

stripped-bedrock ridges enclosing radar-dark eolian(?) plains. Other tracts are now eroded to almost continuous bedrock distinguished by numerous much-subdued, large, subcircular rims and basins. The prevailing interpretation of these diverse ring complexes as produced by crustal shortening and magma upwelling cannot account for their superimposed circular patterns.

Misunderstanding of visual illusions in radar imagery detracts from some interpretations. The scale of imagery in the sidelook direction is not horizontal distance but rather is proportional to slant distance. Slopes facing the spacecraft are foreshortened because their tops and bottoms plot close together, whereas slopes facing away are lengthened, an effect opposite to that of optical imagery. Symmetrical ridges appear to be hogbacks dipping gently in the direction of radar look, and such illusions have been misinterpreted to be thrust-imblicated sheets [2,12]; straight ridges of varying heights can mimic contorted and faulted structures.

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WHERE'S THE BEAVERHEAD BEEF? R. B. Hargraves, Department of Geological and Geophysical Sciences, Princeton University, Princeton NJ 08544, USA. *P3732113*

Only rare quartz grains with single-set planar (1013) deformation features (PDFs) are present in breccia dikes found in association with uniformly oriented shatter cones that occur over an area 8 x 25 km (see Fiske et al., this volume). This suggests that the

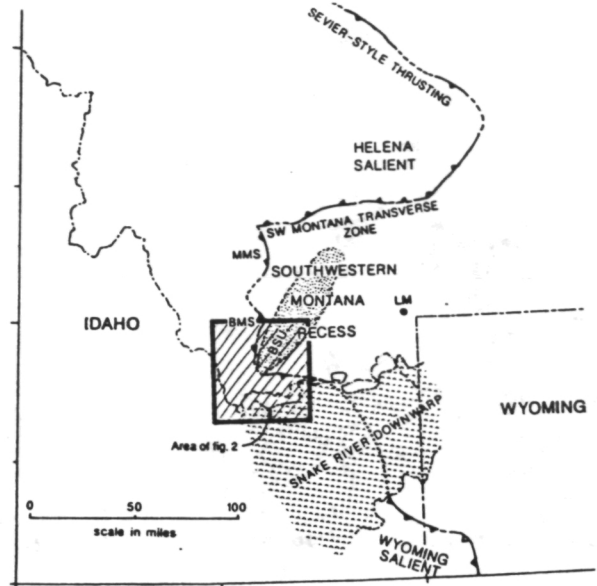


Fig. 2. Southwestern Montana Recess in Sevier Front (from [4]).

Beaverhead shocked rocks come from only the outer part of the central uplift of what must have been a large (>100 km diameter) complex impact structure. These rocks are allochthonous. They are present in the Cabin thrust plate (one of many in the Cordilleran belt), and are considered to have been tectonically transported 50 to 150 km east-northeast from a source in east central Idaho during the Laramide orogeny [1,2].

An impact event of this magnitude on continental crust (thought to have occurred in late Precambrian or early Paleozoic time) could be expected to punctuate local geologic history. Furthermore, although it may now be covered, its scar should remain despite all the considerable subsequent erosion/deposition and tectonism since the impact. The following are three large-scale singularities or anomalies that may reflect the event and mark its source.



Fig. 1. Location of Lemhi Arch (from [3]).

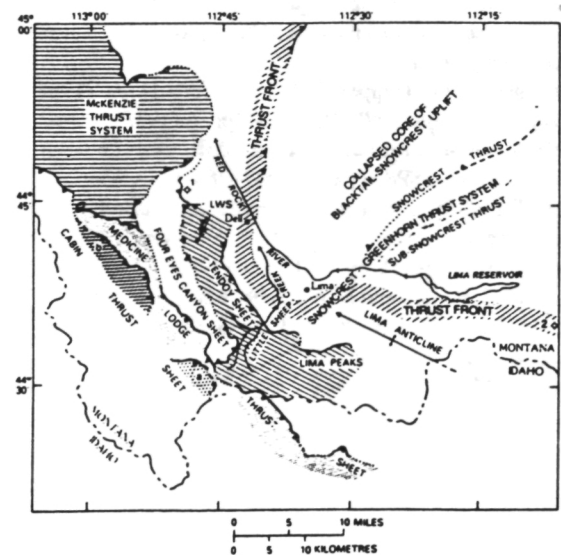


Fig. 3. Detail of apex of Southwestern Montana Recess (from [4]).

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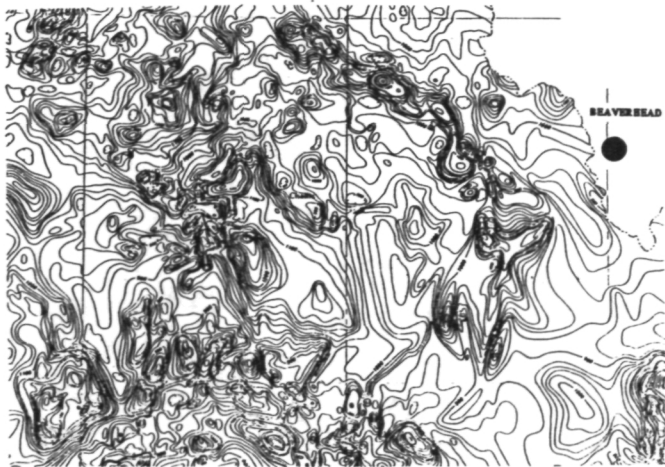


Fig. 4. Eastern segment of Aeromagnetic Map of Idaho [5].

