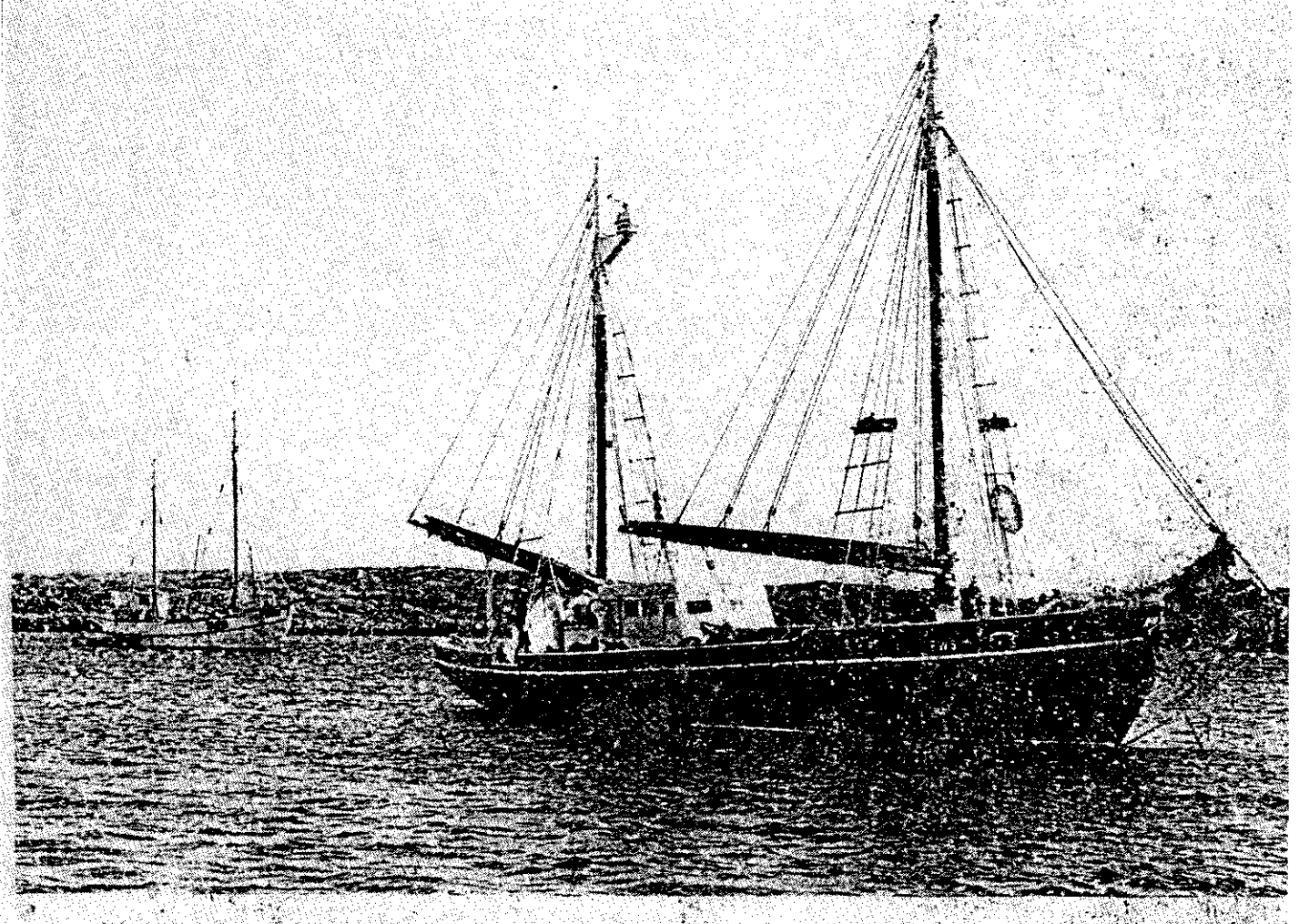
A Survey of Sites Associated with Early Pearling Activities in the Monte Bello Islands, Western Australia

By
Myra Stanbury



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(Front cover - North-West pearling luggers E.W.S. and Voltaire

