NEPHELINE ROCKS OF

The York River, [illegible]

A Geological Report for Mining Claims E.O. 25787 and 25788

Introduction

The area of interest comprises all of lot 10 in concession XIV of Dungannon Township. It is presently covered by mining claims E.O. 25787 and 25788, staked on November 14, 1957, in the name of Elmer B. Wright, (lic. A 22022) of Nephton, Ontario.

A group of 4 patented mining claims adjoining and lying to the south of the present staking, commonly referred to as the "Morrison property", (because of the original ownership by Bill Morrison), have been under the control of Ventures Limited since 1941. The decision by American Nepheline Limited to "have another look" at the York River nepheline rocks resulted in the staking of the two claims in question to round out their present holdings.

History

A summary of the early interest in the nepheline rocks of the Bancroft and York River areas is contained in the writer's report on the "Great Bend Area" (1). More complete details are available in the reports of Adams and Barlow (2), Thomson (3), Hewitt and James (4), Keith (5), Fraser, Gummer and Burr (6), and many others. The most recent regional survey is that of Hewitt and James (4) in 1953-4. A detailed petrographic study of the York River nepheline band was reported on by Tilley (7) in 1958.

Within the area covered by this report there is no evidence of actual mining activity, with the exception of a small test-pit in nepheline pegmatite and a diamond drill hole, both located in the extreme south-east corner. The test-pit is obviously related to the pegmatite mining of the period 1937 to 1942. Such mining activity in nepheline pegmatites is evidenced in the Davis quarry on adjoining lot 9 con. XIV, where 944 tons were produced between 1940 and 1942. The lot is now patented in the name of the Canadian Flint and Spar Co. Ltd. A similar operation produced 1663 tons from the Morrison quarry (lot 10, con. XII) during 1939-40. The Temagami Development Company optioned this land to the American Nepheline Corporation in 1941 and it was subsequently (1943) purchased by Ventures Limited. The largest pegmatite operation however, was that of the Goulding-Keene Company near the north limit of lot 12 in concession XI. Located at the south end of the so-called "York River band", on the west bank of the river a few hundred feet north of the Bancroft east road, this quarry is reported to have produced over 11,000 tons from 1937 to 1939.

The diamond drill hole referred to above is number YR-11. It was drilled during the investigations of 1941-2 by Ventures Limited and the Aluminum Company of Canada, which companies had joined forces in the search for a potential source of alumina in the event of a wartime cessation of bauxite supplies.

Since 1943 the area has been virtually neglected. Most of the open land was staked several times during the uranium boom of the 1950's, but nothing of economic interest was discovered. A little routine prospecting activity by this company appears to have been the only recent interest in the area.

Location and Access.

The prospect consists of 2 mining claims in the north-east quarter of Dungannon Township, comprising all (about 100 acres) of lot 10 concession XIV. The adjoining lot to the east (lot 9 con. XIV) is patented to the Canadian Flint and Spar Co. Ltd. The adjoining lot to the south (log 10 con XIII) is part of the Morrison property.

Access to the area is not difficult. A wagon road runs north along the east bank of the York River from the bridge on the Bancroft east road (Hwy. 500). The south-east corner of the claim group lies several hundred feet west of a point on the wagon road approximately 1½ miles north of highway 500. The claims are thus a little more than 8 miles distant by road from Bancroft, and lie due east of that town. Depending largely on the weather, the wagon road may or may not be serviceable for the ordinary motor car. A 1/2 ton truck or similar vehicle is recommended.

The Canadian National Railway has a line passing through the western part of the township connecting Trenton Junction, Madoc and Bancroft, and continuing west to Kinmount where it joins a line connecting the town of Haliburton to the north with Penelon Falls and other points to the south. The closest approach of this railway to the map area is about 4 miles. Existing roads, however, would require a haul of about 7 miles to Bronson Station.

Method of Survey

With the help of aerial photographs scaling 1/4 mile to the inch, and enlargements scaling approximately 600 feet to the inch, the western boundary of the patented lot 9 (con. XIV) was located. Its position was marked by vague cuttings and blazes but a 1/2" square iron post at either end confirmed the location. The post at the south end was ringed by several rocks, and the remains of old claim posts were still visible near by. Only an old claim post marked the location of the iron post at the north end, which otherwise would be most difficult to find. The line was chained and pickets were put in at 100' intervals.

Traverses were run by pace and compass along lines at right angles to this base line and at intervals of 200'. Only in the north-west corner of the map area was it found not possible, because of the swamp conditions, to completely traverse the area. Aerial photos indicated that no outcrop was likely in this region however. A vaguely blazed line, apparently marking the westerh boundary of the lot, provided a good check on the pacing distances.

Because of the general scarcity of outcrop, boulders were noted as well. They are carefully distinguished on the accompanying geological plan. Rock symbols were those established by Hewitt (4) but colours deviated slightly because of the more detailed nature of the present work. The final

geo ,ical plan was reproduced on a 200' scale.

The writer acknowledges the assistance of H. Maidment during the early reconnaissance of the area, and L. Davis during the present survey.

Topography

The area is typically low undulating terrain. It is densely wooded and the underbrush is heavy. Thick cedar swamps account for almost 30% of the surface area. The relief would not exceed 60' except perhaps at the extreme north end where the land slopes rapidly into a prominent east-west fault depression (Kings Marsh) just north of the map area.

A large cedar swamp covering much of the north-west quadrant occupies a granite-paragneiss area. The only other major swamp cuts completely across the nepheline band in the south-east portion of the map area.

Outcrops are scarce and of small size, and although boulders are not common their character was noted. In some cases the bedrock geology was more easily interpreted by noting the distribution of boulders. Soil cover was sandy and of considerable depth. Probably the least soil cover exists on that part of the nepheline band in the south-east corner of the area.

Although prolific, the trees of the area are generally small and of mixed deciduous type. Only in the northern section do pines become common and of moderate size. Some of these have been lumbered in recent years.

General Geology

The York River nepheline band lies entirely within the Hastings Highland Gneiss Complex. It is apparently cut off to the south by the McArthur's Mills Fault but continues with decreasing width into Monteagle Township to the north. It can thus be traced over a total continuous length of about 7 miles, and may be observed in scattered occurrences over a considerably greater distance.

The nepheline band is flanked on both sides by crystalline limestone over its entire length, and narrow horizons of limestone occur within the band. The Great Bend granites lie to the west, and an extensive area of gabbro (Mallard Lake metagabbro) and minor amphibolites lie east of the nepheline-limestone association.

The diamond drilling of 1941-2 indicated that the nepheline band could be divided into three main members and several minor subdivisions on the basis of mineralogy (4). The lower member (westernmost) is characterized by a nepheline-poor feldspar-rich condition in which biotite is the common dark mineral. The middle member is characterized by nepheline, plagioclase, garnet, and pyroxene, plus a distinctive texture. The upper member is the least uniform but is the richest in nepheline and has hornblende as its dark mineral.

The nepheline gneiss is typically well-foliated and medium to coarse of grain. It strikes north-south at the southern end but swings somewhat

eastward towards the north. Dips vary from 30° to 60° east. The nepheline rocks are everywhere conformable with the limestones and paragneisses with which they are associated. They are distinct from other nepheline rocks of the Bancroft area in their rock associations and higher dark mineral content.

Most geologists familiar with the area have been struck by the strongly gneissic texture, the small but persistant content of calcite in the nepheline rocks and the intimate and conformable association with limestones. The vague ideas of origin based on a differentiation of granite magma, with or without the assimilation of limestone, were early explanations that never completely satisfied. Following the publication of reports by Fraser, Gummer and Burr (6) in 1941-3, based on the Ventures-Alcan investigations, a new round of ideas developed. These were explanations that envisaged a process of selective replacement of various limy sediments by solutions high in alumina and alkalies. The last word in this process of "nephelinization" must be credited to Tilley (7) who attacked the problem by examining over 1500 thin sections made from the core of one drill hole! He concluded that the ancestral rock was a relatively pure limestone, and that fluids rich in soda, alumina, silica, and iron, emanating from some unknown but presumably magmatic source at depth, were responsible for the existing mineral assemblages through processes of replacement.

