

STRUCTURAL GEOLOGY AND PETROLOGY
OF THE LILY POND AREA, MANITOBA

A Thesis
Presented to
the Faculty of the Department of Geology
University of Manitoba

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Albert Michalkow

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A layered series of granitic, sedimentary and altered volcanic rocks occurs in the Lily Pond Area of Southeastern Manitoba. The sedimentary and volcanic rocks are bands or sheets conformably enclosed within and between quartz diorite, granodiorites and quartz monzonite bands or sheets which are structurally concordant to a central domed quartz diorite mass. Field work and a petrographic study of specimens of the rocks showed that the granitic rocks could be intrusive crystallization differentiation fractions from a common parent basaltic melt. The liquid fractions were emplaced as upward and westward moving sheets which intruded a volcanic-sedimentary complex and left parts of this complex as remnant bands within the intrusive series.

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CHAPTER I

INTRODUCTION

THE PROBLEM

Narrow greenstone and sedimentary bands form part of a composite domed batholithic structure of granitic rocks in the Lily Pond Area of southeastern Manitoba. The granitic rocks are a layered series which is structurally concordant to a quartz diorite dome occurring in the southwestern part of the area. The individual units of the series are quartz diorite, pink porphyritic granodiorite, grey gneissic granodiorite, and pink quartz monzonite. The greenstone and the sedimentary bands are structurally concordant units which occur within and between these granitic units. The units are one quarter of a mile to several miles wide.

The greenstone is a hornblende schist which is composed of hornblende and oligoclase with minor quantities of biotite. The sedimentary rocks are medium to coarse-grained sandstone which is composed of quartz, oligoclase, orthoclase, and biotite, with magnetite, zircon, apatite, and tremolite as accessories.

The contacts of the granitic rock units with each other, the greenstones, and the sedimentary rocks are distinct and sharp. However, assimilation of the greenstones and sedimen-

tary rocks by the granitic rocks has occurred and a gradual change in the composition of the granitic rocks is noticeable for several hundred feet from their contacts with the greenstones and sedimentary rocks. The assimilation appears to be predominantly a physical mixing with a lesser degree of chemical reaction. Bordering the greenstone bands, hornblende granules first occur in the granitic rocks approximately a hundred feet from the contact and increase in number and size towards the contact until they occur as euhedral laths a few feet from the contact, and the slightly gneissic rock has gradually changed to a lit-par-lit gneiss. This gneiss is composed of interlaminated granitic and schist lenses. The lit-par-lit gneiss becomes predominantly hornblende schist, then entirely hornblende schist within fifteen feet. At the sedimentary bands the composition of the granitic rocks is noticeably changed by an increase of their quartz and a decrease of their potash feldspar content. This change is greatest near the sedimentary bands where quartzose lenses occur in the granitic rocks and a medium degree of gneissosity is developed, however, it is discernable for several hundred feet from the contact.

The problem of this area was to determine the relationship, if any, of the granitic rock units to each other, the greenstones, and the sedimentary rocks. To accomplish this it was necessary to determine the origin of the rock

units and there were the following three possibilities, each with unique problems:

1. The granitic rocks were formed in situ from the sedimentary rocks and greenstones.
2. The granitic rocks were magmatic in origin and intruded a greenstone-sedimentary series.
3. Both of the above processes were active.

The Lily Pond Area has excellent outcrops which show the relationship of the various rock units. The area is readily accessible by highway and railways, therefore it was selected for the work of attempting to solve the outlined problems of the region.

LOCATION AND ACCESS

The Lily Pond Area is located in the Lac du Bonnet Mining Division of southeastern Manitoba and is part of the Rennie-West Hawk Lake Area as defined by map 50-6 of the Manitoba Mines Branch (Springer, 1952). It is bounded by latitudes $49^{\circ} 47'$, $49^{\circ} 55'$ and longitudes $95^{\circ} 10'$, $95^{\circ} 25'$ and the areal extent is approximately ninety square miles. The locations of the Lily Pond Area and the Rennie-West Hawk Lake Area are shown on the index map (Fig. 1, p. 4).

