The soils beneath Australia's first successful wheat crop: evidence from archaeological sites at Parramatta

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Historical events prior to sowing

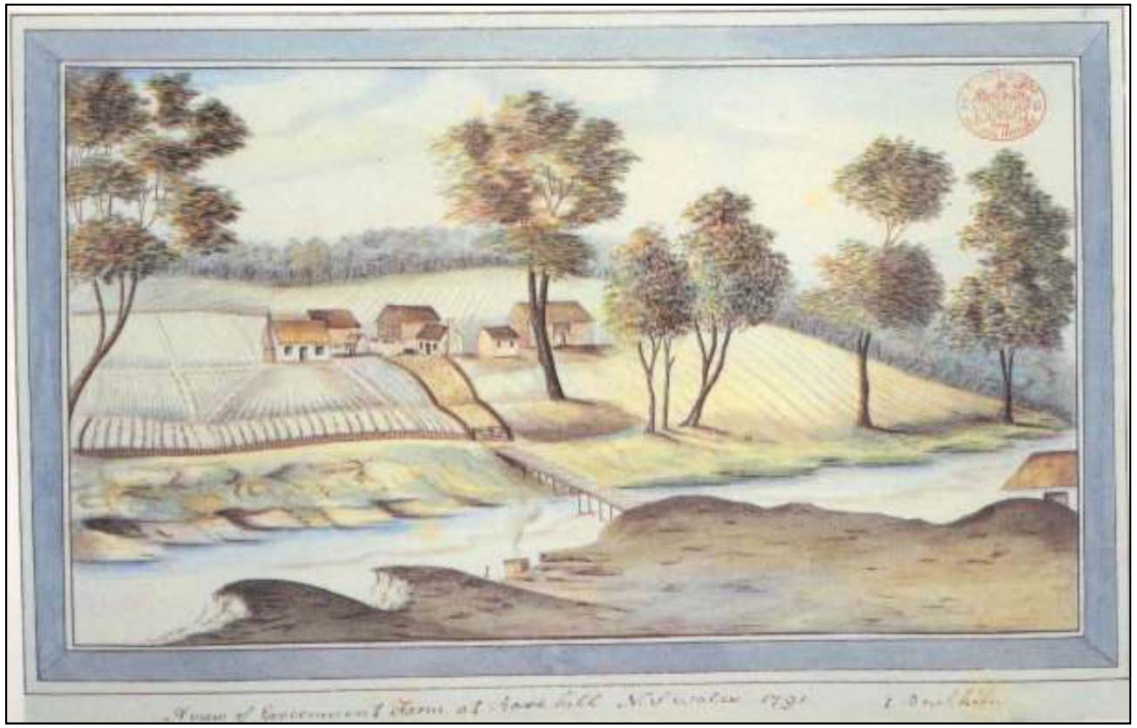
September 1788– failure of first wheat crop near Sydney Cove, partly due to seed damage.

October 1788–"Sirius" sent to South Africa for new seed.

November 1788— site for second settlement chosen, 23 km upriver at Parramatta.

Jan.- April 1789 -- land clearing commences; military redoubt and convict barracks built.

May 1789—"Sirius" returns with viable seed and other supplies.

