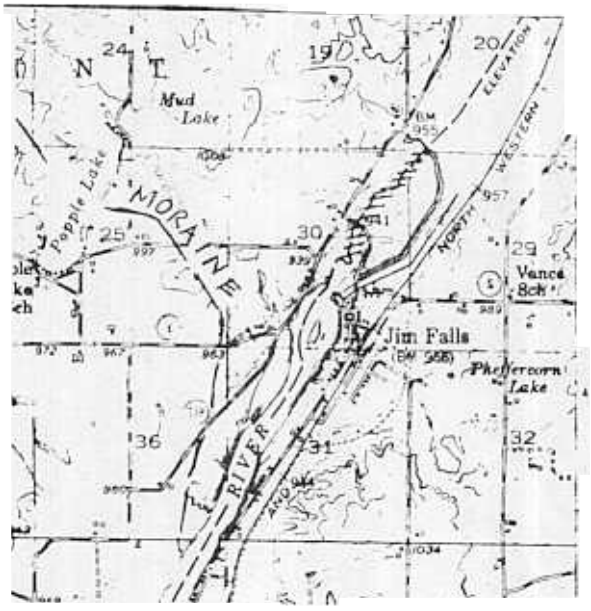
TITLE: Amphibolites and Granites at Jim Falls

LOCATION: E 1/2 Sec. 30, T 30 N, R 7 W, Jim Falls, Bloomer 15' Quadrangle



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SUMMARY OF FEATURES:

Banded amphibolites, probably derived from mafic volcanics and associated sediments, were intruded by granites of diverse composition and their cogenetic pegmatites in Middle(?) Precambrian time. Subsequent cataclasis, deformation, and metamorphism produced a highly deformed system of tectonically interlensing rock units showing only partial preservation of older structures. Prevailing regional structural grain is ENE. Late Precambrian jointing and diabase dike intrusion (1100 - 900 m.y.?) followed prolonged erosion.

DESCRIPTION:

Garnetiferous hornblende gneiss and schist with folded, high-amplitude isoclines (Fig. 1) and persistent ENE strike and steep dip are cut subconcordantly by granitic rocks ranging in composition from leuco-tonalite to granite. Pegmatite dike intrusion occurred at several stages of "granite" intrusion. The older granitic rocks are foliated and locally mylonitized. Shearing and boudinage of pegmatite stringers transposed them into oblique concordance with lamination in the enclosing rocks (Fig. 5). A rough correlation can be made between relative age and concordance of veinlets.

At location A, thinly laminated amphibolite was intruded by granite so that lenticular slices of the amphibolite were dragged en echelon away from the wall (Fig. 6). The coarse granite pegmatite intruded under stress contains en echelon (gash) fractures which are filled with quartz. The amphibolite-granite contact is sheared and cataclastically blended. The cataclastic zone appears to have been granitized. The effects of cataclasis are not easily seen here because shearing occurred almost concordantly: that is, granite intrusion was guided by lamination in the amphibolites, and subsequent shearing was localized along these contacts.

Small scale folds at Location C (Fig. 1) plunge gently east. These are folded high-angle (F-1) isoclines. Older, F-1 isoclines are best seen in amphibolite at Location B. Stream erosion nearly parallel to fold axial planes produced an unusual wood-like grain on the outcrop.

The aeromagnetic map (Fig. 7) shows a V-shaped area of low magnetic contrast opening eastward from Jim Falls. North of this "V", elongate ridges of high magnetic contrast suggest close-spaced interlenticulation of amphibolite and subordinate granite. A magnetic high extends ESE from Jim Falls: this is also probably produced by an amphibolite septum. A prominent magnetic "ridge" crosses the former one, and may represent a dike or fault. Faults of this trend are unusual in the Jim Falls area.

The chronology at Jim Falls is approximately as follows: (1) basaltic volcanism and associated sedimentation (archean?) (2) folding and regional metamorphism converting the volcanics and sediments to amphibolites, (3) late tectonic cataclasis forming ultramylonite, (4) faulting and brittle deformation, (5) successive intrusion of at least four granitic magmas with episodes of intervening cataclasis (folded mylonite xenoliths occur in some of the younger intrusives), (5) prolonged erosion, and (6) Late Precambrian jointing and diabase dike intrusion. (This sequence is modified from Maercklein, 1974, p. 16-20.) As at Big Falls (Eau Claire River) at least three distinct deformational episodes can be seen in these rocks.

