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Dealing with future water resources requires looking to the past

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ABSTRACT

Problems associated with water supply and resources will in the future have to be solved by using the most recently developed techniques in water engineering science, hydrology and the environment. These developments however should not fail to recognise the considerable expertise in exploiting water resources evident in the prehistoric record of Australia.

It is beneficial to establish an awareness of the skills demonstrated to solve water management problems in prehistory when approaching present day attempts in this field. Unfortunately, to date little attention has been paid to the proficiency with which prehistoric people found and utilised water resources in Australia. A remarkable expertise existed in gathering, storing and conserving water in a wide range of environments in American Prehistory.

A variety of food types were obtained from water in rivers and creeks, as well as from marine and estuarine environments. These resources were exploited in a variety of ways. Shell fish and crustaceans were collected along ocean shores and harvested from rocks and by diving. Fish were caught with spears, traps and nets. Fishing was also carried out from canoes with hooks and lines. Exploiting aquatic resources using fish traps was widespread across the Australian continent.

Examining these practices of the past is enlightening and quite valuable.

Key words | Australian aborigines, coastal fish traps, early explorers, river fish traps, water retention

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NOMADIC LIFESTYLE: SIGNIFICANCE OF WATER

Within their nomadic existence the Australian Aborigines possessed great logistic skills, they were also proficient in making use of their varied environment. In their daily life, suitable locations were needed for the family group to stop, gather, prepare and eat food, and to sleep. The protective sites for this could be rock shelters or caves, others might be gunyahs, i.e. specially built huts made of boughs and bark. The length of stay was usually no longer than a day, but could occasionally be extended, depending on the food obtainable, but most important was the availability of fresh water. For occasional, larger assemblies suitable accommodation with adequate water and food had to be provided. A knowledge of the terrain under varying weather conditions was essential.

Aboriginal people utilised surface water courses, as well as under ground water sources. Special hydraulic structures were built to protect and harness potable water, as well as obtain food from water in many places.

WATER RETENTION

Native wells

Native wells were sunk in soil or sand and usually contain only a meagre supply of water. They are frequently hidden under the cover of a bush, or in the midst of a thicket, today they can be easily missed. Some wells were sunk with a slight curve, or formed serpentine in the down course, the retained water being shielded from the direct rays of the burning sun, thereby ensuring a minimum of evaporation.

Table 1 | Nine Simpson desert wells

Well no.	Access	Depth	Water quality	Habitation	Distance
1.	Small/tight	3.6 m vertical	Good	Major	
		2.4 m sloping			
2.	Shallow conical	2.75 m slightly angled	Poor-salt lake nearby	Minor	21.7 km
3.	Not in centre of depression	6.0 m	Good	Major	27.8 km
4.	Dense tree coverage	??	??	Minor	
5.	Conical well depression	4.0 m	Good	Major	26.1 km
6.	1.3 m diameter	3.6 m	Good	Minor	17.8 km
7.	2.5 m	5.2 m	Bitter	Major	
8.	Clean cut	6.7 m	Good	Major	33.0 km
	Seismic line through*				
9.	Dug out by seismic surveyors*	6.0 m initially	Now foul	Major	14.5 km
	Badly disturbed				

*The seismic survey was carried out by the French Petroleum Company of Australia in 1963 to ascertain possible petroleum resources below ground level in the vicinity of this line.
1. Murrabutt or Marubadi; 2. Beelpa or Pilpa; 3. Bolrcoora or Palkura; 4. Pudlowinna; 5. Beelaka or Pirlaka; 6. Wolporican or Walpurkanna; 7. Booloburtinna or Pulabutu; 8. Perlanna or Tjarlpa Parkulu; 9. Kilpatha or Tjilporta.

Native wells vary in depth from half a metre to about six metres. The bottom is often enlarged in depth and size to give greater capacity. Wells have been found in numerous remote locations, sometimes in desert conditions. It is often difficult to reach the water from the ground surface because of the narrow entrance. Knowledge of the location of water sources formed an important aspect of survival in sometimes difficult environments.

