QUETICO-WAWA SUBPROVINCE JUNCTION, REID LAKE AREA, QUETICO PROVINCIAL PARK, ONTARIO

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Reid Lake is located near the center of Quetico Provincial Park just west of the northern end of Agnes Lake. The structural junction between the Archean Quetico and Wawa subprovinces underlies Reid Lake and strikes N29°E (See Fig. 1). In this vicinity three major structurally controlled topographic lineaments are present in addition to the belt junction. In a traverse across the area from the northwest to the southeast the structures associated with the lineaments are recognized as the Side Lake shear zone (Woodard and Weaver, 1990; Woodard and Root, 1993), the Burntside Lake Fault (Woodard and Weaver, 1990; Kambhu and Russin, 1993), the Quetico-Wawa belt junction (Woodard and Weaver, 1990; Woodard, 1992), and the Silence Lake fault (Humm and Sak, this volume) (See Fig. 1).

During the 1993 field season the Quetico research project sponsored by the Keck Consortium in Geology had two nine-person field parties active within the general Reid Lake area. Approximately 125 sq. km were mapped both lithologically and structurally in a NE-SW swath straddling the Quetico-Wawa belt junction. Four mappable lithologies were recognized in the Quetico terrane, north of the belt junction. Granitic-rich migmatite (Agx) underlies most of the terrane. Brackin and Elliott (this volume) have determined relative ages of leucosomes within this migmatite unit and also within the tonalite (At) of the Wawa belt. Elliott is currently working on determining zircon ages for several of these leucosomes. Prior to folding, a thick sill or dike of tonalite (At) was emplaced and now crops out in the vicinity of Woodside Lake. Hornblende quartz monzonite (Agp) sills were also injected prior to folding and are related to a stock-like intrusion whose outcrop centers on Williams Lake. A specimen collected from a folded quartz monzonite sill (Agp) exposed along the Basswood River 30 km along strike to the southwest, gives a zircon age of 2678±1 Ma. Along the Quetico-Wawa belt junction is a narrow band of biotite schist-rich migmatite (Ap) (Woodard, 1992) that probably represents a ductile melange zone. Shuman and Sheaffer (this volume) have related minor folds and foliations within this unit to multiple deformations.

In the Wawa terrane, south of the junction, four mappable units were also recognized. Quartz-biotite-plagioclase schist (Apq) crops out in an extensive belt along the northeast shores of Agnes Lake, apparently in the recumbent limb of a major F1 fold (Farthing and Stewart, this volume). Thick tonalite (At) sills and dikes were emplaced into this sequence before folding and now form extensive areas of much deformed gneiss. A specimen of similar tonalite (At) from United States Point on Basswood Lake , 28 km along strike to the southwest, yields a zircon concordia age of 2694±1 Ma. A narrow belt of volcanically derived rocks (Av) crops out continuously from Isabella Lake on the southwest to Keewatin Lake on the northeast, a distance of approximately 26 km. The unit is dominated by layered amphibolites (see Woodard and Weaver, 1990) which appear to form a melange-like zone associated with the Silence Lake fault (Humm and Sak, this volume). A quartz-rich biotite granitoid gneiss (Agq) is present in the vicinity of Dack Lake southeast of the area shown in Fig. 1 (Farthing and Stewart, this volume).

Deformational structures superimposed upon all of these rock units can be separated into early ductile folding and foliation development, and late more brittle fracturing and slickensiding. Shuman and Sheaffer (this volume) recognize several ages of minor folding and attempt to relate these folds to associated foliations. Such structures are best developed in the biotite schist-rich migmatite melange (Ap) associated with the Quetico-Wawa belt junction.

The main trace of the Burntside Lake fault lies approximately 4 km northwest of Reid Lake and the Quetico-Wawa junction, while the Silence Lake fault (Humm and Sak, this volume) lies approximately 1 km southeast of the junction (Fig. 1). The brittle fracturing, slickenside development, and hydrothermal alteration typically associated with the main Burntside Lake fault lineament (Kambhu and Russin, 1993) is also superimposed upon the earlier ductile deformation present along both the belt junction and the Silence Lake fault trace. As with the Burntside Lake fault proper, the slickensided shear surfaces are steeply dipping and show gently plunging slickenlines ranging from a few degrees southwest, through zero, to a few degrees northeast. Some of these surfaces indicate right-lateral displacement while others indicate left-lateral relationships (Ford and McCormick, this volume).

The Silence Lake fault can be traced continuously for 26 km from Isabella Lake on the southwest (Woodard and Weaver, 1990), through Grey Lake (Ho and Small, 1992) and Silence Lake, to the intersection with the Quetico-Wawa junction at Keewatin Lake (Humm and Sak, this volume). It is everywhere associated with a narrow belt of melange-like metavolcanic rocks (Av) which are currently interpreted as ocean floor basalts. Many of the rock fragments associated with the melange are composed almost entirely of mafic minerals, now chiefly coarse hornblende because of the metamorphic grade.