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2. Charts and Maps:

(i) Australian Admiralty Charts
Monte Bello Islands AUS 60060 and AUS 60061
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Abbreviations

B.L.	Battye Library, Perth, Western Australia
G.D	Governor's Despatches
H	*Herald*
I	*Inquirer*
L.& S.	Lands and Surveys Department, Perth, Western Australia.
M.N.L	Mercantile Navy List
T.B.M.	Temporary Bench Mark
W.A.	*West Australian*
W.A.P.D.	Western Australia, Parliamentary Debates

1. Introduction

One of the most valued maritime resources in the north-west of Australia is the pearl oyster. Thriving only in warm water, this delicate creature inhabits the coastal waters from Exmouth Gulf to Wyndham (Fig. 1). Long before European colonization, the lustrous mother-of-pearl shell was exploited by Aborigines, in particular those of the Kimberley region. Collected from the tidal mud-flats of this extensive stretch of coast, the shell was used to manufacture decorative ornaments such as pendants (Mulvaney, 1975:114). Through networks of exchange, the distribution of Kimberley pearl shell objects became widespread across Australia, reaching locations over 1600 km away (Mulvaney, 1975:111, Fig. 14). In these remote localities, the ornaments became highly prized and sacred objects in rituals, frequently being associated with clouds and rain-making ceremonies (Bindon, 1986: pers. comm.).

European navigators and explorers to the North-West were equally attracted to this resource. Their interests, however, were based on purely economic factors, coupled with the desire to expand colonial settlement to the hinterlands of the Swan River Colony. Any opportunity to create and develop viable export industries was eagerly sought since, without an independent income, the colonists had little hope of establishing a self-sustaining economy, free from Imperial constraints. A period of depression in the 1840s was followed by intensified efforts on the part of the more enterprising settlers to explore new avenues of trade.

Attempts were made in the 1850s to harvest seed pearls from the mollusc species Pinctada imbricata at Shark Bay, but the industry never achieved the economic importance of later developments, firstly at Cossack, then at Broome. By 1866, a Roebourne grazier, W.F. Tays, had proved that the exploitation of the prized Pinctada maxima, or silver-lip shell, at Nickol Bay was a profitable activity (Bain, 1982:15). With his initiative, the foundations of the Western Australian pearling industry were laid.

As with all new discoveries, would-be pearlers rushed to the North West, anxious to participate and profit from this new venture. Fears that the industry would be short-lived were initially allayed by the continual discoveries of abundantly populated pearling banks, making this one of the richest pearling grounds in the world (Bain, 1982:19). The pearl oyster, however, is a fragile organism: it is susceptible to attack by a host of enemies, often resulting in long unproductive periods. Furthermore, it may take up to five years to reach maturity and produce spat.

During the initial years of pearling, little or no attempt was made, either by the Government or the pearlers themselves, to guard against over-exploitation and depletion of the pearling beds. The free-roving pearlers were more concerned with recouping their financial outlays as quickly as possible than with conservation strategies which might prolong the industry for future generations. Many of them wantonly fished the

under-size or 'chicken' shell in order to supplement their catch and cover costs (Bain, 1982:265).

While reluctant to introduce a leasing system, the Western Australian Government did agree to the temporary closure of the pearling banks at Nickol Bay in the 1880s. It was hoped that a five year resting period might allow the pearl oyster population to recuperate. This expectation, however, proved negative, little sign of improvement being noted when the grounds were re-opened in 1886 (Bain, 1982:265).

Faced with similar problems, the Queensland Government commissioned a scientific investigation by W. Saville Kent, Commissioner of Fisheries, in 1890. (1) His condemnation of pearlers who removed immature shell was sufficient to induce the Government to legally restrict the minimum size of shell to six (and later five) inches (127 mm) (Bain, 1982:266). In addition, he advocated the 'cultivation' of mother-of-pearl shell as a means of resolving the problem of exhausted pearling beds. So began a series of experimental schemes to develop culture farms.