For some wells special covers were built to minimise evaporation and to ensure the maintenance of water quality.

Early explorers

Some time after Australia became a convict colony, exploration of the interior began. Extensive reports of these expeditions mention, *inter alia* the existence of native wells.

An important early explorer was the German scientist Dr Ludwig Leichhardt, who in 1844–45 traversed an extensive area in northern Australia. His journey covered about 3000 miles (5000 km) from Moreton Bay to Port Essington. In his party two Aborigines were particularly helpful in enabling him to find numerous native wells, which provided essential water supply to the members of the expedition and their beasts.

Native wells exist all over Australia. Numerous explorers found access to a few of them.

In 1886 the Licensed Surveyor and Explorer, David Lindsay, set out on a journey from Dalhousie Station in South Australia. He travelled to near the Queensland boundary '. . . a distance of 430 miles [688 kilometres] and fixed the position of nine new wells.' (Lindsay 1886).

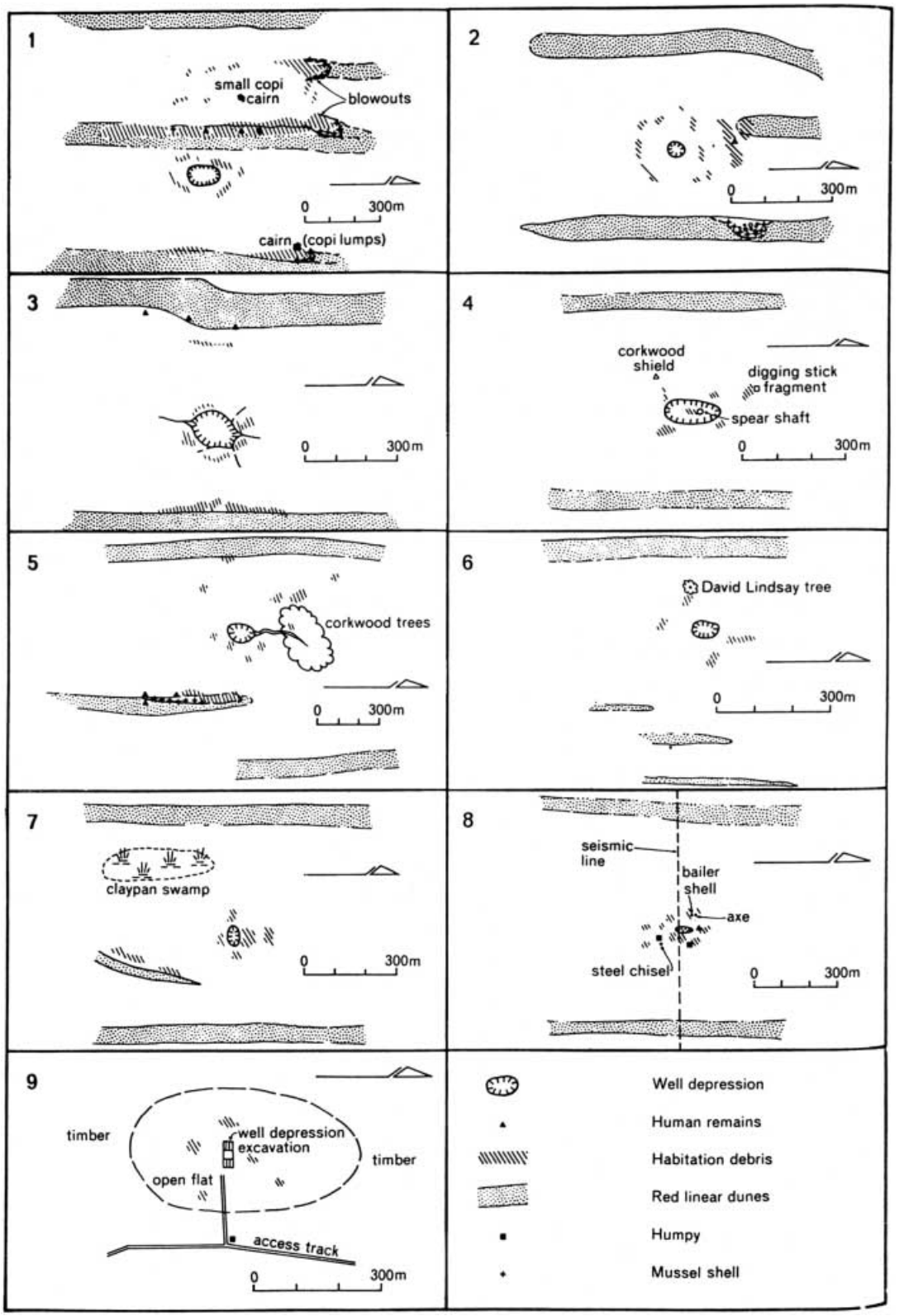

Figure 1 | Nine Simpson desert wells.

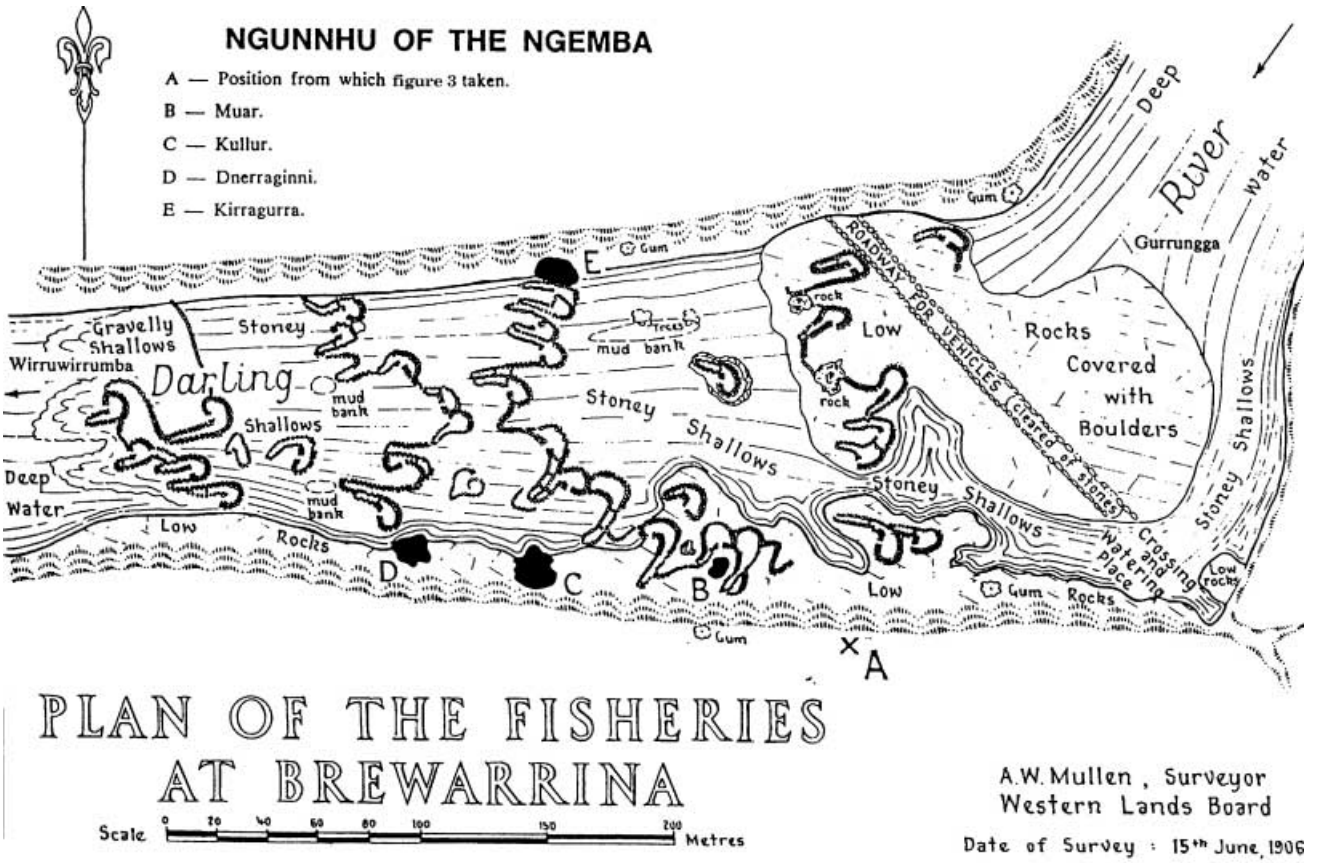

Figure 2 | Plan of Fisheries, Brewarrina.