The geology of the immediate map area is only slightly modified from that presented in the Hewitt and James report (4). All rock formations trend diagonally across the map area from south-west to north-east. The general strike is 5° east of north and the dip is easterly, averaging 35° in the south and less than 30° in the north.

The nepheline band, here showing a maximum width of just over 1000', underlies about 40% of the map area and is confined to the southern and eastern boundaries. The apparent thickening of the band in this vicinity is consistant with the observed flattening as measured in the dip angles.

The writer has interpreted a folded condition about a small domal structure lying just east of the map area, to explain the apparent offsetting of the various members of the nepheline band in the south half of the area. Stereoscopic examination of aerial photographs strongly suggests the validity of the interpretation, but scarcity of outcrops has made it difficult to obtain confirmation on the ground. The dome is slightly elongated in a north-easterly direction and consists of a considerable development of nepheline pegmatite (eg. the Davis quarry) injected into amphibolitic paragneisses and nepheline gneiss. Syenite pegmatite is also present, but the rock type causing the uplift is not exposed. It is suggested that a small gabbro plug may be responsible, as is observed further south in the Egan Chute vicinity.

In the south half of the area a thin zone of biotite and feldspar paragneisses is seen to occur on the west side between the nepheline rocks and the limestones. Towards the north this band appears to thicken and become granitized, though outcrops of the latter are so scarce as to raise considerable doubt. These paragneisses are interbedded with the limestone band and their increased prominence in this area is probably due to locally fluctuating conditions during the original sedimentation. The limestone band persists throughout the map area with an exposed width of 100 to 200 feet.

On the western side the limestone gives way to further biotite paragneisses which have been more or less altered and replaced by the Great Bend Granite. Evidence of granitization can be seen in the occurrence of a rather fine grained buff coloured gneissic biotite granite (hybrid granite gneiss) which is always closely associated with the paragneiss areas and is not seen to cut other rocks. The typical Great Bend granite is represented by a massive pink to white coarse grained leucogranite occurring along the west boundary in the south half of the area. These granites underlie the nepheline-limestone-paragneiss band.

Table of Formations

Pleistocene		**mixed glacial sands and gravels**
Precambrian	Plutonic	(pink & white leucogranite (intrusive?) (buff biotite granite (hybrid) (nepheline gneiss (gabbro(not represented in map area)
	Metasedimentary	(crystalline limestone (amphibolite, paragneiss

Rock Types

Nepheline gneiss -

The nepheline gneiss is a typically medium to coarse grained foliated rock consisting essentially of varying proportions of albite, nepheline and mafic minerals (hornblende, biotite, pyroxene). Garnet, calcite, vesuvianite and microcline are minor accessories. Often the dark mineral makes up 50% of the rock.

The nepheline gneiss strikes almost due north and dips at a low angle to the east. It forms a distinct band across the south-east portion of the map area and is conformable in every respect with the limestones and paragneisses with which it contacts. The band shows a dip of 35 to 40° in the south part of the area, but it flattens to less than 30° in the north. It is underlain by the hybrid biotite granite gneiss and the pink leucogranites of the Great Bend formation.

The distinction of three "members" based on mineralogy has been demonstrated (4,7) for the nepheline rocks making up the York River band. The lower member is a feldspar-rich, nepheline-poor, unit often containing microcline and commonly with biotite as dark mineral. The middle member contains plagioclase, nepheline, garnet and pyroxene, the latter being diagnostic for the unit. A distinctive texture for this unit is described by Fraser (6) in his reference to "large green patches of hornblende commonly bordered by garnet". (Pyroxene has apparently been mistaken for hornblende). The upper member is the least uniform of the three but is richest in nepheline and commonly contains hornblende as its dark mineral. This member has been further divided into three zones, of which the uppermost, when present, contains the very rich nepheline occurrences which were sporadically traced by the drilling of 1941-2. This zone does not appear to be present in the immediate map area. (Note: The distinction of members has been based on detailed petrographic work, chemical analysis, and drill core examinations by the previous authors. The present surface examination is not considered

completely sufficient to delineate these zones with certainty, and hence the limits indicated on the accompanying map must be conditional on further microscopic and chemical work.)

A more quantitative comparison of the nepheline members in this vicinity is provided by analytical data from diamond drill hole YR-11. This hole was drilled (1941) on a westerly bearing from the south-east corner of the map area to completely transect the nepheline band. It was inclined at 44° from the horizontal and returned core lengths in the nepheline band as follows (data calculated from drill logs and analytical reports):

	Core length	$\%Al_2O_3$	$\%Fe_2O_3$ & TiO_2
Upper member	178'	21.1	10.4
Middle "	78'	15.4	13.2
Lower "	122'	15.8	12.5

These analyses are weighted averages of the individual samples belonging to each member. They emphasize a number of obvious distinctions between the various members:

(1) The upper member is significantly richer in nepheline and poorer in dark minerals.

(2) The middle member is relatively poorer in nepheline and enriched in dark minerals.

(3) The lower member is poor in nepheline and enriched in both feldspar and dark minerals.

From an economic point of view it would seem that only the upper member deserves detailed investigation for nepheline-rich areas. (The difference between it and the other two members would be even more significant if the rich uppermost zone observed in the lot immediately to the south were represented in the present map area.)

It is an observed fact that, notwithstanding the scarcity of outcrop, the nepheline content shows a general decrease towards the north in the present map area. It is known however, that a high-nepheline facies again becomes prominent in the north half of the adjacent lot 9 (con XIV).

The nepheline pegmatites are typically variable and extremely coarse-grained differentiates of the nepheline gneisses. They are characterized by the minerals nepheline and albite in roughly equal amounts, with minor calcite, biotite, zircon, and numerous other rare element minerals. Individual crystals of nepheline and albite can often be measured in feet. Small cavities or vugs on the weathered surfaces indicate the previous existence of calcite, now dissolved out by chemical weathering.

The nepheline pegmatites show obvious characteristics of mobility. They are intrusive into limestones and paragneisses with which they display sharp contacts and cross-cutting relationships. They occur in nepheline gneisses both as indiscreet patch pegmatites and as sharply defined dike-like

bodi . An interesting fact is that they are concentrated near the top of the nepheline band, either occuring in the upper member of the band itself or intrusive into limestones and paragneisses on the hangingwall side.

Granite -

There are two granite types observed in the map area, both related to the extensive Great Bend granite sheet lying to the west. In a few scattered outcrops along the western lot line the typical medium to coarse pink leucogranite of this sheet is exposed. The outcrops are small but where visible the rock displays a very coarse, almost pegmatitic texture with a massive structureless aspect. According to Hewitt (4) the granite is a high potash variety composed of about equal portions of microcline, albite, and quartz.

A rather fine grained buff to orange coloured gneissic biotite granite was observed in close association with the amphibolites and biotite paragneisses on the west side of the nepheline band. This would appear to be a hybrid granite gneiss formed by granitization of the sediments.

The granites dip eastward to underlie the nepheline-paragneiss-limestone association, and are in turn underlain by the mixed nepheline and syenite gneisses of the Great Bend area.

Crystalline limestones -

Crystalline limestones overlie and underlie the York River nepheline band. In the present map area a band varying between 100 and 200 feet in width is exposed along the west (footwall) side. It is intimately associated with biotite paragneisses which here become more prominent than in other sections.

The limestone is generally a rather pure medium grained gray variety. Occasional thin impure (silicated) horizons are present. Tilley (7) reports both dolomitic and calcitic horizons within the nepheline band; also a nepheline-free silicate footwall zone containing thin limestone horizons. The latter may be synonymous with the biotitic and feldspathic paragneisses observed in contact with the nepheline band in the present map area. The presence of nepheline in limestone horizons within the York River band is strongly suggestive of the origin histoy of the nepheline rocks as a whole.

Paragneiss- amphibolite -

These rocks are typically biotitic and feldspathic metasediments intimately associated with limestones and completely conformable with the nepheline band. More or less altered relatives of the group occur as thin horizons within the nepheline series. In the present map area they form the footwall of the nepheline band and are probably similar to the nepheline-free, quartz-bearing, silicate zone described by Tilley (7) in the footwall zone of the Egan Chute area.

