provided that (a) for situations in which $\sigma_1 > \sigma_2 > \sigma_3$, one dihedral angle between two conjugate sets of lamellae is less than 90 degrees, and σ_1 is unambiguously the acute bisector; or (b) for cases in which $\sigma_1 > \sigma_2 = \sigma_3$ or $\sigma_1 = \sigma_2 > \sigma_3$, the lamellae lie along conical surfaces with half-angles of less than 45 degrees and greater than 45 degrees, respectively. In this hypothesis they are interpreted in the same manner as shear fractures or faults. Some examples of the angle between sets of quartz deformation lamellae and the attitude of the acute bisector for these sets in discrete samples are listed in the table on page 516. This compilation shows that the sets of lamellae intersect at an average acute dihedral angle of 74 degrees, and that they, therefore, probably formed in planes of high resolved shear stress. Moreover, the compilation indicates that in most cases the acute bisector, which the writer has equated to σ_1 as a working hypothesis, is related meaningfully to geologic reference lines and planes. These relationships, however, do not by any means establish unambiguously that the acute bisector parallels σ_1 in the rock at the time of lamellae formation. The hypothesis is strengthened, however, when other fabric elements are studied along with the deformation lamellae.

From studies of the Baraboo quartzite, Riley[(141)] showed that the character and orientation of lamellae could be used as a qualitative measure of the intensity of deformation. In addition he differentiated between microfractures and deformation lamellae, and found both strongly oriented and geometrically related to the major structure. It is instructive to examine Riley's Figs. 11(a) and 11(b) (see Fig. 40) which show the orientation of these features in his specimen. Two sets of deformation lamellae are defined which intersect at 60-80 degrees, and the normals to the microfractures define a single concentration. If the orientation diagrams for microfractures and lamellae are superimposed, it is apparent that the microfractures bisect the angle between the two sets of deformation lamellae. This geometrical relationship is identical with that of two sets of shear fractures and the enclosed extension fracture, i.e., two sets of lamellae are bisected by σ_1. In this case, σ_1 is oriented normal to bedding and to the fold axis (Figs. 40(c) and 40(d)).*

*Dynamic inferences by Friedman.

SOME EXAMPLES OF THE ANGLE BETWEEN SETS OF QUARTZ DEFORMATION LAMELLAE AND THE ATTITUDE OF THE ACUTE BISECTOR BETWEEN THE LAMELLAE PLANES

Reference	Rock Type	Approximate Angle[a] between Best Developed Sets of Lamellae (degrees)	Orientation of Acute Bisector[b] (σ_1)
Fairbairn, Ref. 138	Ajibik quartzite	80	Normal to s-plane
Ingerson and Tuttle, Ref. 130	Ajibik quartzite	76	Normal to s-plane
	Biotite-gneiss	80	Parallel to s-plane
Riley, Ref. 141	Baraboo quartzite		
	Specimen No. 9	60	Horizontal and at high angles to regional fold axis
	Specimen No. 18	75	Nearly horizontal and subparallel to axial plane foliation and regional fold axis
	Specimen No. 38	65	Nearly horizontal, normal to bedding, and at high angles to regional fold axis
	Specimen No. 47	75	Nearly horizontal, subparallel to bedding, and subparallel to regional fold axis
	Specimen No. 55	85	Horizontal, subparallel to bedding, and at high angles to regional fold axis
	Specimen No. 58	65	Horizontal, at high angles to bedding and to regional fold axis
Mackie, Ref. 147	Quartz-piedmontite schist	60	Normal to fold axis and to s-plane