

SEDIMENTOLOGICAL CONTROL OF GOLD
AND URANINITE MINERALISATION IN THE
WHITE REEF OF THE WEST RAND

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FIGURE I. - LOCALITY MAP

SCALE
10 5 0 10 20 30 40 50 60 70 80 KILOMETRES
10 5 0 10 20 30 40 50 MILES

EXPLANATION

POSITION OF THE AREA INVESTIGATED IN RELATION TO THE REST OF THE WITWATERSRAND BASIN IS SHOWN.
OVERLYING, YOUNGER FORMATIONS ARE NOT INDICATED.
MAP AFTER ONE BY R. BORCHERS, 1960, WITH ADDITIONS.

MINES ON WHITE REEF SEDIMENTOLOGICALLY INVESTIGATED.

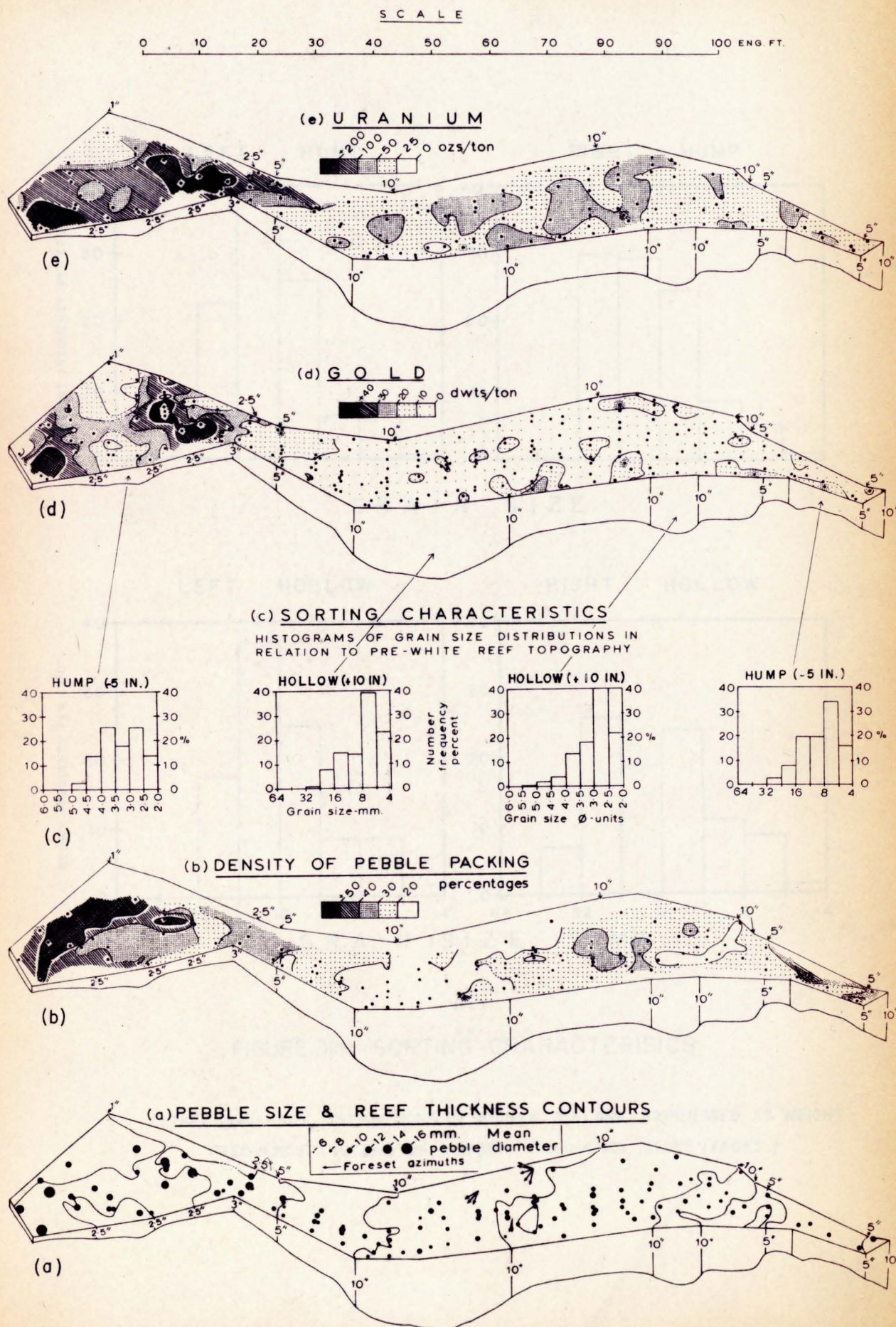
OTHER GOLD MINES.

GEOLOGY

- TRANSVAAL SYSTEM
- VENTERSDORP SYSTEM
- WITWATERSRAND SYSTEM { UPPER DIVISION / LOWER DIVISION
- DOMINION REEF SYSTEM
- BASEMENT FORMATIONS

LSSTEYN

FIGURE 2 - BLOCK DIAGRAMS RELATING SOME SEDIMENTOLOGICAL PROPERTIES OF THE CONGLOMERATE TO THE GOLD AND URANIUM CONTENTS, PILOT STUDY AREA.



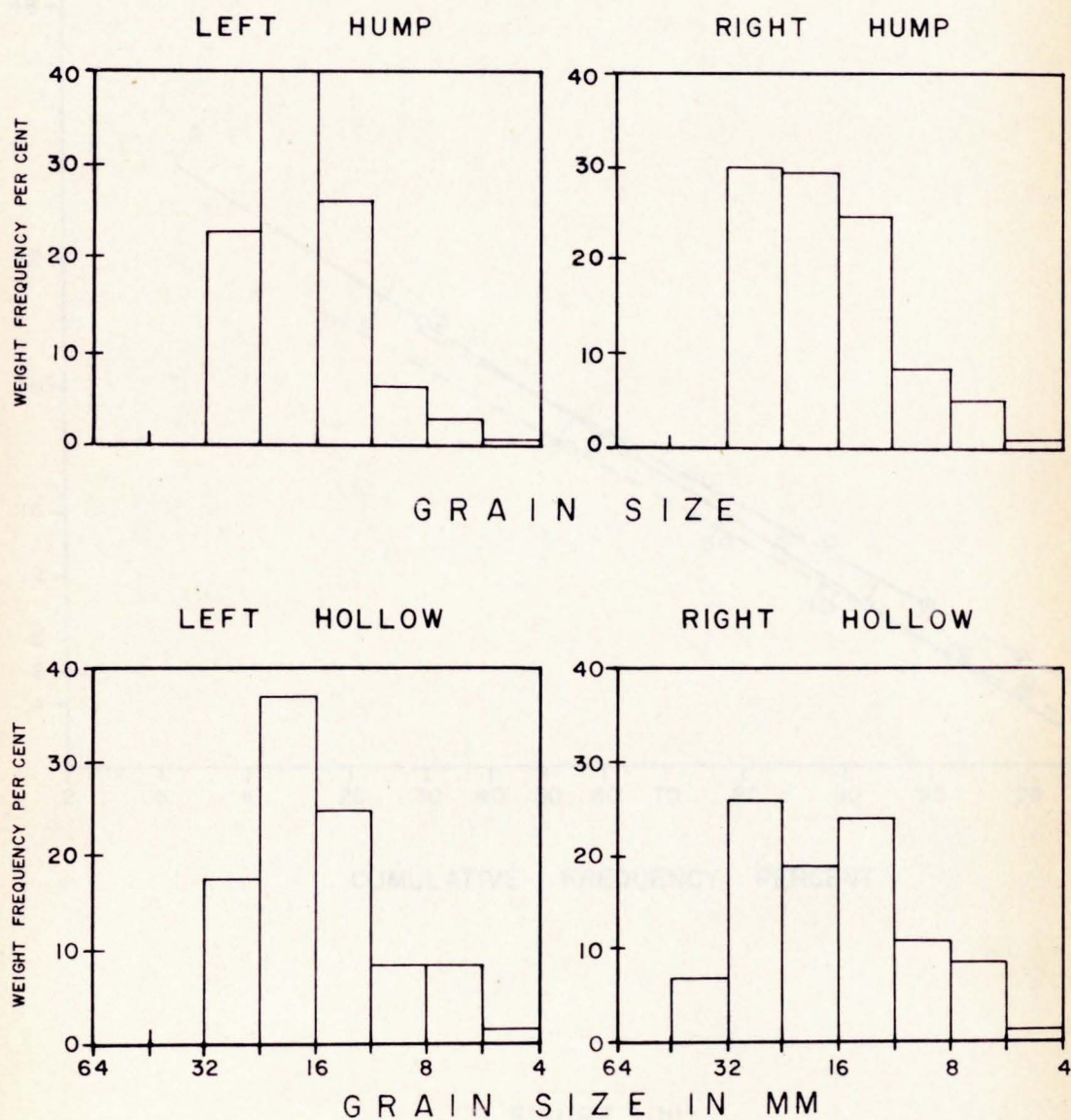


FIGURE 3(a) - SORTING CHARACTERISICS

(THE GRAIN-SIZE DISTRIBUTIONS OF FIGURE 2(c) ARE EXPRESSED AS WEIGHT-FREQUENCY INSTEAD OF NUMBER-FREQUENCY PERCENTAGES.)

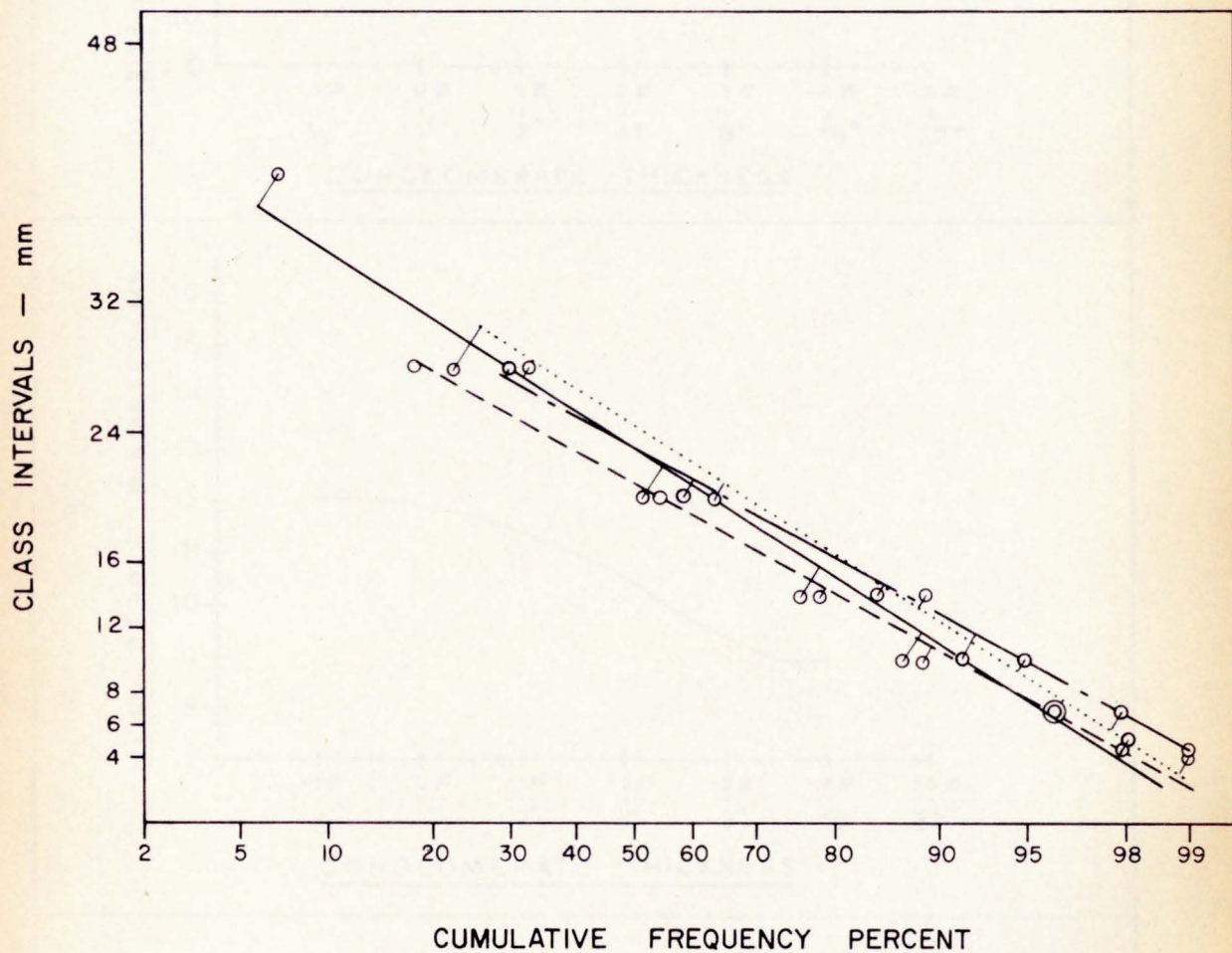
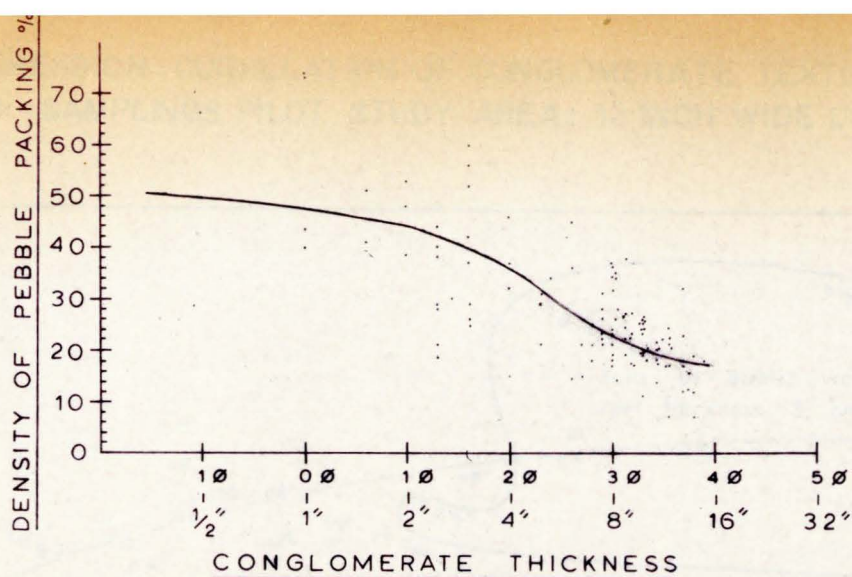