Convenient access is by either Highway No. 1 or the Canadian Pacific Railway. Both of these cross the area. Telford, at the western edge of the area, is one hundred miles east of Winnipeg by either route.

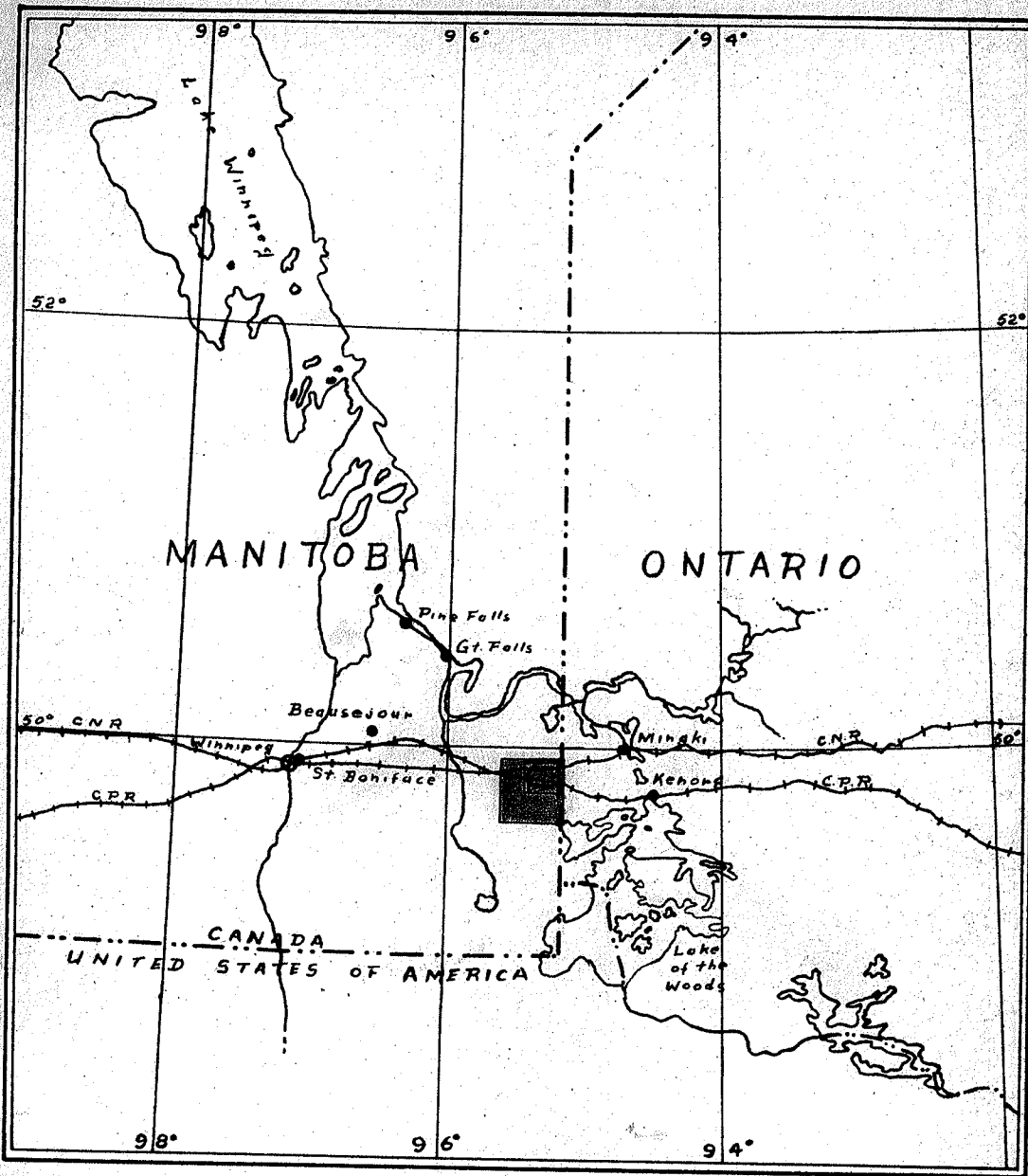


Figure 1

Index Map

Scale: one inch equals sixty statute miles

■ : Rennie-West Hawk Lake Area

■ : Lily Pond Area