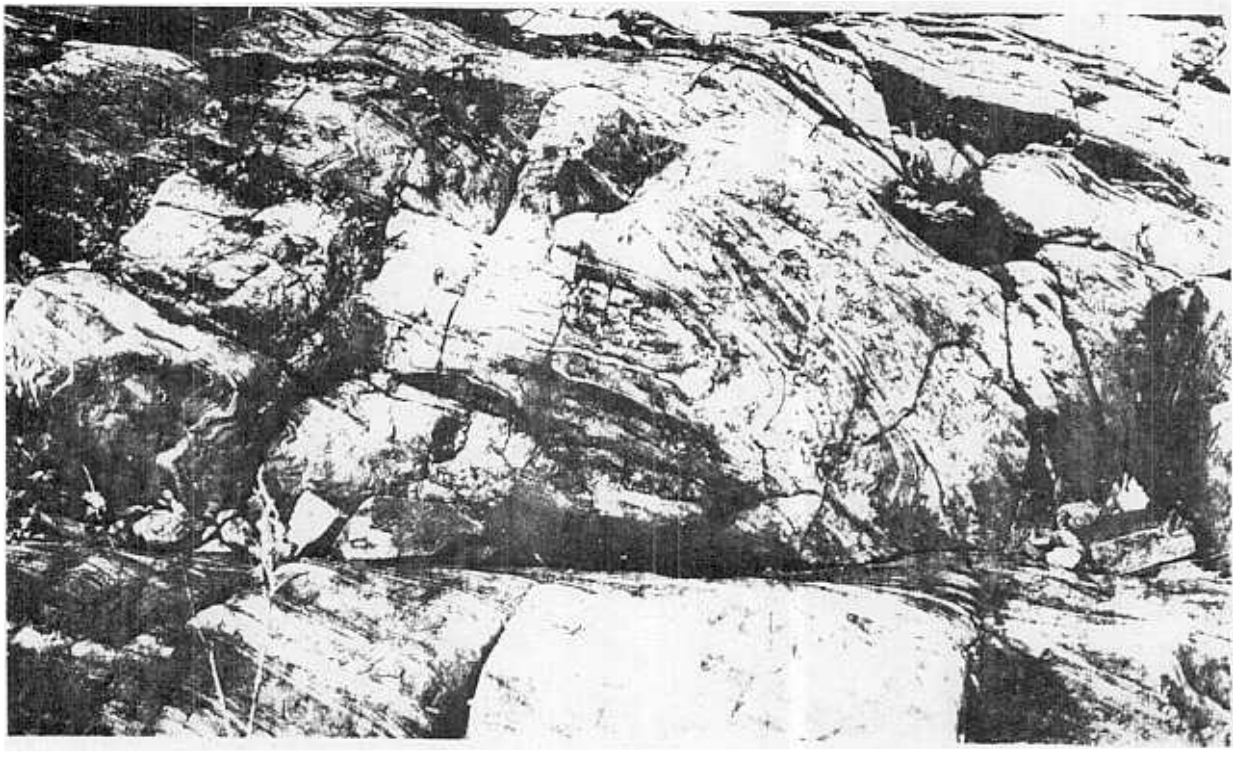


Figure -- Folded isoclines in thinly laminated amphibolite at Location C. Drag folding and brecciation can be seen on some fold limbs. These are F-2 folds. F-1 isoclinal fold hinges can be found in a few places on this outcrop.