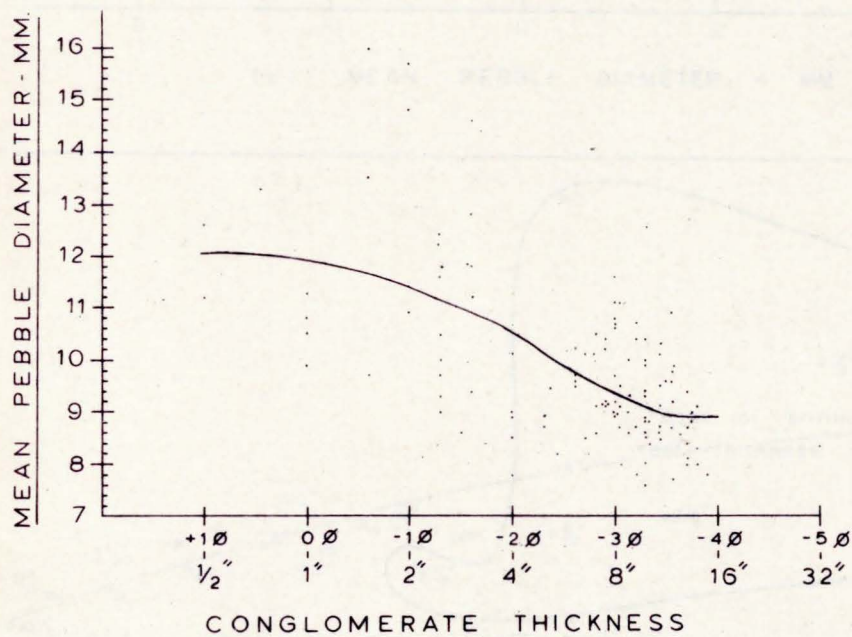
FIGURE 3(b)

GRAIN SIZE DISTRIBUTIONS OF FIGURE 3(a)
PLOTTED ON PROBABILITY PAPER

(c)



(b)



(a)

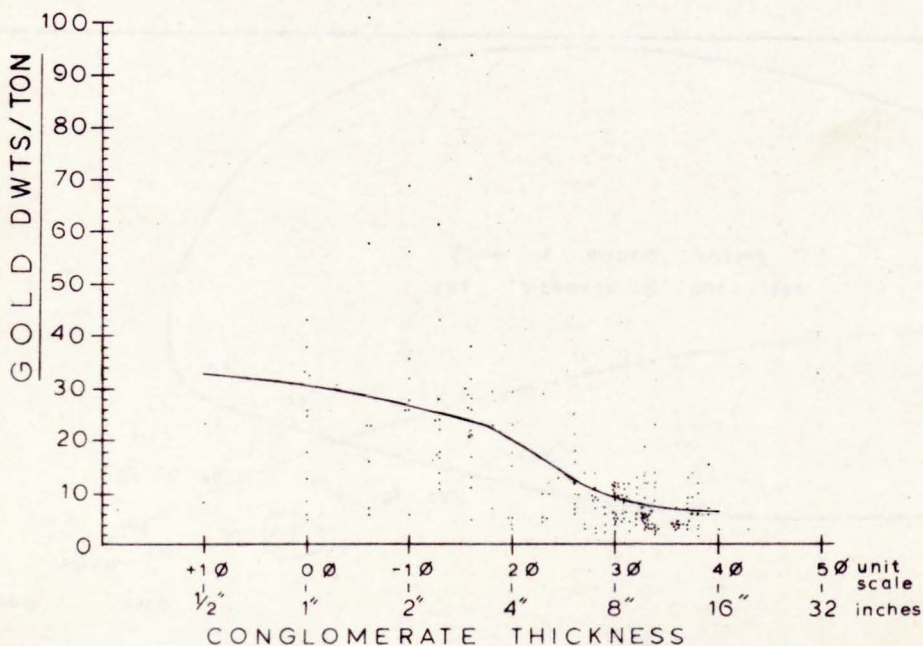
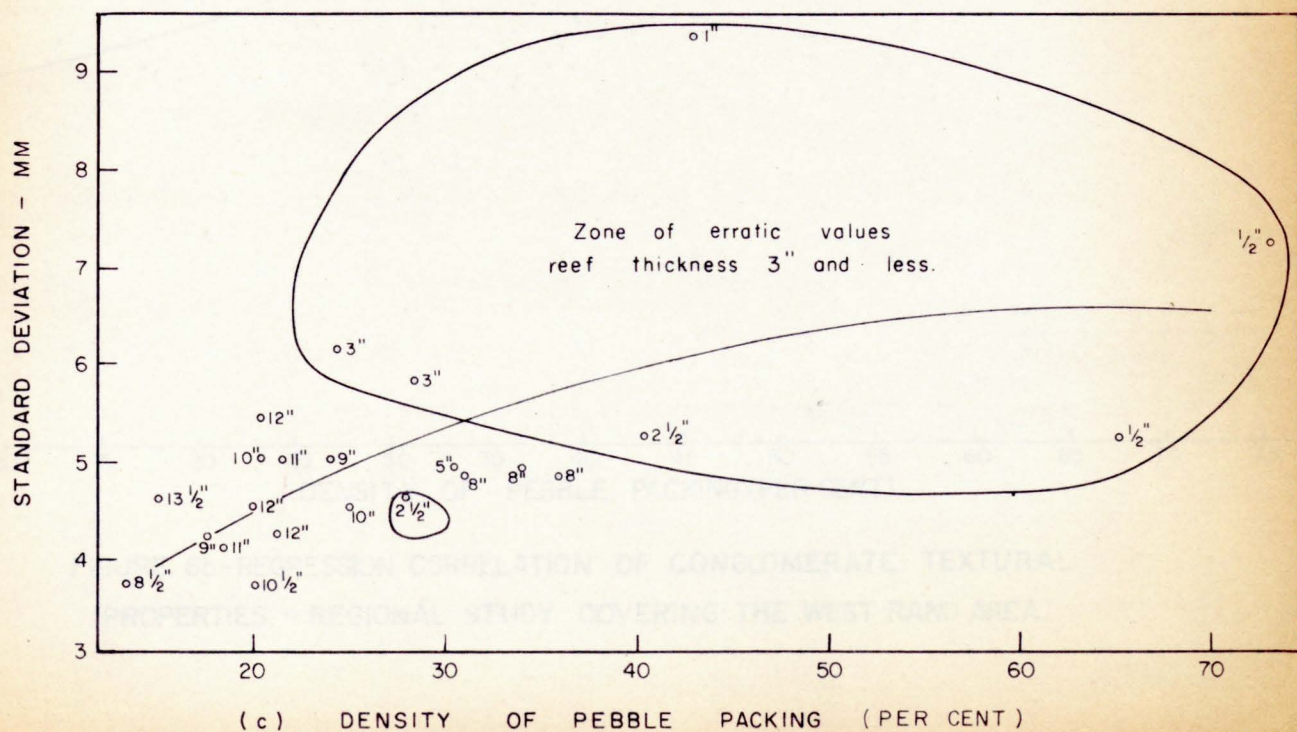
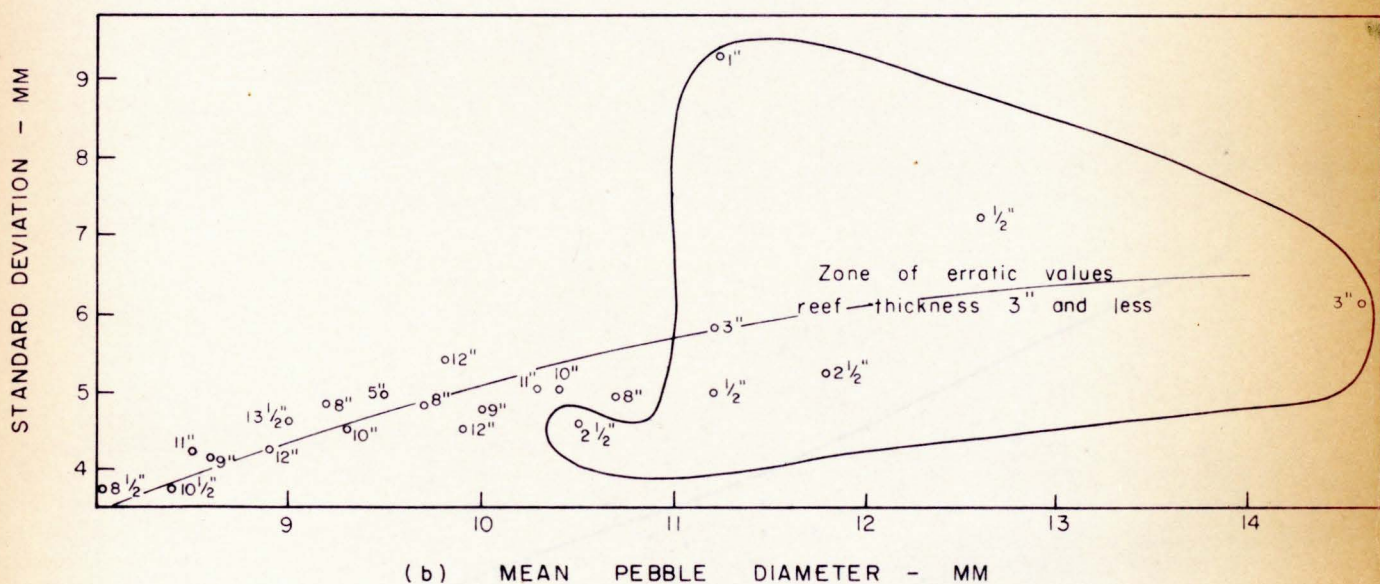
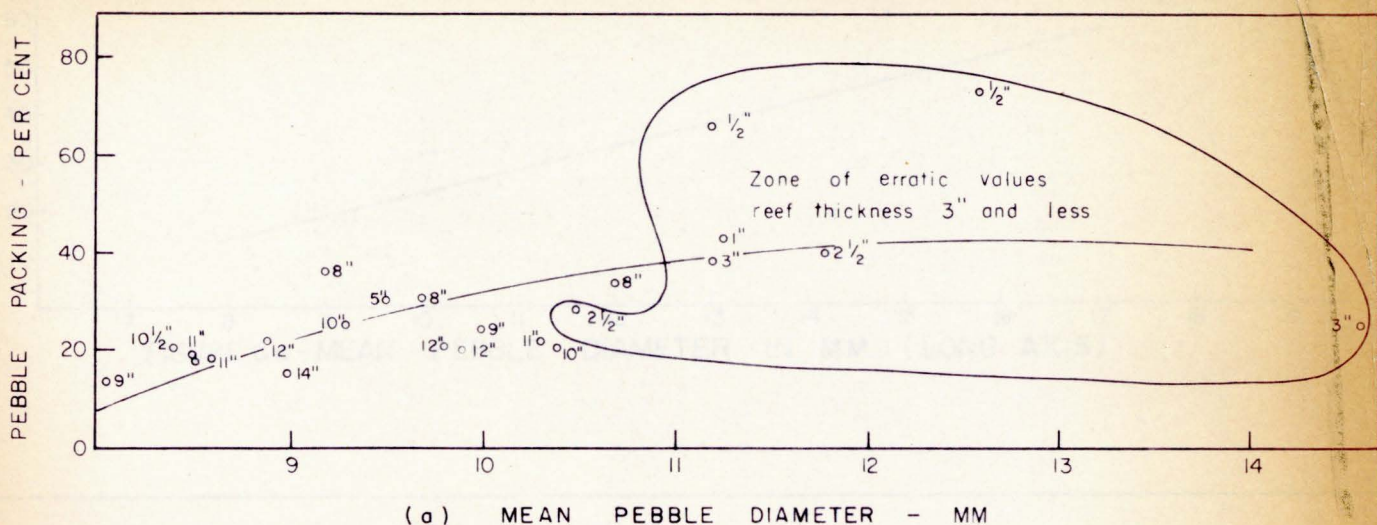
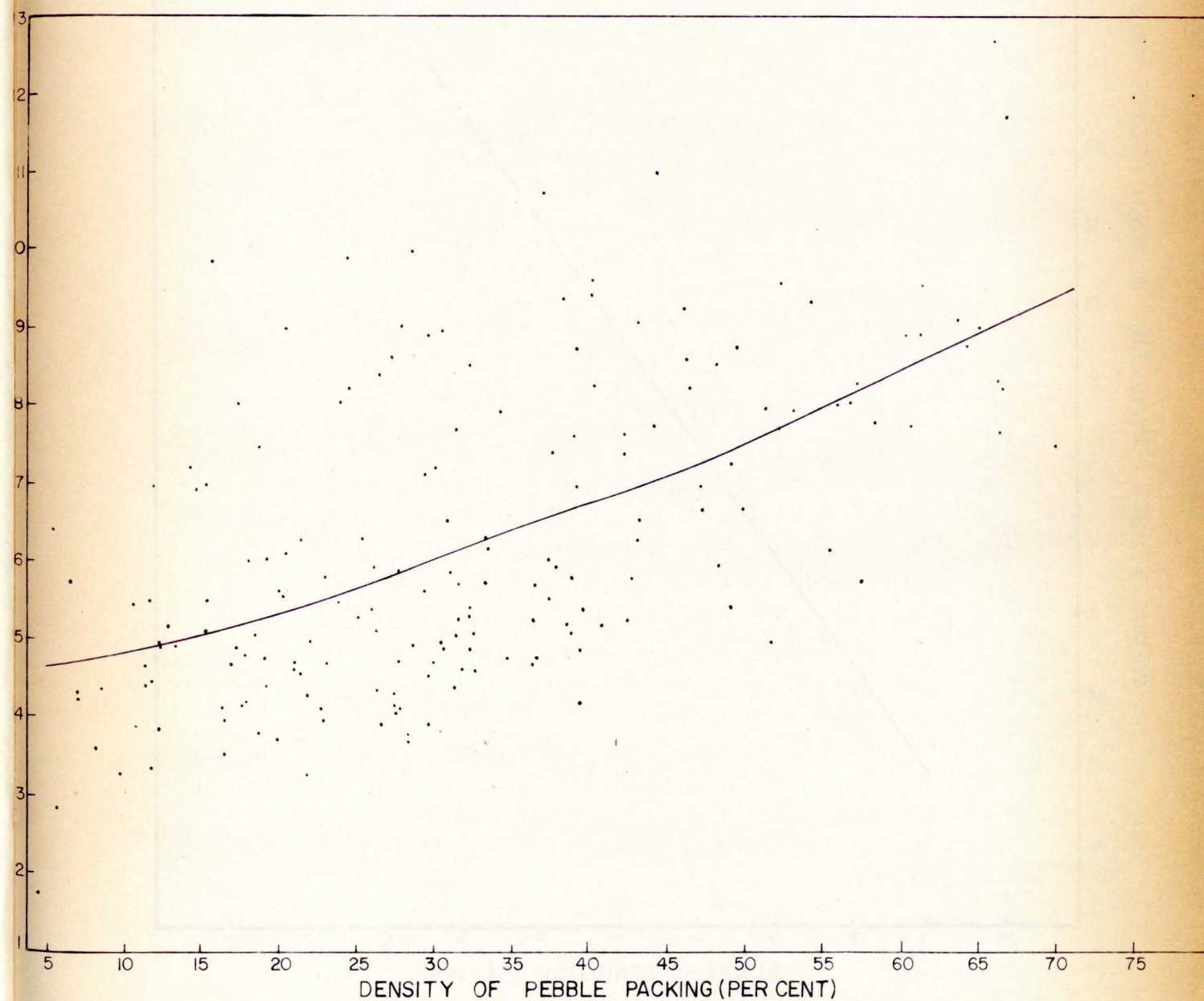
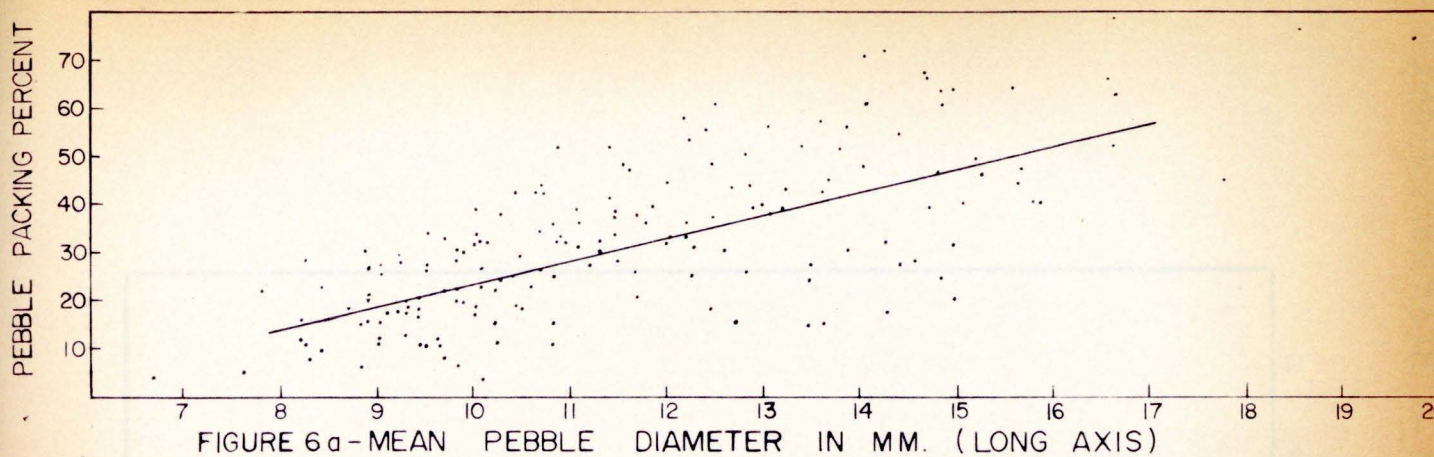


