FORAMINIFERAL BIOSTRATIGRAPHY

HEMATITE SNAIL-1 WELL

OTWAY BASIN

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Three side wall cores and three samples from conventional core-2 were submitted for examination with rotary cutting samples for the interval 800 to 4050 feet. No fauna was found in the side wall core at 2664 feet nor in the conventional core samples. Side wall cores at 1879 and 2113 feet contained non diagnostic fauna. The rotary cutting samples were severely contaminated due to cave ins and the mud. As far as could be ascertained the fauna found in cutting below 2590 were all mud contaminants, thus 2590 feet was regarded as the base of the foraminiferal sequence.

All depths quoted as those written on the samples with the Kelly Bushing as datum.

Three distribution sheets accompany this report. Entire content of the samples is shown on the sheets, regardless of whether it is contaminated.

BIOSTRATIGRAPHY

An attempt has been made to apply the biostratigraphic scheme used by Taylor in the Bass-1 Well completion report to the Snail sequence. This proved difficult due to rotary cutting contamination and the very shallow water origin of the sediment. The diversity of planktonic foraminiferal faunas decreases with decreasing water depth. Thus in shallow water deposits there is less chance of recognising biostratigraphic zones than in deep water ones.

The first cutting sample at 800 feet contained *Globigerinoides glomerosus glomerosus* which was restricted to Zone E (= base of middle Miocene). The S.D.A. report on Nerita-1 regards *G. glomerosus* as being indicative of Zone F, but this is contrary to my observation in all three Bass Strait Basins. Samples down to 980 feet contain members of the *G. glomerosus* complex as well as *Orbulina suturalis*. The base of Zone E is probably at 980 feet, but it

is difficult to be certain as *O. suturalis* persists below this level.

No zone can be designated till 1700 feet where *Globigerina euapertura* is present indicating Zone I. This does not imply that Zones F, G and H are absent, but that they cannot be positively identified. Neither can Zone J be identified, but the top of Zone K is recognised by the appearance of *Globigerina linaperta* at 1910 feet. The presence of *G. pseudoampliapertura* at 2080 feet strongly suggests a zone below K. Thus the top of the Oligocene can be placed tentatively at 1700 feet and the top of the Eocene at 1910 feet. The Eocene age is also confirmed by the presence of the aragonitic benthonic form *Cerobertina kakohoica*.

ENVIRONMENT

The depositional environment of the Snail-1 sequence is a shallow water one throughout. The benthonic fauna to 1500 feet is dominated by *Cibicides spp* and miliolids, suggesting shallow continental shelf conditions. The addition of *Notorotalia spp* below 1500 feet indicates even shallower conditions at the base of the Miocene and in the Oligocene. The percentage and specific diversity of planktonic foraminifera also give evidence of the same trend, as they are higher at the top of the sequence and decrease rapidly downwards.

The environment of the Eocene is impossible to deduce because of heavy down hole contamination. However the presence of "pyrite tubes", typical of the Demons Bluff Formation, are indicators of anaerobic conditions whilst the occurrence of *Cerobertina kakohoica* probably implies cold water. Depositional depth of the Demons Bluff Formation cannot be determined but there is no evidence that it was anything but shallow water.

COMPARISON WITH OTHER SEQUENCES

Snail-1 was deposited in much shallower water than either Nerita-1 or Bass-1. The frequency of planktonic fauna suggests that there were more inhibitions to oceanic circulation over the Snail site than over the Nerita and Bass-1 sites.

The sea floor at Nerita was composed of Zone E (Zone F according to the Nerita report), whilst Zone E is approximately 400 feet below sea level at Snail. The presence of *Orbulina universa* as a contaminant, suggests that Zone D is within the unsampled (above 800 feet) part of the Snail sequence. It could be concluded that structural growth took place on the Nerita structure post Zone E: that is during the late Miocene or Plio-pleistocene. Maybe there was structural growth on Snail post Eocene and pre late Miocene, thus accounting for the shallow water nature of Snail when compared with Nerita and Bass-1.