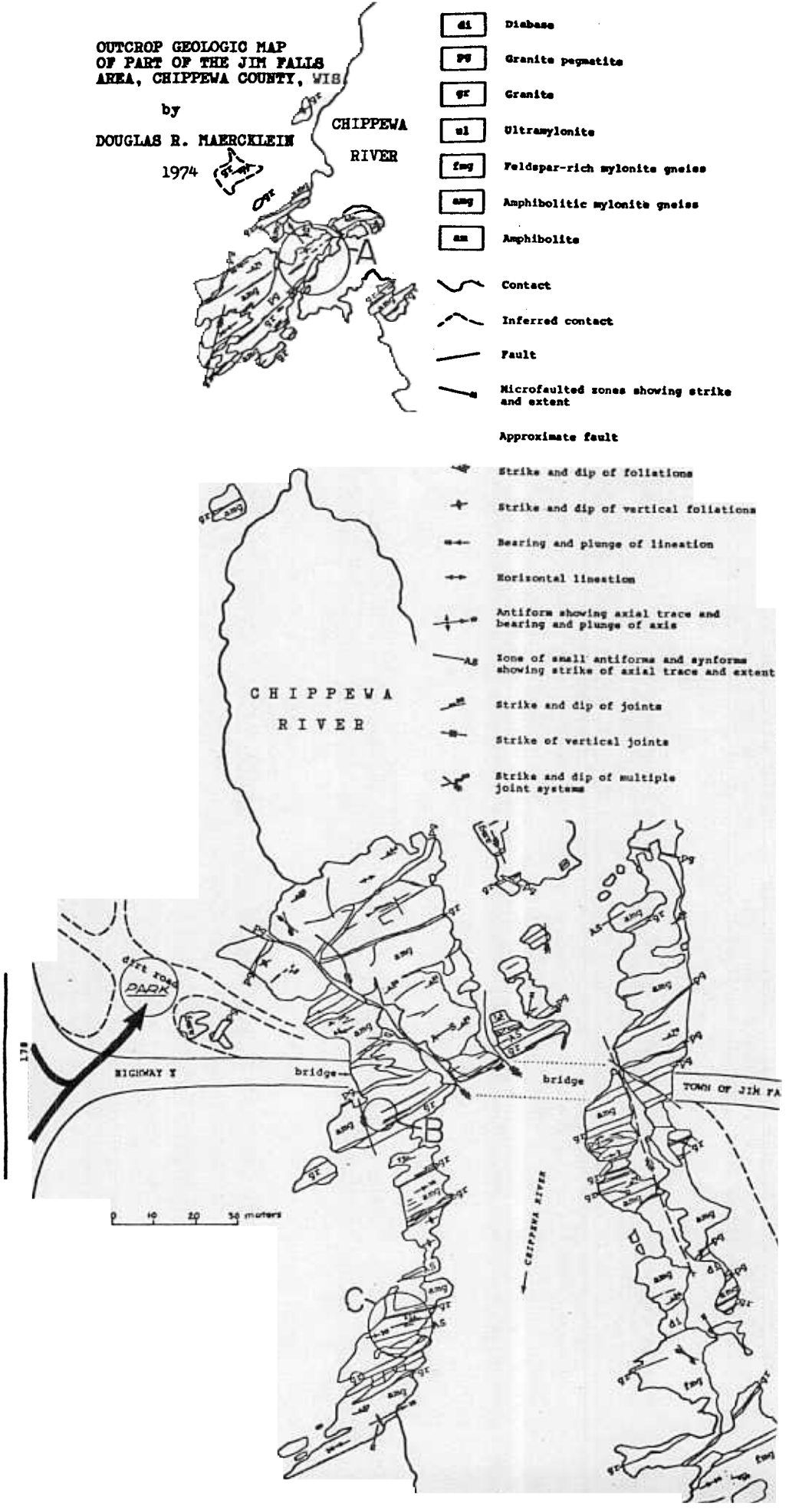


Figure 2 -- Generalized geological outcrop map of Jim Falls Wide lines are contacts; broken lines are inferred contacts.