FIGURE 4 REGRESSION CURVES RELATING GOLD CONTENT, MEAN PEBBLE DIAMETER AND PEBBLE PACKING TO CONGLOMERATE THICKNESS.

FIG. 5.- REGRESSION CORRELATION OF CONGLOMERATE TEXTURAL PROPERTIES
7th & 9th SAMPLINGS PILOT STUDY AREA; 12 INCH WIDE CONGLOMERATE STRIPS.





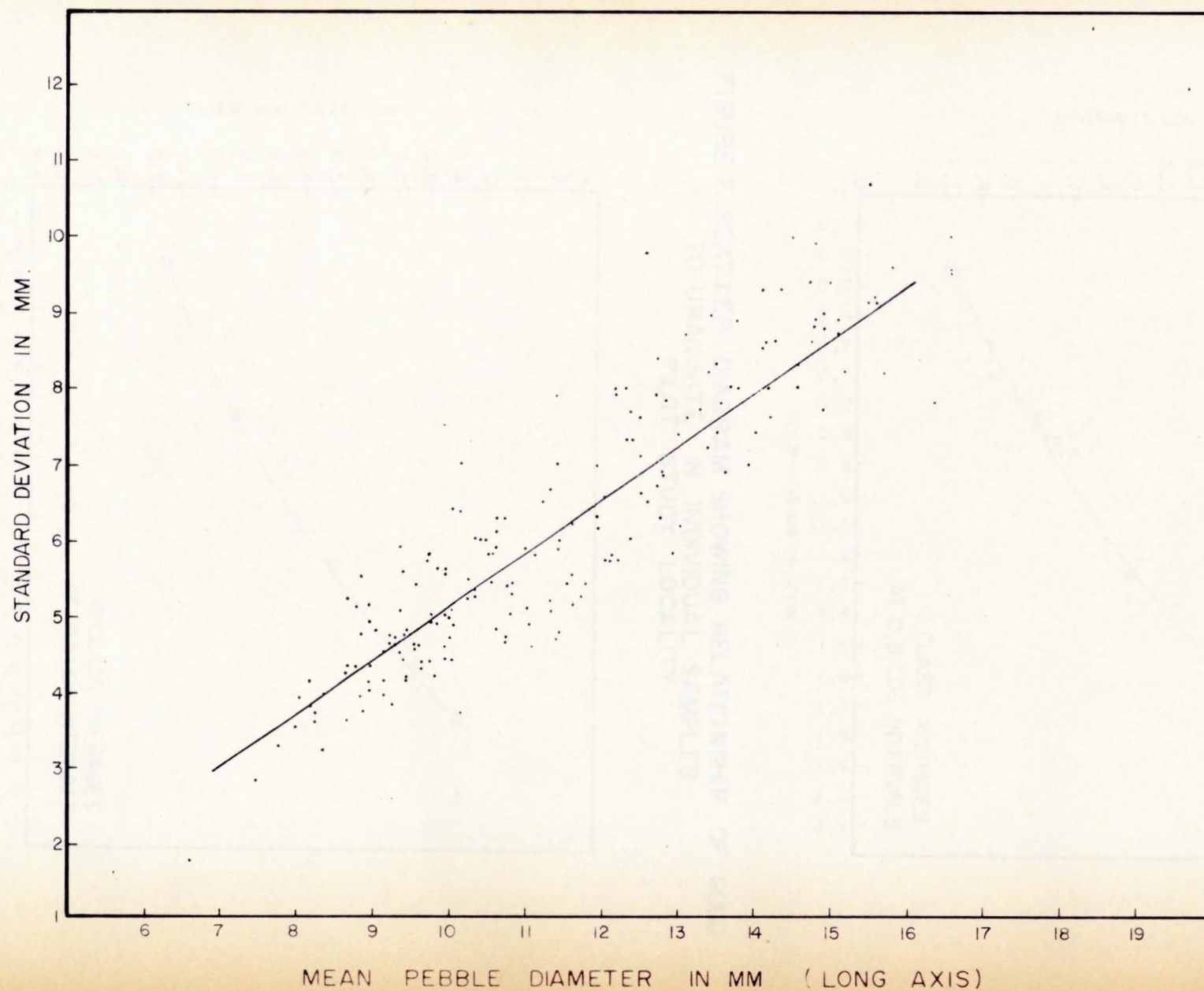


FIGURE 6(c) REGRESSION CORRELATION OF PEBBLE SIZE AND STANDARD DEVIATION — REGIONAL STUDY

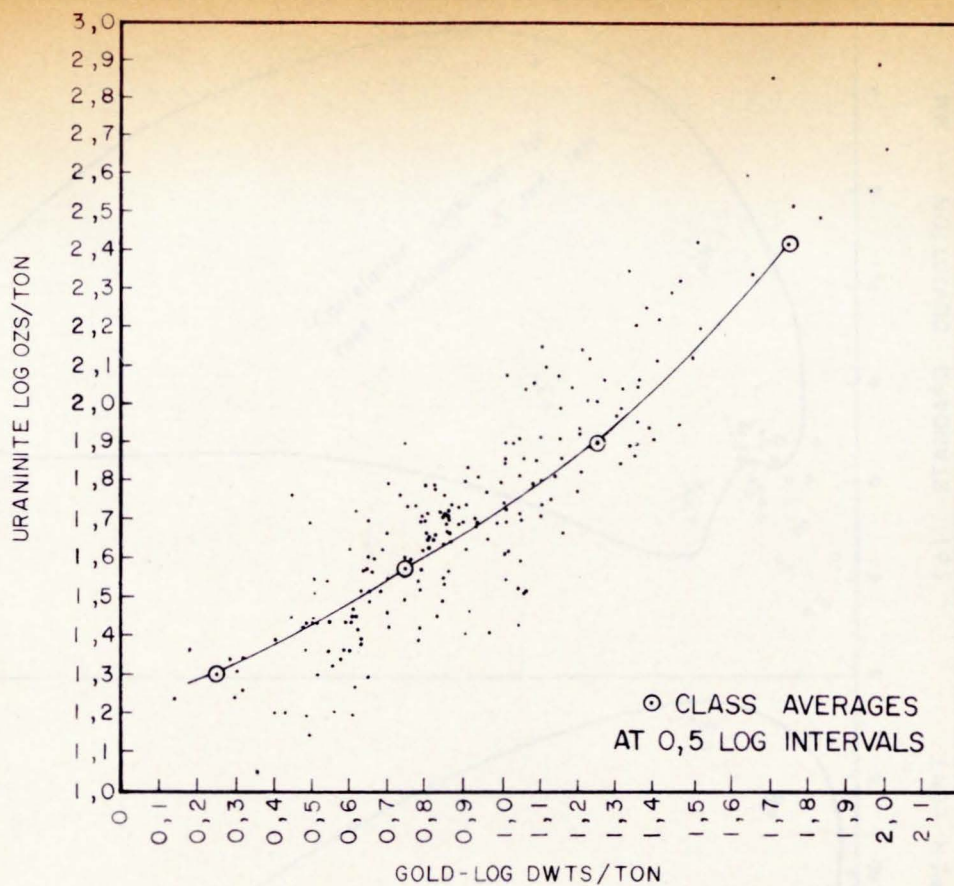


FIGURE 7. SCATTER DIAGRAM SHOWING RELATIONSHIP OF GOLD TO URANINITE IN INDIVIDUAL SAMPLES PILOT STUDY LOCALITY

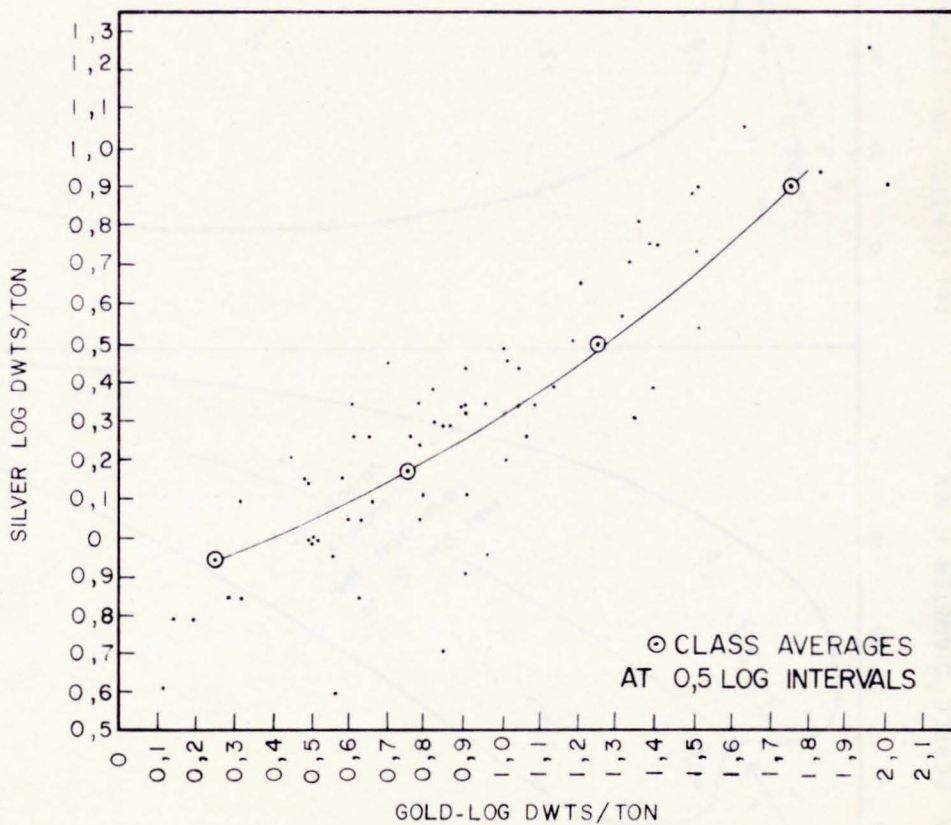