The locations around the wells were centres for the Wangkanguru people. Many years later, however, they were abandoned by them because of social pressures.

In 1983 an academic group visited the wells, following David Lindsay's report and described them in some detail in an academic paper (Hercus & Clarke 1986) (Table 1 and Figure 1).

Rock pools

Rock pools are depressions in the surface of rocks, which hold water from precipitation for a limited time. They range from very small to almost cave size. Small ones hold only a few litres; large ones may contain several cubic metres almost permanently. Many such rock pools existed and were used throughout Australian prehistory. Artefacts that may be encountered in the vicinity of these rock pools can establish the time when they were used. In many locations attempts were made by the Aborigines to protect these water storages from evaporation, from being filled with leaves and tree branches or from pollution by animals.

Rock pools have, however, often been obliterated by residential development.

Rock pool at Kelly's Bush

A good example is in Sydney, in the municipality of Hunter's Hill. In the small public reserve of Kelly's Bush, about 30 m from the shore is a fairly large rock platform, about 11 m across × 5 m wide. Almost in the middle of this platform is a rock pool approximately 3 m long and possibly 1.3 m deep. The importance of this rock pool is the fact that there are no fresh water streams on the whole of the peninsula.

Figure 3 | Fisheries at Brewarrina.

FOOD FROM WATER

Extensive food resources are contained in the waters of lakes, rivers and creeks, as well as in the coastal waters surrounding the continent. They contain essential food assets, which may be important for survival.

Fish and eel traps

Lake Condah, Western Victoria

One example is the huge system of fish traps in Victoria, near Mount Eccles connecting Condah Swamps to Lake Condah and linked to Darlot Creek. It was described in great detail in '*Aboriginal Engineers of the Eastern District, Victoria*' (Coutts 1978).

The Aborigines constructed an elaborate network of canals and traps in the original water course to direct the flow of water. They built stone walls up to 1 metre high and more than 50 metres long using blocks of volcanic basalt, which litter the district. The canals linked to them were up to 1 metre deep and nearly 300 metres long. They were dug with digging sticks.

Fish swam into the narrow channels and were caught in traps inserted in the gaps in the stone walls. Various types of net woven from local reeds were used. Eels were

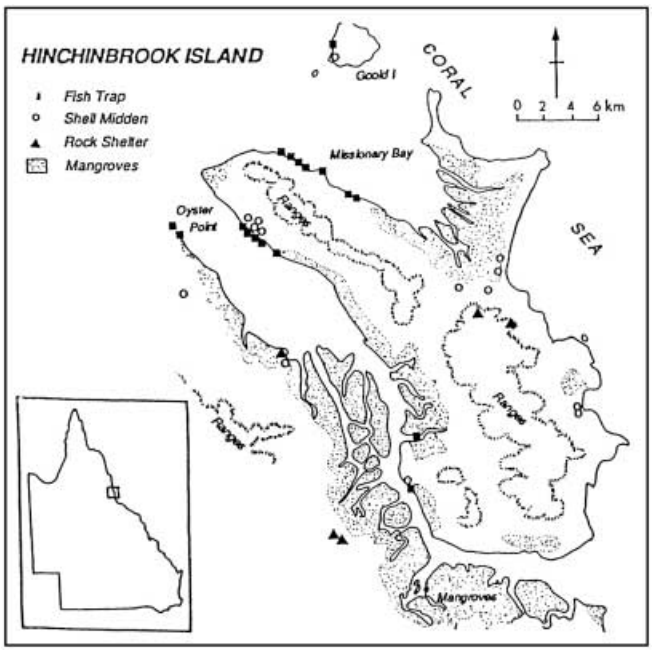

Figure 4 | Hinchinbrook Island, plan.