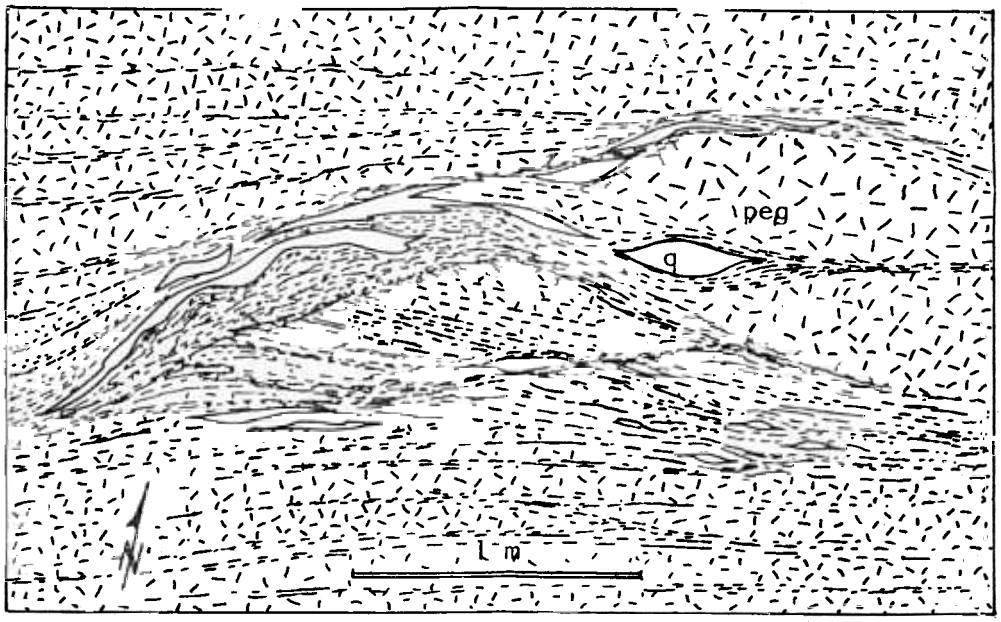


Figure 3 -- Interlensing shear cutting granite pegmatite at Location A. Lenticular white areas are quartz, which tends to be locallized along surfaces of major slippage.

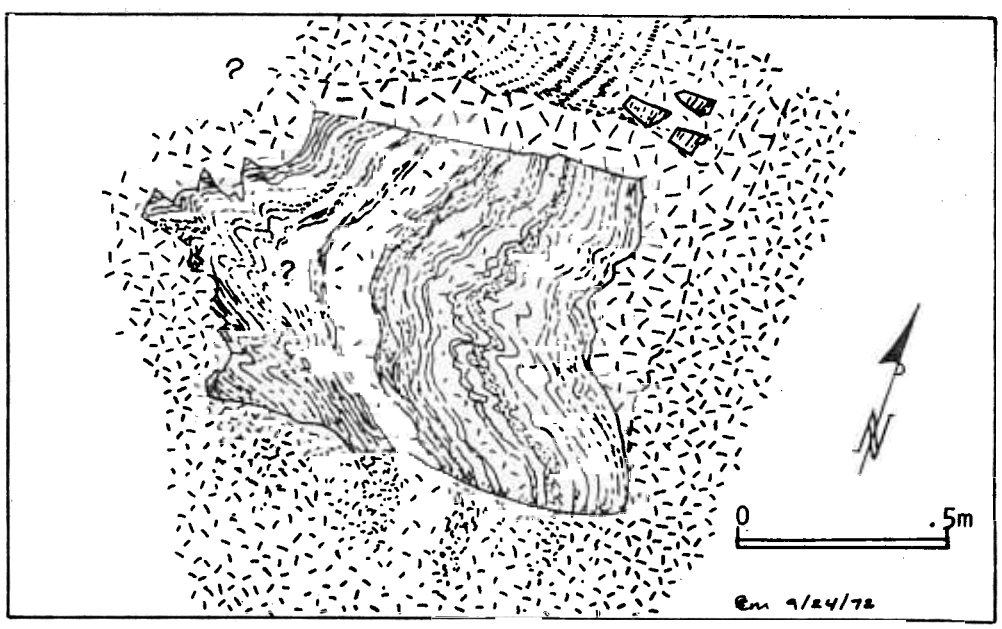
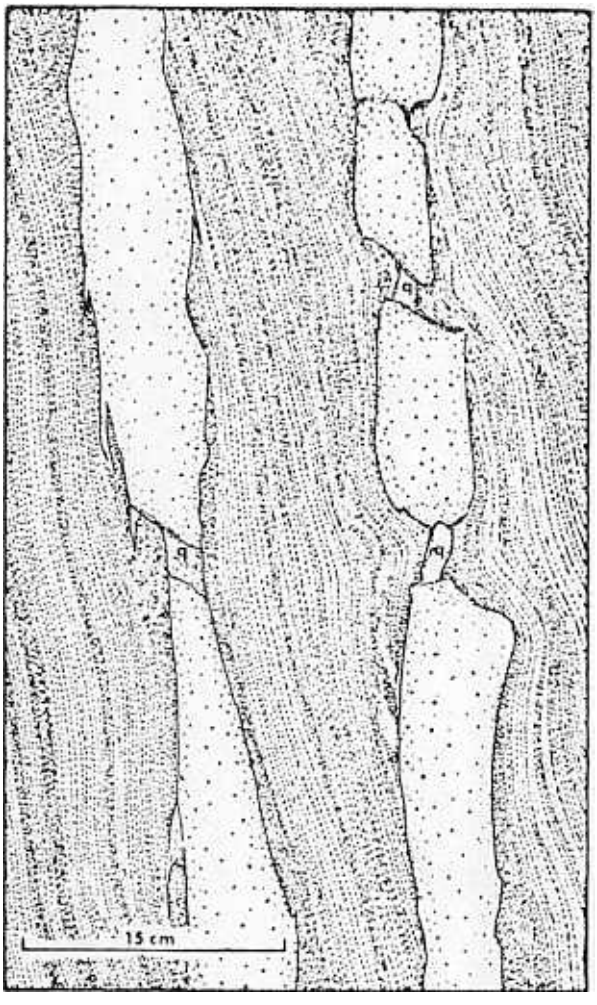


Figure 4 -- Partially granitized amphibolite xenoliths in biotite granite. Contact locally discordant. Biotite-rich bands extend into the granite from the xenolith. Location, halfway between dam and bridge on west side of river.