FIGURE 8. SCATTER DIAGRAM SHOWING RELATIONSHIP OF SILVER TO GOLD IN INDIVIDUAL SAMPLES PILOT STUDY LOCALITY

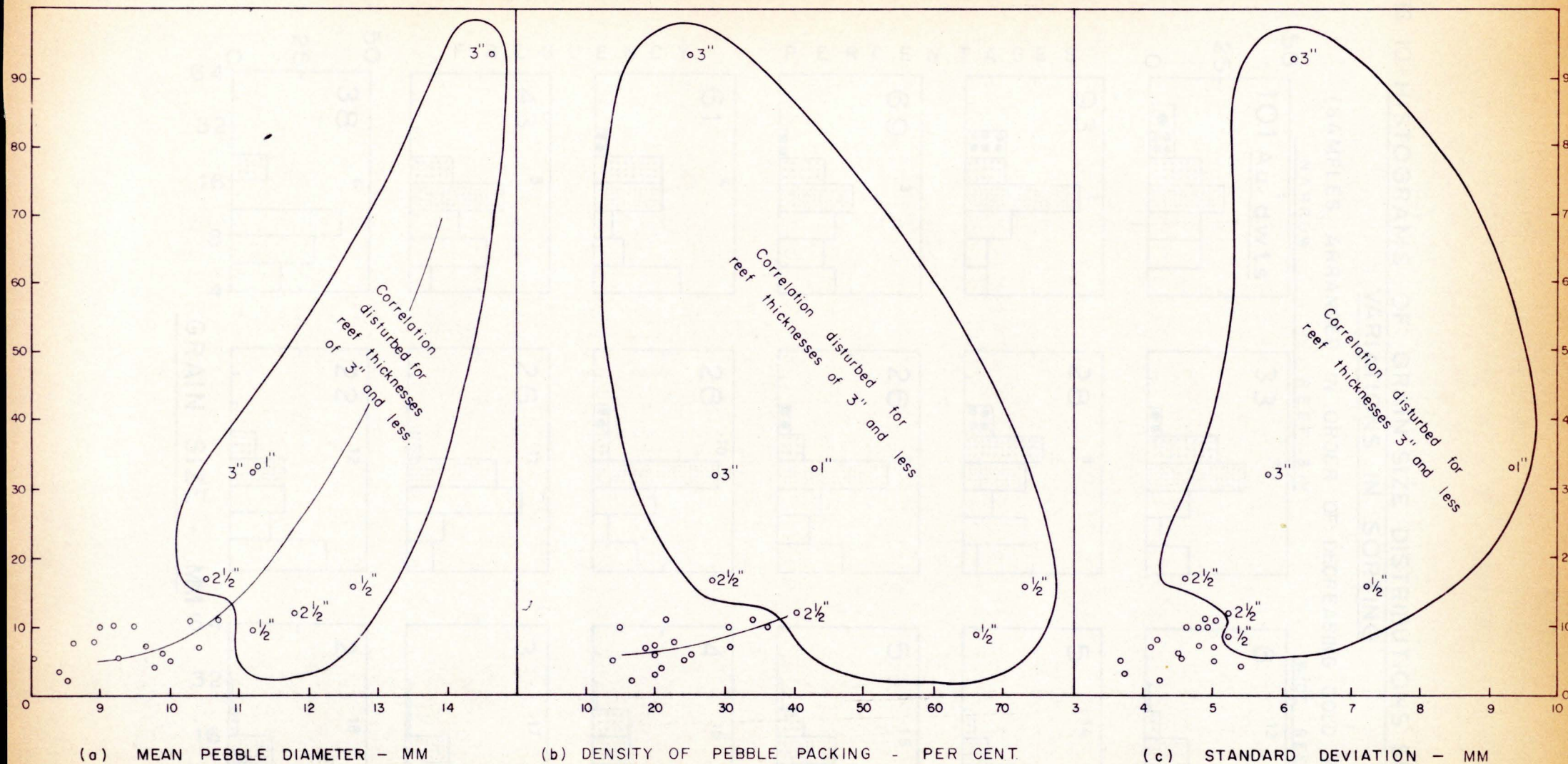


FIG. 9- REGRESSION CORRELATION OF GOLD CONTENT AND CONGLOMERATE TEXTURAL PROPERTIES;
PILOT STUDY 7th AND 9th SAMPLINGS.

(12 INCH WIDE REEF SECTIONS, 10 FEET APART, 3341 GRAINS MEASURED)

FIG. 10.-HISTOGRAMS OF GRAIN SIZE DISTRIBUTIONS SHOWING VARIATIONS IN SORTING

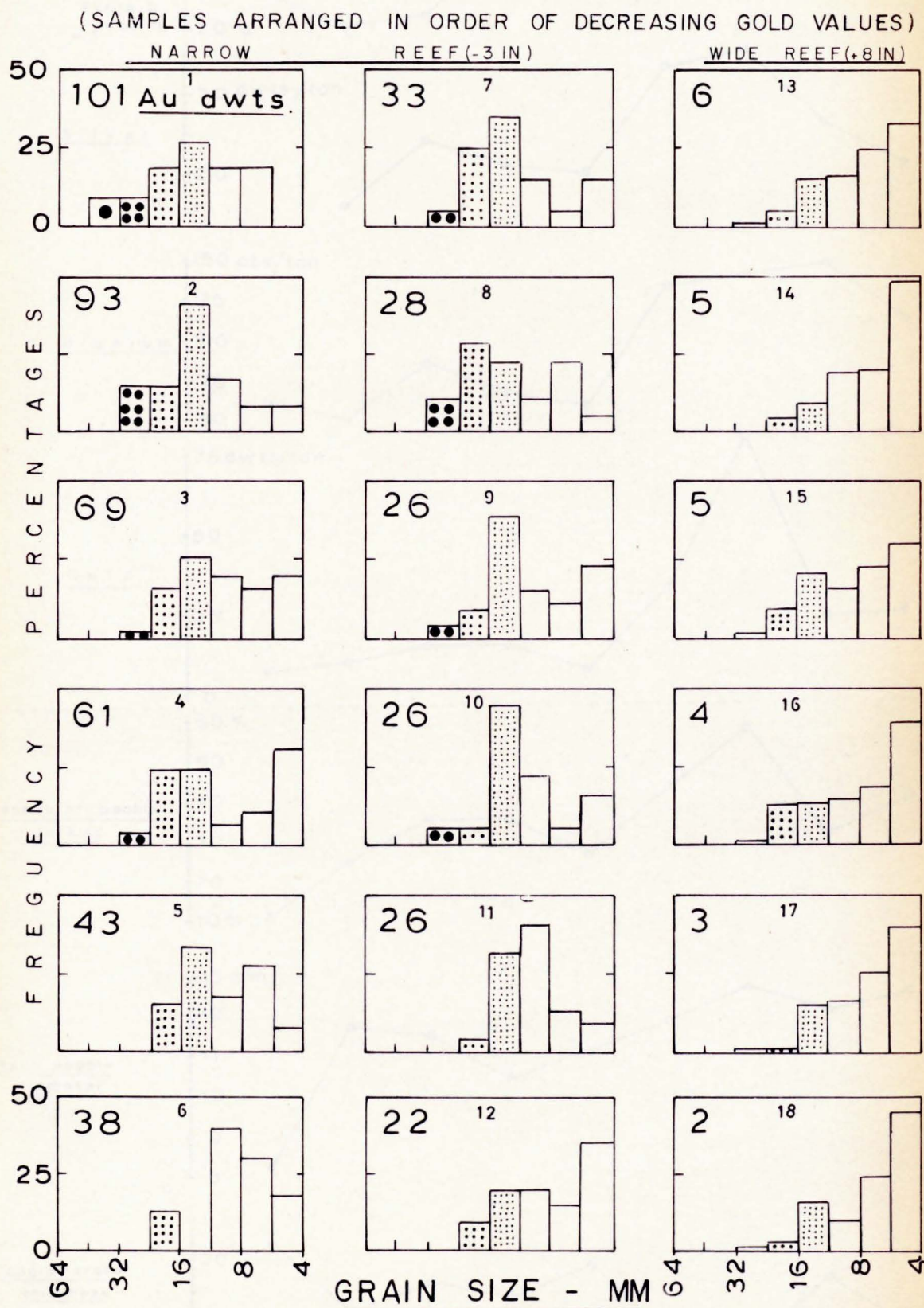
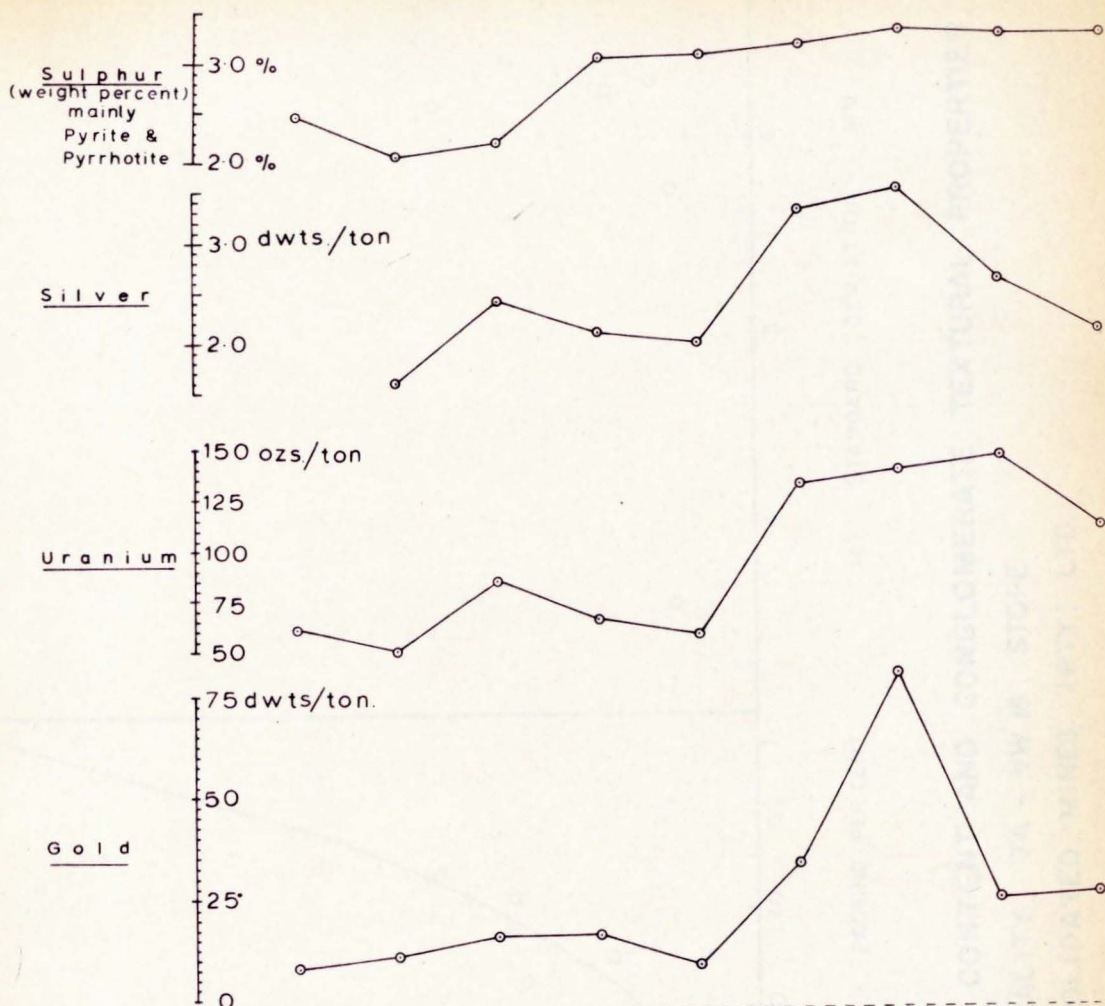


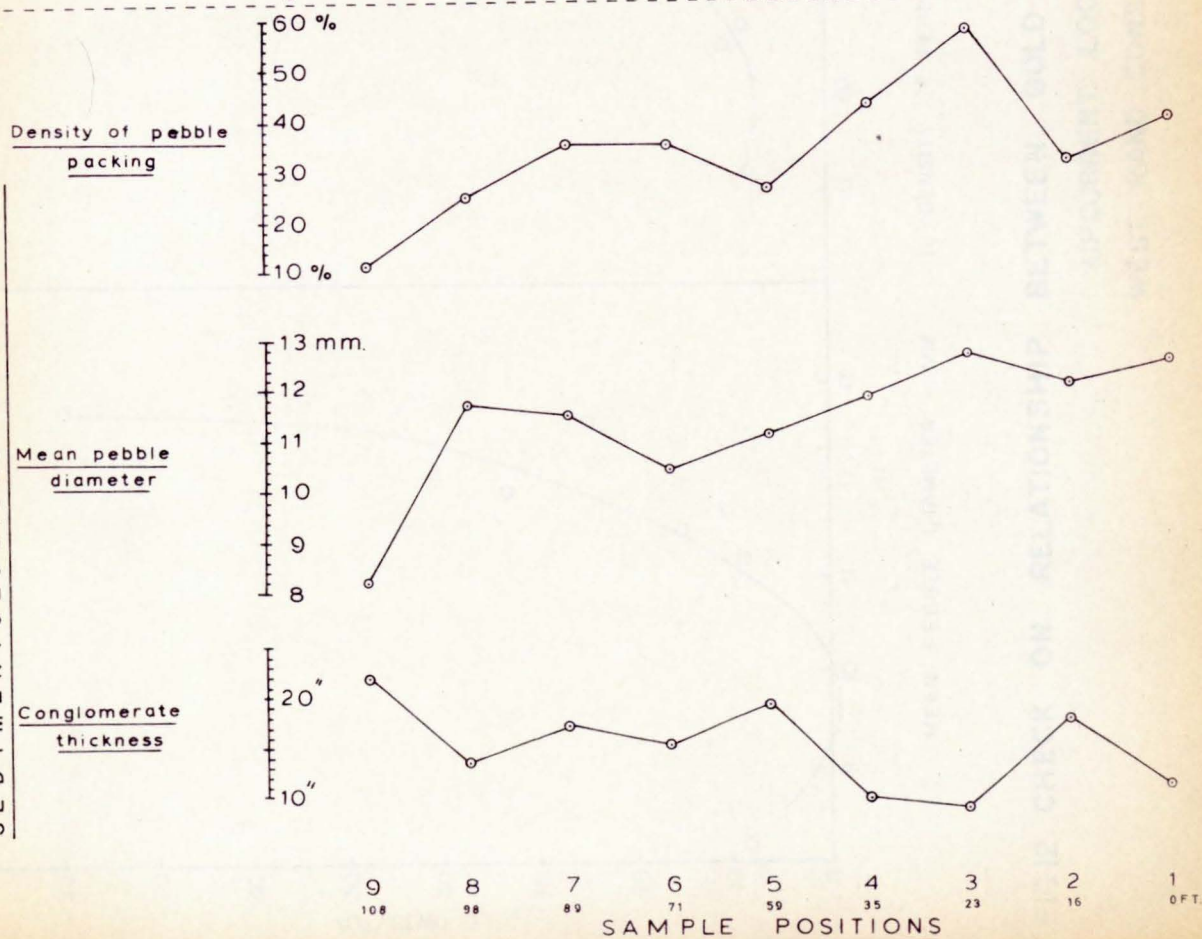
FIG. II.

7^A VW 18 STOPE-WEST RAND CONSOLIDATED-GRAPHS COMPARING SOME
SEDIMENTOLOGICAL PROPERTIES OF THE CONGLOMERATE WITH ORE
ANALYSES.