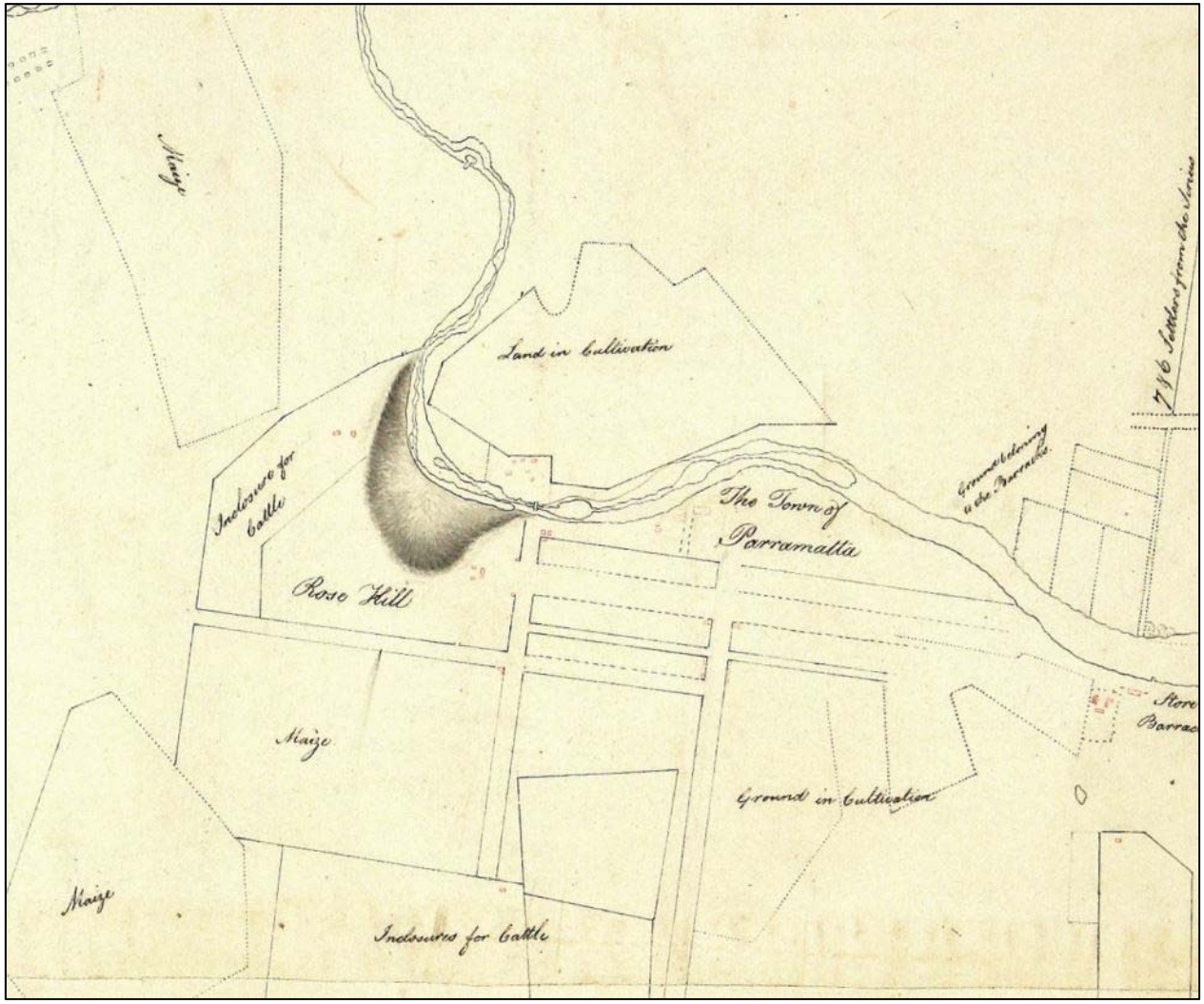


A view of Government Farm at Rose Hill N.S. Wales, 1791, Port Jackson Painter, Watling and Lambert Collection, Natural History Museum, British Museum.