KEY TO SYMBOLS ON THE THREE DISTRIBUTION SHEETS

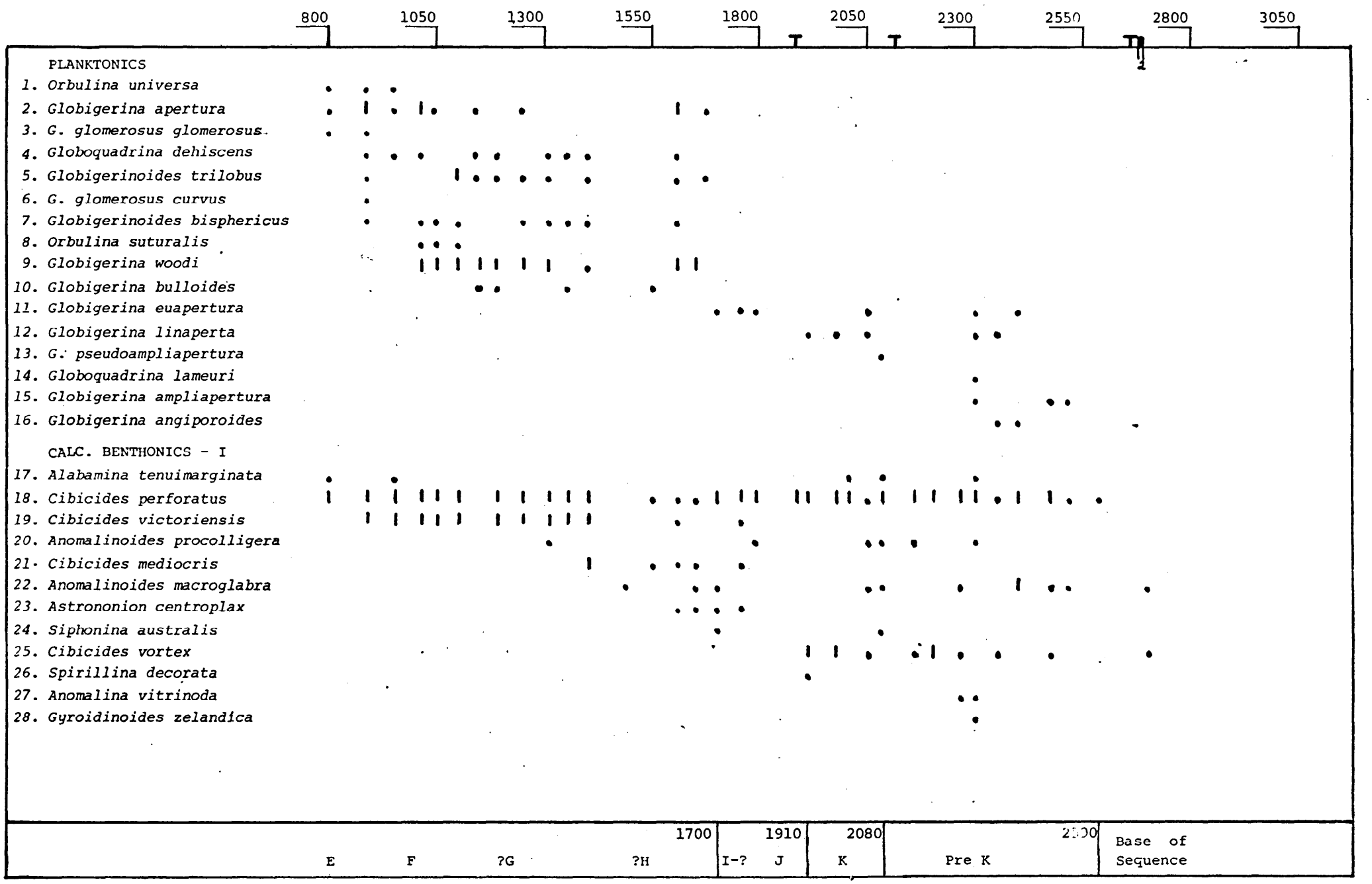
T = side wall cores at 1879, 2113 and 2664 feet