They are medium grained, granular, well-bedded rocks with a crumbly-sandy weathered characteristic. In the north part of the area along the western

lot line there are granitized equivalents of these rocks. A "tongue" of granitized paragneisses is doubtfully shown in contact with the nepheline band in the north half of the area. This is based largely on the distribution density of granitized boulders and is obviously open to question. Whether or not it is significant in this regard is not known, but is none the less an observed fact that the increased development of the nepheline-poor zone is closely related spatially.

Structural Geology

Essentially the structure is simple. The rocks occurring in the map area, with the possible exception of the granites, from thin continuous zones having parallel and uniform contacts. The series strike about due north and dip at a moderate angle to the east.

The band is indicative of a generally lower grade of metamorphism, and has suffered much less distortion and mixing, than the nepheline associations of the Bancroft east road belt. Tilley (7) has suggested that the preservation of primary structures through lack of complete recrystallization "is doubtless to be attributed to the fact that they have been enveloped by limestone which has cushioned them from the stresses which elsewhere have led to such extensive recrystallization".

Evidence of severe folding and faulting is entirely lacking, although minor drag-folding has been suggested to account for some of the pod-shaped nepheline-rich zones to the south of the present map area. Structurally there appears to be the need for a condition of dilatancy to provide suitable traps for the accumulation of mobile nepheline-bearing solutions. Any such theory should also account for the close association of nepheline pegmatite and nepheline-rich areas in the nepheline gneiss.

An extensive area of swamp completely transects the nepheline band in the south half of the map area. Because of the apparent dislocation of the nepheline horizons on either side of this swamp it was first thought that faulting had been active. Stereoscopic examination of aerial photographs was not conclusive on this point however, but it did reveal a domal structure lying just east of the map area in lot 9.

The dome appears to be somewhat elongated in a north-east direction and is some 600' across the short dimension. It is known to consist on surface of a considerable development of nepheline pegmatite (eg: Davis quarry) with lesser syenite pegmatite injected into nepheline gneiss and biotite paragneiss. It is suggested that a small gabbro stock which has not reached surface is responsible for the uplifted area. Such an occurrence, where gabbro is responsible, is well known in the Egan Chute area to the south.

Aerial photographs suggest a terrace pattern of low ridges and depressions in the nepheline-paragneiss association folded around the western flank of the dome. In the accompanying geological plan the offsetting of the nepheline members has been entirely attributed to this folding, but the writer does not wish to preclude the possibility of a more complex structural condition involving both faulting and folding.

List of References

(1) Guillet, G. R., unpublished company reports, 1958.

(2) Adams, F. D., and Barlow, A.E., Geology of the Haliburton and Bancroft areas, Ontario, G.S.C. Mem. 6, 1910.

(3) Thomson, J.E., Mineral occurrences in the north Hastings area, O.D.M. vol. 52, pt. 3, 1943.

(4) Hewitt, D. F., and James, W., Geology of Dungannon and Mayo townships, O.D.M. vol. 64, pt. 8, 1955.

(5) Keith, MacL., company reports, American Nepheline Limited.

(6) Fraser, H.H.C., Gummer, W.K., and Burr, S.V., company reports, Ventures Limited.

(7) Tilley, C.E., Problems of alkali rock genesis, Quarterly Journal of the Geol. Soc. London, vol. 113, May 1958.

Conclusions

1) The area consists of 2 mining claims, comprising all of lot 10, con. XIV, adjoining and lying north and west of the "Morrison" property and the Canadian Flint and Spar property respectively.

2) The prospect is a section of the York River nepheline band which is traceable for more than 7 miles north of the junction of Hwy. 500 and the York River.

3) The nepheline rocks are well-foliated, medium to coarse, assemblages of feldspar (mostly albite), nepheline and dark minerals (hornblende, pyroxene, biotite) in widely varying proportions. Calcite and garnet are minor accessories, and corundum is unknown.

4) The nepheline band can be divided into 3 distinct members based on mineralogy. The uppermost is richest in nepheline and poorest in dark minerals and is therefore of greatest economic interest.

5) The rocks strike north-south and dip east at about 30°.

6) The nepheline rocks are intimately associated with crystalline limestones and paragneisses which form both the hangingwall and footwall and occur as occasional interbeds within the nepheline band. Extensive developments of gabbro and granite are the more distant countryrocks to the east and west respectively.

7) In the immediate map area the nepheline content shows a marked decrease to the north corresponding to a decreasing elevation. It is, however, known to increase again in the north half of lot 9 where it occurs in a prominent hill.

8) The nepheline rocks are characterized by a lower grade of metamorphism, and have suffered less distortion and mixing, than those of the Bancroft east road belt. This has been attributed to the cushioning action of the enclosing limestones.

9) A process of "nephelinization", involving almost complete replacement of limestone by nepheline-bearing solutions emanating from an unknown source at depth, has been suggested to account for the origin of the nepheline rocks.

10) It has been suggested that drag-folding may be the structural requirement for the localisation of the nepheline-rich zones. No rich zones were observed in the present map area but folding is believed present beneath the swamp in the south half of the area.

11) Folding around a small domal structure has caused displacement of nepheline horizons under low ground in the east-central part of the lot. There is no suggestion of nepheline enrichment in this vicinity.

12) Nepheline pegmatites are small in the present map area. They are typically concentrated in the upper member of the nepheline band and the hangingwall paragneisses. They are composed essentially of nepheline and albite in equal amounts.

13) Results of diamond drilling (hole #YR-11) during 1941-2 in the southern part of the lot do not recommend this portion of the York River nepheline band.

14) The area is one of low relief with considerable swamp and overburden, and is rather densely wooded and heavy with underbrush.

15) The location of the west limit of the patented lot 9 (con. XIV) was definitely established and used as a base line in the present survey.

16) Access to the area is not difficult via several miles of wagon road from highway #500. Distance by road from Bancroft is about 8 miles; from Bronson Station on the C.N.R., about 7 miles.

Recommendations

1) The north half of lot 10, con. XIV, occupied by claim EO 25787, is considered of no economic value and should be dropped. The south half of the same lot (EO 25788) is of doubtful value and could probably be dropped as well. However, pending the acceptance of this report for assessment work credit, both claims can be retained without further work until December 11, 1959.

2) It is suggested that further work on the "Morrison property", including actual examination of drill core YR-11, will recommend any possible value for EO 25788, at which time a decision can be made concerning it.

Respectfully,

G. R. Guillet,
Nephton, Ontario,
December 22, 1958.

GRG:c.

Nepheline Rocks of Du

The York River, Great Bend Area

A Geological Report for Mining Claims K.O. 25789 - 25792 Inclusive

History

The area of interest occupies all of lots 14 and 15, concession XIV in Dungannon township. It lies within that portion of the York River known as the Great Bend and is relatively inaccessible except by a water route provided by the river itself. It is believed that the difficulty of access has been largely responsible for the apparent neglect which the area has received.

The work of Adams and Barlow (1) in the early 1900's indicated the area to be underlain predominantly by crystalline limestones. Thomson's (2) map of 1943 was only slightly modified from that of his predecessors and did not correct the designation. It was not until the detailed work by Hewitt and James (3) in 1953-54 that the area received its proper status.

Unpublished reports by Keith (4) in 1937, working for the then Canadian Nepheline Limited, indicated the attractive quarrying possibilities and generally favourable mineral composition. His recommendations, however, were apparently overshadowed by the difficulty of access since no further references can be found.

From 1937 to 1942 the Bancroft-York River nepheline belts were prospected by a number of companies. Some of these actually engaged in intermittant production of nepheline pegmatites for the ceramic and glass industries. These were short-lived ventures however, suffering mainly from the non-uniform characteristics of the pegmatites and the generally high lime content.

