

## THE SEDIMENTOLOGY OF SOME TRANSVAAL HOMINID CAVE DEPOSITS AND ITS ENVIRONMENTAL AND CHRONOLOGICAL IMPLICATIONS\*

by

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### ABSTRACT

The sedimentology of cave deposits is principally influenced by two sets of factors:

- (1) those relating to the morphology of the depository and its evolution through time; and
- (2) those resulting from external influences, including the production of sediments and their introduction into the cave under varying conditions of climate and vegetation cover.

The interaction of these two sets of factors often poses unique sedimentological problems which differ markedly from those encountered in other sedimentary environments. In particular, the imprint of intracavernous conditions on specific sedimentary facies frequently complicates interpretations relative to extracavernous environmental influences. Inferences from sedimentological studies should, therefore, be supplemented as far as possible with other evidence — for example from isotope analyses, palynology and faunal studies — in any meaningful attempt to reconstruct ancient environments from these deposits.

The sequence of intracavernous events which occurred during the accumulation of the Makapansgat and Sterkfontein Formations will be outlined in relation to the probable imprint of external changes. When viewed in conjunction with the evidence of variations in the concentrations of  $^{13}\text{C}$  and  $^{18}\text{O}$  in the various stratigraphic units and with interpretations relative to the extent of the cover of woody vegetation near each site, a fairly consistent picture of climate fluctuations emerges. These early fluctuations may, in a general way, parallel those recorded by Shackleton and Opdyke in the northern hemisphere for the period between 3,2 My B.P. and the beginning of the Quaternary.

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### OCCURRENCE

Similar features have been observed by the authors in calcified alluvial deposits of the Vaal River (Partridge and Brink 1967), calcareous gravels at Long Hanborough near Oxford, England (Fig. 2) and in coastal calcarenites; counterparts have been reported from Florida, California and Brazil and are doubtless common in many other areas (Goulet July 1973). They are invariably associated with areas in which soluble rocks are present beneath a mantle of superficial soil.

### MODE OF ORIGIN

These pits contain a surface transported soil which overlies residual material from the adjacent host-rock. It is clear, therefore, that they are formed by corrosion and decalcification rather than by the mechanical action of water or wind.

The name Makondo has previously been suggested (Partridge and Brink 1967) for this type of corrosion pit in recognition of the valuable services rendered by the late William Makondo in investigations at the Makapansgat Limestone Hominid site.

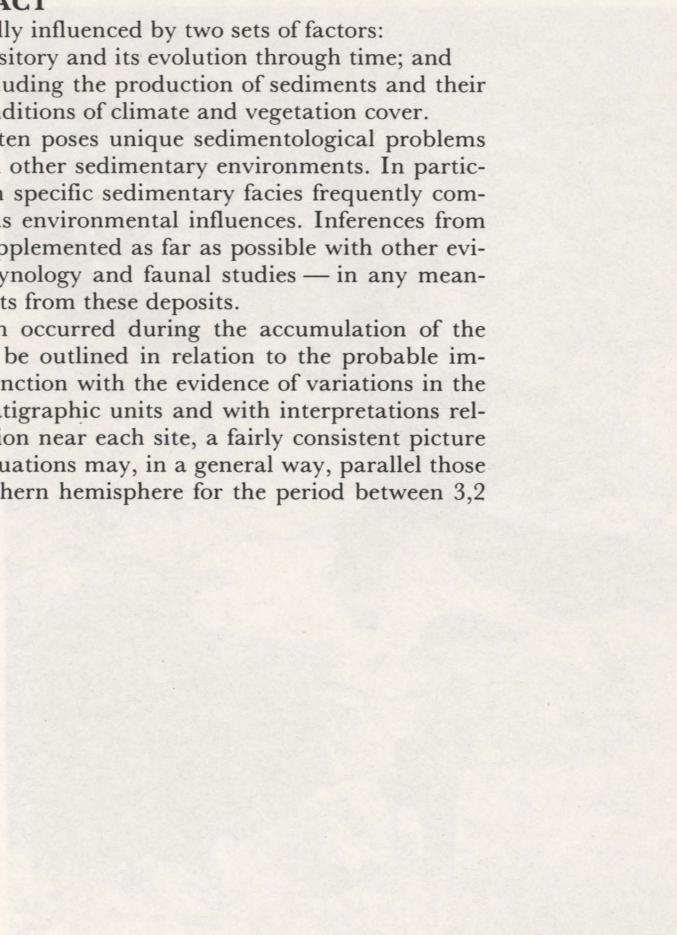


Figure 1. Makondo in Member 4 of the Makapansgat Formation.

As a possible explanation of the mechanism of corrosion, it is suggested that deep-rooting vegetation will tend to take root in joints in the host-rock and would subsequently provide concentrations of organic acids which would cause local decalcification of the surrounding deposit. Successive generations of vegetation would tend to continue to take root in the pits and to extend them downwards.

### PIT FILLINGS

Since the carbonate content of Transvaal cave breccias usually exceeds 50 per cent, this process produces a soil residue of insoluble substances in