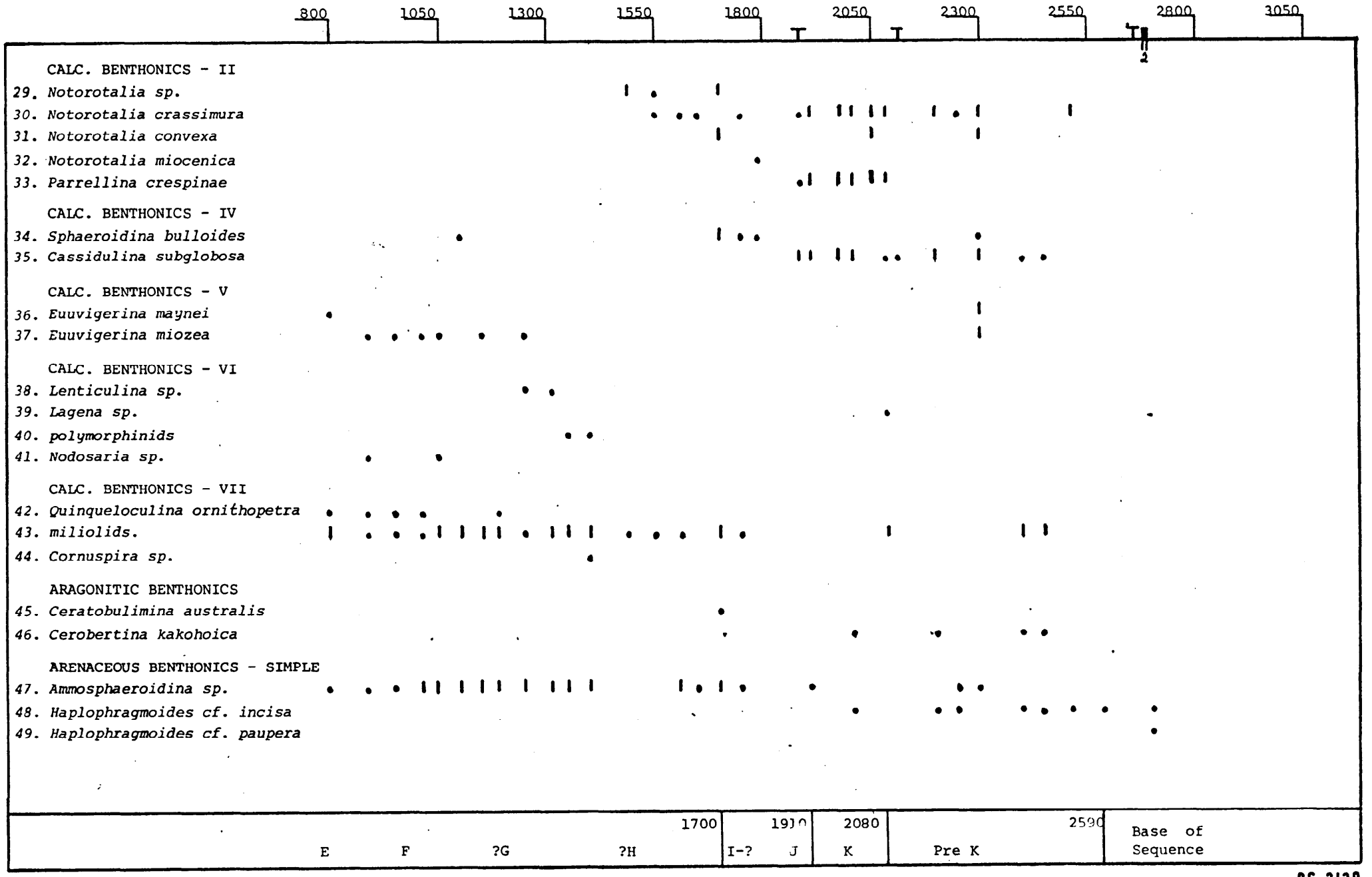
 = conventional core 2 with samples at 2667, 2683 and 2689 feet.

Other samples plotted are rotary cuttings.

