

AN X-RAY POWDER EXAMINATION OF
SOME PEGMATITE MINERALS
FROM SOUTHEASTERN MANITOBA

A Thesis

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by

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ABSTRACT

This thesis describes the results of an investigation by means of X-ray diffraction powder photographs of the minerals from the pegmatites of southeastern Manitoba. These pegmatites are located in an area that is about 100 miles northeast of Winnipeg. Reference is made to all the minerals that have been reported from these pegmatites although the X-ray diffraction study did not include all these minerals because specimens of all of them were not available to the writer.

Each mineral was photographed with a standard small (57.3 mm. diameter) powder camera, but when the complexity of the mineral warranted more detailed work a standard large (114.6 mm. diameter) powder camera was used. The main source of reference was the well-known A.S.T.M. X-ray Powder Data File. In this thesis the non-silicate minerals are classified according to the Seventh Edition of Dana's System of Mineralogy, Volume 1 and 2, and the silicates are classified according to Strunz in his Mineralogische Tabellen.

Powder data are given for 29 minerals of which six have not previously been reported from this area, and eight have been identified more specifically than previously. The minerals which had not been reported earlier are: jamesonite from south of Shatford Lake, brazilianite (?) and "sarespatite" (illite-montmorillonite) from the Chemalloy mine at Bernic Lake, sicklerite from east of Bernic Lake, and uranophane-sklodowskite and vesuvianite from the Huron claim, south of the Winnipeg River. New

localities for magnetite and pollucite are reported, these localities being the Huron claim south of the Winnipeg River and north of Maskwa Lake respectively. The minerals which have been identified more specifically are: triphylite-lithiophilite, heterosite-purpurite, muscovite and lithian muscovite (which include all the writer's specimens called lepidolite and zinnwaldite), topaz, epidote-clinozoisite (including some material called zoisite), maximum microcline and low albite. The other minerals for which powder data are given are: cassiterite, tantalite, wodginite, rhodochrosite, amblygonite, apatite, beryl, tourmaline, spodumene, chlorite, biotite, petalite, and quartz.

CHAPTER I

INTRODUCTION

Numerous studies of the pegmatite dykes occurring in southeastern Manitoba have been made at various times since their discovery in the 1920's. Most of these studies have been of a geological nature, but because of the many interesting and varied pegmatite minerals that occur in this area, the writer decided that a thorough identification of these minerals would be a desirable study. This thesis reports an attempt to determine accurately by means of X-ray diffraction powder photographs, the actual minerals that are present. The study was limited by the actual number of minerals available for examination, and not all minerals reported have been examined in this investigation. Limits were also imposed by those inherent in the X-ray powder technique. An attempt has been made to include at least some discussion of all the minerals reported from this area, so that at least some reference is made to every mineral known at the time of this writing.

Because of the interesting and varied mineralogy, a secondary purpose of this thesis is to present suggestions for further study.

