Preliminary Report on the SHELBURNE GRANITE AREA Shelburne Co., N. S.

Edward J. Longard. 1947

SHELBURNE GRANITE AREA

INTRODUCTION:

"The Shelburne Granite Area" is an irregularly-shaped batholyth approximately 120 sq. miles in area, and is located in the vicinity of Shelburne town. It includes the upper portion of Shelburne harbour and extends up the Roseway River approximately ten miles. Lake George and the Clyde River serve as approximate easterly and westerly boundaries respectively.

Highway No. 3 and the Canadian National Railway traverse the southern portion of the area, while Shelburne harbour offers a ready means for shipping. With the exception of the town of Shelburne, the area is sparsely settled.

A preliminary map, to the scale of 5 ins. to one mile, was drawn with the aid of aerial photographs, and the geology was located by means of pace and compass survey. Geological information was transferred from this map to a reproduction of Map No. 20 of the National Topographic Series, enlarged to a scale of one inch to one mile, which proved to be more suitable for this report. Plane table methods were used to map the Birchtown area to a scale of one inch to

200 feet.

Mr. Lewis H. King rendered most valuable assistance in the field. The author also wishes to acknowledge most gratefully the time and assistance given by Prof. M.F. Bancroft of Acadia University, and W.T. Dauphinee, M.L.A.

Topography:

The relief of the area is not pronounced, the country in general being in a stage of late maturity. Erosion is more advanced in the Clyde and Jordan river valleys, since these rivers traverse schisted zones while the Roseway traverses high resistant granite. No elevations exceed 400 ft.

Patches of swamp and barren land, some of considerable size, are numerous in all sections.

Glacial deposition, usually in the form of eskers and drumlins, is extensive with the result that outcrops are exceedingly scarce. The esker material should prove of value for any future hard-surfacing of roads.

Geology:

The rocks of the area consist of quartzites and schists of the Pre-Cambrian Goldenville Series which

have been intruded by igneous rocks of Devonian age.

A more detailed description of the different rock types is incorporated in a discussion of ten localities: Birchtown area, Robert's Mountain, Moose Hill, Little Rocky Mountain, Morris Lake, Andrew Bower Quarry, Hartz Point, Reed's Hill, Campbell's Hill and Jordan area. (See Map No. 1)

Birchtown area:

Quarrying was commenced in 1931 on boulders near the road. In 1933 the first ledge was quarried, that being now called the Porphyritic Quarry. No. 1 and No. 2 Quarries were begun in 1935 and 1938 respectively. In 1941 the Main Quarry was opened and in 1945 the quarry immediately to the south of it was worked but was given up in preference to the Main Quarry.

Situated near Birchtown is an area of "black granite", the most important to be discussed in this report. The outcrops are distributed over an area of approximately 1/10 of a sq. mile, and are surrounded by a number of grey granite outcrops. Only approximate and assumed geological boundaries could be determined as all definite boundaries are obscured by glacial debris. The approximate boundaries were determined with a reasonable degree of accuracy, and

served as the means of establishing the assumed boundaries. (See Map No. 2)

Nowhere was the "black granite" seen in contact with the older quartzite. It is completely surrounded by grey granite which can be seen cutting the "black granite" in numerous places. (See photo No.1)

It should be noted here that the term "black granite", as used in this report, is a commercial term. Actually the rock is not black but is a dark grey. The term is also misleading in that it is not granite but has a dioritic appearance.

Four distinctly different phases of "black granite" were mapped:

High feldspar content - This rock contains a relatively large smount of feldspar and is the lightest in color of the four phases. These well-defined feldspar crystals make the rock almost granular in appearance; although, this texture changes gradationally to a more finely grained texture in some zones.

It is the opinion of some that this rock is too light to be marketed as black granite; however, one quarry is still in operation. The rock is very hard and is fresh, thus it takes a very good polish.

Pegmatite dykes and veinlets are not numerous enough to hamper quarrying operations to any great extent.

High chlorite content - This rock contains a very high percentage of chlorite giving it an almost matted texture, as well as a dull green appearance. The rock is too soft to take a good polish which, added to its dull appearance, renders it unsuitable as a commercial stone.

Low chlorite content - This rock is a cross between the two above-mentioned rocks. It contains a small amount of chlorite; otherwise, it approaches the rock of high feldspar content with the exception that the texture is finer and has a much darker appearance.

Present polishing techniques yield an excellent polish to this rock; however, this was not always the case. Until polishing methods were improved, this rock had no commercial value. At present it is the main source of "black granite" at Birchtown. This rock weathers well.