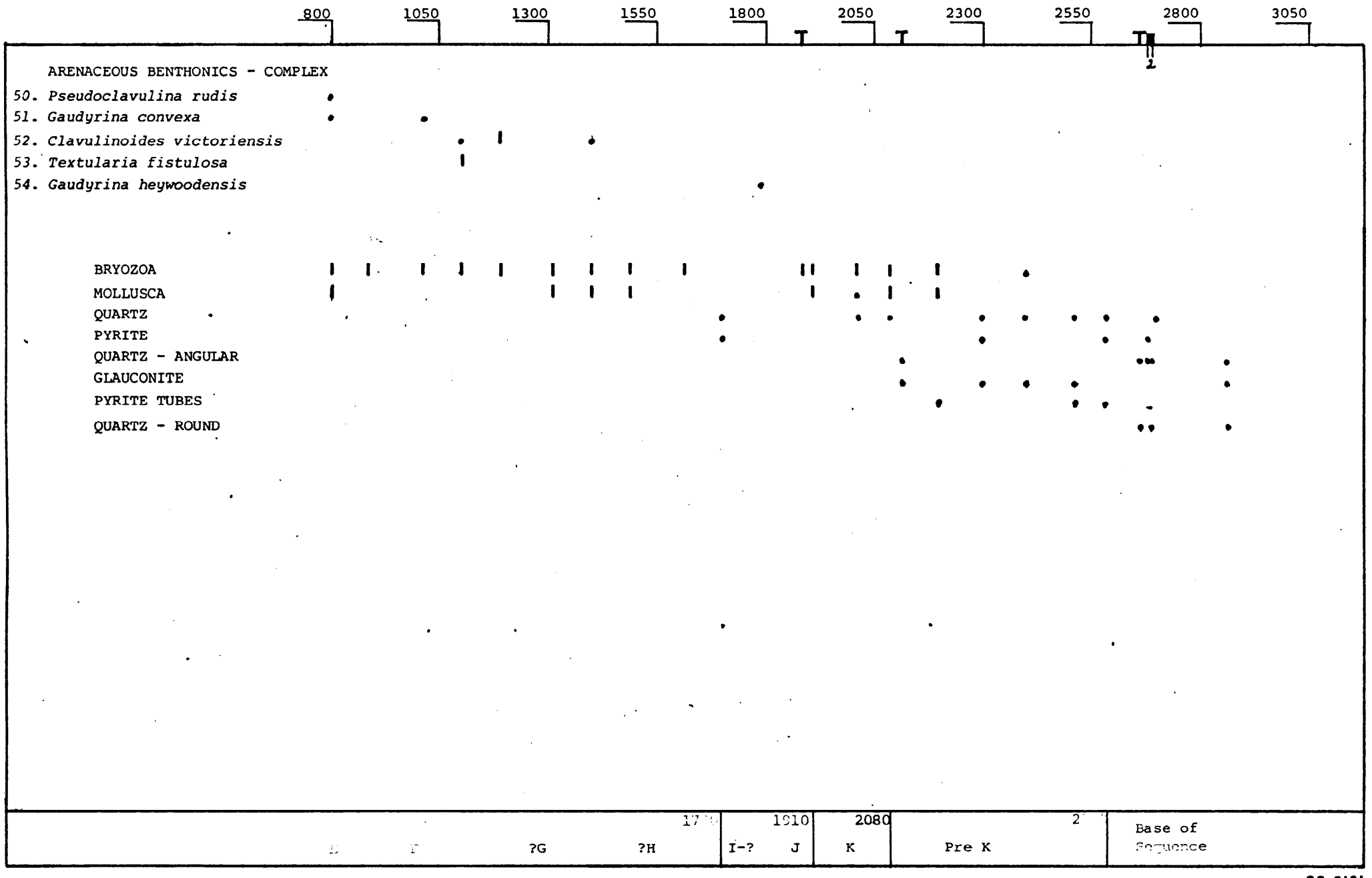
• = 1-20 specimens

| = over 20 specimens


800
1050
1300
1550
1800
2050
2300
2550
2800
3050
PLANKTONICS
1. Orbulina universa
2. Globigerina apertura
3. G. glomerosus glomerosus
4. Globoquadrina dehiscens
5. Globigerinoides trilobus
6. G. glomerosus curvus
7. Globigerinoides bisphericus
8. Orbulina suturalis
9. Globigerina woodi
10. Globigerina bulloides
11. Globigerina euapertura
12. Globigerina linaperta
13. G. pseudoampliapertura
14. Globoquadrina lameuri
15. Globigerina ampliapertura
16. Globigerina angiporoides
CALC. BENTHONICS - I
17. Alabamina tenuimarginata
18. Cibicides perforatus
19. Cibicides victoriensis
20. Anomalinoides procolligera
21. Cibicides mediocris
22. Anomalinoides macroglabra
23. Astrononion centroplax
24. Siphonina australis
25. Cibicides vortex
26. Spirillina decorata
27. Anomalina vitrinoda
28. Gyroidinoides zelandica
1700
1910
2080
2500
E
F
?G
?H
I-?
J
K
Pre K
Base of Sequence


800
1050
1300
1550
1800
2050
2300
2550
2800
3050
2
CALC. BENTHONICS - II
29. Notorotalia sp.
30. Notorotalia crassimura
31. Notorotalia convexa
32. Notorotalia miocenica
33. Parrellina crespinae
CALC. BENTHONICS - IV
34. Sphaeroidina bulloides
35. Cassidulina subglobosa
CALC. BENTHONICS - V
36. Euuvigerina maynei
37. Euuvigerina miozea
CALC. BENTHONICS - VI
38. Lenticulina sp.
39. Lagena sp.
40. polymorphinids
41. Nodosaria sp.
CALC. BENTHONICS - VII
42. Quinqueloculina ornithopetra
43. miliolids.
44. Cornuspira sp.
ARAGONITIC BENTHONICS
45. Ceratobulimina australis
46. Cerobertina kakohoica
ARENACEOUS BENTHONICS - SIMPLE
47. Ammosphaeroidina sp.
48. Haplophragmoides cf. incisa
49. Haplophragmoides cf. paupera
1700
1910
2080
2590
E
F
?G
?H
I-?
J
K
Pre K
Base of Sequence

OG 3130


800
1050
1300
1550
1800
2050
2300
2550
2800
3050
ARENACEOUS BENTHONICS - COMPLEX
50. Pseudoclavulina rudis
51. Gaudyrina convexa
52. Clavulinoides victoriensis
53. Textularia fistulosa
54. Gaudyrina heywoodensis
BRYOZOA
MOLLUSCA
QUARTZ
PYRITE
QUARTZ - ANGULAR
GLAUCONITE
PYRITE TUBES
QUARTZ - ROUND
?G
?H
1910
I-?
J
2080
K
Pre K
Base of

OG 3131