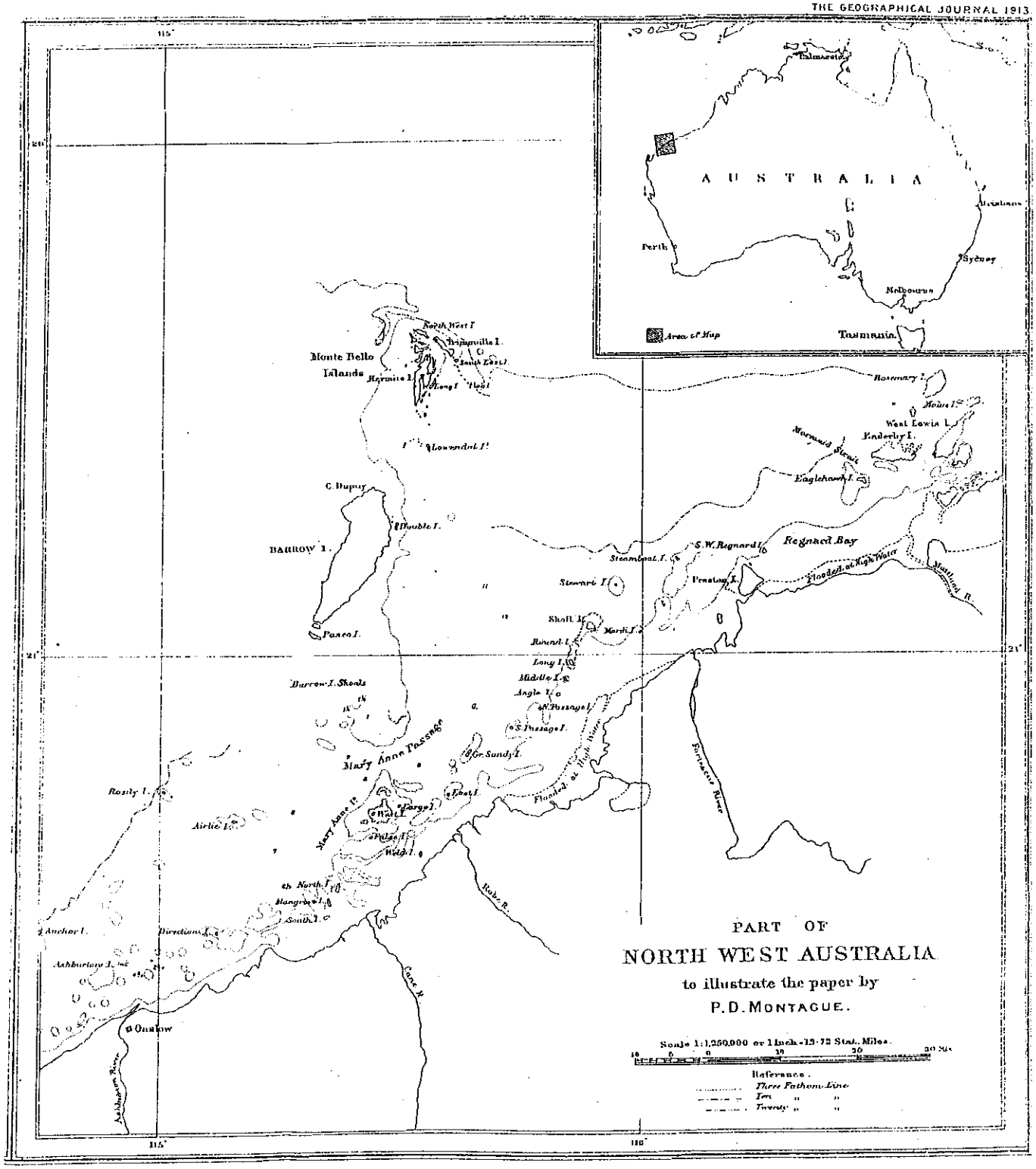
The Monte Bello Islands off the north-west coast of Australia played an important role in these developments. It was here that the first major attempt at 'cultivation' of mother-of-pearl shell was undertaken in Western Australia. A visit to the islands in August 1985 by staff of the Western Australian Maritime Museum provided an opportunity to investigate the location of sites that may have been associated with this activity. The main purpose of the field trip was to re-investigate and positively identify the wreck of the English East India Company ship Trial, lost on the Trial Rocks in 1622 (Green, 1977 & 1985). The pearling project, therefore, was designed as a secondary objective, to be carried out when adverse weather conditions prevented any diving on the wreck site.