In 1941-42 the area was further investigated by Ventures Limited and the Aluminum Company of Canada as a potential source of aluminum in the event of a war-time cessation of bauxite supplies. It was generally recognized that such a venture would not be profitable in competition with bauxite ores. A considerable program of diamond drilling and surface mapping was carried out under the direction of Fraser, Gunmer and Burr (5) in the Bancroft and York River nepheline belts. This work, however, was apparently not extended to include the area of present interest.

There are indications of at least two periods of activity in the immediate map area. In the north half and close to the west boundary of lot 14, concession XIV, there are three or four small pits in nepheline gneiss facing east near the crest of the main nepheline hill. One of these pits is about 10' square with vertical walls and appears to be quite deep. It is presently water-filled. Others are shallower depressions worked in an erratic pattern and following no clearcut geological feature. The present growth of vegetation in these pits suggests that the work was done in the early 1900's, probably shortly before World War I when there was a good market for corundum. Of interest is the occurrence of a cairn a hundred feet or so south of the workings. It is about 4' square and 2 to 3' high, and does not appear to be a survey marker of any kind. A few stones were removed to investigate the interior, which was hollow, but nothing was found.

Later activity in the area has been in the form of transit surveys. Well-cut lines with base stations can still be seen clearly even though the work seems to be 10 or 15 years old on the basis of present vegetation. The work looks more like a forestry survey than anything related to mining exploration. The use of blue and red paint for marking trees along the survey lines is typical. For a number of years prior to the present staking, the area had been staked annually as an uranium prospect, based not on the radioactivity of the rocks but only on the established pattern of "blanketing" that prevailed throughout the Haliburton-Bancroft area at the time of the uranium boom. It is not known whether or not the observed survey work was related to this activity.

Following the publication of the Hewitt and James report (3) on Dungannon and Mayo in 1956, American Nepheline Limited, which has always maintained at least a passive interest in the area, decided to make a routine examination of some of the nepheline occurrences that had been brought to light by the detailed mapping. As a result four claims were staked in the Great Bend region of the York River on November 14, 1957. Staking was in the name of E. B. Wright of Nephton, Ontario, (mining licence no. A 22022) with the intention of transferring the holdings to American Nepheline Limited at a later date.

During the past year a number of bulk samples have been taken from various parts of the occurrence. The writer acknowledges the assistance of Messrs. W. Lindhorst, E. Davis, G. H. Taylor and H. Maidment in this connection. Mr. Maidment also assisted in the early prospecting of the area. During the recent geological survey conducted between September 2nd and 18th the writer was capably assisted by E. Davis and A. Cameron.

Location and Access

The prospect consists of 4 mining claims in north-central Dungannon township comprising all of lots 14 and 15 concession XIV. The area is located on the east bank of the York River and is largely surrounded by that portion known as the Great Bend. The straight line distance east from the town of Bancroft is about 5 miles.

The most ready means of access is by way of a private road through the Hysert farm to a point on the York River known as Bronson Landing. This road takes off in a north-easterly direction from a point on the Bancroft east road (Hwy. #500) about 1/2 mile east of the Bronson settlement, or some 4.8 miles east of Bancroft. Permission should be obtained from the Hyserts to use the road and one of the several boats which they keep at the landing. It is normal to walk the last 1/4 mile to the river because of the condition of the road. The nepheline occurrences may be examined on the east shore at several points between 1/2 mile and 1 mile downstream (north) from Bronson Landing.

The Canadian National Railway from Trenton Junction to Bancroft passes through the western part of the township. Bronson Station is some 4 miles by road south-west from Bronson Landing.

Method of Survey

Aerial photographs were obtained for the entire area on scales of 1/4 mile to 1 inch and approximately 600 feet to 1 inch. These served as a general guide in the mapping but a surveyed base line was used for actual control.

The existence of a surveyed line holding to the west side of the syenite occurrence was noted in early reconnaissance of the area. This line was re-cut and re-run by transit and chain, and pickets were put in at 100 foot intervals.

Mapping was done by pace and compass traverses run at approximately right angles to the base line and at 200 foot intervals. In the more attractive nepheline areas the interval was reduced to 100 feet or less. Reconnaissance of the river shoreline was by boat, and short trips were made inland at various places where the photographs suggested rock outcrop might be found. A pocket-type barometer was used to give approximate elevations of prominent topographic features.

Mapping symbols for the various rock types and geological features were those used by Hewitt (3). It was found that far more detail had been accumulated in the field work than could be applied to a 200 foot scale. Hence the final draught of the map was considerably simplified especially as regards out-crop boundaries. Often it was necessary to indicate only the predominant rock type where more than one was noted.

A camp was established at the north-east corner of the claim-group. Field work was conducted between September 2nd and 18th, 1958.

Topography

The nepheline rocks occur in two large hills on the east side of the York River. Their north-western flanks are cliff faces which rise vertically from the extensive marsh areas of the river valley. The ground slopes away gently to the east and south-east giving way to a broad sand plain which occupies much of the eastern part of the map area. The main nepheline hill occupies the central and northern part of lots 14 and 15 and is entirely contained within the area covered by staking. The much smaller northern hill extends for a few hundred feet out of the map area to the north into concession XV.

Overburden is moderate on the nepheline hills, becoming heavy on the northern slopes and valleys. A thick blanket of typically unstratified glacial sand forms an extensive plains region extending beyond the map area on the east side. Outcrops are scarce in this region and evidence of recent fires accounts for the abundant growth of very young poplars, pine and spruce. An observed thickness of some 30 feet of sand can be seen at various points along the river shores.

Areas underlain by nepheline rocks show the maximum relief in the map area. Peak elevations of the nepheline hills are about 1100 feet above sea level. The York River lies at an elevation of 950 feet at this point, giving a maximum relief of 150 feet for the area. Despite the moderate relief however the topography must be described as rugged. The north and

west flanks of the nepheline hills rise almost vertically from the marsh areas bordering the York River. Steep sided gullies cutting the nepheline hills indicate the presence of more easily weathered metasedimentary bands. The more rugged areas support rather sparse but more mature stands of timber than the plains area to the east.

The York River flows north-eastward, draining the area into the Ottawa River by way of the Madawaska. The broad marshy valley through which it flows is marked by a tangled growth of deciduous trees and bushes fringing the river banks, and giving way to thick grass meadows a short distance back.

General Geology

The Great Bend nepheline occurrence forms part of the 'Hastings Highland Gneiss Complex', which occupies much of the northern half of the township. As defined by Hewitt (3) this terrain is characterized by high-grade metamorphic gneisses of Grenville type. Amphibolites, paragneisses, marbles, and basic volcanics have been intruded and replaced by nepheline syenite, syenite, granite, and gabbro. "The Hastings Basin' area to the south is generally characterized by sediments of low to intermediate metamorphic grade. Nepheline rocks do not occur in this terrain. The two contrasting areas are separated by an east-west fault (the McArthurs Mills fault) passing through Bancroft and north of the settlement of McArthurs Mills in Mayo township.

The nepheline rocks of the Great Bend area, as herein described, consist of two major hills of predominantly nepheline-bearing gneisses which form the eastern limit of the so-called'Bancroft nepheline belt'. They are in most respects similar to their more familiar and accessible relatives to the west and sout-west. Occurring in intimate association with various alkali syenites, they are flanked on the west and east by the Bronson and Great Bend granites respectively. Minor amounts of limestone, amphibolite, and rusty-weathering quartzo-feldspathic paragneisses occur as sedimentary remnants in the map area.

Table of Formations

Pleistocene		sand (glacial-fluvial)
		- unconformity -
Precambrian	Plutonic rocks	granite, granite pegmatite
		syenite, syenite pegmatite
		nepheline gneiss, nepheline pegmatite
	Metasedimentary rocks	crystaline limestone or dolomite
		amphibolite, paragneiss

The band of nepheline and alkali syenites strike in a direction 30° or 40° west of north and dip to the east at a moderate angle. From Hewitt's (3) work it is apparent that these rocks form part of the east limb of a south-easterly pitching anticline of nepheline and alkali syenites which are intruded in the crestal region by the Bronson granite.

Topographically the alkali rocks are sharply terminated on the north-west side where the structural relations are lost in the low ground of the valley floor. It seems quite likely that a south-east trending fault, suggested by Hewitt (3) along the line of the river valley at this point, may account for the abrupt termination of these rocks.