METAL PROPERTIES



SEDIMENTOLOGICAL PROPERTIES



SAMPLE POSITIONS

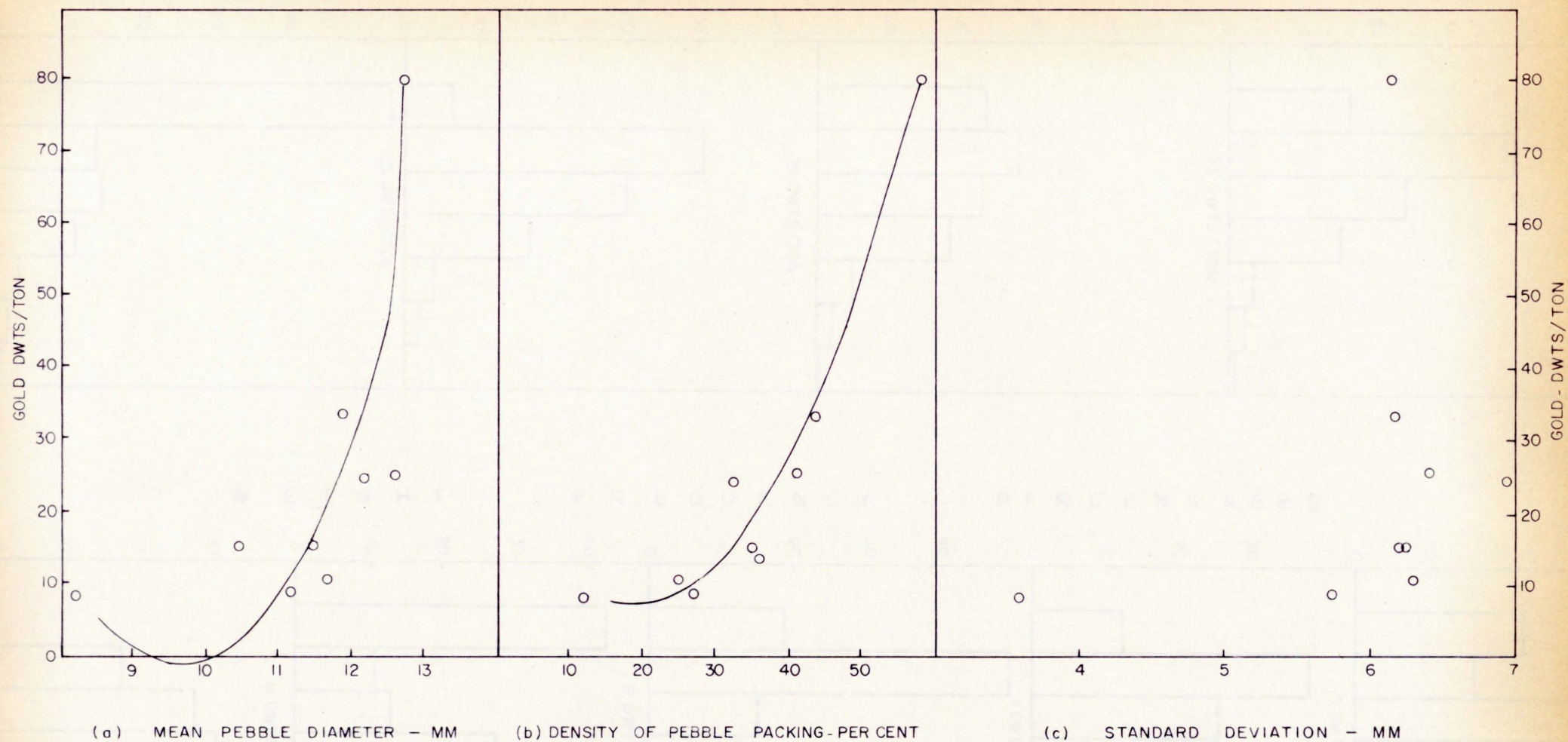
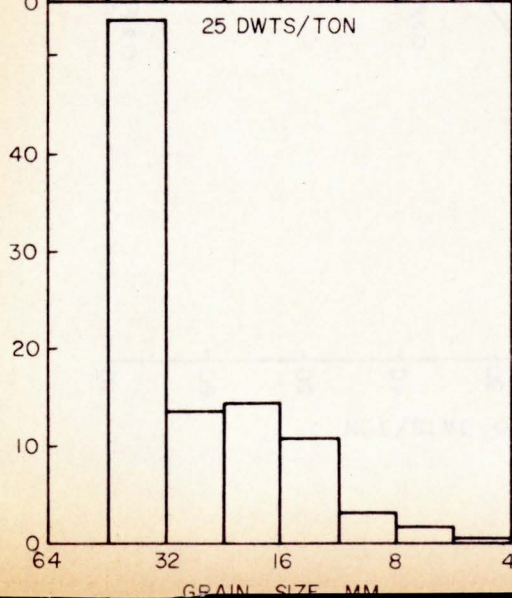
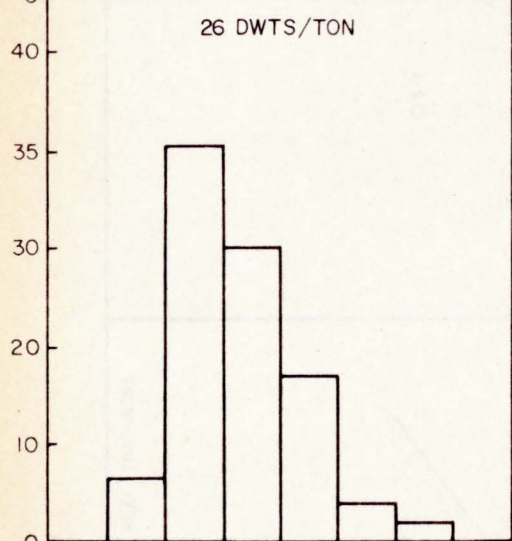
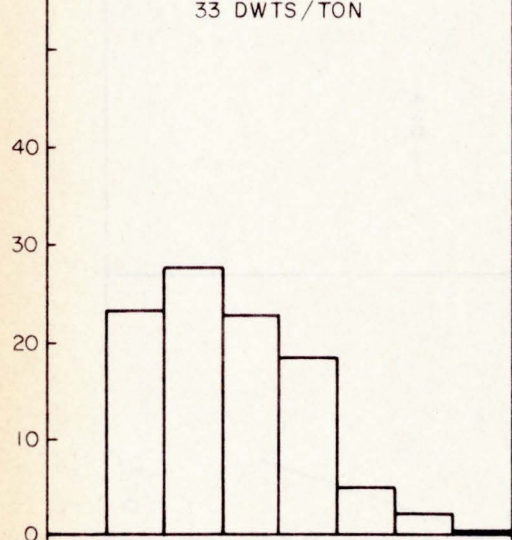
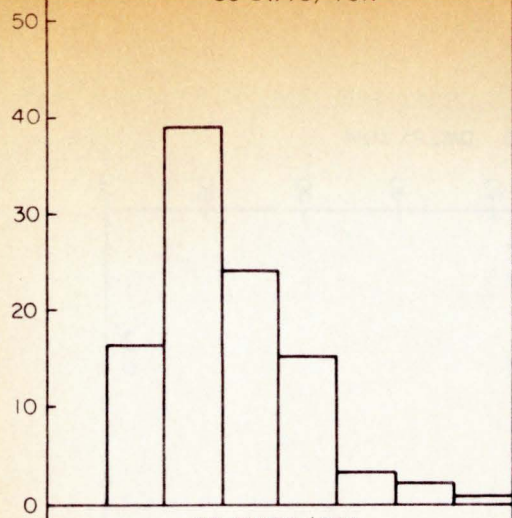


FIG.12. CHECK ON RELATIONSHIP BETWEEN GOLD CONTENT AND CONGLOMERATE TEXTURAL PROPERTIES,
UPCURRENT LOCALITY 7A - VW 18 STOPE
WEST RAND CONSOLIDATED MINES (PTY) LTD.

PERCENTAGES



PERCENTAGES

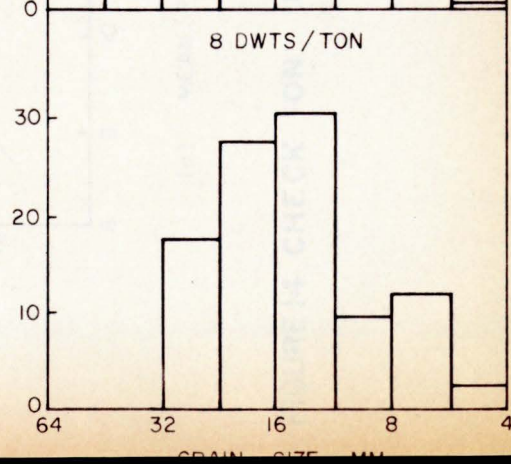
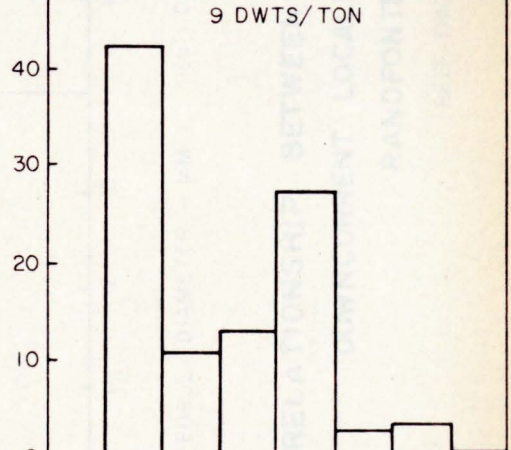
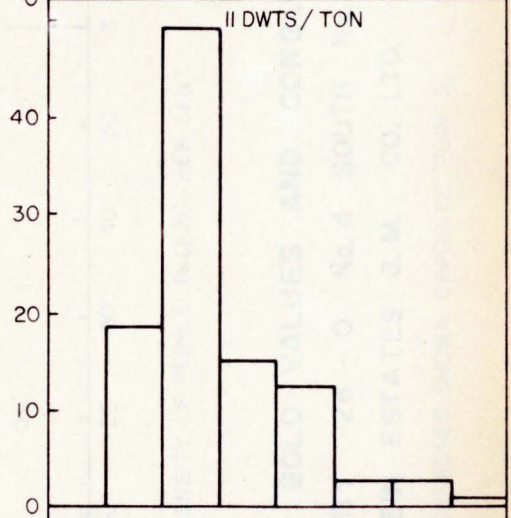
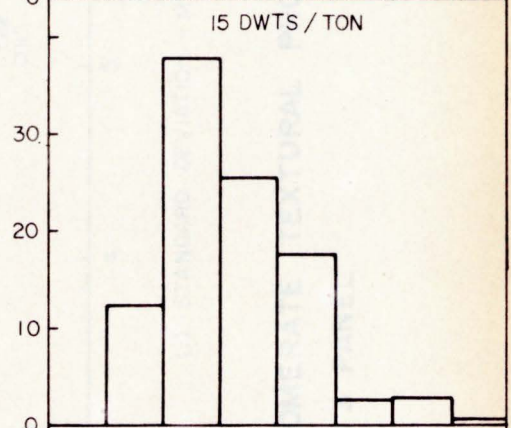
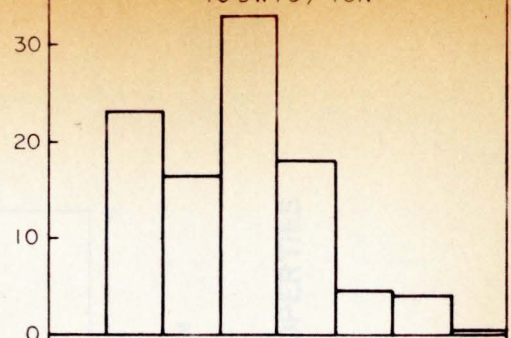


FIGURE 13 HISTOGRAMS OF PEBBLE GRAIN SIZE DISTRIBUTIONS AT

DIFFERENT GOLD VALUES 7A - VW18

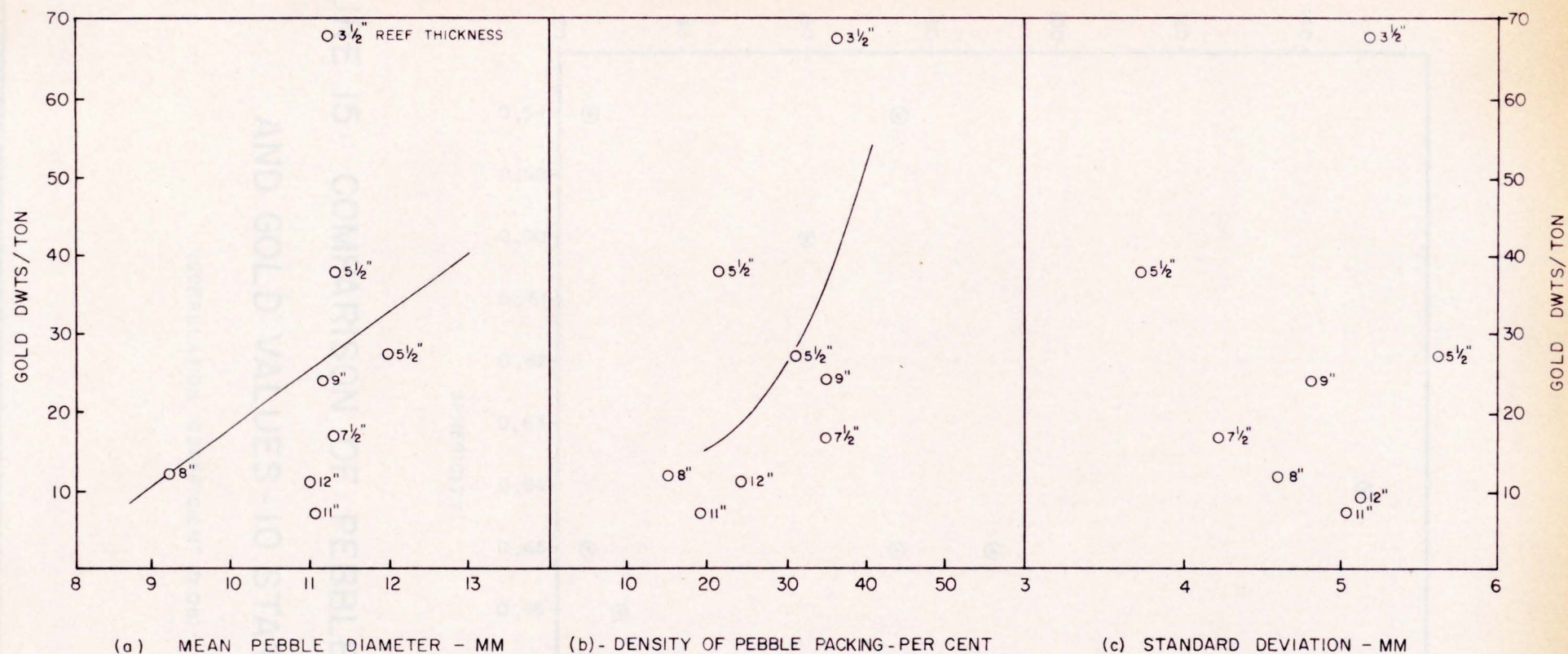


FIGURE 14. CHECK ON RELATIONSHIP BETWEEN GOLD VALUES AND CONGLOMERATE TEXTURAL PROPERTIES
 DOWNCURRENT LOCALITY 26 - O No. 4 SOUTH No. 3 PANEL
 RANDFONTEIN ESTATES G.M. CO. LTD.
 (REEF THICKNESSES SHOWN OPPOSITE POINTS)