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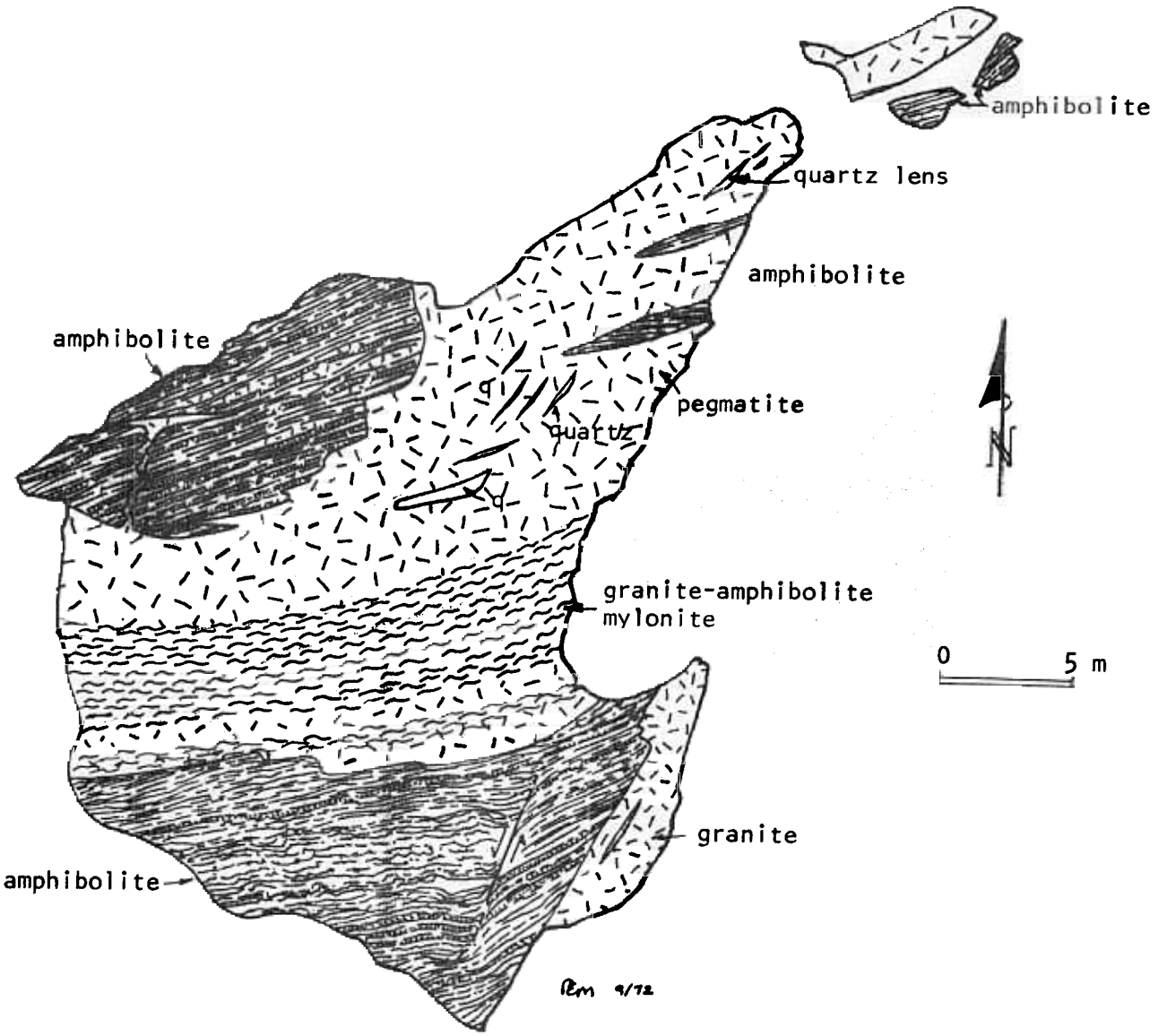