It is regretable that quarrying operations are frequently hampered by numerous pegmatite dykes and veinlets, changes in texture and grey granite pipes. (See photos No. 1 and No. 2)

More intensive prospecting should be directed

towards this phase in the higher ground immediately south of the main quarry.

Porphyritic - This phase of the granite differs from the other three not so much in composition as in texture; however, the groundmass of this rock is practically identical with the low chlorite phase both in texture and composition. Scattered throughout the groundmass are beautiful phenochrysts of biotite mica ranging as high as one inch in diameter. These large crystals render the rock useless for the tombstone industry where an even texture is desirable. The abundance of biotite, however, makes for a dark rock which might possibly be used successfully as a building stone. When polished, it would quite possibly be suitable for interior decoration.

Details of the Diamond Drill Holes [1]

Hole No. 1 in quarry No. 2 was started 14 feet below the present lip of the quarry at the south end; it cut 55 ft. of granite. The upper portion was reported to be good grade black. The hole was vertical.

Hole No. 2 was a vertical hole 50 feet deep and located northeast from No. 1. The upper 25 feet of black granite passed gradationally to grey.

Hole No. 3 was close to the eastern boundary

of the area. It was drilled 85 feet deep, inclined 45° to the horizontal in a westerly direction. A poor grade of black granite was found.

Hole No. 4, west of No. 3 was a vertical hole, 15 ft. deep starting in a poor black granite and showing transition to grey granite.

Genesis:

In the writer's opinion, the "black granite" represents an intrusion of a dioritic magma which was later followed by a much larger intrusion of granite. This view differs from that advanced by Prof. G. V. Douglas in previous publications. (1) (2)

Robert's Mountain:

The deposit of black granite at Robert's Mountain was discovered by Whitman Townsend approximately 40 years ago; however, the discovery was not made public until Mr. Townsend staked a claim on this property in 1944. A small amount of quarrying was done during the summer of 1946 on the north side of the hill, in order to determine a suitable position to begin operations, and to obtain suitable samples for polishing. To date, this is the extent of operations. The mountain is situated 2 miles south of Harper Lake. As a result, at least 3 miles of

road must be constructed before the mountain is accessible by vehicle.

Robert's Mountain stands slightly over 100 feet above the surrounding territory and it is believed that the major portion of it is black granite. Eleven outcrops have been found near the summit. The rock is unaltered as the weathered surfaces, or "sap" zones, of the outcrops are extremely thin. A thin section study indicates that the rock is diabase.

When polished the rock is quite dark and has a definite bluish cast.

The most southerly outcrop of "black granite" is a different type of rock. This rock has very fine ophitic texture and must also be called a diabase. It takes a very poor polish even though it is extremely hard. The polished surface has a dull metallic luster. This is a chilled phase of the diabase. Muscovite granite outcrops at the extreme south side of the hill.

The origin of Robert's Mountain is not understood. It might either be a stock or a "blow" in the course of the diabase dyke which runs from LaHave Island, in a westerly direction, and is sometimes believed to cut the Shelburne granite. Plate I will show that this deposit lines

up roughly with two other "black granite" deposits; one at Little Rocky Mountain and one approximately 1½ miles above Jordan Falls; however, no connection between individual deposits is apparent at the surface. Possibly these deposits are similar to the volcanic necks of South and West Africa. Here mining operations have revealed that a number of these necks are connected by an underground dyke. (2) (3)

Moose Hill:

This hill rises over 125 ft. out of surrounding swamp land and presents a profile very similar to that of Robert's Mountain. A thick mantle of glacial till, containing large "black granite" boulders, obscures any ledge rock. Considering the shape and float found on Moose Hill, the future possibilities of that locality seem very good. It would be well worth while if either prospect pits or drilling were employed there in an attempt to find ledge rock. It might be mentioned that this locality also lies on the proposed underground dyke line.

This rock is slightly lighter in shade than the rock at Robert's Mountain, and has a greenish brown tinge. From its texture this rock appears to be a diabase.

Little Rocky Mountain:

Situated only 2 miles north of Shelburne, Little Rocky Mountain is the original "black granite" quarry in the county. Quarrying was begun shortly after World War I. The "mountain" is about 25 feet high and 200 feet in diameter.

Tombstones made of this rock proved a disappointment. Within 10 years monuments made of this rock weathered to a yellowish brown color and took on a pebbly scale. This scale is a vegetable growth feeding on the decaying minerals.

It is believed that the origin, as previously implied, is similar to Robert's Mountain.

Morris Lake:

On the height of land east of Morris Lake are several outcrops of "black granite". This rock is similar to the Birchtown rock of high feldspar content. The fact that there are other large accessible quantities of this type of rock has diverted quarrying operations from this a rea.

