

#### IV GEOLOGY

##### 1. Summary of Previous Work

The drilling of Clam-1 was the first direct attempt at finding hydrocarbons in the King Island Sub-basin. Prior to this test three seismic surveys were carried out encompassing this area. These are as follows :

###### Hematite Petroleum Pty.Ltd.

Survey K (1965), 138 miles of single fold coverage.

###### Esso Exploration and Production Australia

Survey EO (1966-67) 364 miles of six fold coverage

Survey EP (1967) 123 miles of six fold coverage

The King Island Sub-basin was not covered by airborne magnetometer although two surveys did include part of the fringe area. These were carried out by Hematite Exploration Pty.Ltd. in 1961-62 and Esso Exploration and Production in 1966-67.

In the Otway Basin proper hydrocarbon exploration has been carried out for many years. Although no commercial discoveries have been made to date, several shows of gas and oil have been recorded. The most significant indication of hydrocarbons occurred in the Port Campbell-1 well which yielded 4.2 MMCFGD with some condensate on drillstem test.

##### 2. Summary of Regional Geology

The geology of the Otway Basin proper has been previously described in detail in the Well Completion Reports of Esso-BHP's Crayfish-1, Prawn-1, Argonaut-1 and Nautilus-1. The structural-stratigraphic information gained from the drilling of Clam-1 has in no way altered any of these geological concepts, although a series of events are recognised, prior to Cretaceous deposition, which are at present unique to the King Island Sub-basin. These are recognized to have been influenced by geological events effecting north-western portion of Tasmania. The following summary relates primarily to the King Island Sub-basin.

###### Pre-Cambrian

Both metamorphic and unmetamorphic Pre-Cambrian rocks are widely distributed over northwestern Tasmania and King Island. It is thought that the two rock types are separated from each other by the Frenchman Orogeny which occurred between the Lower and Upper Pre-Cambrian. Separating the Pre-Cambrian and Cambrian was the Penguin Movement.

###### Cambrian

During Cambrian times Tasmania lay within the Tasman Geosynclinal Zone consisting of a multitude of sedimentary basins subsiding intermittently and erratically. Sedimentation was extremely varied, accompanied by widespread volcanic activity. Outcrops of Cambrian rocks in northwestern Tasmania attain thicknesses of up to 5000 feet as at Smithton, suggesting possible distribution offshore. The section here is represented by a wide variety of both marine and non-marine sedimentary rocks in part with tuffaceous matrix overlain by tuffs, siltstone, greywacke, breccias and basic lavas. Occurring on King Island are over 4,000 feet of Cambrian rocks consisting mainly of basic lavas, basalts, pyroclastics and conglomerate.

###### Cambrian to Devonian

Moderate deposition may have continued in northwestern Tasmania up until the Mid-Devonian Tabberabberan Orogeny which greatly effected the western portion of the state. Rocks of this time interval, however, are unknown in the northwestern tip of the island. This may be due to non deposition during this period, although erosion as a result of uplift seems more likely. Accompanying the Mid-Devonian Tabberabberan tectonics were large out-pourings of granite extending from King Island all the way down the west