

with extrapolated regional geology seemed to indicate the basin to be primarily of Cenozoic depositional origin, covering an area of some 25,000 square miles, and to contain a sedimentary section some 12,000 feet thick in the centre. Further it was possible that this section included Tertiary marine sediments favourable for petroleum generation and accumulation. Of the prospects outlined by the Haematite seismic survey, the reef-like anomalies were deemed the most interesting, and after detailed seismic work by Esso, the Esso Bass-1 well was located at the apex of one of these anomalies.

(2) Regional and Historical Geology

The Bass Basin lies at the southern end of the Paleozoic Tasman Geosyncline whose rocks probably exceed 25,000 feet in thickness in the Mornington Peninsula, north of the basin (Keble, 1950). The strata ranged from Cambrian through Carboniferous in a complexity of folded, faulted and intruded marine to non-marine sedimentary, metamorphic, and extrusive and intrusive igneous rocks. In Tasmania, similar rocks, tens of thousands of feet thick, occur along with more than 25,000 feet of pre-Cambrian sedimentary and metamorphic rocks. It is quite logical then to expect Bass to be underlain by any of these rocks. They would extend from shallow depths at the basin edge, and downward from 12,000 feet in its deepest part.

Bass is essentially a Tertiary basin, although it may contain Permian, Triassic, and Cretaceous rocks between the relatively undisturbed Tertiary above and completely folded and intruded pre-Permian rocks below. Permian "tillites" are known from small outcrops along the northern Tasmanian coastline. These may extend northward for some distance into the Bass Basin. Triassic sandstone and shale with minor conglomerate and coal occurs in Tasmania, and minor glacial beds in Victoria. However regional outcrop pattern negates these being in the Bass Basin. The Jurassic-Lower Cretaceous, generally non-marine, Otway Group occurs in the Gippsland and Otway Basins, and may well be present in the Bass Basin; rocks of Upper Cretaceous age are present in the axial portion of the basin.

During the Paleocene and Eocene time, gentle regional downwarping occurred in the Gippsland and Otway Basins and similar downwarp occurred in the Bass Basin. Tasmania remained a positive area. Volcanism and lava flow was abundant from the western part of Gippsland westward to the eastern part of Otway. Similarly, a few small flows occurred in Tasmania. No volcanic rocks of this age were deposited in the axial portion of this basin at the Esso Bass-1 location. There were widespread swamp conditions under which peat, clay, sand, silt, and gravel were deposited. Upper Eocene time saw a change in sedimentary conditions from non-marine to restricted marine.

Uplift and slight deformation took place in Gippsland after deposition of the Eocene coal measures. Deposition apparently was continuous during this time in the Otway Basin. In the Bass Basin, there is definite seismic and stratigraphic evidence of a local unconformity toward the edges of the basin at the top of the Eocene.

During the Oligocene and Miocene time, marine conditions prevailed in the Bass Basin, with deposition of fossiliferous limestone, calcareous mudstone, marl, and minor siltstone beds. At and near the present edges of the Bass Basin in Tasmania and Victoria there are outcrops of mainly Miocene skeletal limestones and some marine, fossiliferous siltstone. Local angularity beneath the Oligocene-Miocene contact on seismic sections indicated a regressive pulse of marine conditions at the beginning of Miocene time.