Early cropping history at Parramatta

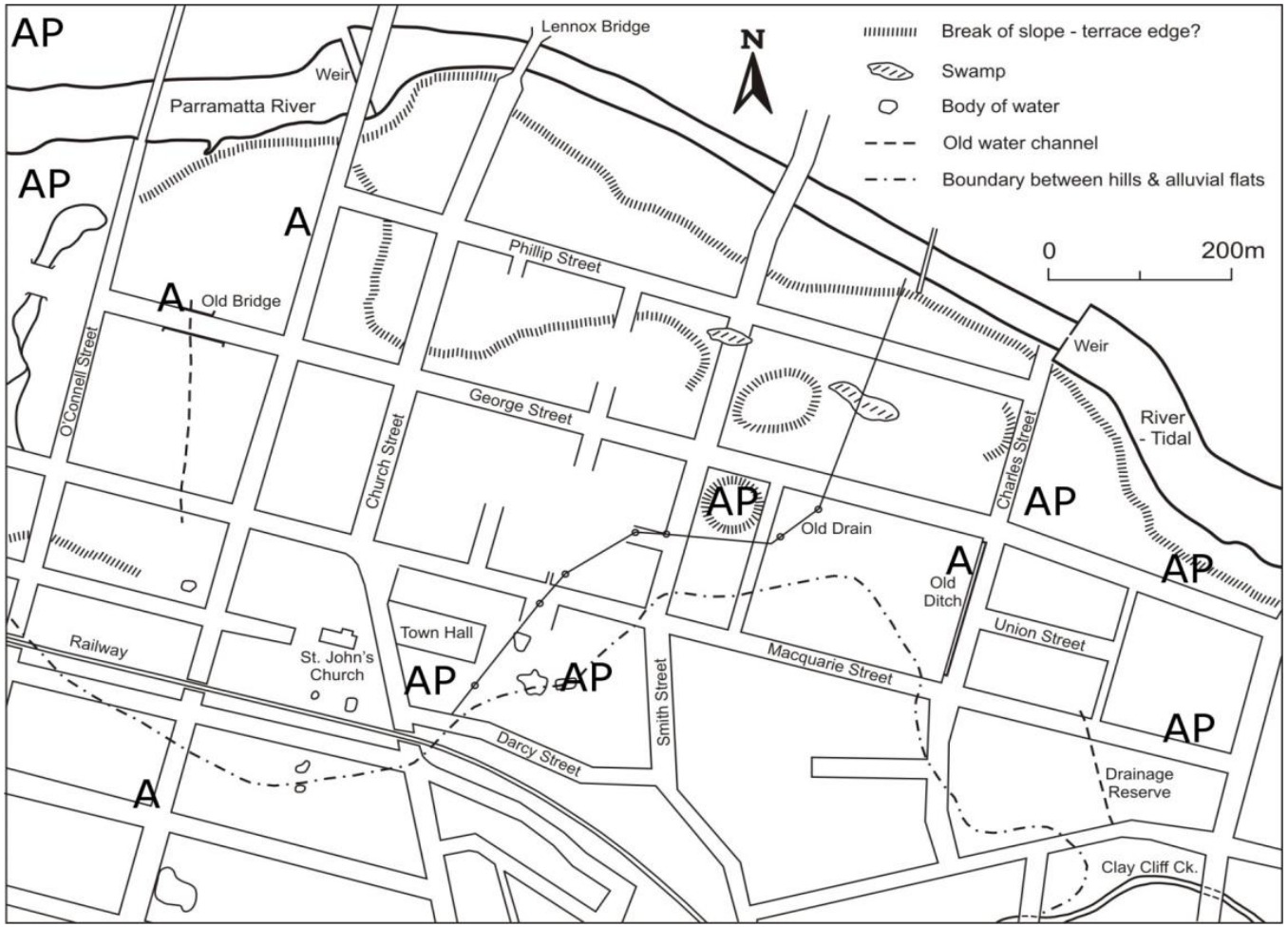
June, July 1789 – wheat sown on north side of river
December 1789 -- crop harvested, yield 200 bushels (about 600 kg/ha).

1790–drought year for wheat, barley and oats; 22 ha sown in May and June on both sides of the river; wheat harvested in November, yield about 900 kg/ha.



Map of Parramatta c. 1791 [Bonwick Transcripts ML SLNSW].

Landscape features at Parramatta, showing location of some archaeological sites where soil profiles have been described (A) and sampled for phosphorus testing (AP).



Original 1789 government farm is located on an ancient alluvial terrace–

-right next to Western Sydney Stadium (WSS) construction site, July 2017.