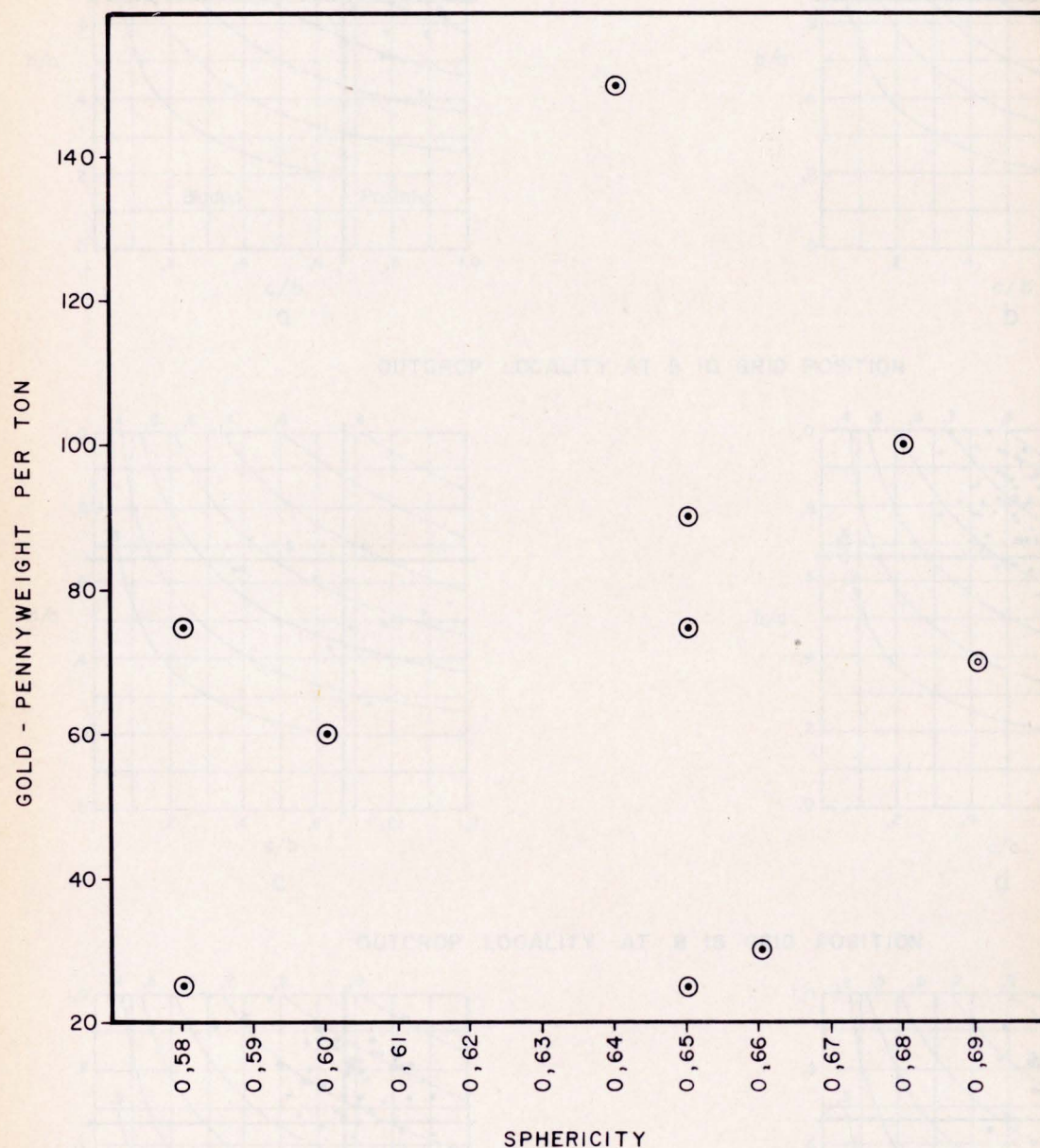
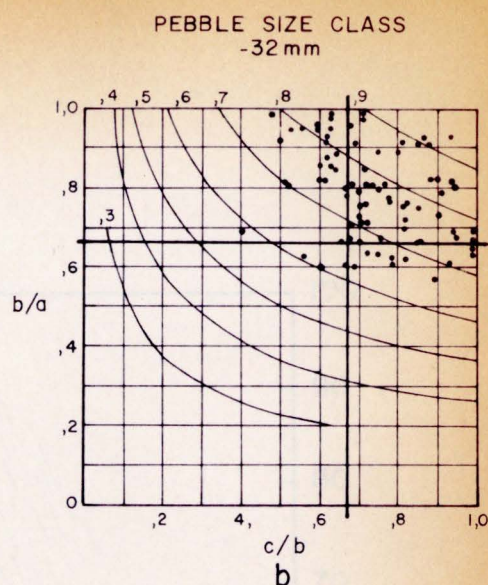
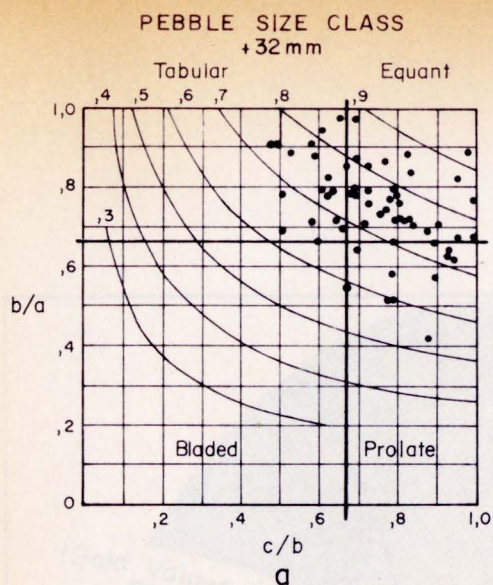
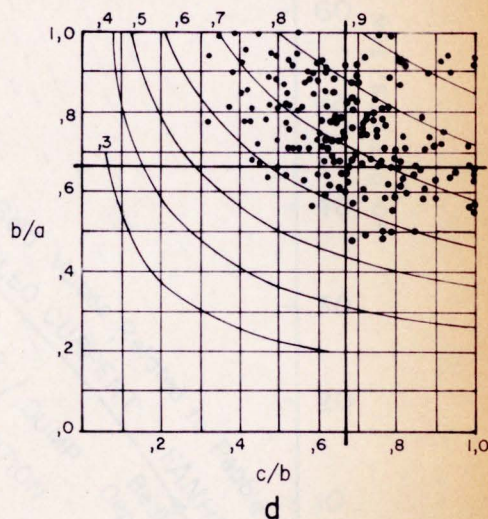
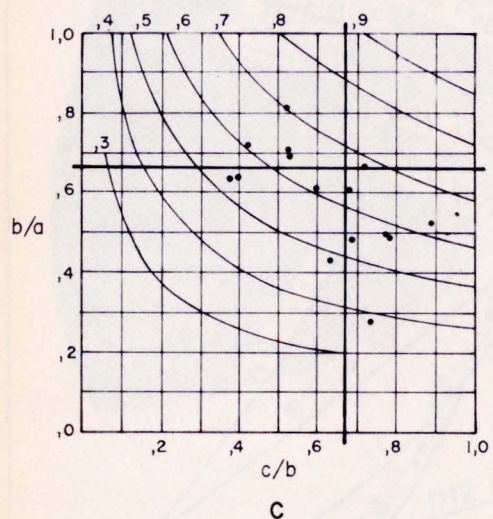


FIGURE 15: COMPARISON OF PEBBLE SPHERICITIES
AND GOLD VALUES - 10 STATIONS.

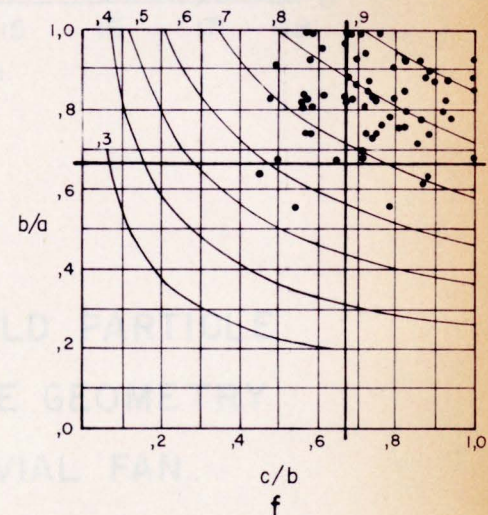
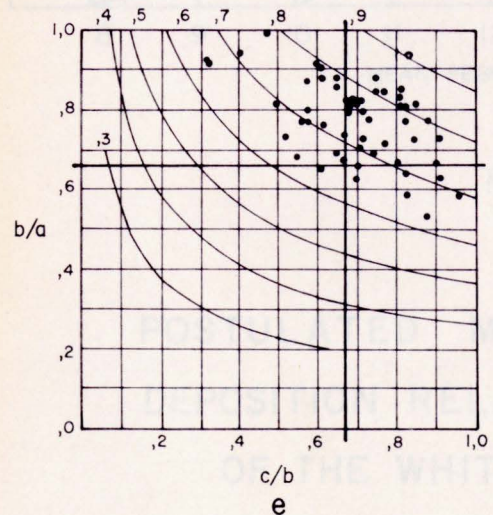
(CORRELATION COEFFICIENT 0.08)



OUTCROP LOCALITY AT B 10 GRID POSITION



OUTCROP LOCALITY AT B 15 GRID POSITION



OUTCROP LOCALITY AT C 26 GRID POSITION

FIGURE 16. PEBBLE SHAPE AND SPHERICITY DISTRIBUTIONS ACCORDING TO ZINGG SHAPE INDICES (PETTIJOHN 1956, p 56)

(THE CURVES REPRESENT LINES OF EQUAL SPHERICITY; KRUMBEIN, 1941)

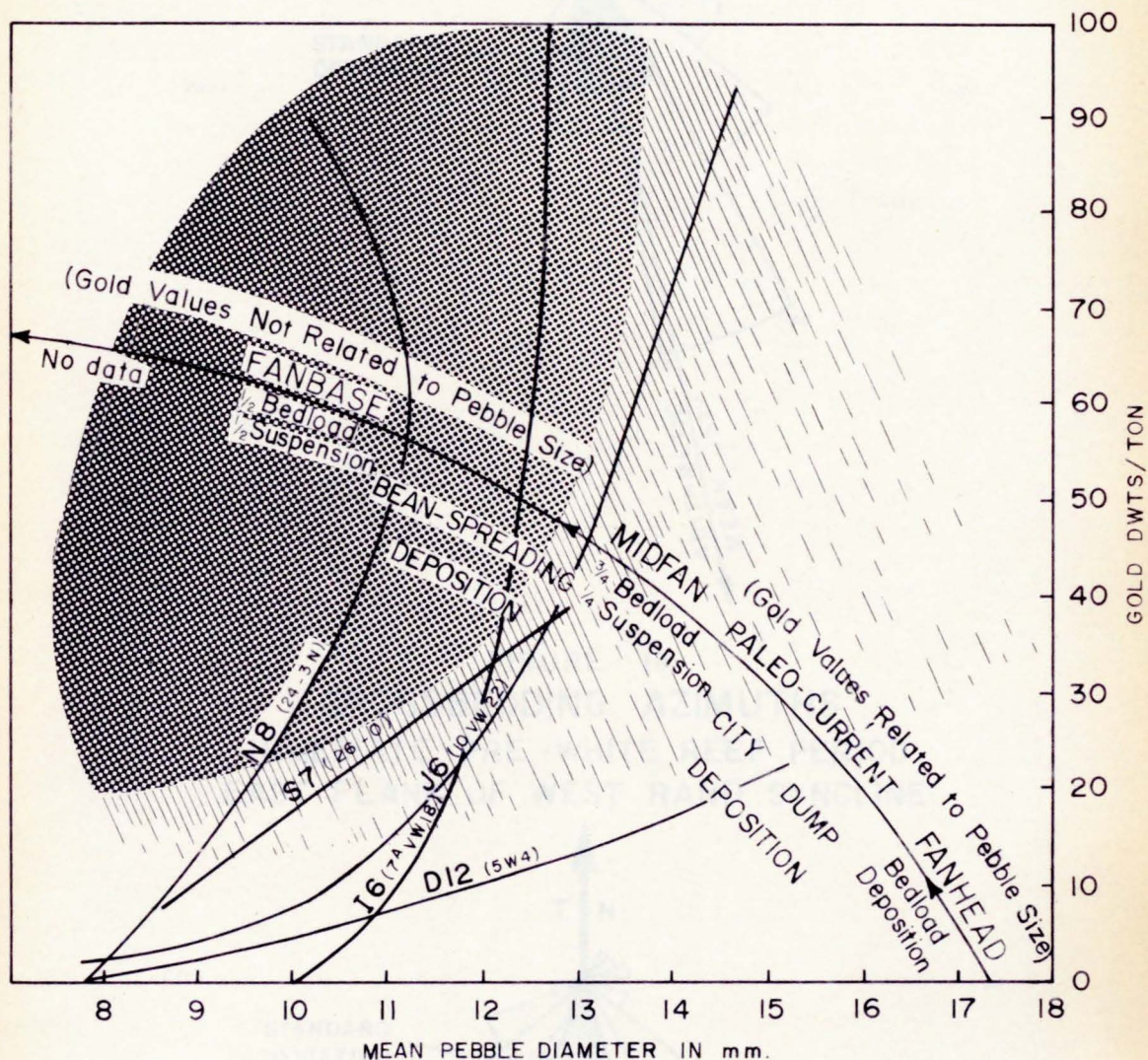


FIGURE 17.

POSTULATED MODES OF GOLD PARTICLE DEPOSITION RELATIVE TO THE GEOMETRY OF THE WHITE REEF FLUVIAL FAN.