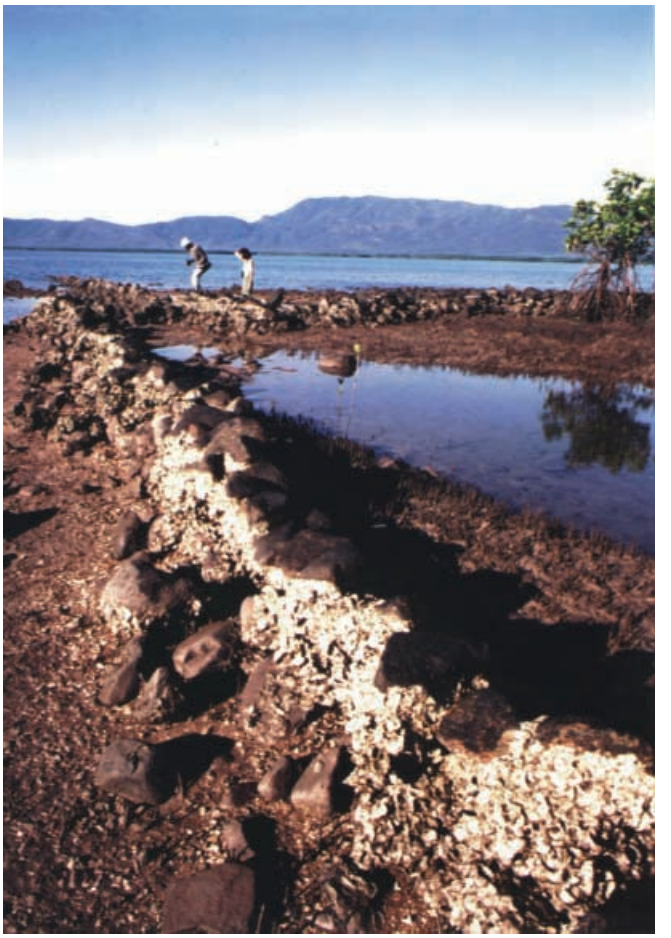

Figure 5 | Hinchinbrook Island Fish Trap.

probably the main species caught during their annual migrations, upstream in spring and downstream in autumn. It is estimated that less than 20 people were required to operate the traps once they were built. Aboriginal fishermen made optimal use of the topography, which lends itself to this fishing industry in fresh water. The Aborigines understood the hydrology of the lake and used it to full advantage.

The construction of such a complex fishing system, without the use of surveying aids, confirms that the Aborigines certainly possessed and applied considerable engineering ingenuity. It has been established that the fish traps could have been in operation for about 8,000 years.

The original water course and holding basin has been much altered to suit European agriculture and flood protection.

Brewarrina, Barwon River, Northern New South Wales

In northwestern New South Wales the Barwon–Darling forms a riverine system, large by Australian standards. An extensive structure was built by Aborigines to establish means to obtain good fish supplies at the right seasons. The stone pens were erected across the Barwon River using boulders to form a complex maze of weirs and pens stretching along about 500 m of the river on a low bar of sandstone (Figures 2 and 3).

The stone walls are between half and one metre in height and about half a metre at the base. They formed tear-drop shaped enclosures and were kept in good repair especially before the spawning season in the spring, when vast numbers of fish would travel upstream. As soon as enough fish had entered the trap, men and women would block up the openings. The fish were then herded into smaller enclosures, where they could be speared, clubbed, or caught more easily by hand. Pens at different heights came into operation in sequence, as the water level in the river rose or fell. Great care was taken that no trapped fish

should escape, for fear that they would swim away and might warn their fellows 'about the ingenuity of their enemies' (Flood 1990).

The traps originally extended further downstream but portions have been lost in more recent floods and by the removal of stones either for the passage of boats, or for buildings in the town. Here again we have an example of an Aboriginal engineering structure, built rather skilfully without special surveying equipment, at an appropriate location, to exploit the food resources available in the flowing river environment.

