GEOLOGY OF TASMANIA - SUMMARISED

BY H.G.W.KEID M.SC. CHIEF GEOLOGIST

DEPARTMENT OF MINES

There are no recorded occurrences of Archaeozoic formations in Tasmania the oldest rocks being the Pre-Cambrian series known by the type name of the Davey Group.

The Davey Group (Pre-Cambrian)

The Davey group consists of a series of highly folded sedimentary rocks composed of quartz-schists, quartz-mica-schists and conglomerates. Some amphibolites occurring in the Collingwood River and Rocky River districts are regarded as of this age.

The Davey group is confined to the Western half of the state the principal occurrence extending as an almost continuous belt from the southern coast at South West Cape in a northerly direction to the vicinity of Cradle Mountain. They outcrop again on the north Coast near Port Sorell and westwards to Sisters Hills whence a narrow belt extends in a southerly direction to the vicinity of the Pieman River.

The Pieman Group (Cambrian)

The Pieman Group contains a series of rock types which include sediments, volanic fragmentals and lavas estimated to exceed in thickness 20,000 feet. Previously this series was referred to generally as belonging to the Cambro-Ordovician age but recent work has helped to more clearly define these formations and it seems certain that they extend from the Upper Proterozoic to the Cambrian. In 1949, Hills and Carey put forward the following tentative sequence to show the relationship between this and adjoining series.

Junee Group. Ordovician to Upper Cambrian.

Unconformity

	(Read Rosebery Volcanics
	(Nubeena Quartzite
Pieman Group	(Montana Melaphyre Volcanics
Upper Proterozoic	(Zeehan Glacials
to Cambrian	(Oonah Quartzites
	(Cleveland Cherts
	(Smithton Dolomites

Unconformity

Davey Group

Extensive intrusions of Basic and Ultrabasic magmas occurred at the close of the deposition of the Pieman Group. These were responsible for the introduction of the Osmiridium and some gold. The asbestos deposits of Tasmania are also associated with the rocks.

Junee Group. Ordovician to Cambrian.

The following sequence for the Junee Group was put forward by Hills and Carey.

Eldon Group

Unconformity

Junee Group Ordovician probably to Cambrian	(	Crotty Sandstones
	(	Gordon River Limestones
	(	Caroline Creek Sandstones and shales
	(	West Coast Range Conglomerate
	(	Jukes Breccias and Conglomerate

Unconformity.

Since that sequence was advanced further work by Gill and Banks has established a Silurian age for the Crotty sandstones which are now included in the Eldon group.

The Eldon group (Devonian to Silurian)

The Eldon group consists of a series of sandstones, slates and quartzites which attain a thickness of approximately 6000 feet. Originally referred to as Silurian, Thomas, in 1944 maintained that portion at least of the series was Devonian in age. This has been confirmed by Gill and Banks. A Silurian age for the lower members has also been shown. The sequence put forward by Hills and Carey in 1949 has therefore been modified by Gill and Banks to give the following:-

Permian System.

Unconformity

Eldon Group Devonian to Silurian	(	Bell shales
	(	Florence Quartzite
	(	Keel Quartzite
	(	Amber Slate
	(	Crotty Quartzite.

Conformity

The foregoing systems are confined chiefly to the Western half of the state and occupy practically the whole of the Western Coast.

Mathinna Group.

Situated in the north eastern part of the state and apparently of the same age as the Eldon group there is a series of slates and quartzites referred to as the Mathinna group. These slates underlie the Permian strata. The Mathinna group occupy the greater portion of the area to the north east of the South Esk River.

At the close of the deposition of the Eldon and Mathinna series extensive intrusions of granitic magmas occurred both in the western and north eastern parts of the state. It is probable that two distinct periods of intrusion within the Devonian era have taken place for two types of granitic rocks occur. Of these two types of rock one is a granodiorite whilst the other is a granite either porphyritic or even grained.

The mineralisation associated with the granitic rocks is also distinctive.

Tin Ores.

In the north eastern part of the state, from Branxholm to Gladstone and to St Helens, the granites are of two types one of which is coarsely porphyritic with felspar phenocrysts ranging in length to three inches. Neither in association with this granite or its offshoot dykes has any mineralisation occurred. The second type of granite is not porphyritic and is an even grained type. In association with this second type of granite the tin fields of the north east occur. More particularly is the tin ore associated with the pegmatitic dykes and greisenised marginal phase of the granite. From this source arises the bulk of the alluvial tin won from the district and little productive mining has taken place from the narrow veins which occur.

The western Tasmanian tin fields are also of two types one of which occurs as quartz- cassiterite lodes in association with granites whilst the second type occurs as replacement bodies of folded sediments. The latter are in general sulphide ore bodies the cassiterite, fine in grainsize, occurring in association with pyrrhotite.

In some fields both types of formation occur.

Gold.

In the vicinity of Scottsdale an extensive outcrop of granodiorite occurs. It lies to the westward of the granite area and is remarkably free of tin. With it are associated the principal gold mines of the state which occur in a comparatively narrow area extending from Lefroy through Lisle, Mangana thence northerly through Mathinna to Alberton. The area is roughly marginal to the Granodiorite except in the Lefroy district where it is almost certain the Granodiorites underlie at depth the Silurian sediments.

