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DEPARTMENT OF MINES
SOUTH AUSTRALIA

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PLAN : 61-720

The Cenomanian sediments of the Winton formation hitherto were regarded as the youngest Mesozoic strata represented within the Great Australian Artesian Basin. No records were available to testify events which had taken place over the long period between the Cenomanian and the lowermost Tertiary.

While revisiting the area north of Cordillo Downs (S.A.) in 1961 the author had the opportunity to check some outcrops of white, torrentially bedded sandstones which were previously regarded to be of Lower Tertiary age (Wopfner 1960 and 1961) and hence correlated with the Eyrian Formation. New evidence suggests however, that these sediments are of Pre-Tertiary age.

On the eastern slope of Mt. Howie (30 miles NE of Cordillo Downs) a development of torrentially bedded sandstone, about 100 ft. to 156 ft. thick, was found to rest disconformably on flat lying Winton beds (Fig. 1 and 2). The contact between the Winton sediments and the overlying sandstone is extremely irregular and the relief of the contact exceeds 20 feet. In one place, the contact is more than vertical and overhanging, suggesting a fossil, undercut, stream-embankment. Immediately below the contact (for about 12 to 18 inches) the Winton beds are strongly fractured and show brown staining due to limonite. The fractures, often concheidal, are commonly filled with limonite. This is considered indicative for sub-aerial weathering on an old land-surface (see fig. 2).

The sediments above the disconformity consist of white to light grey, medium to coarse grained, subangular to subrounded, quartz sandstones with kaolinitic matrix. Sorting is poor to fair. Approximately 35 feet above the base, a shale band is intercalated. It develops somewhat gradationally from the underlying sandstone but shows a very sharp upper

boundary where it is again succeeded by sandstone.

At or near the disconformity, and again above the shale horizon, layers and/or lenses of a "shale conglomerate" occur. The "shale conglomerate" consists of rounded to subrounded shale fragments, embedded in a medium grained, sandy and richly kaolinitic matrix. The average longest diameter of the shale pebbles ranges from ½ inch to 1 inch, the maximum being about 2 inches. In numerous cases, the original bedding is recognisable, now resting at any incidental angle to the bedding of the surrounding sediment. The top of the sandstone is capped by duricrust.

From top to bottom, the Mt. Howie - Section comprises:

5 ft.	duricrust, grey, very hard, dense columnar, siliceous (Grey Billy)
25 ft.	duricrust, red rubbly, sandy and pisolitic, siliceous.
15 ft.	sandstone, white, medium grained, partly indurated by silica.
35 ft.	sandstone, white medium grained, medium hard, subangular to subrounded, kaolinitic, torrentially bedded with stringers of coarse sand.
9 ft.	"shale conglomerate", white to grey. Rounded to subangular shale pebbles (⅛"-2") in medium grained, kaolinitic sandstone.
15 ft.	sandstone, white, medium to coarse grained, porous, slightly kaolinitic, medium hard. Some shale pebbles.
9 ft.	shale, white to creamy grey, silty, kaolinitic, medium hard, massive to poorly bedded with plant remains and vertical tubes.
35 ft.	sandstone, light grey, medium to coarse grained, subangular, slightly kaolinitic, porous, torrentially bedded with lenses of "shale conglomerate" near base.
	Disconformity.
50 ft. +	Minton beds. Shale and siltstone with stringers of sand, flat lying.

Outcrops of the same sediments occur intermittently from Mt. Howie to the east and southeast, mainly within the headwaters of Milpie Creek. They are commonly marked by the occurrence of the "shale conglomerate" and further by the development of large caves at the lower boundary of the duricrust.

Remnants of similar sediments were found also at the headwaters of Jiblie Creek, near the South Australian - Queensland border. Torrentially bedded sandstones with lenses of shale conglomerate occupy the tops of two

isolated hills. The sediments were partly affected by secondary silicification, indicating that both occurrences were capped by duricrust. The contact with the underlying Winton beds is again disconformable whereby the respective plains of disconformity dip towards each other. This gives the distinct impression of a large channel which was eroded out of the Winton sediments (see Figure 3).

From the above observations the conclusion can be drawn that these Post-Winton sediments were deposited in channels which were cut into the flat lying Winton sediments. Large amounts of eroded Winton shale and siltstone were reworked to form the components of the shale conglomerates while the finer material was partly incorporated in the matrix. For the sand a more distant source has to be assumed which as yet is unknown.

