

BRICK SHALE RESOURCES OF CANBERRA

SUMMARY<sup>1</sup>

Reference to the geological map of Canberra and surrounding districts shows that important deposits of shale suitable for brick making can be expected only in the Canberra Group of Lower Silurian sedimentary rocks and in shales in the Queanbeyan area near the boundary between rocks of Upper Ordovician and Lower Silurian ages. The area south and west of Canberra consists mainly of igneous rocks unsuitable for brickmaking.

Sedimentary rocks of the Canberra Group underlie most of Canberra city, and during 1959 supplies of brick shale have been obtained from Cork Hill, near the site of the future Parliament House. Except for this locality, where excavation has to be carried out to remove the crest of the hill, mining within the city boundary is not permitted. North of Canberra City very large reserves of brick shale have been proved. This material has not been shown to be suitable for immediate use in the present Brickworks plant.

In the Queanbeyan area north of Mt Jerrabomberra a deposit of shale that has been mapped and sampled could provide supplies for the Brickworks for about 10 to 15 years. The shale makes a very satisfactory brick with the plant that is being operated at present.

INTRODUCTION

The Canberra brickworks was established at its present site at Yarralumla early in the history of Canberra adjacent to an outcropping body of calcareous shale and sandstone, in which a pit was started for the supply of brick shale. Up to the start of the war, 1939, when it had been nearly mined out, this pit had supplied raw material for the manufacture of about 70,000,000 bricks. During war-time the brickworks closed down and orders were met from accumulated stocks.

In anticipation of heavy post-war demand for bricks the need for a new deposit of shale became somewhat urgent. The Bureau of Mineral Resources (Nye and Owen 1944) investigated a low hill at Deakin consisting of calcareous shale and tuffaceous sandy beds, which had been recommended in 1940 by Dr WG Woolnough, Commonwealth Geological Adviser. Full scale working commenced some time later and continued until the end of October 1957 when the permissible amount (down to the 1930' contour level) had been removed, and limestone was encountered in an easterly extension of the workings. For a short period subsequently, shale was obtained from Block 46 at the corner of Belconnen and Yass Roads. Concurrently, geological mapping of the Deakin Pit was undertaken to delineate areas that were free of limestone and could safely be worked to a greater depth (Gardner and Prichard, 1957).

Investigations were then started towards finding fresh deposits of shale. The approach to this work and the areas or localities in which it would be conducted were of necessity controlled by the geology of the Canberra District and surrounding areas. This is outlined in the following paragraphs.

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<sup>1</sup> Some of the words are not clear on the original document and I am not familiar with geological names – apologies for any errors in spelling.

**TABLE 1**

**GEOLOGICAL SUCCESSION, CANBERRA DISTRICT, WITH REFERENCE TO BRICK SHALE.**  
**MINOR ROCK UNITS UNSUITABLE FOR BRICKMAKING ARE OMITTED**

<b><u>Geological Age</u></b>	<b><u>Formation Name</u></b>	<b><u>Lithology</u></b>	<b><u>Suitability for brickmaking</u></b>	<b><u>Notes on Distribution &amp; Availability for Expenditure</u></b>
Recent (A)	(Qa)	Silt, sand & unsuitable gravel	In river flats	
Pleistocene (Q)	Lyneham Lake beds (Q1). Lake beds, not differentiated (Qa)	Clay, silt, sand, & gravel, commonly with matrix of clay	Probably the clayed beds could be utilized in an extrusion method. Not suitable for Canberra brickworks or for large-scale production	Cover large areas of Turner, O'Connor, Lyneham, Dickson, Fyshwick & Fairbairn Aerodrome. All these areas are developed and are not available for mining.
Permian (P)	Fyshwick Gravel (Pg)	Gravel beds: cemented	Unsuitable	Several deposits in Fyshwick, Reid and Acton
Lower Devonian (D1)	Narrabundah Ash stone (Dln) and Ainslie Volcanics (Dla)	Lava and tuffs, mainly dacitic	Unsuitable	Large areas covering Duntroon, Mt Ainslie and Mt Majura; east and south-east of Narrabundah; south of Canberra
Upper Silurian (Su)	Mugga Porphyry (Sum) and Mt Painter Porphyry (Sup)	Igneous rocks	Unsuitable	A broad belt that extends north-west beyond Black Mt Creek and south-east beyond Narrabundah
	Yarralumla formation (Suy)	Mudstone, siltstone, shale, sandstone, tuffaceous beds and limestone lenses. In places has been...(can't read)	Suitable. Exploited at Yarralumla and Deakin. Limestone to be avoided. The hornfelsed are hard resistant and unsuitable.	Occupies Yarralumla and parts of Deakin and Red Hill, and a narrow belt extends into Woden District. Red Hill is composed of hornfelsed beds.  Nearly all in developed areas and not available. A narrow band across Kent Street (Federal Deposit) found on