On the east side the relations are again obscured by the flat sandy peneplain. The few outcrops suggest extensive granitization, which though widespread is by no means complete. The occurrence of only slightly altered sediments suggests a very juvenile stage in the granitization process. Remnants of nepheline gneiss in essentially granitic outcrops unquestionably places granitization as post-nepheline in age.

Rock Types

Nepheline gneiss -

The nepheline rocks of the area are medium to coarse grained, well-foliated gneisses striking 30° to 40° west of north and dipping 40° to 80° east. Mineralogically they consist of varying amounts of nepheline and albite with accessory biotite or hornblende (rarely both). Minor amounts of calcite, microcline, magnetite, corundum, sodalite, zircon and apatite may or may not be present.

The nepheline and plagioclase contents vary inversely with one another over short distances, while the dark minerals remain reasonably constant at 15 to 20% of the whole. An attempt was made during mapping to record the nepheline content at intervals of 10%. Bands containing as much as 60% nepheline over short widths were indicated, but could not be depended upon to continue for any distance along strike. It is possible, however, that zones containing 40 to 50% nepheline may occur in mineable widths, although the overall average will probably be less than 30%.

The well-foliated character of the rocks is due to a structure varying from schistose through gneissic to massive. There is an obvious, though not infallible, relation between structure, grain size, and nepheline content, as follows:

Structure	Grain size	Nepheline content
schistose	medium	low
gneissic	medium to coarse	medium
massive	very coarse	high

Structurally the nepheline gneisses conform to the structure of the syenite gneisses and metasediments with which they occur. (This is not always obvious with the marble occurrences which may show a rapidly varying foliation due to plastic flowage.) It is often possible to trace individual bands of nepheline gneiss along strike through a sequence marked by decreasing nepheline content to essentially a "nepheline-poor" gneiss or syenite gneiss. The transition is particularly obvious on the weathered surface where normally light-grey nepheline gneisses showing the characteristic blue-pitted (due to nepheline) weathering can be seen to give way to pink, buff, and white nepheline-poor gneisses. These changes become more common towards the south end of the occurrence, indicating a progressive replacement by processes of syenitization.

Dikes of pink syenite varying in thickness from a few inches to a few tens of feet, and sometimes showing cross-cutting relations, intrude nepheline and syenite gneiss. Cross fracturing (or jointing) is not severe but is conspicuous by the few inches of alteration associated with it, especially the superior weathering of the bleached zone.

The occasional occurrence of corundum along the east side of the syenite mass has been mentioned in the section on "History" in connection with the old surface workings observed near the boundary of lots 14 and 15 in the north half of concession XIV. Wherever this mineral was observed it was always sheathed in a black submetallic mineral which typically occurred in a locally bleached area of otherwise normal nepheline gneiss. In the vicinity of the old pits this mineral association was represented by large crystals, measuring up to several inches in length, occurring in medium grained biotite nepheline gneiss. The corundum, which is often less than 50% of the combined crystal, is of the brown variety.

The characteristic barrel shaped crystals with their rudely hexagonal cross-sections suggest that the unknown black mineral is pseudomorphic after corundum. Commonly associated minerals are biotite, calcite, corundum and sulphides.

The following observations were made using oil immersion techniques:

- deep green in transmitted light
- non pleochroic
- isotropic (remains dark in cross-polarized light)
- index of refraction is greater than 1.80

Also these properties:

- weakly magnetic
- hard
- green streak
- uneven fracture
- no cleavage (?)

The mineral probably belongs to the spinel group.

Syenite and Syenite pegmatite -

Dikes of pink leucocratic alkali syenite, from several inches to over 30 feet in thickness, are frequently seen to intrude the nepheline and syenite gneisses. They range in grain size from fine to pegmatitic and are composed of microcline and albite with minor amounts of biotite, hornblende and tourmaline (?). These rocks are of the fracture-filling type and are usually injected parallel to the foliation of the host rock. Cross-cutting relations were observed in a few instances but were always of low angle discordance. The tendency was for the foliation of the host rock to curve around the injected dike.

In contrast to the well-foliated gneisses in which it occurs, the

pink syenite displayed a massive and structureless appearance with blocky weathering characteristics. The contacts were often sharp but gradations over a few inches were occasionally noticed. Along strike the dikes were usually seen to pinch out in wedge-like fashion but one was observed to grade into nepheline gneiss by interfingering and swamping over a distance of 30 feet. It is likely, however, that such complete replacement played only a minor role in the localization of the syenite dike occurrences. A partial replacement or metasomatism is usually obvious in the contact region, where nepheline gneiss has been altered to pink nepheline-poor gneiss.

Syenite gneiss and Nepheline-poor gneiss -

These names are essentially synonymous. The term "nepheline-poor gneiss" was used in mapping to indicate variously coloured syenite gneisses that had been obviously formed from nepheline rocks by syenitization. Since this criterion could probably be safely applied over considerably wider limits it was found to be not practical to attempt a distinction on the scale used for the final draught of the map.

Structurally these rocks are identical to the nepheline gneisses with which they occur. They are typically interbanded with nepheline gneisses and show complete gradation, through colour and varying nepheline content, from one to the other. In the immediate map area they were seen to include remnants of limestones and paragneisses.

The syenite gneisses are readily distinguished from the nepheline rocks on the weathered surfaces where they are seen to comprise three fairly distinct colour types - pink, buff and white. The white gneisses are believed due to a period of albitization subsequent to the emplacement of the nepheline. The pink and buff varieties invade and replace both the nepheline gneisses and the white syenite gneisses. Both may be due to a period of potash metasomatism which accompanied the injection of the pink syenite dikes. There was some evidence, however, to suggest that the buff variety was more closely related to the contact regions bordering inclusions or bands of limestone and other metasediments occuring as remnants in the syenite mass.

The syenite gneisses contained either biotite or hornblende (rarely both) in about the same proportion as in the nepheline gneisses. Magnetite and muscovite were minor accessories. Texture and grain size was completely consistant with that of the nepheline rocks.

Crystalline limestone or dolomite -

The limy rocks are of sedimentary origin. They are not abundant in the immediate map area though they may occupy considerable areas of low marshy ground where outcrops are absent. Two types are observed: - a silicated marble, and a marble tectonic breccia.

More or less silicated marbles were observed in several places to be conformable and interbanded with the nepheline and syenite gneisses. They are typically medium grained grey rocks with a poorly-developed banding (bedding?) due to layers of varying siliceous content. Graphite and an orange coloured garnet are usually present. Locally the marble has been altered to a diopside-phlogopite skarn where it contacts the nepheline gneisses.

The marble breccias are observed in several places along the York River shore. They consist of heterogeneous mixture of rock fragments in otherwise medium grained grey limestone. Included fragments are granitic and syenitic gneisses, and amphibolites, arranged without respect to orientation.

Amphibolite, Rusty-weathering gneiss -

Amphibolites, rusty-weathering quartzo-feldspathic gneisses, and related paragneisses, occur as sedimentary remnants in granites and nepheline and alkali syenites. They have been variously replaced and altered by the syenitization and granitization processes. These rocks occur sparingly in the map area and it is doubtful whether any form mapable units. One such unit however, is questionably shown to trend north-south along the eastern edge of the property, but the scarcity of outcrops would equally permit the interpretation of sedimentary remnants in a predominantly granite terrain.

Granite and Granite pegmatite -

The syenite belt containing the rocks of present interest is flanked on the east and west by the Great Bend granite gneiss and the Bronson granite respectively. The Bronson granite is not represented in the map area and so will not be dealt with here.

The western edge of the Great Bend granite sheet can be observed in widely scattered outcrops on the eastern side of the map area. This portion of the area is overlain by a considerable thickness of glacial sand which extends for about a mile eastward across a broad flat plain.

The Great Bend granites are poorly foliated, pink, fine grained to pegmatitic, leucocratic rocks, trending almost due north and dipping eastward at a low to moderate angle. Inclusions of syenite and nepheline gneisses, limestones, amphibolites, and paragneisses were observed in the few outcrops. Because of the outcrop scarcity and the often considerable extent of the inclusions mentioned above, it was not with any certainty that the rocks were mapped as one rock type or another.