The field evidence is sufficient to place the age of these sediments as post Winton (Cenomanian) and Pre-Duricrust (? Miocene) but it does not permit to place them for certain in the Mesozoic or in the Tertiary.

At Mt. Howie Section, the author and Dr. B.G. Forbes found several casts and moulds of plant fossils within the shale band, about 35 feet above the disconformity. They consist of:

1. Branchlets, slender, 28 mm to 34 mm long, 4 mm wide, leaves fleshy, spirally arranged, rhomboid lanceolate, about 3 to 5 mm long, 1.5 to 2 mm. wide. ? Brachyphyllum.

2. Amentum, ovoid, 6 mm in diameter at base. Base concave with central stem. Scales rhomboid, longitudinally grooved, spirally disposed, 0.4 mm long and 0.2 mm wide, less acute at base. Brachyphyllum.

3. Plant impression, parallel striated in 4 mm intervals. Elliptic nodules, 1.5 to 2 mm long, 0.9 mm wide in grooves between and longest diameter parallel with striations. Nodules occur in 12 mm to 15 mm intervals along direction of striation and 4 mm laterally. Total width of specimen 30 mm.

The genus Brachyphyllum is essentially a Mesozoic genus and generally the flora (though rather poorly preserved and poor in genera) shows Mesozoic affinities rather than Cainozoic aspects.

Furthermore, the basal quartz conglomerate, composed of highly polished pebbles with large amounts of agate and silicified wood-pebbles, which on past experience has been found typically associated with the lower Tertiary sands over a wide area (Innamincka, Cordillo, Tibooburra, Barree) is missing. The flora which occurs in these lower Tertiary sediments is

composed mainly of angiospermae and is of a different type to the one described above.

The evidence which has come to light so far suggests a Mesozoic age and the author is inclined to place the "Mt. Howie sandstone" and related sediments in the Upper Cretaceous rather than to correlate it with the lower Tertiary sands and polished grits of the "Eyrian formation".

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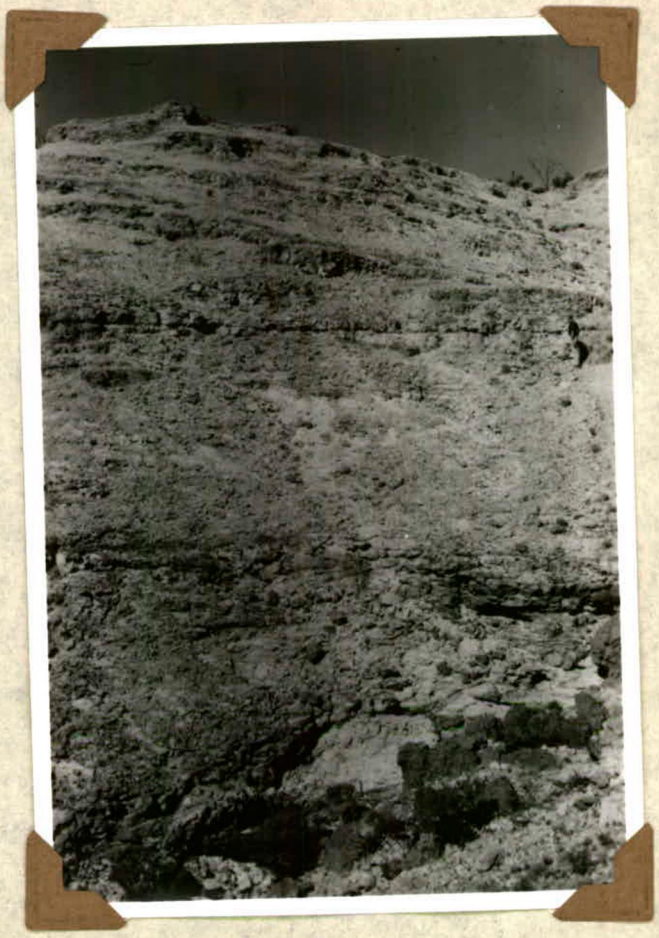

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Fig. 1. Lower portion of section of Post Winton sediments at Mt. Howie. The contact between the Winton sediments (white) and "Mt. Howie sandstone" is seen in lower centre of picture. B.G. Forbes standing at base of plant bearing shale horizon. Torrential bedding is exhibited above.