With the coming of the white man, the Aborigines were prevented from using the fishery. A mission station was established, imposing restrictions on movement. This allowed the traps to partly fall into disrepair. An Aboriginal cultural centre has been established in Brewarrina at the fish trap site recently, which is being jealously maintained.

Marine fish traps

Hinchinbrook Island, North Queensland

Along the North Queensland coast, 160 km north of the main city of Townsville, is a small township of Cardwell. Across a drowned river channel is the attractive Hinchinbrook Island. The island is a part of the extensive Great Barrier Reef. It is the world's largest island national park. Numerous fish traps can be found mainly along the northern part of the island (Figures 4 and 5).

The low walls of the tidal fish traps are cemented together with rock oysters. The total area of fish traps is about 2.16 km^2.

Obviously good knowledge of the tides and use of oysters as cementing medium show outstanding engineering application (Thorsburn 1974; Flood 1990).

Shell fish and crustaceans were collected along ocean shores and harvested from rocks and by diving. Fish were caught with spears, traps and nets. Fishing was also carried out from canoes with lines and hooks.

However, details of these activities cannot be included in the presentation because of space limitations. Some have been presented in other papers by the author (Bandler 1999*a*,*b*).

CONCLUSIONS

Native wells and rock pools were significant for water retention, indicating the ability of the Aboriginal groups to adapt to sometimes very adverse environmental conditions. The chosen sites indicate that food resources must have been available in the vicinity. This made them centres for groups to rest. Not only was there an accommodation to the scarcity of water, but the Aboriginal groups were apparently able to maintain reasonably adequate living standards for the relatively small community groups. It is regrettable that it would not be possible, nor acceptable to follow these practices of the past, in our present day society. It can also be observed, and is significant, that unfortunately many of the locations have been abandoned or been lost.

The concern with water by the Aboriginal people is consistently found to be significant, independent of whether they were groups living in close proximity to the ocean, or in areas where more or less extensive fresh water was available by such features as lakes, rivers and creeks, or in the dry inland, even desert areas. Unfortunately details of the methods of fishing and gathering other aquatic resources cannot be dealt with in this limited paper.

Based on the material presented it can be correctly claimed that 'Australian Aborigines were exploiters, conservators, managers and manipulators of water resources' (Lloyd 1988).

As illustrated only few of the hydraulic structures built by the Indigenous inhabitants of Australia can be applied for water supply or food exploitation in our present day and future water science. It is, however, important to recognise the significant heritage treasure bestowed on the present and future generations from Aboriginal Australians concerned with the task of dealing with the demand of water for the population on a continent with very limited water resources.

REFERENCES

Bandler, H. 1999*a* Exploiting maritime food resources on the Pacific Rim in pre-European Australia. Australian Institute for

Maritime Archaeology Inc. (AIMA) 19. *Annual Conference, 'The Pacific Rim'*, Australian National Maritime Museum, Darling Harbour, Sydney, 18–21 September 1999.

Bandler, H. 1999*b* Expertise in finding water and exploiting water resources in Australian prehistory. *International Conference on Water, Environment, Ecology Socio-Economics and Health Engineering*, Seoul, Korea, October 18–21, 1999.

Coutts, P. J. F., Frank, R. K. & Hughes, P. 1978 *Aboriginal engineers of the Western District, Victoria*. Victoria Archaeological Survey.

Flood, J. 1990 *The Riches of Ancient Australia*, pp. 256–257 & 130–131. University of Queensland Press.

Hercus, L. & Clarke, P. 1986 Nine Simpson Desert Wells. *Archaeology in Oceania* **21**, 51–62.

Lindsay, D. 1886 Report of journey from Dalhousie to the Queensland boundary submitted to the Minister of Education, Adelaide, 29th January 1886.

Lloyd, C. J. 1988 Either drought or plenty. N.S.W. Water Resources Commission.

Thorsborne, A. & Thorsborne, M. 1988 Hinchinbrook Island–The Land Time Forgot. Weldons, Sydney.