Structural Geology

Within the Highland Gneiss complex the Bronson granite is interpreted by Hewitt (3) as occupying the crest of a major anticline of nepheline and syenite gneisses plunging south-east. On the basis of this interpretation the occurrence of present interest lies on the east limb of this anticline, the west limb of which contains the well-known nepheline areas along the Bancorft east road. This is a very acceptable relationship since there can be no question about the lithological similarity between the rocks of the present map area and those of the Bancroft belt.

The metasomatic origin of the nepheline rocks in the Dungannon area is held in general favour by most geologists. The intimate association of obvious sedimentary rocks, the chemical and mineralogical variability of the nepheline rocks and the generally higher lime content (as compared to intrusive types), suggest a process of selective replacement (ie:"nephelinization") of limy sediments. Since nothing further can be added to the many detailed theses

on this subject, it is only repeated here that the nepheline occurrence should be considered as a sediment in all problems of evaluation and mining.

Faulting appears to be an important feature of the Highland Gneiss Complex. The ruggedness of the terrain is probably related to both faulting and differential weathering. The only faulting or shearing that seems to be justified in the present map area is an arcuate depression passing through the north part of lot 14, con. XIV and disappearing in the south part of lot 15, con. XV. This depression has been seen to contain, at least in part, a silicated limestone, which should properly be called a marble mylonite in this connection. More doubtful evidence of faulting is the uncertain relationship between various nepheline and syenite gneiss horizons occurring on the two nepheline hills separated by the depression in question. There is a suggestion here of the north side moving east.

The sharp truncation of the nepheline bands on the north-western flanks of the two main hills suggest faulting, but since the relations are not clear this is not shown on the accompanying plan. However, Hewitt (3) suggests a major north-west trending fault through the west side of the map area which he says has controlled, at least in part, the location of the York River in this vicinity. Perhaps the two main nepheline hills have suffered later dislocation, since the features mentioned above would seem to require a north-east trending break.

The zones of highest nepheline content are concentrated in the north-west portion of the occurrence, reaching a maximum in that portion of the main central hill close to the intersection of the arcuate depression (fault?) and the steep cliff face. Depending on ones view of the history of the nepheline rocks, the distribution of the nepheline can be explained in two ways. If the Great Bend nepheline occurrence is considered to be a separate and distinct localization, then one might suggest that the locus of metasomatic (nephelinization) activity was centred in the north-west portion of the mass. The interpretation favoured by Hewitt (3) and others, including the writer, is that both on a regional and local scale the distribution of nepheline was controlled by the observed process of progressive syenitization of a once relatively homogeneous nepheline band.

Summary of Sampling Activity

American Nepheline Limited has been largely interested in the higher nepheline rocks as a possible source of high-quality ceramic material. Samples of the rocks are crushed, screened and subjected to dry magnetic separation according to a standard method as established by the company for purposes of primary evaluation.

The following samples have been tested in this way:

Sample (1) - Composed of 15 lbs. of rock taken from three widely scattered points (one from the north hill and two from the main central hill).

Sample (2) - Bulk sample of 300 lbs. taken from the talus slope at the base of the north-west scarp on the north hill.

Sample (3) - Composed of 100 lbs. taken from a small area near the top of the north-west scarp on the north hill (January 7, 1958).

Sample (4) - Bulk sample of 700 lbs. taken by drilling (portable gas drill) and blasting at 10 points across the western end of the main central hill. (July 16, 1958). See accompanying geological plan for pit locations.

The products obtained by testing the above samples according to the aforementioned method were analyzed chemically with the following results: (S. Johnston, analyst)

	Sample (1)	Sample (2)	Sample (3)	Sample (4)
SiO_2	50.97	50.32	50.74	53.52
Al_2O_3	28.91	28.16	28.06	26.81
Fe_2O_3	0.10	0.141	0.344	0.109
CaO	1.21	2.70	1.86	1.90
MgO	trace	0.09	0.06	trace
Na_2O	13.14	11.71	12.74	12.11
K_2O	4.26	4.26	4.38	4.36
H_2O	0.05	0.02	0.06	0.05
Loss on ignition	1.14	2.60	1.72	1.46
	99.78	100.00	99.96	100.32

While none of these analyses can be considered representative of more than just the immediate sample location, certain general conclusions can be drawn. Thus it can be said that the generally high content of alumina and combined alkalies are characteristics attractive to the glass and ceramic industries. However, the lime and iron contents are too high for present acceptance by these consumers. From these analyses, and from general impressions gained in the field, it is considered that the problem of maintaining product uniformity would be of major concern in any mining enterprise.

References

References indicated by number (in brakcets) throughout the report refer to the following publications:

(1) Adams F. D. and Barlow A. E., Geology of the Haliburton and Bancroft areas, Ontario, G.S.C. Mem. 6, 1910.

(2) Thomson J. E., Mineral occurrences in the North Hastings area, O.D.M. vol. 52, pt. 3, 1943.

(3) Hewitt D. F. and James W., Geology of Dungannon and Mayo townships, O.D.M. vol. 64, pt. 8, 1955.

(4) Keith Mac.L., company reports, American Nepheline Limited.

(5) Fraser N.H.C., Gummer W. K., and Burr S.V., company reports, Ventures Limited.

Conclusions

(1) The Great Bend nepheline area forms part of the east limb of a south-easterly plunging anticline composed of various alkali syenites which make up the so-called "Bancroft nepheline belt". The rocks of present interest are therefore chemically and mineralogically similar to the well-known occurrences along the Bancroft east road (eg: Davis, Lillie Robertson, Cooney, etc.), but are distinct from those of the "York River belt" (eg: Morrison property).

(2) The nepheline rocks of the Great Bend area are medium to coarse grained gneisses composed of nepheline, albite, and biotite, with minor calcite, magnetite, and hornblende.

(3) The nepheline gneisses are interbedded with limestones and amphibolitic paragneisses, intruded by pink syenite dikes and rare nepheline pegmatites, and partially altered by periods of soda and potash metasomatism.

(4) It is generally agreed that the nepheline gneisses were formed from limy sediments by a process of "nephelinization" (ie: partial replacement by nepheline-bearing solutions emanating from depth).

(5) The zones of highest nepheline content are concentrated in the north-west corner (north 1/2 of lot 15) of the occurrence. Syenitization, as indicated by decreasing nepheline content, increases progressively to the south-east.

(6) The distribution of nepheline in the highest grade section of the main central hill would suggest the following zones of possible economic interest:

Nepheline content greater than 50% = area 100' x 300'
" " " " 40% = " 150' x 700'
" " " " 30% = " 400' x 1000'

(7) Chemically we could expect the product from a zone of mineable size to fall somewhere within the range: alumina 26 to 28%, combined alkalies 16 to 17%, lime 2%, and iron 0.1 to 0.2%.

(8) The problem of maintaining chemical uniformity of the product might well be the most difficult phase of any mining venture.

(9) The northernmost hill of the group is considered of doubtful interest because of its intimate association with limestone and its common pink syenite dikes. A small area of good quality nepheline gneiss extends into concession XV but the acquisition of this land is not considered necessary for the aforementioned reasons.

(10) Corundum is not common but does occur sparingly in the east central portion of the mass. It would be of no problem in the zones of possible interest.

(11) An attractive quarry site exists in the highest grade section in the form of a cliff rising vertically to an elevation of about 100' above the river, then more gradually to a peak elevation of about 150'.

(12) The topography can only be described as rugged, being typically "mountain and muskeg" terrain.

(13) Access to the area is difficult, requiring a boat from Bronson Landing or an overland hike of several miles from the York River road in lot 10 concession XIII.

Recommendations

(1) At the present time it would seem that we could safely drop the south 1/2 of lots 14 and 15 (L.O. 25790 and 25792). However, pending the acceptance of this report for assessment credit, all four claims can be retained without further work until December 11, 1959.

