and are the youngest igneous rocks of the area.

Alteration, Structure and Age of the Igneous Complex

The Monts McGerrigle Igneous Complex is surrounded by a 1 - 2 mile wide contact-metamorphic aureole consisting of an inner zone of hornfels, skarn and meta-andesite, and an outer 0.5 to 1.5-mile outer zone of calcareous and silty argillites. West and north of the batholith the larger part of the aureole is beyond the map-area.

Lack of outcrop and lithologic similarity in the outer zone prevented differentiation of the Quebec Group into separate units. In the inner zone, on the other hand, more pronounced contact-metamorphic effects resulted in more distinctive and reorganized mineral assemblages that are correlatable with the units of regionally metamorphosed rocks farther east.

The hybrid granitic rock is essentially a contaminated rock characterized by numerous xenoliths of mainly meta-volcanic rocks. The xenoliths

indicate a very limited degree of assimilation. The younger, red and fresh granite also contains xenoliths, but shows no signs of contamination or reaction, except in the case of the vesicular meta-volcanic inclusions. It appears that the coarse hornblende-feldspar-sphene-epidote filling of the vesicles is directly related to the young, red granite. Patches of spotted, pelitic, and banded, cherty hornfels lying side by side in the granitic rocks suggest that they were derived from originally argillaceous and silty-calcareous sediments, respectively. Silification, as often supposed, did not play a major role in alteration. Evidently, the injection of the granitic rocks took place into an environment of dioritic, altered Quebec Group, and meta-volcanic rocks that was in equilibrium with the new intrusion.

The igneous rocks of the Complex are remarkably devoid of certain structural features normally associated with plutons. No platy or linear flow structures have been observed. Extensive fracturing is obvious, mainly represented by NW, EW and NNE-trending sub-vertical joints.

The pronounced dragging of the Quebec Group near its contacts indicates beyond doubt that the Monts McGerrigle Igneous Complex as a whole represents a forceful intrusion. Total lack of flow structures as well as the slight degree of alteration of the meta-sedimentary inclusions suggests, furthermore, that this is the roof portion of a pluton.

It seems that the felty and vesicular meta-volcanic members of the batholith are the oldest igneous rocks of the complex. Forming inclusions in the diorite and gabbroid rocks, they were possibly brought up and derived from volcanics older than any present in the area. The diorite and gabbroid fractions also intrude the Quebec Group rocks, but are in turn injected by the older hybrid granitic rocks.

The latter, largely contaminated when emplaced, reacted only slightly with the above-mentioned rocks.

The relations between the porphyritic granite and other igneous rocks are uncertain; traverses south of the area suggest that it may be associated in age to the younger granite.

Finally, the last major intrusive phase is represented by the red, equigranular granite, emplaced largely in the peripheral parts of the batholith.

Recent K/Ar determinations have clarified the age of the granitic rocks of the Monts McGerrigle Igneous Complex.. (P.R....., 1970).

An age determination was carried out on a 25lb. sample of granitic rock from the NW contact zone of the pluton. The sample site is located on a S-facing slope, 4,300 feet S65 W of Mont Ste-Anne. Generally, the rock is grey, medium-grained and quartz-rich. The average sample contains 30% quartz, 20-25% K-feldspar, 40% plagioclase feldspar and 5-10% chloritized biotite and hornblende. At places however, irregular clusters of finely distributed quartz, feldspar and biotite suggest digested xenoliths typical of the hybrid granitic rock. Two whole-rock analyses of the same sample yielded 352.4 and 339.9 m.y., averaging to 346.2 ± 7 m.y., indicating an uppermost Devonian Age.

ECONOMIC GEOLOGY

Mineralization in the form of copper minerals, pyrite and pyrrhotite, is largely confined to rocks of the alteration zones and to the Quebec Group inclusions within the batholith.

Of particular interest are two similar Cu-showings located 1100 feet from each other in the meta-andesite body SE of Mont Auclair. Blasting uncovered small, fracture-controlled smears of bornite, chalcopyrite and malachite, along with some pyrrhotite. The host rock is a fractured and altered andesite of the Quebec Group, characterized by 0.25 to 0.5" long

oval spots of chlorite. This extremely favorable area is characterized by large inclusions of hornfels, skarn and meta-andesite complexly injected by dioritic and granitic rocks. It definitely warrants further study and exploration. A grab sample of the mineralized material assayed 0.91% Cu.

A few specks of chalcopyrite and malachite stains were found at the contact between Quebec Group pyroclastics and quartz-feldspar conglomerates 1,000 feet west of the area. A slightly mineralized sample assayed 0.11% Cu.

Pyrite and pyrrhotite are particularly associated with banded, calc-silicate hornfels and skarn. Scattered, small concentrations of them are conspicuous in the eastward bulging protrusion of the inner zone of alteration in the central part of the map-area.

Another pyrite-pyrrhotite mineralization worth investigating is associated with skarn underlying the meta-andesite S and SE of Mont Auclair. Extensive rusty zones, particularly at the contact, suggest widespread sulfide mineralization.

Tiny specks of chalcopyrite, galena and pyrite, associated with carbonate veins, are found in the Ruisseau à Galène, south of Lac St. Pierre. The mineralization, which is within the grey, folded limestone unit of the Quebec Group, is very restricted and has been largely removed by earlier work.

A total of 302 stream sediment samples was collected during the field work. A single high uranium value of 128 ppm is recorded 1,000 feet SE of the Petit Lac Ste-Anne log cabins. High Mo values of 180 and 120 ppm (background 6-10 ppm) are found in the SW corner of the area and in the vicinity of the Mont Jacques Cartier road.

No anomalous values for Sb were noted above the background of 20-30 ppm in the intrusive rocks. Surprisingly high Ni-values of 140-380 ppm are recorded in the calcareous sandstone-siltstone and shale belts in the

eastern part of the area. They are believed to be associated with diabase dike rocks. The same belts are also associated with background values of 10-20 ppm Ag. A few high Co-values of 10 times the 20-30 ppm background are recorded in the SW corner of the area.

The distribution pattern of the Cu-values shows that interesting mineralization is largely confined to two environments: The inner alteration aureole and the contact zones of the andesite belt.

Of particular interest are 2 localities: the skarn band 4000 feet N of Mont Auclair, and the complexly injected diorite-andesite inclusion 1 mile SE of Mont Auclair.

At the first locality, up to 320 ppm Cu (background: 10-20 ppm), 200 ppm Zn (background: 50-80 ppm), 120 ppm Pb (background: 10-50 ppm) and 24 ppm W (background: 1-8 ppm) were recorded. Although limited in extent, this skarn band is worth further investigation.

Of greater importance is the second locality, which coincides with the location of 2 showings mentioned above, carrying visible Cu-mineralization. Here 600 ppm Cu were recorded, more than 15 times the background and the highest value in the area. This area warrants further exploration.

Near-anomalous Cu-values of 200-250 ppm are found from the upper and lower contact zones of the andesite belt outside the alteration aureole. This suggests that, genetically, Cu-mineralization is primarily related to the andesite. Although heat was necessary to remobilize and concentrate the mineralization, it is postulated that the Mont McGerrigle pluton is not the primary source of Cu-mineralization in this area.