Figure 6 -- Detailed geologic map showing sheared intrusive contact of "granite" in thinly banded amphibolite. Lenses of amphibolite were carried away from the wall by the granite. En echelon fractures were filled by quartz during contraction of the pegmatite. Location (A)

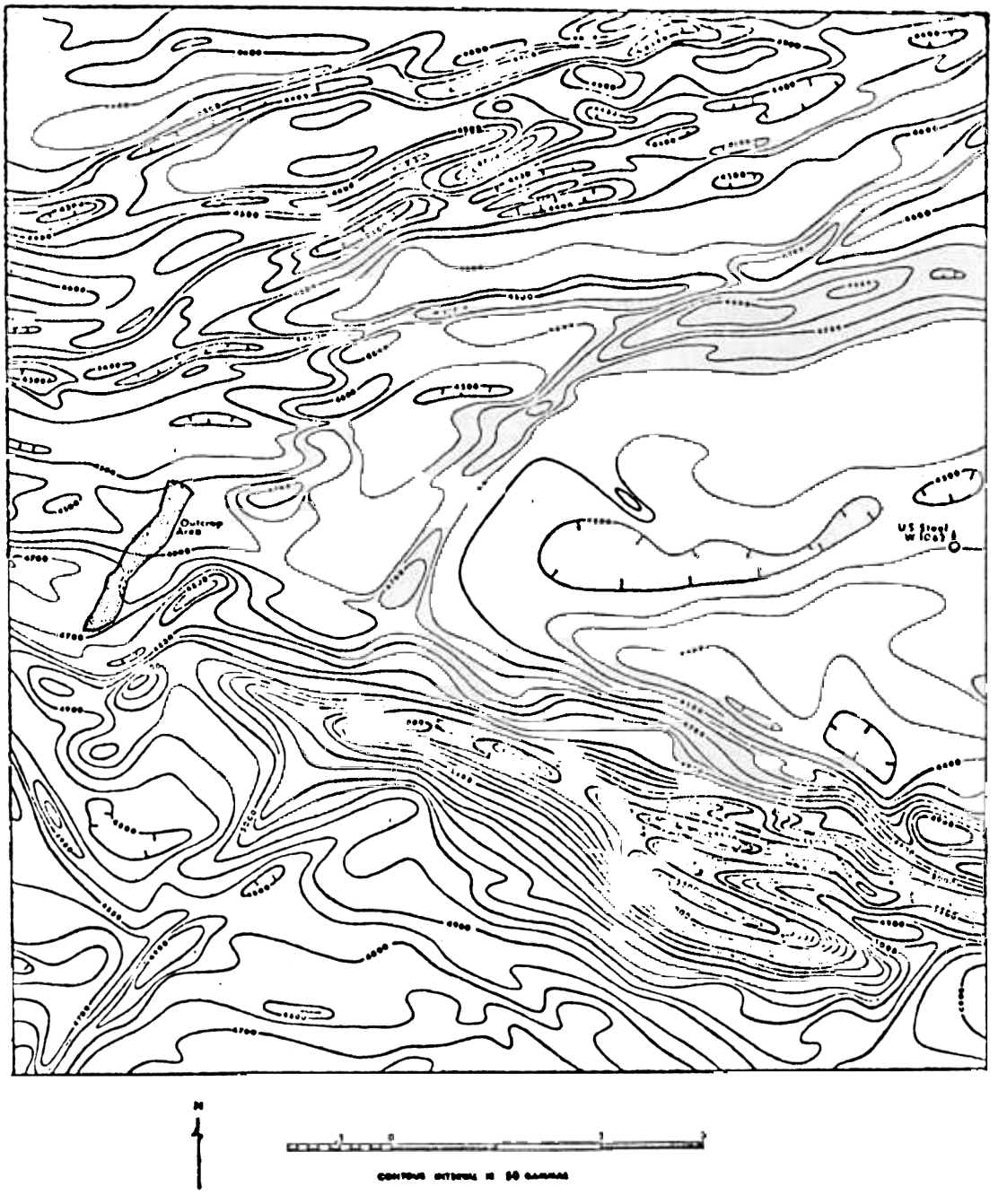

Figure 7 -- Aeromagnetic map of Jim Falls area adapted from an aeromagnetic survey by U.S. Steel, 1974. Exposures at Jim Falls are shown by stippled area near left margin.