

NEW MINERAL OCCURRENCES IN PEGMATITES OF SOUTHEASTERN MANITOBA

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Since the beginning of this century the Precambrian of southeastern Manitoba has been well known for its pegmatites containing unusual and rare minerals. An x-ray diffraction study of pegmatite minerals collected in this area mainly by Dr. J. F. Davies (Bristol 1962), and a recent investigation of these pegmatites by the second author led to the discovery of numerous new occurrences of rare species, and considerably extended our knowledge of the mineral parageneses of some pegmatite bodies.

This paper reports briefly on some of these new finds. The paragenesis of the Tanco (Chemalloy, Montgary) pegmatite at Bernic Lake is described in other contemporaneous publications, and new occurrences from the Rush Lake area will be reported separately. The minerals reported here were identified mainly by x-ray powder diffraction, supplemented by optical examination and in some cases by chemical tests.

The location of the discussed pegmatites can be found in the maps published by Davies (1957 — Shatford Lake, Greer Lake), Davies *et al.* (1962 — Spot and Matty claims as Nos. 3 and 24, respectively, in Fig. 10), and Černý & Turnock (1971 — Greer Lake area).

Shatford Lake

(i) The largest pegmatite located on the southern shore, approximately $\frac{3}{4}$ mile west of the eastern end of the lake, is known to contain albite, quartz, zinnwaldite, biotite, yellowish Li-mica, monazite, columbite, fluorite, euxenite-polycrase, topaz, beryl, pyrite, stibnite (Davies 1957) and gadolinite (Mulligan 1968), *Microcline-perthite*¹ was found to be also an essential component of this body. A specimen of alleged stibnite was identified as *jamesonite* by x-rays. The brownish-grey dish-like mica was found to be a $2M_1$ muscovite with negligible Li and Fe contents; Mulligan (1965) gives as much as 0.78% Li_2O in this mica.

(ii) The central of three small pegmatites on the southeastern shore of Shatford Lake, reported by Davies (1957) to contain local concentrations of beryl, contains an assemblage of rare-earth-rich minerals with *plagio-*

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clase (An_{38} to An_1), *microcline-perthite*, and quartz as the major constituents; *muscovite* is subordinate. *Biotite*, *garnet*, *beryl*, *calcite* and *chlorite* (after *garnet*) are the most abundant accessory minerals. Other species are rather rare: fibrous metamict *allanite* mostly altered to greyish-green *bastnaesite*, *monazite* replaced by beige *synchisite*, tiny black laths of metamict *yttrotantalite*, greenish-black grains of metamict *euxenite-polycrase*, fan-shaped black aggregates of niobium-rich *pseudo-ixiolite* partly replaced by yellow *pyrochlore-microlite*, and *apatite*.

(iii) Another beryl-bearing pegmatite outcrops approximately 4,000 feet southeast of the east end of the lake, and contains feldspar, quartz, biotite, zinnwaldite, yellowish-green mica, beryl, columbite, and fluorite (Davies 1957). Both *microcline-perthite* and *albite* are abundant in this pegmatite, and pale-blue to violet *apatite* is a frequent accessory constituent. The mica reported as zinnwaldite is a $2M_1$ *muscovite* with very subordinate Li and Fe percentages. In the central parts of this pegmatite large columnar crystals of water-clear or milky *topaz* were found, attaining up to 30 cm in length and 12 cm across. Their outer parts are usually replaced by yellowish-green mica but some are almost perfectly preserved.

Huron Claim Pegmatite

This body is well known for the uraninite from which the great age of the Superior Province was first established. Davies (1957) reports albite, quartz, biotite, muscovite, chlorite, beryl, columbite, euxenite-polycrase, uraninite, monazite, and zoisite from this pegmatite; Mulligan (1968) quotes tourmaline in addition.

Albite is the predominant feldspar in this pegmatite, but *microcline-perthite* is frequently found in central portions of the body. *Oligoclase* with up to 26% An occurs along the contacts with country rock, together with tiny grains of *garnet*. Zoisite was found to be *clinozoisite*, with about 7-9% of the ferric component.

Columbite reported by earlier authors is a partly ordered *pseudo-ixiolite* with intermediate Ta, Nb and Fe, Mn-contents, as found by Černý & Turnock (1971). These authors recognized a frequent replacement of this mineral by *fermite*, indistinguishable in hand specimens. A *pyrochlore-microlite* phase was observed only in polished sections.

A single rounded grain of greyish-black metamict *thorite* was found in albite; irregular dark-brown grains of metamict *zircon* seem to be rather frequent in some parts of the pegmatite, embedded again in albite. Dark-brown crystals of *sphene* were found in albite only once. A mixture of

¹ Italicized names represent occurrences reported for the first time.

uranophane and *sklodowskite* forms a coating on a specimen of quartz with *magnetite*.

Soft white decomposition products of beryl, mentioned already by Walker (1931), consist largely of *bavenite* occasionally contaminated by chlorite. *Bityite* is a quite abundant secondary beryllium mineral, never found in beryl or in bavenite pseudomorphs but disseminated as fine white, silky flakes in fissures and vugs of albite.

Greer Lake area

To date the beryl-bearing pegmatites around Greer Lake have not been subjected to a detailed mineralogical examination. Davies (1957) lists some minerals from only two of 17 bodies opened by prospectors. Field examination during the summer of 1968 and subsequent laboratory study threw more light on their mineral content. The pegmatites consist of *microcline-perthite*, *albite*, *quartz*, and *muscovite* generally, with subordinate *biotite*, *cordierite* (altered to biotite, chlorite, and muscovite), *beryl*, *garnet*, and *apatite*. Some of them also contain *lithian muscovite*, and late *chlorite* in fissures and vugs.

The Nb-Ta oxides and related phases have been reviewed recently by Černý & Turnock (1971), who found widespread *pseudo-ixiolite*, *niobian rutile* in pegmatites Nos. 2, 8, 9, 12, *microlite* in Nos. 2, 2A, 3, 6, 8, 11, 12, *cassiterite* in the pegmatites 8, 12A, SF, and *ilmenite* in No. 8. The other accessory minerals of interest are *gahnite* in pegmatites Nos. 9 and 12, in greenish-black distorted octahedra up to 15 mm long; *monazite* in rusty-coloured platy crystals up to 25 mm in diameter, in pegmatites 6, 8W, 8C, and 12; and grey-brown metamict *zircon* in the pegmatite No. 9. Tourmaline reported by Davies (1957) and Mulligan (1968) was not found.

Other localities

Sicklerite was identified in the petalite-rich Coe-claim pegmatite at the eastern end of Bernic Lake, and in the spodumene-bearing pegmatites on Matty claims near Bird River. In both localities sicklerite is probably an oxidation product of primary triphylite-lithiophilite.

Tabular crystals of *pseudo-ixiolite* occur on the Irgon Claim north of Cat Lake, in beryl-bearing pygmatitic pegmatites consisting of reddish albite and quartz. These pegmatites are strikingly different from the banded spodumene-rich bodies known from this locality.

Pollucite was identified in a pegmatite specimen from northeast of Maskwa Lake, from the spodumene pegmatites of the Spot group of claims.

This find suggests that the Spot claim pegmatites deserve a detailed mineralogical study, since the occurrence of pollucite usually indicates ultimately differentiated pegmatites rich in minerals of rare elements.

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PRELIMINARY INVESTIGATION OF ALMANDINE-SULPHUR-WATER AT 700°C AND 1 KB

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Almandine garnet rarely occurs in contact metasomatic rocks, whether or not it is present in the adjacent rocks, even though it is stable within