Andrew Bower Quarry:

250 yds. S.E. of Little Rocky Mountain is a small quarry which was opened a year ago by Mr. Andrew Bower.

The stone is an exceedingly fine-grained grey granite with a very pleasing texture.

Cutting the grey granite is a fine-grained diabase dyke of about 6 ft. in width and similar to the rock on the southern side of Robert's Mountain.

Hartz Point:

Opposite the town of Shelburne is located a large grey granite quarry that was operated some years ago by the Shelburne Granite Company. The stone is of an excellent, fine-grained, grey type, but the formation is badly shattered and blocks of suitable size can be obtained only by the removal of a large amount of waste and smaller stone.

The granite at the end of Hartz Point is of a porphyritic nature and some of this stone has been used for tombstone bases. A definite contact between porphyritic and fine-grained grey granite was observed on a large boulder, indicating that the change was not gradational, but is probably similar in origin to the porphyritic phase of the Birchtown "black granite".

There is an outcrop of porphyritic grey granite only 1.2 miles down the east Hartz Point road from Highway No. 3 which appears to have good quarrying possibilities and

would be much more accessible than the stone at the end of the point.

For the last 4 years material for tombstone bases has been quarried at the "Island Quarry" on the shore just .3 miles down the eastern shore from the highway, but this rock fades when exposed.

Reed's Hill:

Situated about 3 miles N.W. of Shelburne, Reed's Hill represents a pegmatite zone. Here pegmatite dykes, some as wide as 10 ft., cut a coarse-grained biotite granite. Some quarrying has been done in the past; however, the pegmatite dykes made operations too difficult. The pegmatite dykes carry large books of biotite mica, as well as a few crystals of tourmaline. Quartzite xenoliths associated with plumose mica were observed in this area. It might be mentioned here that this association was observed in a number of other areas as well.

Campbell's Hill:

Directly west of Robert's Mountain, and rising to an equal height, is Campbell's Hill. Grey granite was found outcropping on the southern side of this hill. The ledge is in excellent shape for quarrying as it has a natural face about 15 ins. high. The rock is a fine to medium-grained

binary granite and its prospects look encouraging.

Jordan Area:

East of the Shelburne granite batholyth, and in the vicinity of Jordan Falls is a highly metamorphosed zone of the Goldenville Series. The major portion of the metamorphosed rock is a very coarse staurolite schist. The coarseness of the rock is due to the presence of remarkably regular crystals of staurolite.

This schist occurs in the upper beds of a northerly-plunging syncline and is underlain by an ottrelite schist. These contacts between these schists are gradational.

The synclinal axis is striking 20° and plunging 17° north. This data has made it possible to estimate the thickness of the staurolite beds to be over 4000 ft. at the most northerly outcrop.

The deposit of "black granite" previously mentioned near Jordan Falls was quarried to a considerable extent in the past. The rock is similar in all respects to that of Little Rocky Mountain, and proved useless for monumental purposes.

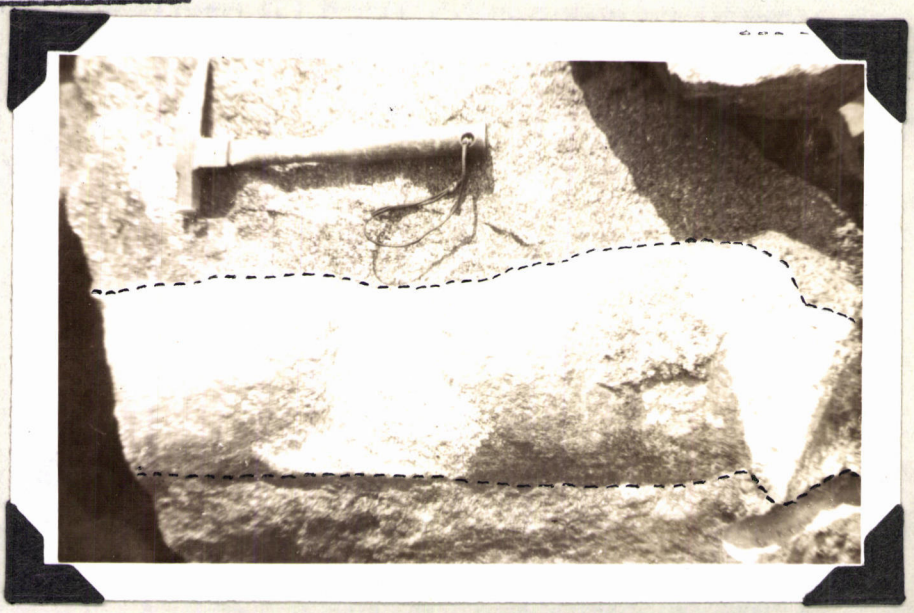
REFERENCES:

(1) Douglas, G. V. : Black Granite At Shelburne Nova Scotia Department of Mines, 1942.