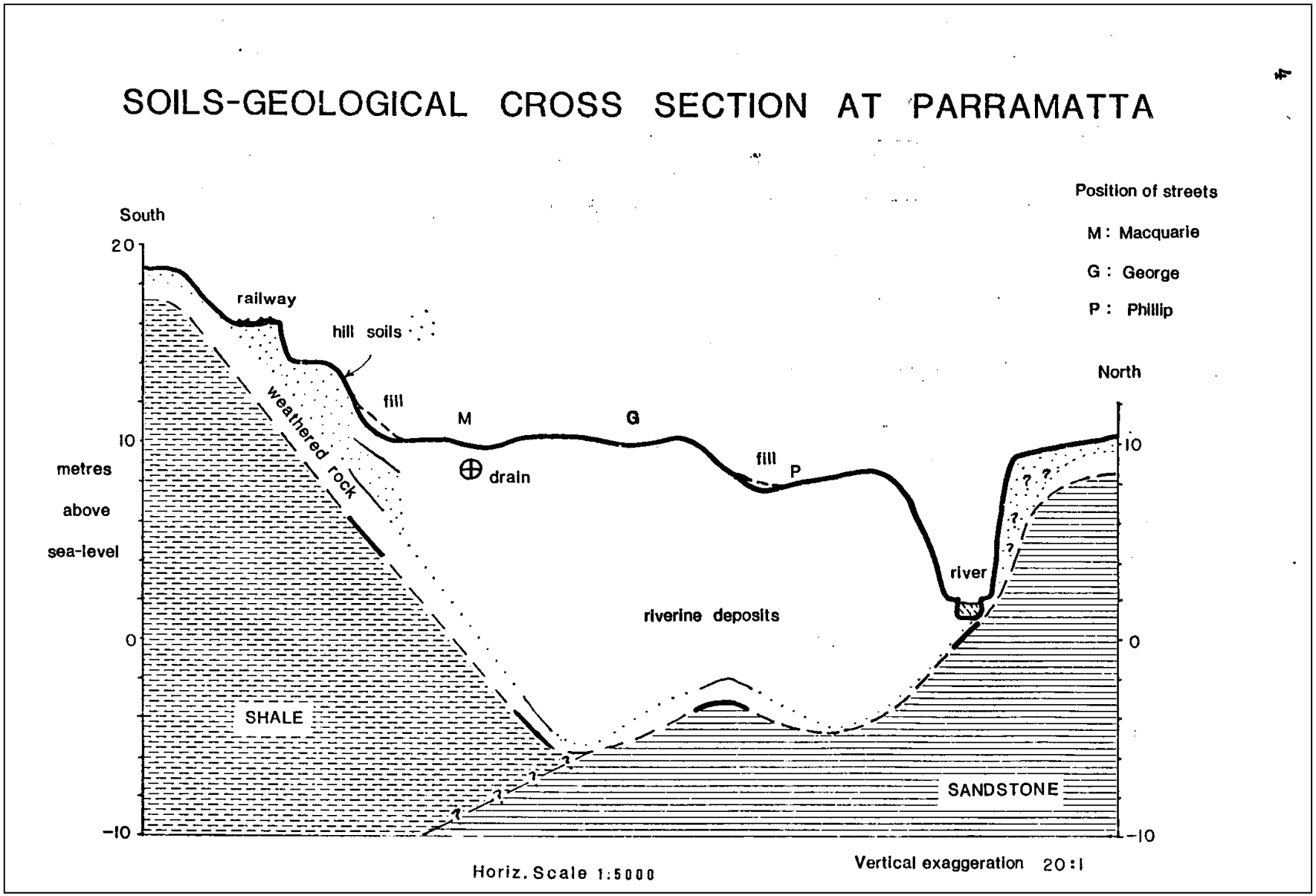
(Above) At the time of sampling, much of the upper profile had been removed or truncated in the 1970's, and a 1 ha pit 4m deep had been excavated to accommodate the football field.
This exposed huge colourful mottles in the floor of the pit.

(Right) South of the pit the upper soil horizons remained, apparently intact.

Western Sydney Stadium
river terrace kandosol
(sampling depths in cm)

0-10: light greyish brown loam with flecks of charcoal
12-17: light yellowish brown sandy loam with fine roots
33-40: light brown sandy loam with soft Fe/Mn concretions
50-60: light reddish brown fine sandy loam
75-85: reddish brown very fine sandy clay loam

The town centre of Parramatta is located on riverine sediments >10m thick. (Lawrie 1982)



In early 2016 furrows of grey light clay topsoil were exposed underneath a former concrete roadway off Macquarie Street, 3 Parramatta Square.

Photo: Casey & Lowe P/L.

