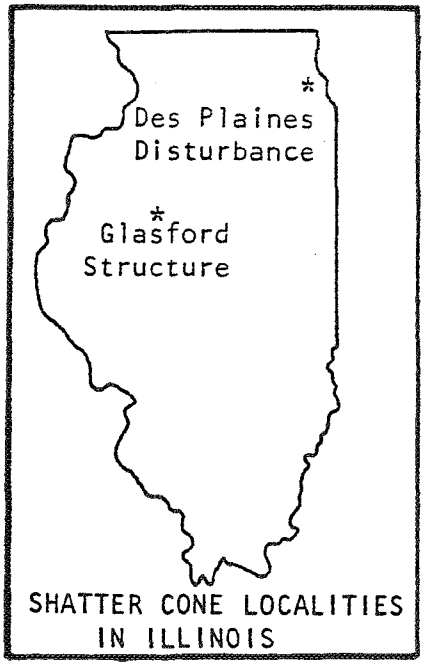
SHATTER CONES IN ILLINOIS: EVIDENCE FOR METEORITIC IMPACTS AT GLASFORD AND DES PLAINES; John F. McHone*, Michael L. Sargent**, and W. John Nelson**, *Geology PSF, Arizona State Univ., Tempe AZ 85287, ** Illinois State Geological Survey, 615 E. Peabody, Champaign, IL 61820

Shatter cone fragments have been recovered from rock cores at two previously suspected, but heretofore unverified, impact structures in Illinois. Both sites are buried features known from geophysical surveys and drill holes.

The Glasford Structure (4 km dia., Lat. 40°36.1' N; Long. 089°47.1' W) is a domal feature centered about 16 km WSW of Peoria, Illinois. Deep wells reveal a normal sequence of about 350 m of undisturbed Quaternary and Paleozoic strata overlying more than 400 m (depth of penetration) of intensely disturbed and brecciated sedimentary rocks (Buschbach and Ryan, 1963). Oldest undisturbed rocks are an anomalously thick, atypical, originally flat (now slightly domed) shale of Cincinnatian (upper Ordovician) Maquoketa Group which are in abrupt contact with randomly oriented cm-scale breccia clasts of similar appearance. Deeper rocks are mostly chaotic blocks of severely brecciated dolomites with some lower units of autochtonous sandstone breccia and strongly contorted shales. Rare but well-developed shatter cones occur in fractured blocks of unidentified massive brittle dolomite and also as dolomite clasts within breccia veins bounded by fractured and contorted sandstones.

The Des Plaines Disturbance (8 km dia., Lat. 42°02.7'N; Long. 087°52.4'W) underlies the Chicago suburb of Des Plaines (Emrich and Bergstrom, 1962). A central core of brecciated Champlainian (middle Ordovician) St. Peter Sandstone is uplifted more than 250 m above normal elevation. Individual quartz grains commonly have well-developed percussion fractures, strain lamellae, and occasional sets of crystallographically oriented planar microfractures. Shales of the Maquoketa Group surround this central uplift in moderately to steeply tilted beds in which numerous faults cause repeated sections and layers of severe fracturing. Occasional beds of brittle dolomite contain distinct, weakly developed shatter cones between layers of otherwise thoroughly crushed shales.



SHATTER CONE LOCALITIES IN ILLINOIS

Shatter cones are accepted widely as field criteria of meteoritic impact (Dietz, 1960). Detection of these shock indicators in both the Glasford Structure and the Des Plaines Disturbance upgrades these sites in Earth's inventory of known and suspected impact structures from possible impact sites with compatible structure and morphology to probable impact structures which possess also evidence of shock metamorphism.

References: Buschbach and Ryan, Bull. Am. Assoc. Petrol. Geol., v. 47, no. 12, p. 2015-2022, (1963); Dietz, Science, v. 131, p. 50-58 (1960); Emrich and Bergstrom, Geol. Soc. Am. Bull., v. 73, p. 959-968, (1962).