1. The Lemhi Arch (Fig. 1) is a major structural uplift that occurred in late Proterozoic-early Paleozoic time in East Central Idaho and caused the erosion of at least 4 km of sedimentary cover [3]. This may be directly related to the impact.

2. Of the many thrust sheets comprising the Cordilleran belt, the Cabin plate that carries the shocked rocks is unique in that it alone intersected the crystalline basement [2]. It also now marks the apex of the Southwest Montana Recess in the Sevier front [4] (Figs. 2 and 3). The basement uplift remaining from the impact may have constituted a mechanical obstacle to the advancing thrust sheets in Cretaceous time, causing the recess. Perhaps a piece from the western edge of this uplift was sliced off and transported by the Cabin thrust.

3. What could be interpreted as a roughly circular aeromagnetic anomaly ~70 km in diameter can be discerned in the state aeromagnetic map [5] centered about 20 km southeast of Challis, Idaho, in the Lost River range (Fig. 4). It is in approximately the right place, and ignoring the possibility that the anomalies have diverse causes and the circular pattern is coincidental, it may mark what remains of the buried central uplift structure!

The relevance of these speculations in the search for the source of the Beaverhead shocked rocks will be explored this summer and reported at the meeting.

References: [1] Ruppel E. T. and Lopez D. A. (1988) *U.S. Geol. Surv. Prof. Paper 180*, 122. [2] Skipp B. (1988) *Interaction of the Rocky Mountain Foreland and the Cordilleran Thrust Belt* (C. J. Schmidt and W. J. Perry, eds.), 237-266, GSA Mem. 171. [3] Ruppel E. T. (1986) *Paleotectonics and Sedimentation in the Rocky Mountain Region, United States* (J. A. Peterson, ed.), 119-130, A.A.P.G. Mem. 41. [4] Perry W. J. et al. (1989) *Geol. Resources of Montana* (D. E. French and R. F. Crabb, eds.), Montana Geol. Soc. 1989 Field Conf. Guidebook. [5] U.S. Geological Survey (1978) *Aeromagnetic Map of Idaho*.

REPORT ON THE INTERNATIONAL CAMBODIAN CRATER EXPEDITION—1992. J. Hartung¹, C. Koeberl², P. Lee³, Kuhn Pagnacith⁴, and Touch Sambath⁴. ¹600 East Fifth Street, Des Moines IA 50309, USA, ²Institute of Geochemistry, University of Vienna, A-1010 Vienna, Austria, ³404 Space Sciences Building, Cornell University, Ithaca NY 14853, USA, ⁴Department of Geology and Mines, Ministry of Industry, Phnom Penh, Cambodia.

It has been proposed that Tonle Sap, a lake in Cambodia, 100 km long and 30 km wide, marks the location of an elongate basin formed by the oblique impact of a comet or asteroid [1]. The impact is considered to have produced melted ejecta found now as tektites over much of southeast Asia and Australia. The location of the lake, its approximate age, its size, and the orientation of its long axis (toward Australia) are consistent with this hypothesis.

After learning about the hypothesis, five individuals volunteered to participate in an expedition to Cambodia: Jack Hartung, Christian Koeberl, Charles Harper, Burkhard Dressler, and Pascal Lee. We agreed that a proper expedition could not be undertaken without a local host or "contact." After a year without progress Hartung decided to arrange travel to Phnom Penh, Cambodia, in January 1992. The primary objective of this trip was simply to identify a local contact. A secondary objective was to collect a variety of representative rock samples. In spite of the uncertainty related to getting into the field in Cambodia, Lee and Koeberl also decided to make the trip. Early in December 1991, John McAuliff, Director of the U.S.-Indochina Reconciliation Project, informed us that he had arranged for us to be received in Phnom Penh by officials of the Ministry of Industry. Although still uncertain regarding their status, Hartung and Lee arrived in Phnom Penh on January 5, 1992, and were greeted by Kuhn Pagnacith and Touch Sambath, who did all that was possible to make the expedition scientifically profitable and personally satisfying. Because we were not from Cambodia, travel into the countryside had to be approved by officials of the

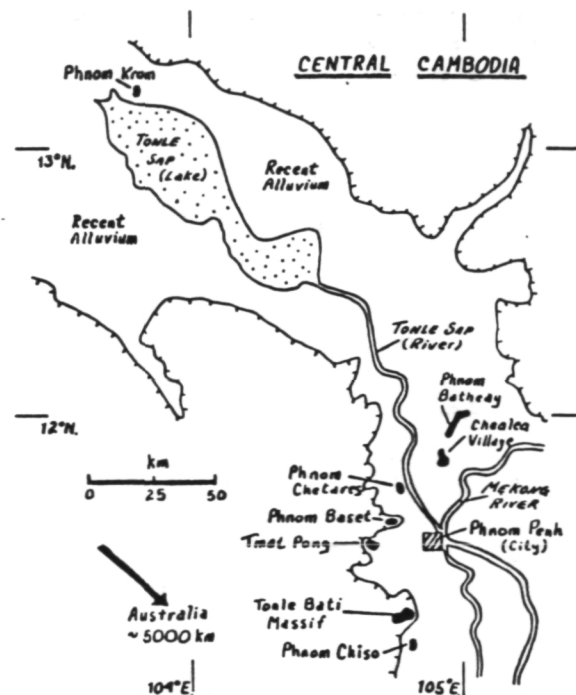


Fig. 1. Map of Central Cambodia, modified from [3].