(SAMPLING STATIONS, EG. D 12
ON PALEO-CURRENT MAP NO 13)

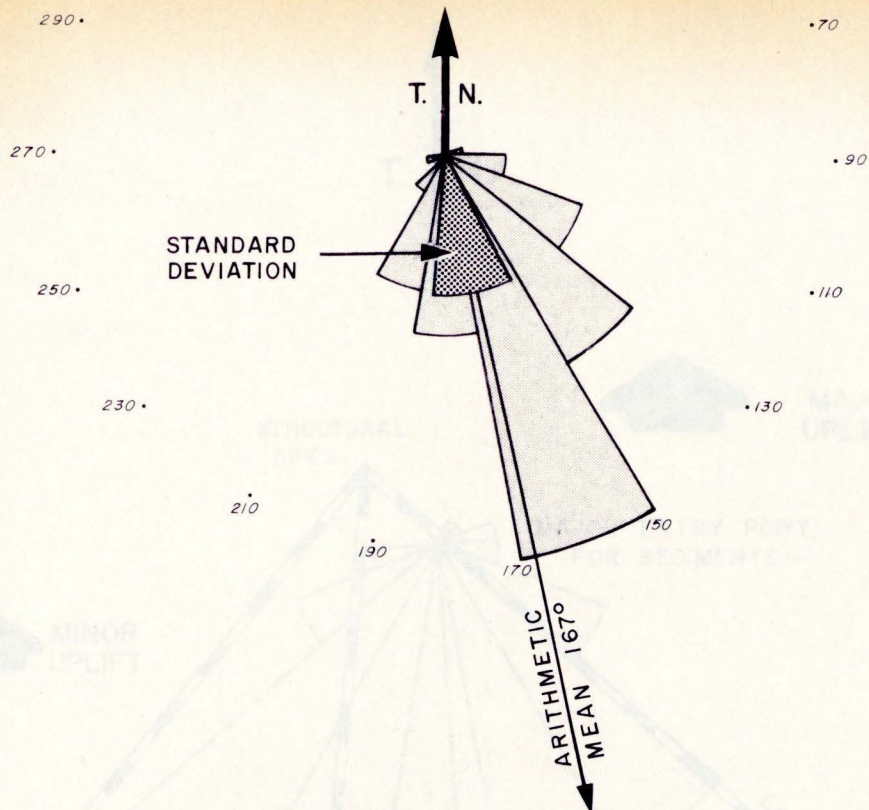


FIGURE 18.
CROSSBEDDING AZIMUTHS
IMMEDIATE PRE-WHITE REEF PERIOD.
EAST FLANK OF WEST RAND SYNCLINE.

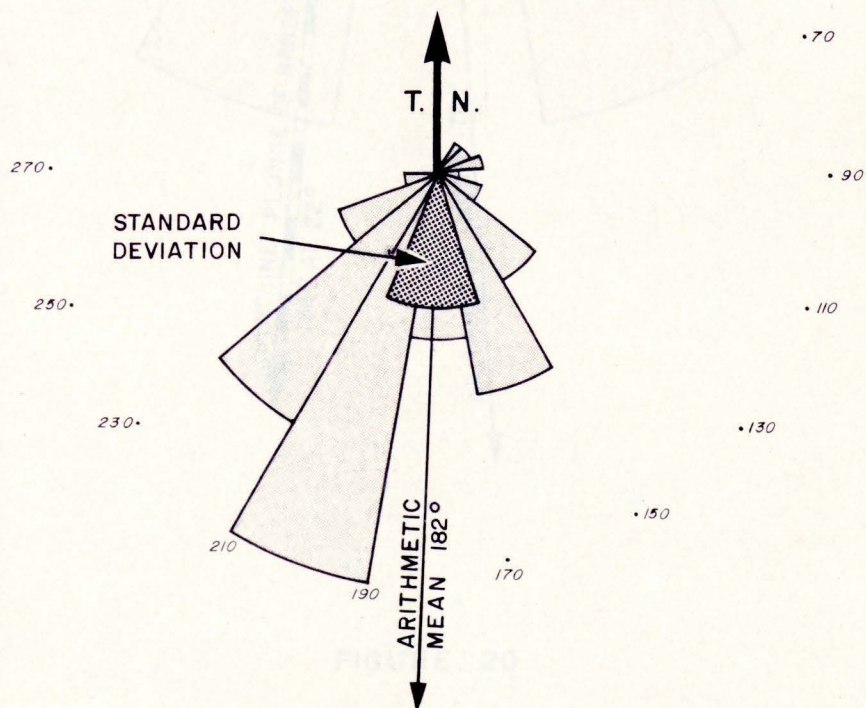


FIGURE 19.
CROSSBEDDING AZIMUTHS
IMMEDIATE PRE-WHITE REEF PERIOD.
WEST FLANK OF WEST RAND SYNCLINE.

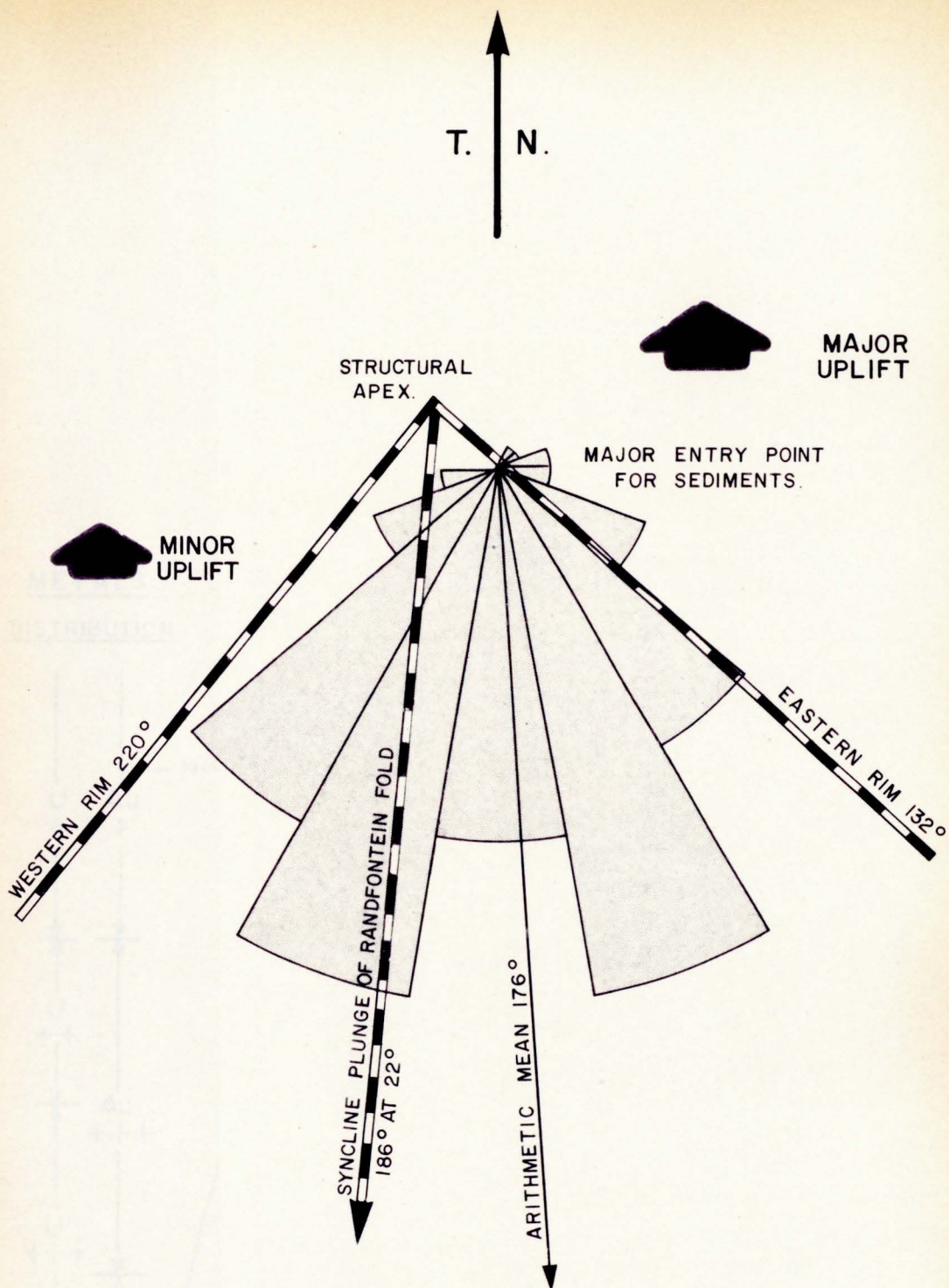


FIGURE 20.

RELATIONSHIP OF PALEOCURRENT AZIMUTHS
AND THE STRUCTURE OF THE WEST RAND SYNCLINE
FOR THE IMMEDIATE PRE-WHITE REEF PERIOD.

METALS
DISTRIBUTION

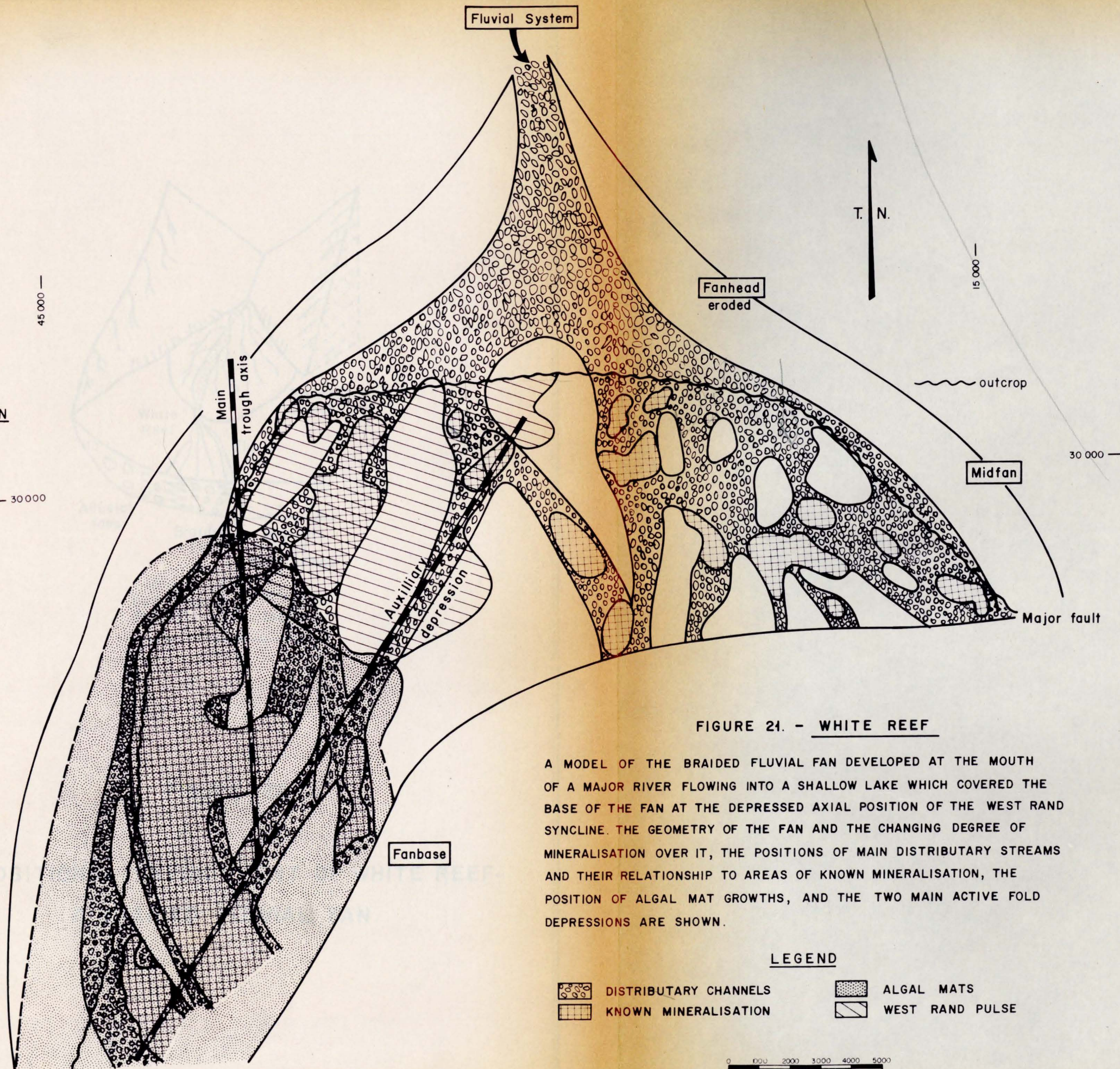
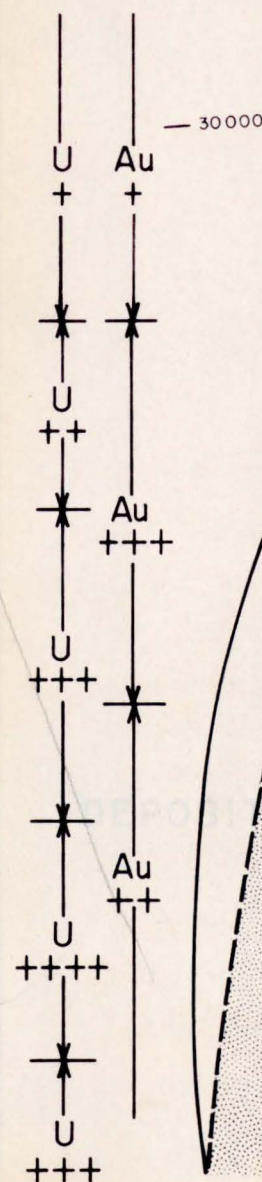


FIGURE 21. - WHITE REEF

A MODEL OF THE BRAIDED FLUVIAL FAN DEVELOPED AT THE MOUTH OF A MAJOR RIVER FLOWING INTO A SHALLOW LAKE WHICH COVERED THE BASE OF THE FAN AT THE DEPRESSED AXIAL POSITION OF THE WEST RAND SYNCLINE. THE GEOMETRY OF THE FAN AND THE CHANGING DEGREE OF MINERALISATION OVER IT, THE POSITIONS OF MAIN DISTRIBUTARY STREAMS AND THEIR RELATIONSHIP TO AREAS OF KNOWN MINERALISATION, THE POSITION OF ALGAL MAT GROWTHS, AND THE TWO MAIN ACTIVE FOLD DEPRESSIONS ARE SHOWN.

