

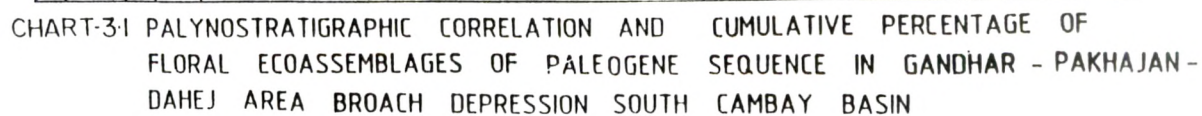
## CHAPTER - VII

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### 7.0 STRATIGRAPHIC CORRELATION

As revealed from the various details presented by the author in the previous chapters, the subsurface Paleogene sequence containing different types of Palynomorphs is extensively developed all over the Broach Depression and is readily delineated on seismic profiles between the reflectors corresponding to the 'Y' marker (Upper Cambay Shale) and the Dadhar Top in the stratigraphic sections presented by the author (Chart : 3.1, 3.2 and 3.3). No abrupt changes in the sequence thickness are noticed in these sections. However, the overall Paleogene thickness is relatively more in the middle part of the depression around Pakhajan and in its northern vicinity (Fig. 8). As further noticed in the figure the Paleocene, Eocene and Oligocene sequences have encountered in all the studied wells except wells Gandhar-B, Gandhar-C, Gandhar-D, Pakhajan-A and Dahej-A, where Paleocene sequence is not encountered.

Palynological studies carried out in all such Paleogene subsurface sediment samples have led to identify four correlatable levels in the studied area of Broach Depression. The palynofloral assemblages, their frequency and distribution worked out by total counting of about 200 grains in each sample have indicated lateral as well as vertical variation (charts 3.1, 3.2., 3.3) in the area. These studies have further resorted to establish the fact that the Paleogene sequence is almost dominated by pteridophytes,



angiosperms, and phytoplanktons except Paleocene sediments corresponding to Olpad Formation where marine phytoplanktons are totally absent. Two correlation profiles (charts 3.1, 3.2) cover almost all the studied well locations in the Broach Depression area. The correlation have been attempted by considering the Dadhar top as a datum. The criteria considered for the delineation of the boundaries and the biostratigraphic markers, guiding the correlation are detailed below :

The first correlatable level is the first down hole appearance of Proxapertites sp and Moncolpopollenites sp corresponds to Paleocene/Early Eocene boundary at 4060m in well Gandhar-A. This level is correlated at 1895 m and 1580 m in wells Palej-A and Matar-A respectively (chart 3.2). The microfloral ecoassemblage suggest continental to slightly brackish water conditions of deposition (Charts 2.1A, 2.1B, and 2.1C). Absence of marine phytoplanktons is observed in this zone.

The next correlatable level is at first down hole appearance of Polybrevicolporites cephalus and Pellicieropollis langenheimii of Early Eocene/Middle Eocene boundary. In well Gandhar-A it has been marked at 2980 m and traced in Gandhar-B at 2890 m, Gandhar-C at 2990 m, Gandhar-D at 3040 m, Pakhajan-A at 3560 m, Dahej-A at 2720 m, Palej-A at 1875 m and Matar-A at 1520 m. (Charts 2.1A, 2.1B, 2.1C). The zone covers the total Cambay Formation and little lowermost part of Hazad Member of Ankleshwar Formation.

The palynoflora recorded in this zone indicate nearshore environment of deposition in the north eastern flank which is gradually changed to shallow marine towards south western flank of Broach Depression. South Cambay Basin (fig.5.1, 5.2, 7 chart 3.1, 3.2).