(2) It is recommended that next year's assessment work be in the form of a detailed examination of the most promising zones as outlined in this report. This work would therefore be largely confined to the north 1/2 of lot 15 (L.O. 25791), and would take the form of extensive trenching and sampling by drilling and blasting.

Respectfully,

G. R. Guillet

G. R. Guillet

Nephton, Ontario
December 16, 1958.

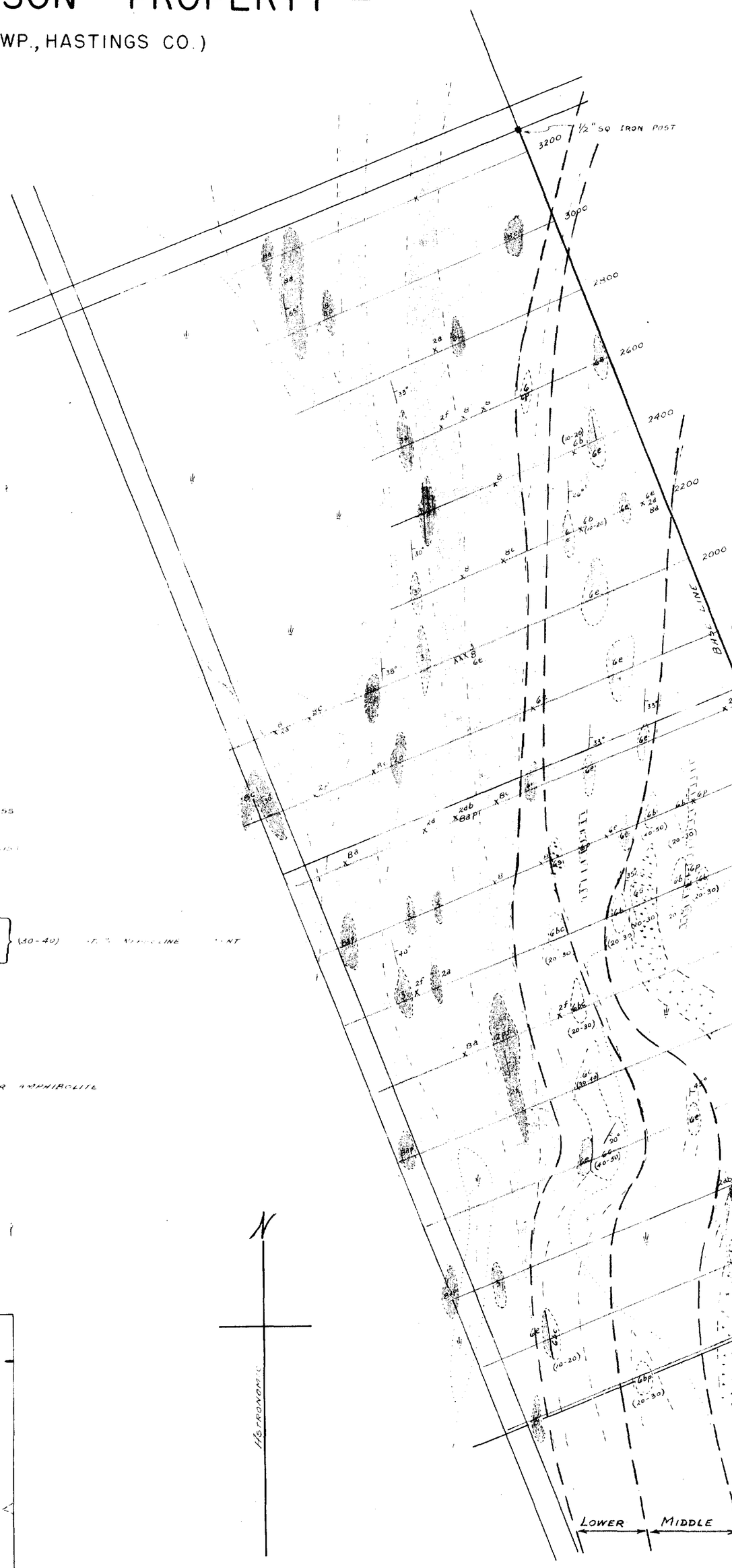
GRG:c

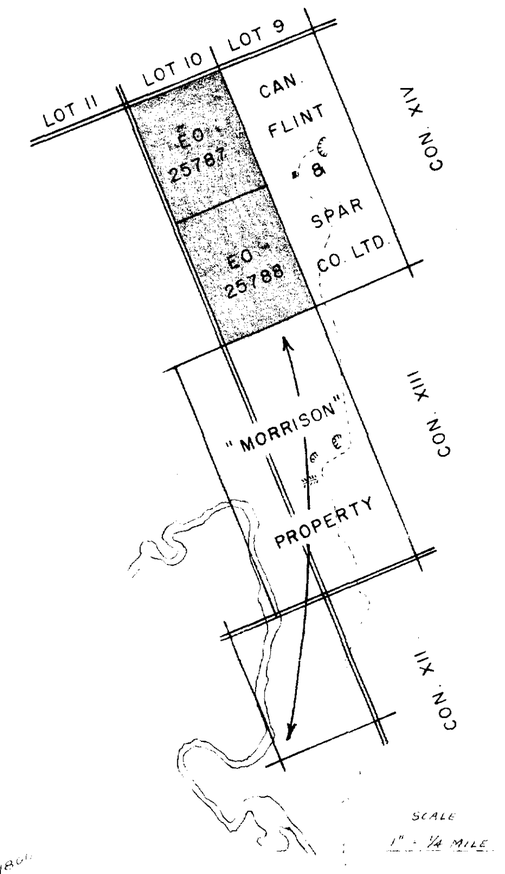
YORK RIVER NEPHELINE AREA

—VICINITY OF "MORRISON" PROPERTY—

(LOT 10, CON. 14, DUNGANNON TWP., HASTINGS CO.)

SCALE 1" = 200'





SYMBOLS

- BOUNDARY OF ROCK OUTCROP
- BOULDERS
- SWAMP OR MARSH AREA
- GEOLOGICAL CONTACT - OBSERVED
- GEOLOGICAL CONTACT - ASSUMED
- 30° STRIKE AND DIP OF FOLIATION
- STRIKE ONLY - DIP UNKNOWN
- BOUNDARY OF NEPHELINE MEMBERS
- TRAVERSE LINES SHOWN IN PENCIL

LEGEND

GRANITE

- 8a PINK AND WHITE LEUCO-GRANITE, GRANITE GNEISS
- 8p GRANITE PEGMATITE, PEGMATITIC GRANITE
- 8c RED OR BUFF BIOTITE GRANITE, GRANITE GNEISS

NEPHELINE GNEISS

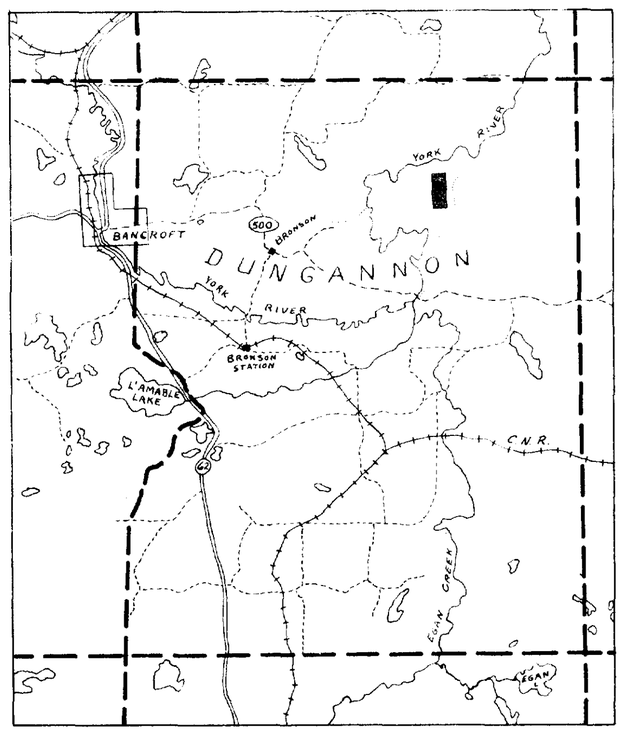
- 6b NEPHELINE - PLAGIOCLASE - HORNBLENDE - GARNET (30-40) ... NEPHELINE POINT
- 6 NEPHELINE - PLAGIOCLASE - HORNBLENDE
- 6c NEPHELINE - PLAGIOCLASE BIOTITE
- 6e PLAGIOCLASE HORNBLENDE, (NEPHELINE-POOR)
- 6p NEPHELINE PEGMATITE