Between the southwest end of Reid Lake and Silence Lake are three S-shaped topographic depressions which extend across both the Quetico-Wawa junction and the Silence Lake fault (see A, B, C on Figs. 1 and 2). There is no correlation between these features and mapped rock units. In fact the depressions lie across both the lithologic and general structural trends. Their S-shape suggests that they are related to shear and rotation along the Quetico-Wawa junction. They may represent the rotated segments of earlier-formed shears which connected the Silence Lake fault with the Quetico-Wawa junction. That such connections existed are illustrated by three late-formed shears which were not rotated (D on Figs. 1 and 2, and E and F on Fig. 1). If left-lateral movement took place on the Quetico-Wawa junction and the Silence Lake fault as indicated by the arrows on Fig. 2, then the early-formed shear connections lying between the two structures would be rotated and opened as S-shaped tensional features. The right-lateral sense of motion indicated by slickensided surfaces along the Silence Lake fault (Humm and Sak, this volume) would be the result of later subhorizontal movement in a more brittle environment. Much later these tensional features were differentially eroded to form the S-shaped topographic depressions. Approximately 15 km northeast, along the strike of the belt junction, is one of the largest lakes in Quetico Provincial Park, Kawnipi Lake. The Kawnipi Lake topographic depression lies across the Quetico-Wawa junction and forms a gigantic (at least 25 km long) S-shape. It may be that this feature has an origin similar to the small S-shaped features southwest of Reid Lake.

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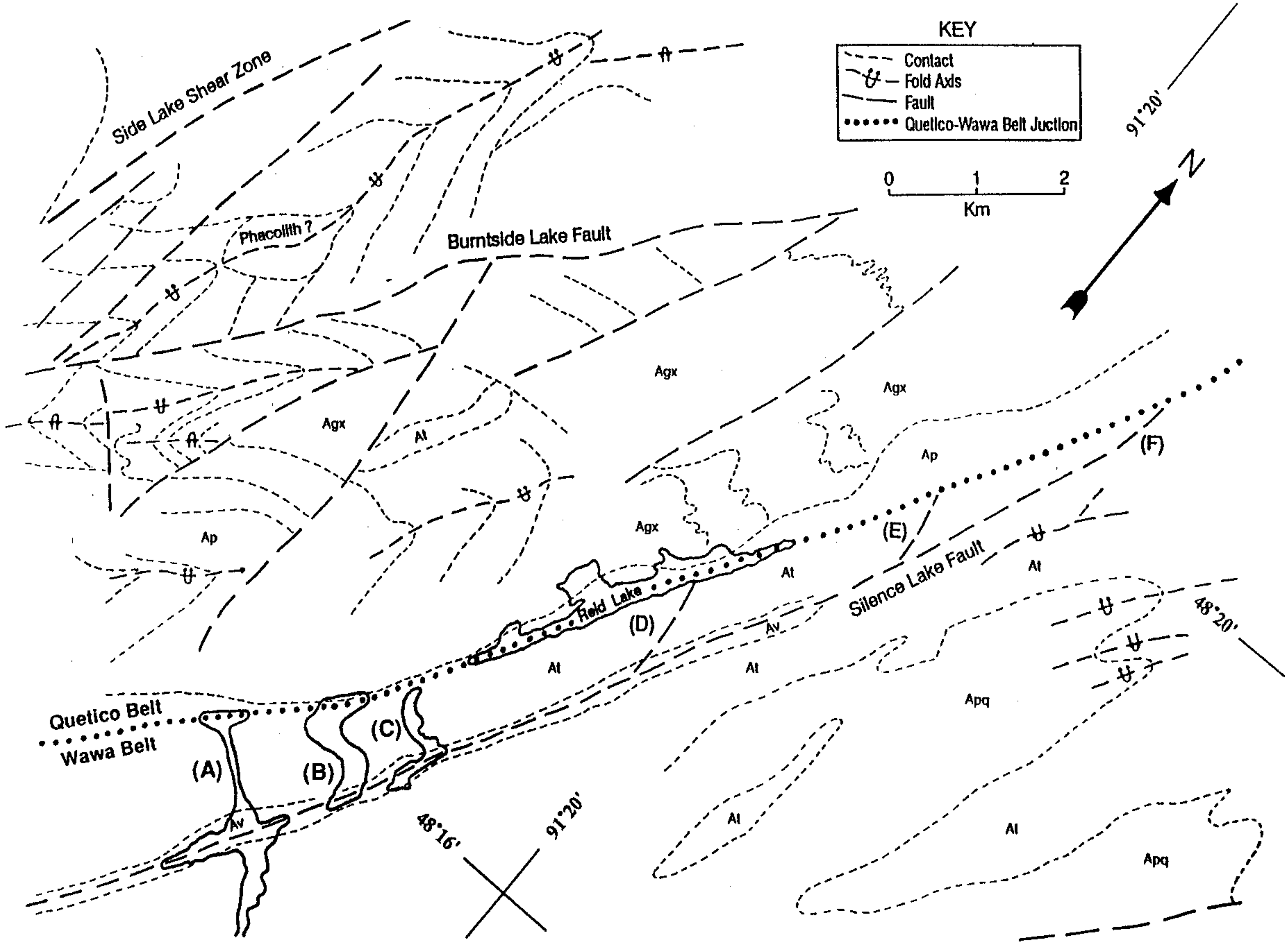
Fig. 1 - Lineaments and fold configurations, Reid Lake area, Quetico.