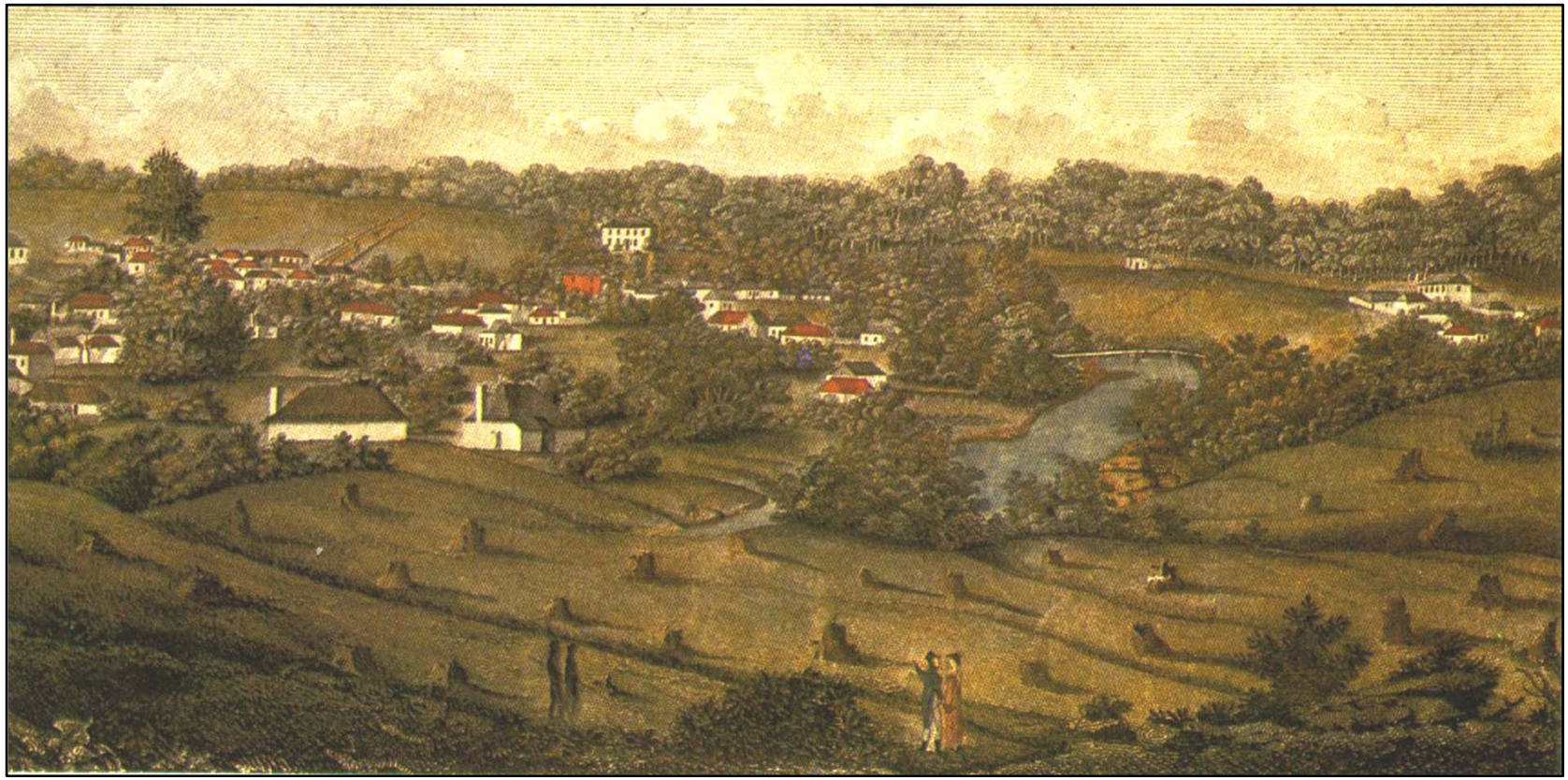
A well-preserved A_1 horizon was previously sampled in December 2015, 20m from the furrows buried beneath a layer of sandy fill.

A detailed pollen study found –
"evidence that the sample represents the early 1790's clearance phase".

Regarding the A_2 horizon, the study also found –
" compelling evidence that the soil sample predates European settlement at Parramatta in 1790."

Manure, the main P source for crops in the colony, remained too scarce and expensive for most farmers, due to the shortage of livestock.

“without the assistance of manure, which is probably out of his (i.e. the pioneer farmer’s) power to procure, his lands will continue decreasing in produce, so that at the end of six years, the soil will be entirely exhausted..” - prominent gentleman farmer John Oxley, 1820.



"View of part of the town at Parramatta in New South Wales", by John Eyre, 1812.
(SV1B/PARR/10. Mitchell Library, State Library of New South Wales).