(author's photograph)

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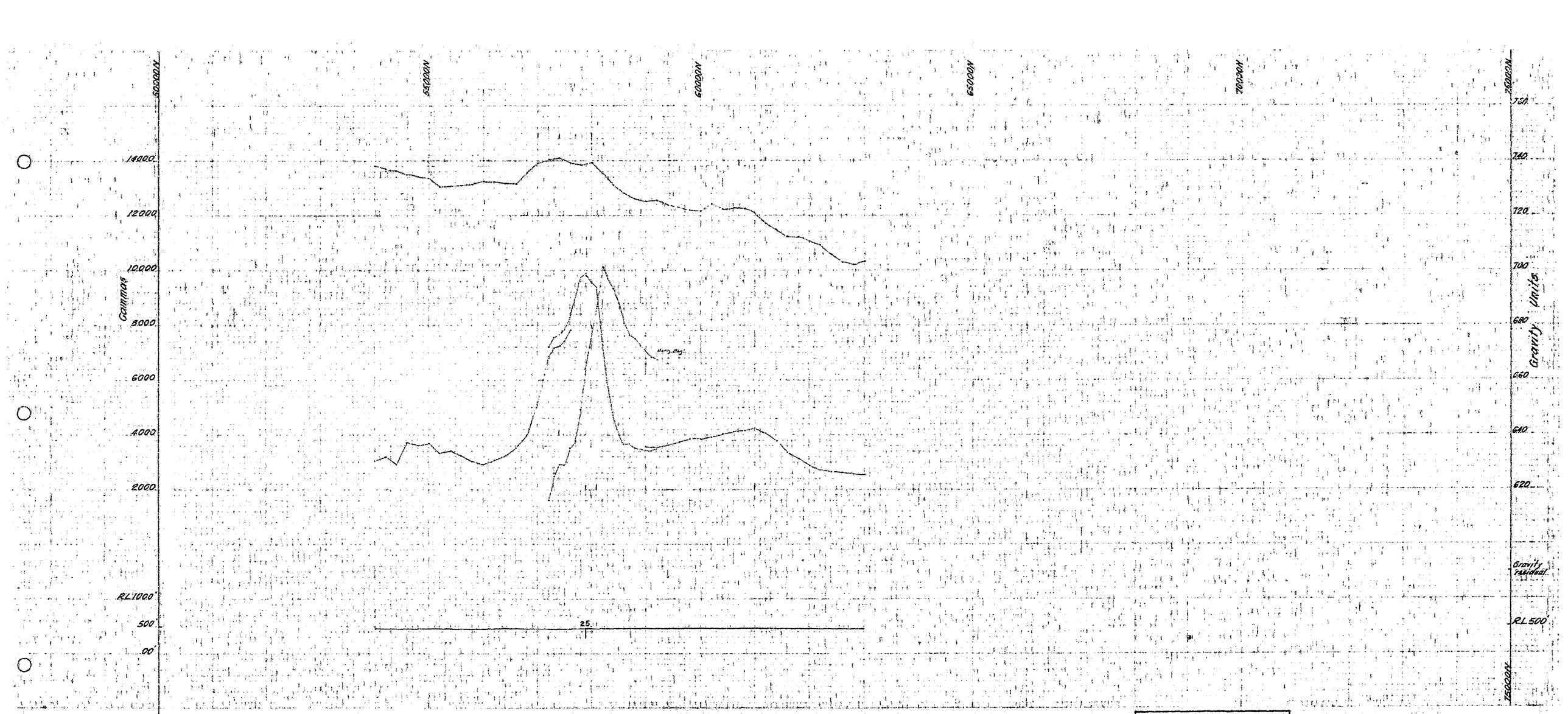
Fig. 2. Contact between flat lying Winton Shale (fractured and limonite-stained) and torrentially bedded "Mt. Howie sandstone" at Mt. Howie. The dip of the sandstone is due to torrential bedding.

(author's photograph)

Fig. 3. Sketch showing two remnants of "Mt. Howie sandstone" at the headwaters of Jiblie Creek. The Winton sediments dip about 3^{0} E and 1^{0} W respectively. The contact at the eastern remnant shows a dip of 10° to 15^{0} NW whilst the contact at the western hill dips 5o ENE. The probable outline of the fossil stream-channel is marked with heavy, dashed line. The formation and warping of the duricrust postdated the deposition of the "Mt. Howie sandstone".



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