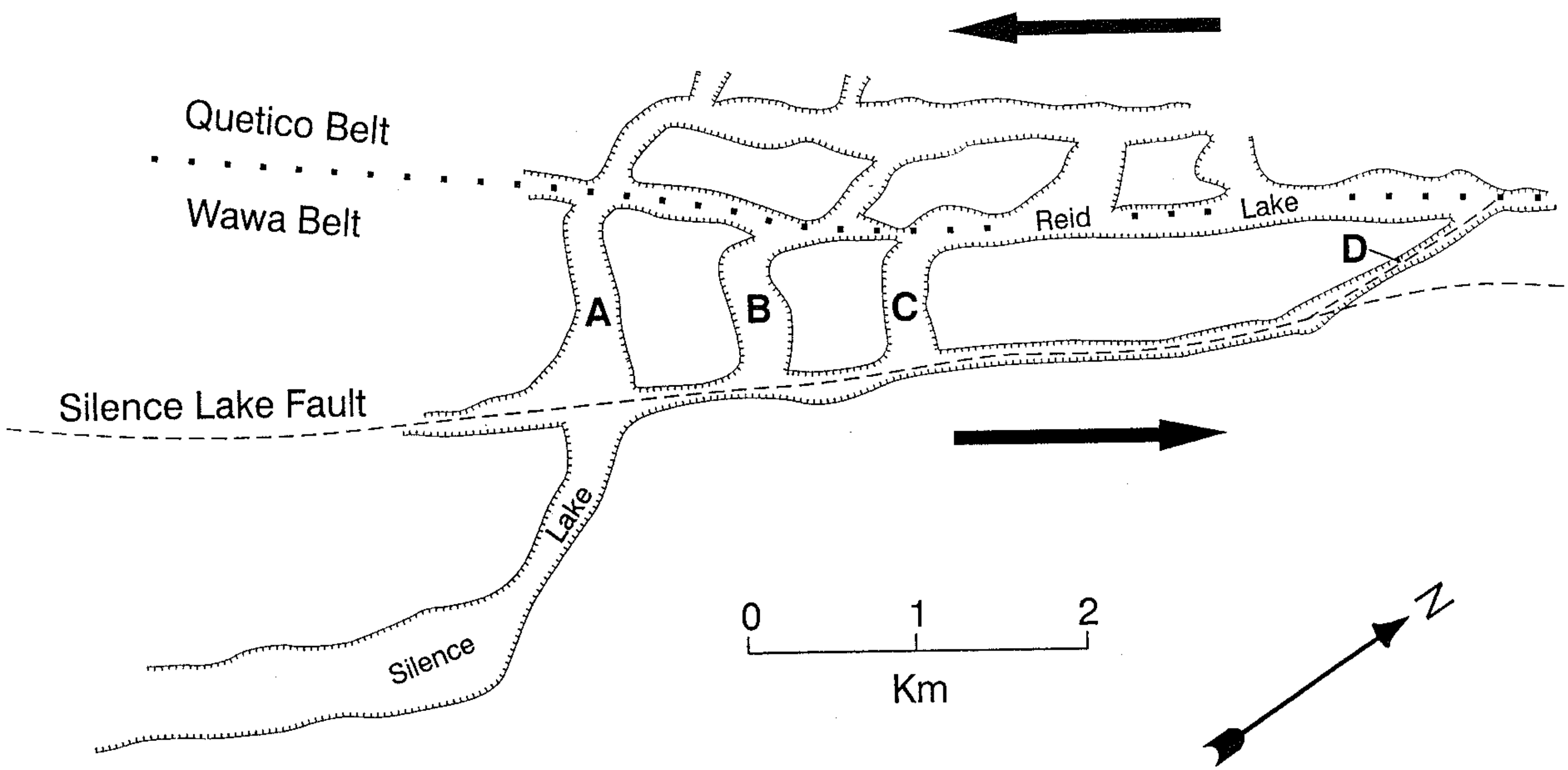


Fig. 2 - S-shaped topographic depressions (A,B,C) resulting from rotation and tensional opening of passive shears (D) which connect the Quetico-Wawa junction and the Silence Lake fault at approximately 30 degrees.