LEGEND

- | | |
|-----------------------|-----------------|
| DISTRIBUTARY CHANNELS | ALGAL MATS |
| KNOWN MINERALISATION | WEST RAND PULSE |

0 1000 2000 3000 4000 5000
ENGLISH FEET

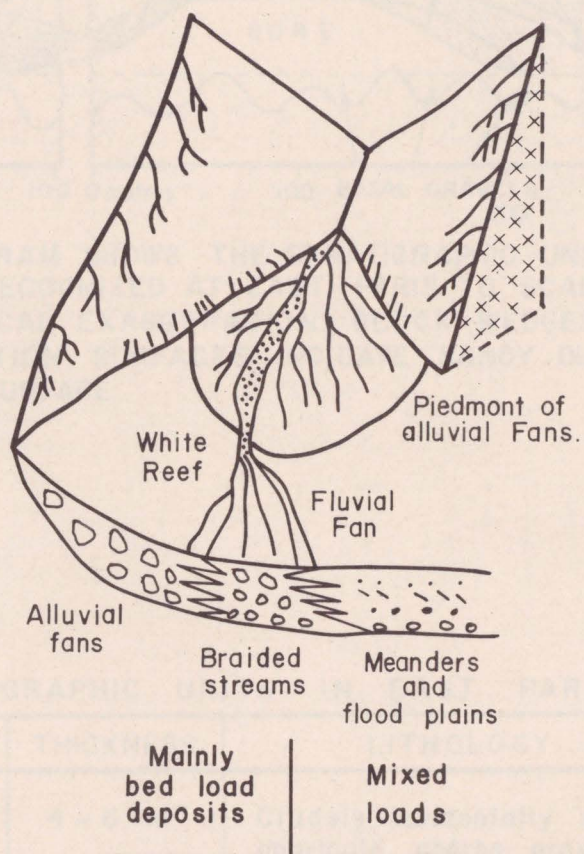
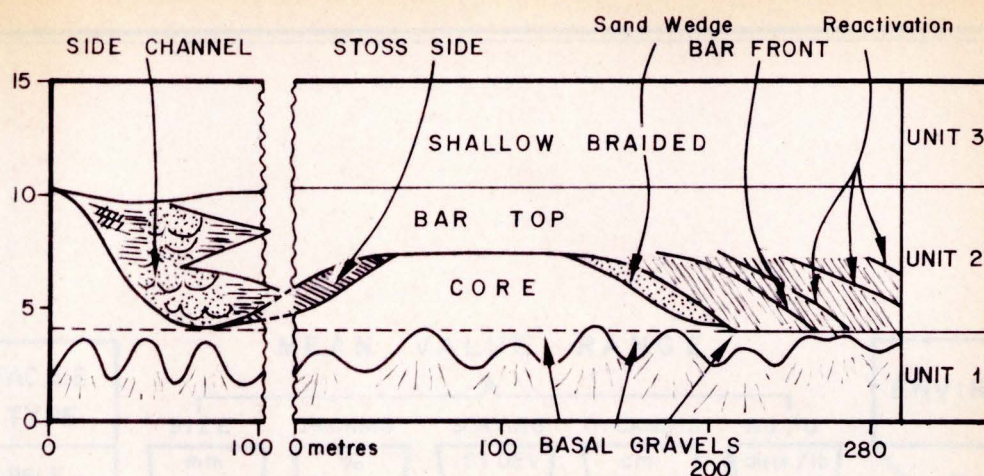


FIGURE 22.

DEPOSITIONAL ENVIRONMENT OF WHITE REEF-
A BRAIDED FLUVIAL FAN.



THE DIAGRAM SHOWS THE STRATIGRAPHIC UNITS AND FACIES RECOGNIZED AT EAST PARIS TO SCALE, BUT WITH 4x VERTICAL EXAGGERATION. BLACK WEDGES ON THE REACTIVATION SURFACES INDICATE SANDY DUNES, MOVING UP THE SURFACE.

STRATIGRAPHIC UNITS IN EAST PARIS PIT

UNIT	THICKNESS	LITHOLOGY
3	4 - 6 m *	Crudely horizontally stratified, imbricate coarse gravels with sandy lenses.
2	2 - 6 m	Cross-stratified gravels and sandy gravels, adjacent to wide channel with trough cross-bedded sands.
1†	4 - 9 m	Unstratified to crudely horizontally stratified coarse gravels.

* Minimum thickness - section is lost at top of pit face.

† Rest abruptly on Wentworth Till at south end of pit, but base rarely seen. Thickness is a minimum, 4m for the bulk of the unit, 9m for the areas with topographic highs.

FIGURE 23 : FACIES RELATIONSHIP IN PLEISTOCENE OUTWASH GRAVELS, A MODEL FOR BAR GROWTH IN BRAIDED RIVERS. (After EYNON AND WALKER 1974).

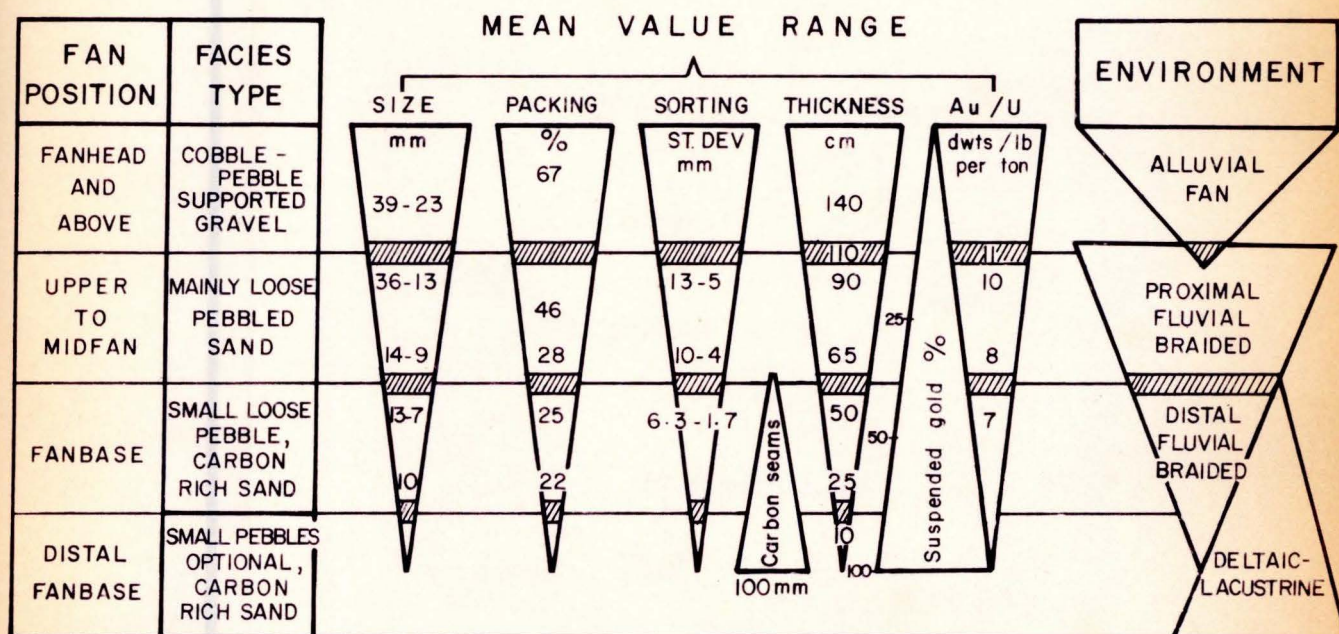
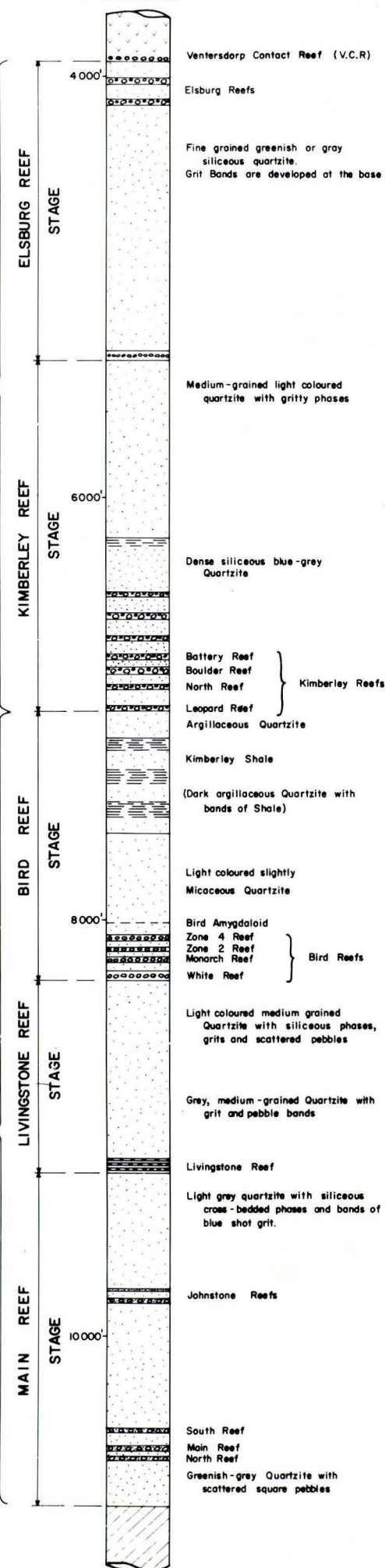


FIGURE 24.

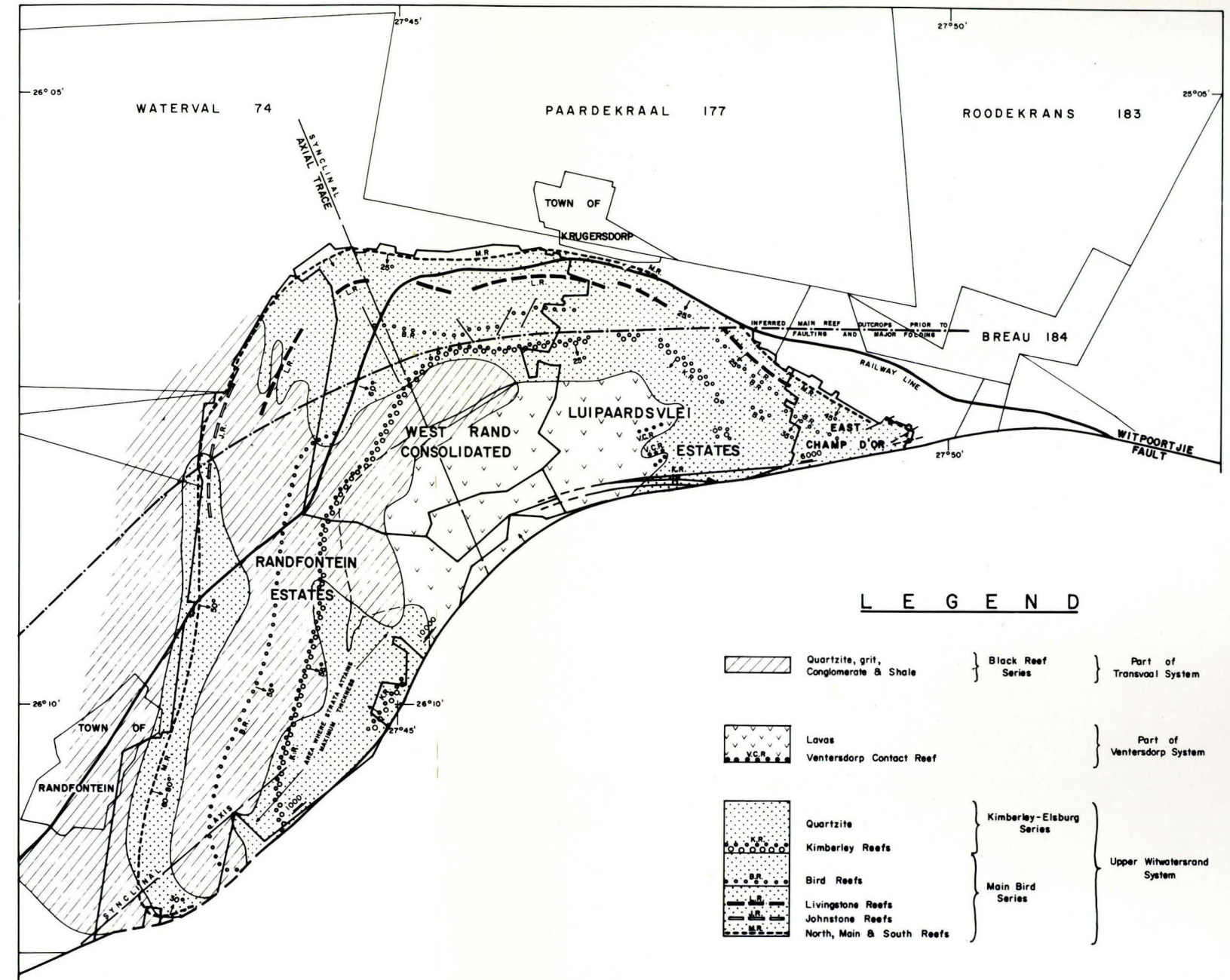
PRELIMINARY PREDICTIVE MODEL FOR THE
IDENTIFICATION OF FAN POSITION, FACIES TYPE
AND ENVIRONMENT FOR WITWATERSRAND
TYPE OF CONGLOMERATES.

GENERALISED GEOLOGICAL SECTION OF THE WEST RAND

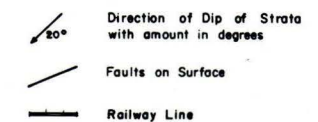
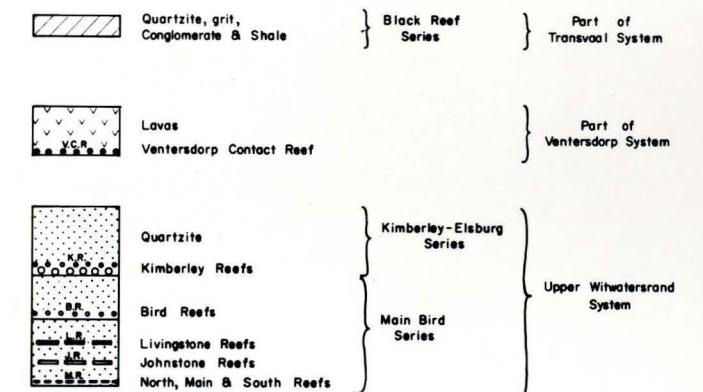
KIMBERLEY - ELSBURG SERIES



GEOLOGICAL MAP OF A PORTION OF THE WEST RAND



LEGEND



MAP 1.