(2) Douglas, G.V. ; Campbell, C.O. : Barasois and Indian Brook Area Nova Scotia Department of Mines, 1947.

(3) Shand, S. J. : Eruptive Rocks Second Edition, John Wiley and Sons, Inc., 440 Fourth Avenue, N.Y., 1943. Pg. 319.

ILLUSTRATIONS:

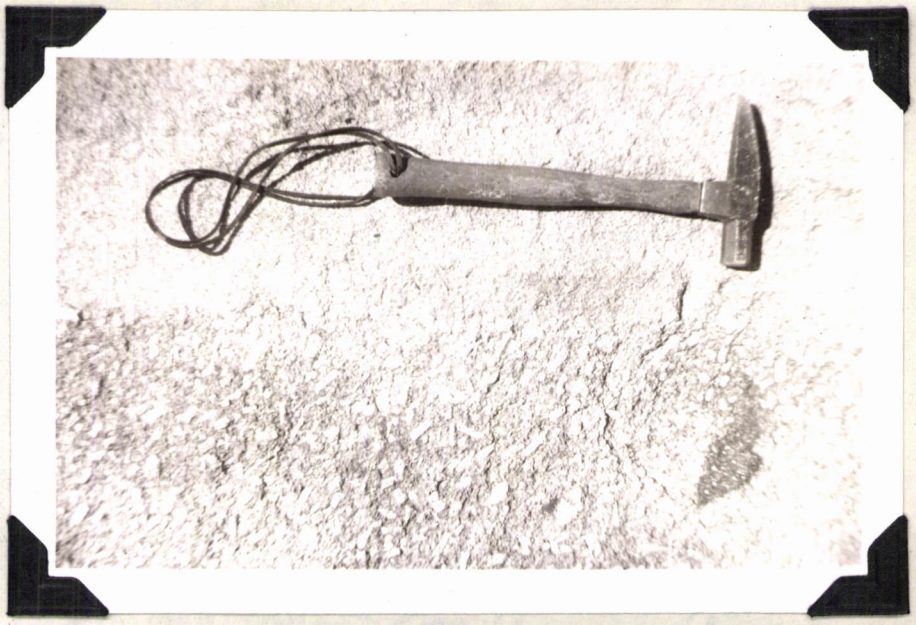


1. Grey granite pipe cutting "black granite".

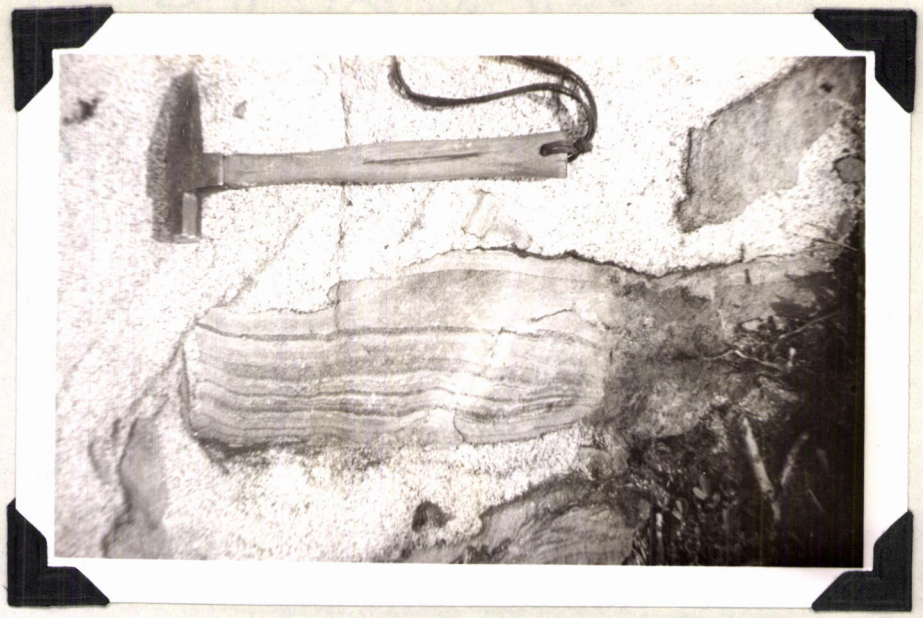
2. Pegmatite dyke cutting " black granite" at Main Quarry.