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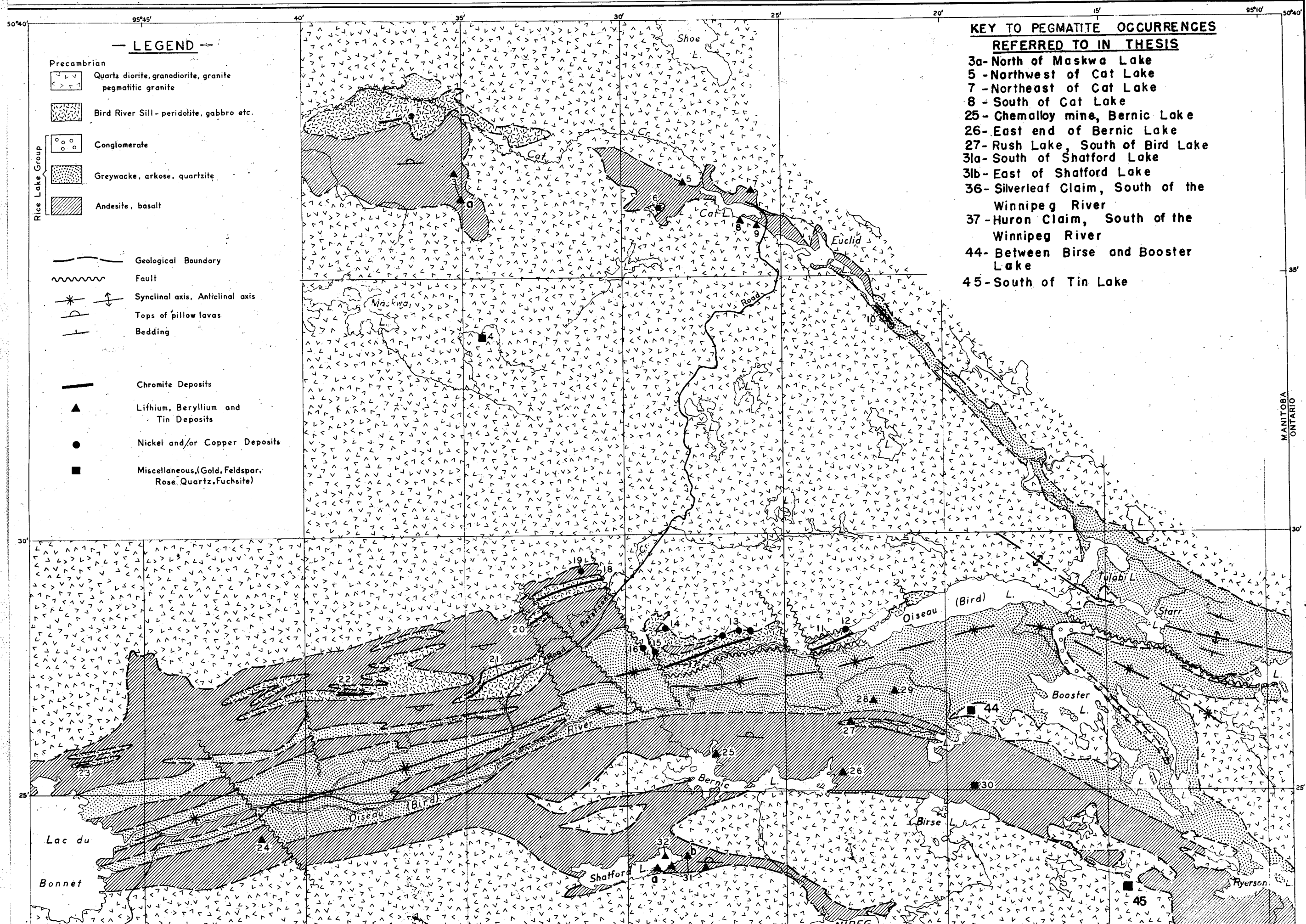
Special thanks are due to fellow graduate students, Mr. Colin Riley for the photograph of vesuvianite and to Mr. F. J. Wicks for the D.T.A. analysis of 'sarospatite'. Thanks are also due to Mr. John Jambour of the Geological Survey of Canada, Ottawa, for the photographs of triphylite (17253L) and beryl (17250L), and to the Director of the Geological Survey of Canada for the ixiolite specimen used in this report.

During the last year of this study the writer received financial assistance from the National Research Council through a Grant to Dr. Ferguson.

PREVIOUS WORK

A number of times since the 1920's this area has attracted prospectors and exploration geologists because of the rare minerals. The area was first explored for cassiterite in the 1920's. Since then interest has switched to feldspar, the lithium minerals (mainly spodumene and lepidolite), beryl, and most recently pollucite because of its caesium content.

FIGURE I.



— LEGEND —

- Precambrian**
- Quartz diorite, granodiorite, granite pegmatitic granite
 - Bird River Sill - peridotite, gabbro etc.
- Rice Lake Group**
- Conglomerate
 - Greywacke, arkose, quartzite
 - Andesite, basalt
- Geological Features**
- Geological Boundary
 - Fault
 - Synclinal axis, Anticlinal axis
 - Tops of pillow lavas
 - Bedding
- Mineral Deposits**
- Chromite Deposits
 - Lithium, Beryllium and Tin Deposits
 - Nickel and/or Copper Deposits
 - Miscellaneous, (Gold, Feldspar, Rose Quartz, Fuchsite)

KEY TO PEGMATITE OCCURRENCES

- REFERRED TO IN THESIS**
- 3a - North of Maskwa Lake
 - 5 - Northwest of Cat Lake
 - 7 - Northeast of Cat Lake
 - 8 - South of Cat Lake
 - 25 - Chemalloy mine, Bernic Lake
 - 26 - East end of Bernic Lake
 - 27 - Rush Lake, South of Bird Lake
 - 31a - South of Shatford Lake
 - 31b - East of Shatford Lake
 - 36 - Silverleaf Claim, South of the Winnipeg River
 - 37 - Huron Claim, South of the Winnipeg River
 - 44 - Between Birse and Booster Lake
 - 45 - South of Tin Lake

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