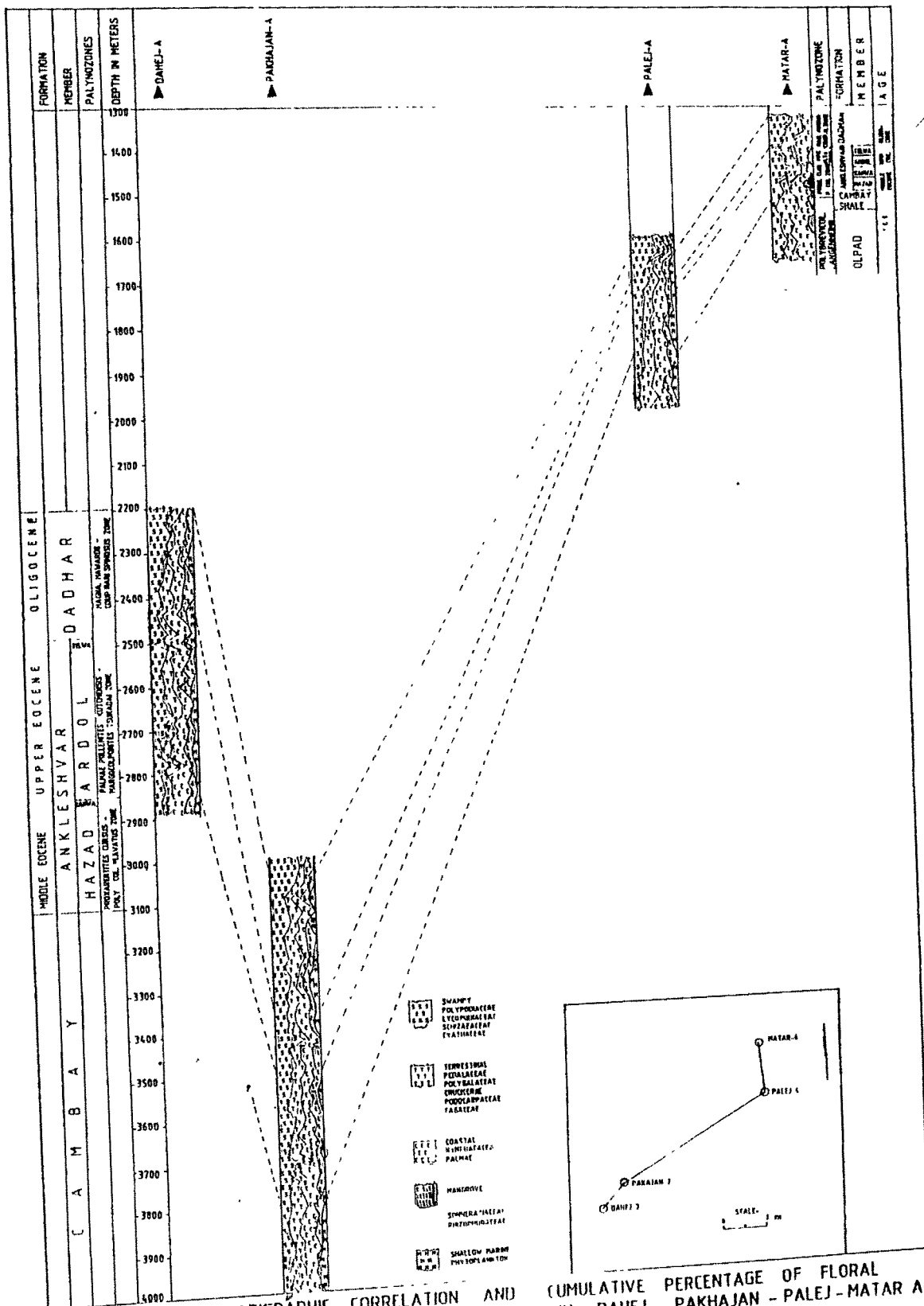


Chart-32 PALYNOSTRATIGRAPHIC CORRELATION AND ECOASSEMBLAGES OF PALEOGENE SEQUENCE IN DAHEJ - PAKHAJAN - PALEJ - MATAR AREAS, BROACH DEPRESSION, SOUTH CAMBAY BASIN

The next successive correlatable level is the first down hole appearance of Proxapertites cursus and Polycolpites flavatus of Middle Eocene.

This level corresponds to Middle/Upper Eocene boundary and falls at the top of proxapertites cursus - Polycolpites flavatus assemblage zone. In Gandhar-A it has been marked at 2675 m and traced in Gandhar-B at 2710 m, Gandhar-C at 2770 m, Gandhar-D at 2750 m, Pakhajan-A at 3560 m, Dahej-A at 2720 m, Palej-A at 1730 m and Matar-A 1440 m. This zone covers the Hazad sand, Kanwa Shale and lower part of Ardol members. The thickness of this zone is found to be thinning towards eastern part (Matar area, chart 3.3). The microfloral evidences suggest that the environment of deposition is changing laterally from brackish water to shallow marine conditions towards Gandhar area (fig. 5.1, 7).

The next successive correlatable level has been demarcated by first down hole appearance of Palmaepollenites kutchensis and Margocolporites tsukadai of Upper Eocene. This level corresponds to top of Palmaepollenites kutchensis-Margocolporites tsukadai assemblage zone and marked at 2345 m in Gandhar-A. This level has been traced at 2420 m, 2410 m, 3365, 2440 m, 1705 m, and 1380 m in wells Gandhar-B, Gandhar-D, Pakhajan-A, Dahej-A, Palej-A and Matar-A respectively. This zone covers the upper part of Ardol, Telwa members of Ankleshwar Formation and lower part of Dadhar Formation. The microfloral ecoassemblages gradually changes laterally and shows higher frequency of marine phytoplanktons towards western part (Gandhar area) and the percentage of floral elements increases towards eastern part (Matar area) of the basins (fig. 5.1, 7). This evidence suggest a gradual change of depositional environments laterally from transitional to shallow marine conditions from eastern margin to western margin of the basin (fig. 5.1, 7).

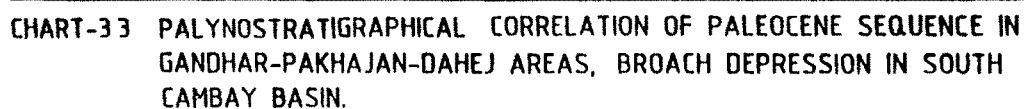


CHART-33 PALYNOSTRATIGRAPHICAL CORRELATION OF PALEOCENE SEQUENCE IN GANDHAR-PAKHAJAN-DAHEJ AREAS, BROACH DEPRESSION IN SOUTH CAMBAY BASIN.

The Magnastriatites howardii - Couperipollis rarispinosus assemblage zone of Oligocene age is the top most zone of the Paleogene sequence which corresponds to Upper part of Dadhar Formation. The top of this zone is marked at the first down hole appearance of Magnastriatites howardii and Couperipollis rarispinosus at 2200 m, 2230 m, 2200 m, 3040 m, 2200 m, 1645 m and 1325 m in wells Gandhar-A, Gandhar-B, Gandhar-D, Pakhajan-A, Dahej-A, Palej-A, and Matar-A respectively. The microfloral ecoassemblages of this zone indicate gradual changes of depositional environment from transitional to shallow marine from eastern part (Matar area) to western part (Gandhar area) of the basin. (fig. 5.1, 7).

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