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MAJOR DEFORMATION CONNECTED WITH MINERALIZATION.

Erasmus Haworth: Relations between the Ozark uplift and ore deposits. Bull. GSA 11, 1900, 231-240.

Elliptical zone of Pb-Zn deposits around border area of Ozark dome. Shown on Tectonic Map of N.A.

Pre-Cambrian basement exposed, E part of uplift, in SE Mo. Pb district. Ls: E part, Lower Silurian, Cambrian; Miss., W part. These ls. in general compact firm; in some places, esp. in E, filled with minute openings, where they carry quantities of disseminated lead ore. Around the border zone esp., cut by steep ore-bearing fissures.

Some of Sil-Camb. is ss, esp. in SE mining region, S Mo. and N. Ark.

SW mining area has enormous masses of chert: some 300' thick, extend laterally 3-5 mi. Flint irregularly in Miss. ls. Fissures in flint about Galena, Joplin, Webb City are the principal openings filled with lead and zinc ores.

Structure: Monoclinical type more typical of W US. p. 235: "It seems that the forces producing the uplift acted radially rather than tangentially and resulted in a stretching of the strata rather than a crumpling. On the summit the bedding planes are found to be almost horizontal, while throughout the border areas they are inclined away from the dome center."

Stretching of Strata: Degree to which strata were stretched or elongated has not been measured accurately, but signs of it everywhere. Winslow

noticed tendency of the fissures to contract downward, although he does not esp. refer to elongation of surface. (Arthur Winslow: An Illustration of the flexibility of ls. Am. Jnl. Sci. (3) vol. 43 (1892), 133-134. Most probable source: Notes on the lead and zinc deposits of the Miss. Valley and the origin of the ores. JG 1 (1893), 612-619. Or Lead & Zinc Deposits. Mo. Geol. Survey 6 and 7, 763 pp. 1894. Or Lead & Zinc deposits of Mo. TAIME 24 (1895) 634-689. Disseminated lead ores of SE Mo. USGS Bull. 132, 1896.

Coalfields in SE Kansas show "horsebacks" which are clay-filled seams or fissures, trending parallel to the tangent of the Ozark elliptical dome. The brittle coal beds break readily. Stretching of surface lines resulted in opening these numerous fissures to distances varying from 3-30', faulting on these axes. As distance from Ozark uplift increases, fissures diminish.

Fractures are much more numerous around borders of uplifted area than elsewhere. Flint extremely shattered, Joplin. To E at Wentworth and Aurora, near center of dome, the heavy flint beds carrying the ores are almost fissure-free. Fissures form true fissure veins around N border of uplift. Also in SE, Bonne Terre and Mine La Motte; same for N Arkansas, S Mo. p. 236: "This is in accord with the general conditions observed elsewhere in areas occupying great monoclinical uplifts, the areas of maximum fracturing and faulting being confined to the borders."

Nature of rocks influenced nature of fissures. Heavy beds of Silurian ls. with cushions of soft IB ss, would resist fracture. But when stress became great enough to produce fracturing the tough and somewhat elastic ls. would yield, producing a small number of relatively large fissures, accompanied by vertical displacement or otherwise, thereby relieving the strain.

Opposite extreme with heavy beds of brittle flint, Joplin. Here the slightest strain would fracture a rock as brittle as glass, already possessing high internal tensions; hence required yielding would be along the lines of myriads of small fractures rather than along a few large ones. Large fissure veins and appreciable faults would therefore be less frequent than in ls. regions. However, the many small fissures would permit descending waters to dissolve ls next the flint, max. opportunity for ground waters to deposit ore.

No vulcanism in uplift; 1 peg. dike in Camden Co.

Mineralization: S, W, N parts: ZnS, ccpy, py., marcasite; cal., dolo., barite, qtz. SE district, in addition to these: large quantities of FeOx, with Co, Ni. Qtz very rare in Joplin. SE. qtz abundant.

Lack of qtz., fldsp., mica, garnet fluorite wolframite etc. militates against notion of hypogene ore. Ore by cold descending waters, around ring of maximum fracturing.

Prospect around the border ring.