At Beaconsfield the gold bearing reefs are contained within Ordovician strata but there is little doubt that the granodiorite has given rise to the reef formation.

In the Western half the state gold occurs in association with the base metals and is recovered as a by-product in their treatment. It is from this latter source that present production comes.

Permian System.

There are no sedimentary formations of Carboniferous age in Tasmania. Between the end of the deposition of the Eldon Group and the commencement of the Permian system the whole of Tasmania was subjected to a period of peneplanation. Towards the end of this period weathering was accelerated by Glacial action and the lowest member of the Permian system is of Glacial origin. Following the Glacial period was an extended period of marine deposition, interrupted by a series of fresh water beds in which the Preolenna Coal measures occur. A second Glacial period was followed by the Ferntree mudstones and the system was completed with the formation of the Cygnet Coal Measures.

The full succession was therefore as follows:-

(Cygnet Coal Measures
(Ferntree Mudstones
(Woodbridge Glacials
(Grange Mudstones
Permian (Cascades Formation (Preolenna Coal Measures
(Granton Limestones and marl Wynyard Glacial Formation

Unconformity

Eldon and Mathinna Group.

The Triassic System.

The triassic sediments lie conformably on the Permian strata of Tasmania. The lowest members of the system are the Ross Sandstones which have a basal section, generally narrow, of grits and conglomerates which grade upwards into a highly siliceous fairly coarse sandstone.

The Ross sandstones are followed by the Knocklofty sandstones and shales which occur as alternating bands. The sandstone series have been used for building purposes.

Of most importance in the Triassic system are the New Town Coal measures. These comprise a series of sandstones and shales with which the principal coal seams of the state are associated. The sandstones are generally fine in grain size and are in part felspathic. The shale bands are usually narrow ones.

Overlying the New Town Coal measures are the Felspathic sandstones generally pale green in colour and with a mottled appearance.

It is claimed that the Felspathic sandstones are lithologically and mineralogically identical with the Wanthaggi Coal measures of Victoria and may therefore be of Jurassic age.

The full sequence of the Triassic system is therefore as follows:-

Tertiary Rocks
Unconformity

(Felspathic Sandstones
((probably Jurassic)
(New Town Coal measures
Triassic (Knocklofty Sandstones and
(shales
(Ross Sandstones

Disconformity.

Jurassic Dolerite.

At the close of the Triassic system large and extensive intrusions of Doleritic magmas took place. These magmas cut across the older formations as dykes and have had their main effect on Strata of Permian age or younger where they occur as extensive sill formations. The commonest horizons for the occurrence of sills is the Base of the Permian, the mid-permian and above the New Town Coal measures of the

Triassic System. In extent the Dolerites now cover at least one third of the state.

The Coal Measures.

The economic coal measures of the State are of two ages, the Permian and Triassic. Such coal as occurs in the later Tertiary system has not yet been exploited and has so far proved of no economic value.

The Permian coals occur as a lower (Preolenna) series situated in the middle of the Cascades formation and an Upper (Cygnet) series near the upper limits of the Permian system. They are fairly widespread and occur at the Preolenna, Pelion-Barn Bluff, Cygnet, Bruny Island and the Mersey Coal fields.

In general the Preolenna series contains four coal seams whilst in the Cygnet series only one seam occurs.

Production from Permian coals is small, the annual production being approximately 2,000 tons from operations at the Spreyton mine.

The Triassic coal occurs in the New Town Coal measures situated near the upper limit of the system being overlain only by the Felspathic sandstones series. Eight coal seams have been shown to exist in the series and economic mining has been carried on in at least two of the seams. The seams vary considerably in thickness to approximately 15 feet. The coal is of medium quality only, being high in ash content, and fairly low in both Volatile and Fixed Carbons.

The seams are widely distributed geographically, extending in a discontinuous manner from the Stanhope mine at Avoca easterly along the Fingal and Mt.Nicholas Ranges and thence southerly along the east coast of the state to as far south as Mt.Paul on the Freycinet Peninsula. Other occurrences are in the vicinity of Hobart and the Langloh mine near Hamilton.

Of the total production of 220,000 tons annually, only about 2,000 tons are produced from Permian coal seams and about 150,000 tons annually from the Triassic seams of the Mount Nicholas area.

Tertiary System.

Resulting from extensive faulting at the close of the Mesozoic sedimentation, many of the present topographic features of the island originated. Faulting along lines trending slightly West of North has influenced the course of many of the principal rivers of the State as seen in the case of the Derwent River and the Tamar River.

Basalts occur at two points in the Tertiary system, the earlier occurrence being of Oligocene age and the later one towards the end of the Pliocene age.

6.

The Basalts are widely distributed.

Pleistocene.

Glaciation was widespread during the Pleistocene age as is evidenced by the occurrence of morainal deposits, cirques and tarns on the highlands.

Sgd (H.G.W.Keid)
M.Sc. M.I.M.M.(AUS)

CHIEF GEOLOGIST

The Department of Mines,
HOBART...TASMANIA

13.2.52.