CRYSTALLINE LIMESTONE

- 3 CRYSTALLINE LIMESTONE, DOLOMITE
- 3a INTERLAYERED LIMESTONE AND PARAGNEISS OR AMPHIBOLITE

PARAGNEISS AMPHIBOLITE

- 2a AMPHIBOLITE
- 2ab BIOTITE AMPHIBOLITE
- 2f QUARTZO FELDSPATHIC PARAGNEISS
- 2p BIOTITE PARAGNEISS



SCALE 1" = 2 MILES

N

MAGNETIC

Note

THIS PLAN IS COMPILED FROM FIELD NOTES TAKEN DURING A GEOLOGICAL SURVEY CONDUCTED BETWEEN OCTOBER 6th AND 10th INCLUSIVE.

G. J. Guillet
GEOLOGIST

YORK RIVER — "MORRISON" AREA — SURFACE GEOLOGY —

G.P.G.

1 INCH = 200 FEET

DECEMBER 8, 1958

8-10-39

YORK RIVER NEPHELINE AREA

— GREAT BEND PROSPECT —

(LOTS 14 & 15, CON. 14, DUNGANNON TWP., HASTINGS CO.)

SCALE — 1" = 200'

N

MAGNETIC

SYMBOLS

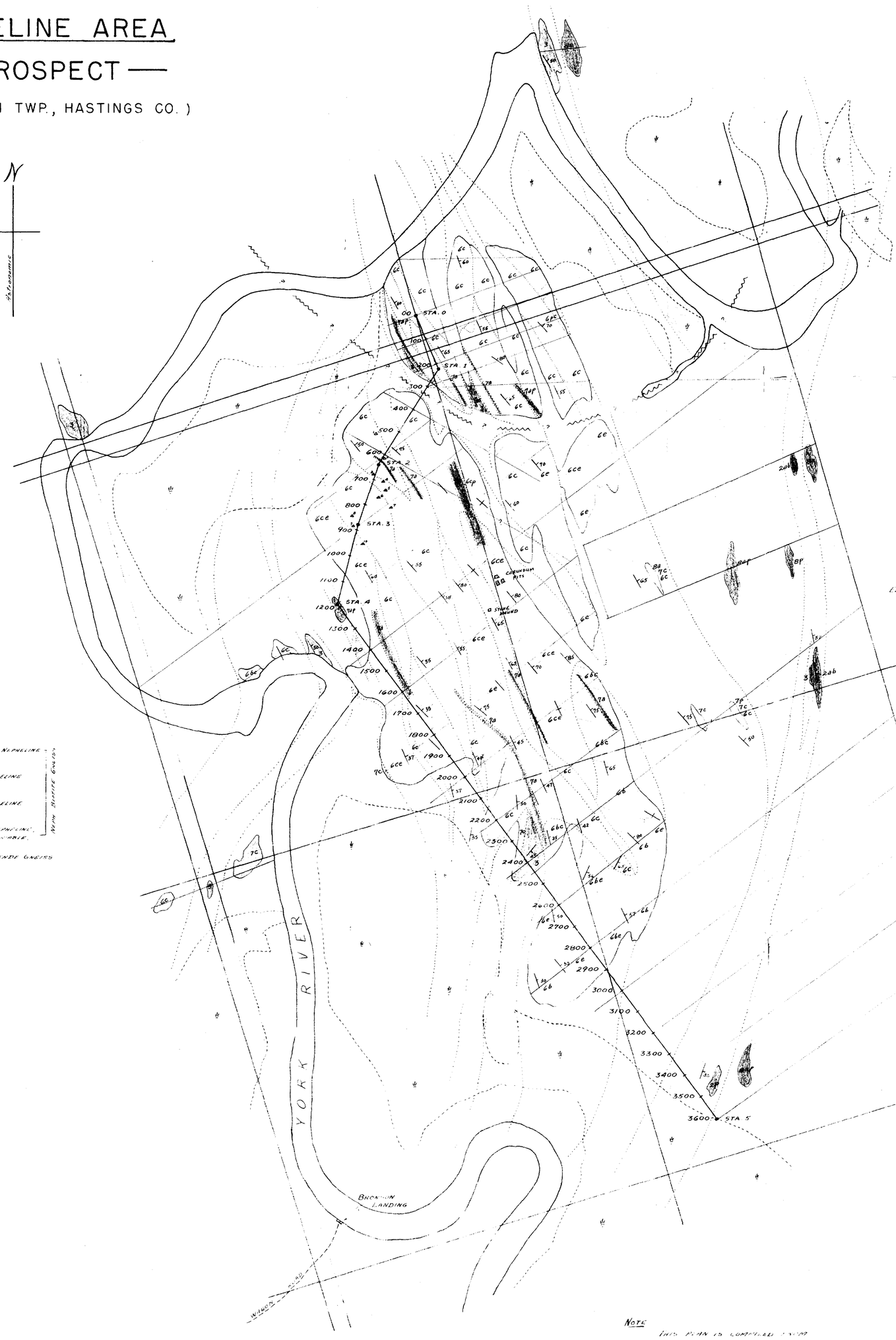
- Rock Outcrop or Outcrop Area
- Swamp or Marsh
- Assumed Rock or Zone Contact
- Possible Fault
- Strike of Foliation or Bedding
- Strike & Dip of Foliation or Bedding
- Strike & Vertical Dip of Foliation or Bedding
- Test Pit — Sample Location
- STA.2 Transit Station — Base Line Survey
- Traverse Lines in Pencil

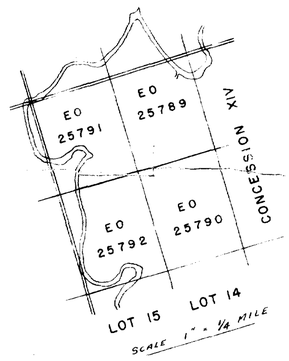
LEGEND

- Granite, Granite Gneiss, Granite Pegmatite
- Syenite, Syenite Pegmatite.
- Syenite Gneiss, Nepheline-Poor Gneiss.
- Nepheline Gneiss, Nepheline Pegmatite.
- Crystalline Limestone or Dolomite.
- Amphibolite, Rusty Weathering Gneiss.

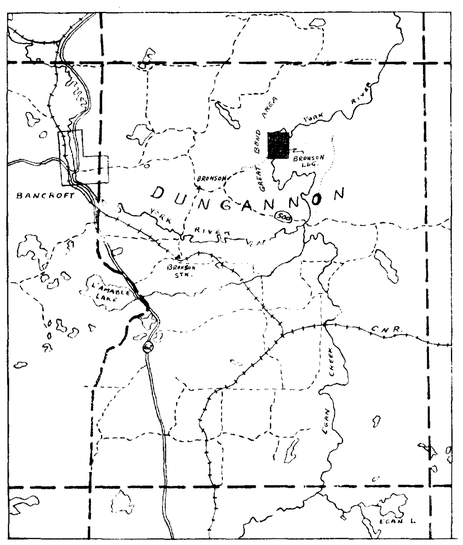
Non Biotite Gneiss

- More than 50 % Nepheline
- 40 to 50 % Nepheline
- 30 to 40 % Nepheline
- Less than 30 % Nepheline, Mafic and Lamprite
- Nepheline Hornblende Gneiss





(Extensive Sand-Plains Area. (Outcrop Scarce)



NOTE

This plan is compiled from field notes taken during a geological survey conducted between Sept. 2nd and 17th, 1938.

YORK RIVER — GREAT BEND — SURFACE GEOLOGY —

S.S.G.

1 inch = 200 feet

November 10, 1938

8-10-38