				testing to be slightly hornfelsed and unsuitable.
Upper Silurian (Su)	Deakin Volcanics (Sud)	Acid volcanic rocks interbedded with tuffaceous sandstones and in places tuffaceous shales with limestone bands.	Mainly unsuitable; possibly small reserves in thin shaly members. These are likely to contain limestone	An area of up to 6 miles wide extending to 12 miles south of Canberra consists almost entirely of volcanic rocks and minor tuffaceous sediments, all unsuitable for brickmaking. A thin shaly member in Kent Street near the Cemetery was sampled for the brickworks. It contains hard calcareous bands and is difficult to work.
Middle Silurian (Sm)	Gladesfield Volcanics (Smg)	Acid volcanic rocks	Unsuitable	A belt that runs north from the western side of Fairbairn aerodrome
	Mahon Formation (Smh)	Calcareous shale, limestone and tuff	Not tested. Outcrop near Mahon Trig. May be too hard at a shallow depth	Near Mahon Trig; south of Fyshwick industrial area. Doubtful whether mining would be undertaken in area that is being developed.
	Molonglo River Formation (Smr)	Calcareous shale limestone and tuff	Mainly unsuitable but possibly small areas of suitable shale could be found	Small areas in Fyshwick. Larger area west of Mt Majura. Probably available west of Mt Majura.
	St John's Beds (Slh)	Volcanic rocks interbedded with tuffaceous mudstone, sandstone, limestone and shale.	Mostly unsuitable. Possibly thin shaly members could be found free of limestone.	Small outcrops south of St John's Church. A larger area north of Mt Ainslie. Not available. Probably not available.
Lower Silurian (Sl)	City Hill Shale with limestone bands and lenses	Generally it is insufficiently weathered, and as a result is hard. Contains too much limestone.	Forms eastern half of City Hill and southern slope of hill on north-eastern side of	Not available

		Commonwealth Bridge	
	Riverside Formation (Slr)	Calcareous shale and mudstone, fined grained sandstone...(unreadable)	<p>A thick formation with varying lithology. Some portions unsuitable but ...areas known of...(unreadable)</p> <p>Much of the built-up area of Canberra is underlain by Riverside Formation. Large area of shaly sediment... (unreadable). A considerable volume and sandy and silty sediment is being obtained from Cork Hill...Parliament...(Unreadable).</p>
Lower Silurian (Sl)	Turner Shale (Slt)	Calcareous mudstone with thin layers of fine grained sandstone, thin tuffaceous bands and impure limestone laminae.	<p>Probably suitable for making bricks.</p> <p>Fairly large area in Turner and smaller areas in O'Connor and Lyneham, generally beneath 10ft or more of lake sediment.</p> <p>Not available</p> <p>The large area of probable Turner Shale along Gundaroo Rd, south of Mulligan's Flat. The same shale occurs at and north of Mulligan's Flat. Much of it is hornfelsed and is too hard for brickmaking, but suitable material is available in some of the less elevated country.</p> <p>Available but is probably slightly hornfelsed and too hard at a shallow depth.</p>
	State Circle Shale (SlS)	Non-calcareous sandy shale and black shale with beds of fine grained sandstone.	<p>Suitable for brickmaking. Free of limestone.</p> <p>Western side of State Circle. Narrow belt north of Black Mountain exposed in</p>

				Etheridge Creek. Large area in Belonnen running north-north-east through Navel Wireless Station.
				Not available. Suitable for residential areas. Available reserves small. Main reserves in Wireless Station and CSIRO property are not available. Limited reserves outside these properties.
	Camp Hill Sandstone (Slc)	Sandstone	Not suitable	Camp Hill and Capital Hill
Lower Silurian or Middle Ordovician	Shale north of Mt Jerrabomberra Queanbeyan	Weathered grey and buff shale.	Suitable.	Relatively small area north of Mt Jerrabomberra.
Upper Ordovician (Ou)	Acton Shale (Oua)	Siliceous shale.	Not suitable	Fairly large areas north of Black Mountain. East and north of Mt Jerrabomberra. North and east of race course Acton. Small area north of Westlake cottages. Has been utilized [the old quarry - now Attunga Point].
		Weathered p...siliceous shale	Suitable for cream face bricks	
Middle Ordovician (Om)	Muriarra Formation (Omm)	Interbedded shale and greywacke	Not suitable	Large area extending northward from Queanbeyan past Fairbairn aerodrome.
	Pittman Formation (Omp)	Interbedded sandstone, shale and mudstone	Not suitable	Large area north and west of Black Mt. Large area around Mt Jerrabomberra.
? Lower Ordovician	Black Mountain Sandstone (O1)	Hard sandstone	Not suitable	Black Mountain, Capital Hill, Mt Jerrabomberra