

NOTES ON THE PERMO-CARBONIFEROUS SYSTEM IN
TASMANIA.

The P.C. sedimentation must have taken place over the whole of what is now the State of Tasmania with the possible exception of the extreme south-western portion. The basement upon which the basal members were deposited consists of highly folded Proterozoic and lower Palaeozoic sedimentary rocks and associated igneous intrusions. In many parts of the State the surface of the basement had been worn down to a peneplain before the deposition of the basal members of the Permo-Carboniferous system.

The total thickness of the system has a considerable range. It has a minimum thickness of 400 feet in the north-eastern part of the State, but the thickness apparently increases rapidly to the south and west, the greatest thicknesses being in the eastern, south eastern and portions of the north-western districts. The maximum thickness has a range of 2000 to 3000 feet. The thickness of the different series also has a considerable range in the different parts of the State.

The structure of the rocks of this system is uniform through-out the State. Folding is absent, but block-tilting has occurred to a large extent. The amount of tilting, however, is not great and the dips of the beds range from 0° - 10° and very seldom exceeds the latter, a few dips up to 25° being recorded. The system has been largely faulted with the result that it occurs in the form of horizontal or slightly tilted blocks as described above. The faulting and tilting was for the most part associated with the intrusions of the Mesozoic diabase (dolerite) at the close of the Triassic sedimentation.

The summit of the system is marked by pebbly grits forming the basal members of the Ross series of the Triassic system.

The following series have been recognised in Tasmania :-

Basal Series - The basal members consist of conglomerates, pebbly grits or pebbly sandstones. In most districts these are definitely of glacial origin and consist of glacial conglomerates and tillites. In the Wynyard and Preolenna districts this series of glacial beds is 1200 feet in thickness. In the north-eastern districts where the thickness of the system is not great the basal beds consist of pebbly grits and sandstones not definitely of glacial origin.

Lower Marine Series - The basal conglomerates, tillites, etc. pass up into the Lower Marine series without any break. This series consist of highly fossiliferous marine mudstones, limestones, mudstone conglomerates. The thickness ranges from 30 feet at Barn Bluff to approximately 1000 to 2000 feet in the southern districts.

The following genera are among the most prominent - stenopora, fenestella, protoretopora, productus,

strophalosia, spirifera, aviculopecten, eurydesma, pachydomus, platyschisma, pleurtomaria, and conularia.

The limestone member of this series is prominent throughout the State and ranges in thickness from 50 feet in the north-east to a maximum thickness of several hundred feet on Bruny Island.

Greta Series - At many localities the Lower Marine series is succeeded by a fresh water, coal-bearing series of sandstones and shales. It occurs particularly at Barn Bluff, Preolenna, Mersey Valley and Lilydale in the north, and Bruny Island and Port Cygnet in the south. The series is characterised by the *Glossopteris* and *Gangamopteris* flora.

At several localities (Quamby Bluff, Mersey Valley, Chudleigh and Conah) in the north central districts, the Greta fresh-water series is replaced by a marine series containing beds of Tasmanite oil shale. In these areas it would appear that fresh water conditions did not exist, but the marine (probably estuarine) conditions continued from the Lower Marine series.

In some districts in the south, the Greta series has not been definitely proved to exist, and it is probable that the Lower and Upper Marine sedimentations were continuous.

Upper Marine Series - The Greta series is conformably overlain by the Upper Marine series. This series consists mainly of white siliceous mudstones and impure sandstones, and is not so fossiliferous as the Lower Marine, the upper portion being only sparingly fossiliferous. It is thickest in the south and reaches 1000 to 2000 feet in the vicinity of Hobart.

The fossils are generally similar to those in the Lower Marine, the most plentiful being *fenestella*, *spirifer* and *strophalosia*.

In many districts the Upper Marine series is overlain apparently conformably by the basal grits of the Triassic system.

Tomago Series - In several districts (Barn Bluff, Preolenna, Sandfly-Cygnet) the Upper Marine Series is overlain by a thin fresh water series with a *Glossopteris* flora. It has been correlated with the Tomago series of N.S.W.

The above sub-divisions give the general section of the System as at present recognised in Tasmania, but there are features in some localities of which the correct stratigraphic positions have not been determined.

At Cape Paul Iamanon, A.N. Lewis has described a glacial series containing blocks of fossiliferous P.C. limestone. If the limestone is from the Lower Marine, then there must be a glacial series above it at some localities at least.

In the ordinary section the usual coal-bearing series (the Greta) is of course above the Lower Marine series (including the limestones). At Mt. Elephant near St. Marys, however, two thin coal seams occur below limestones. It would appear therefore that either another fresh water series will have to be recognised below the Lower Marine or else a new limestone horizon will have to be recognised below the Lower Marine.

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