3. Main Birchtown Quarry of " black granite."

4. Quarrying at Main Quarry, Birchtown.



5. Contact between porphyritic grey granite and a finer grained grey granite on float at Hartz Pt.



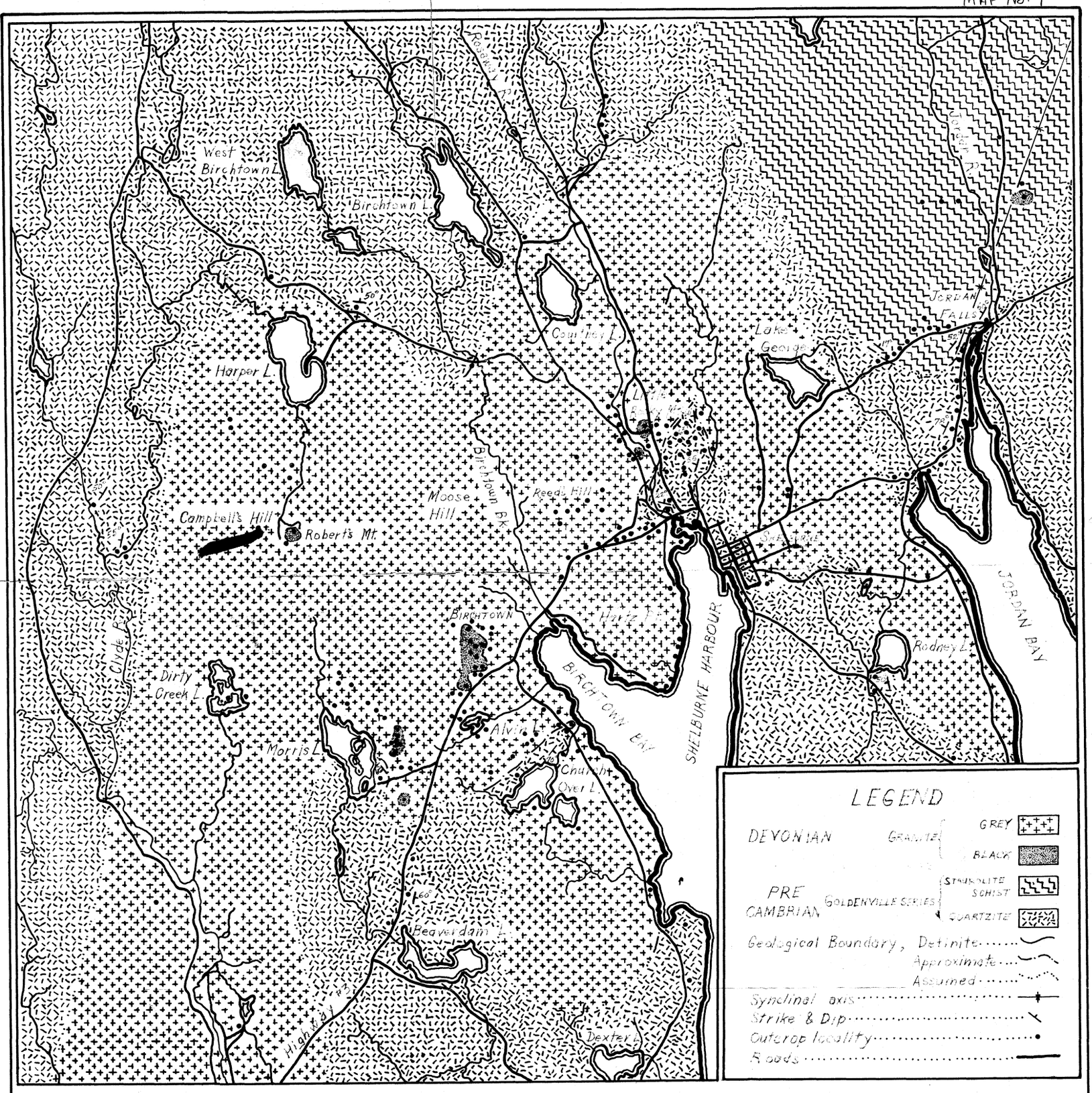
6. One of many quartzite xenoliths in grey granite at Reed's Hill.

7. Moose Hill looking easterly.

8. Staurolite crystals in schist . (Coin is 25¢)

22-P-9(3)

MAP No. 1



PLAN OF

SHELBURNE GRANITE AREA

SHELBURNE CO., N.S.

Scale in Miles

1 0 2 4 6 8 10

22 - P - 0902