Fig. 2. Generalized lithologic logs of the Manson M-1 and M-2 cores.

basal unit in the core was another sequence of sedimentary clast breccia, 51 m thick, and similar to the upper interval in the core. The two sedimentary clast units, like the lithologically similar unit in the M-1 core, probably formed as debris flows from the crater rim. The middle, nonbrecciated interval is probably a large, intact block of Upper Cretaceous strata transported from the crater rim with the debris flow. Alternatively, the sequence may represent the elusive postimpact lake sequence.

Additional drilling is planned for the late spring and summer of 1992. Targets include structurally preserved Upper Cretaceous strata on the Terrace Terrane, a zone of complete melting, and postimpact lake sediments in the Crater Moat.


A QUASI-HERTZIAN STRESS FIELD FROM AN INTERNAL SOURCE: A POSSIBLE WORKING MODEL FOR THE VREDEFORT STRUCTURE. L. A. G. Antoine1, W. U. Reimold2, and W. P. Collision3, 1Department of Geophysics, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa, 2Economic Research Unit at the Department of Geology, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa, 3Department of Geology, University of the Orange Free State, P.O. Box 339, Bloemfontein 9300, South Africa.

The Vredefort structure is a large domal feature approximately 110 km southeast of Johannesburg, South Africa, situated within and almost central to the large intracratonic Witwatersrand Basin.
This structure consists of an Archean core of ca. 45 km in diameter, consisting largely of granitic gneiss, surrounded by a collar of metasedimentary and metavolcanic supracrustal rocks of the Dominic Group, Witwatersrand and Ventersdorp Supergroups, and Transvaal Sequence (for geological descriptions see, e.g., [1]).

The interpretation of images of the gravity and magnetic fields over Vredefort has permitted the delineation of several important features of the structure and of its immediate environment [2]. The polygonal, concentric outline of the collar strata is a prominent feature of both the gravity and the magnetic fields. The Vredefort structure shares this distinctive geometry with other structures (e.g., Manicouagan, Decaturville, Sierra Madera) of debated impact origin. In all these, successively older strata with steep outward dips are encountered while traversing inward to the center of the structure.

Figs. 1. Schematic illustrating a diapiric quasi-Hertzian stress field as a possible working model for the Vredefort structure: (a) predeformation cross section showing the quasi-Hertzian stress field, (b) postdeformation cross section (the crust-on-edge model), and (c) postdeformation plan view with superimposed stress field.

In conclusion, the geometric and structural attributes of the Vredefort structure are consonant with a quasi-Hertzian stress field. In particular, it corroborates the many observations of ubiquitous subhorizontal structures that have led investigators to deduce that the Vredefort structure was produced by subhorizontal forces (see, e.g., [8,10]).


The Sudbury structure has been interpreted as a deeply eroded remnant of a peak-ring basin [1]. The polymict, allochthonous breccias of the Onaping Formation (OF) occur in the central part of the Sudbury structure, which is surrounded by the 1.85-Ga-old [2]...