This report presents the results of the field investigations together with site plans compiled from field survey observations, Admiralty charts and aerial photographs.

2. **The Monte Bello Islands: Location and Description**

The Monte Bello Islands comprise a group of more than one hundred islands situated 43 nautical miles (79.5 km) north-west of Cape Preston on the north-west coast of Australia (Fig. 1). While many of the islands are merely small rocky platforms, others are several kilometres in extent. The three largest islands are Hermite, Trimouille and North West Island (Fig. 2). Extending over a distance of 12 nautical miles (22.2 km), the islands run in a north-south direction between latitude 20°S and 20.33'S, centred on longitude 115.33'E.

Geologically, the islands are described as consisting of Pleistocene Coastal Limestone formations which are consolidated sand dune deposits (2). The 'Coastal Limestone' (or calcarenite) is further described by Burbidge (1971) as being 'a buff or red coloured highly calcareous, ferruginous, cross bedded sandstone' (1971:2). On inland areas there is



the Royal Geographical Society.

NORTH WEST AUSTRALIA
MONTAGUE

1. Locality map of North-West Australia

extensive cover by loose sand derived from the coastal limestone. Hill (1955) reports that the sand is 90% soluble in dilute acid, thus signifying its high lime content. On the larger islands the sand has been blown into high travertinised dunes covered with typical dune vegetation of spinifex and xerophytic plants.

In general, the vegetation is sparse and varies according to particular habitats. These are described by Hill (1955) as:

(a) crevices in rocks;
(b) sandy beaches;
(c) sand dunes;
(d) inland areas; and
(e) mangrove swamps.

The flora of these habitats is described by both Hill (1955) and Burbidge (1971). There is no fresh surface water on any of the islands and rainfall is low and unreliable. During both summer and winter, however, heavy dew occurs at night, thus affording some moisture for local fauna and flora.

3. **Research Design**

As stated in the introduction, this project was designed as a secondary objective of a major fieldwork programme focussing on the wreck of the English East India Company ship Trial (1622). From previous field experience in 1971, it was anticipated that there would be a certain number of days when weather conditions would prevent work being undertaken on the Trial wreck site. On such occasions, therefore, it might be feasible to employ both staff and volunteers in other useful activities.

The suggestion to investigate the pearling sites in the area was initially raised by Graeme Henderson, Curator of Colonial Wrecks, currently involved in research into Australian pearling luggers (Henderson, 1983). It was felt that information gleaned from field investigations would complement this aspect of colonial maritime history. At least two potential land sites had been observed by Henderson et al. in 1971 and Sledge in 1978 (Sledge, 1979), but details of the sites had not been substantially recorded.

Given the assumption that local variables, (that is, time, weather, accessibility to sites, safety factors and so on), made this a feasible project, a preliminary plan was designed to carry out an exploratory investigation of the islands in the Monte Bello Group with the aim of:

(a) re-locating land sites observed in 1971; and
(b) recording any sites not previously recorded in 1971 or 1978. (3)

Based on the preliminary findings, the fieldwork was designed firstly, to accurately locate the sites on an overall map of the Monte Bello Islands. Using existing survey data obtained from the Department of Lands and Surveys (4), the position of each site was to be fixed relative to established bench marks using a theodolite surveying technique. Secondly, the individual sites were to be mapped in order to record particular site features. Mapping would be carried out either by stadia survey techniques or simple triangulation using a tape measure and hand-bearing compass. Thirdly, representative samples of artefacts were to be collected or recorded, (either by drawings or photographs), for the purpose of identification and dating of each site. Finally, the findings were to be synthesized with available documentary evidence in order to confirm questions as to the age, origin and function of each site.

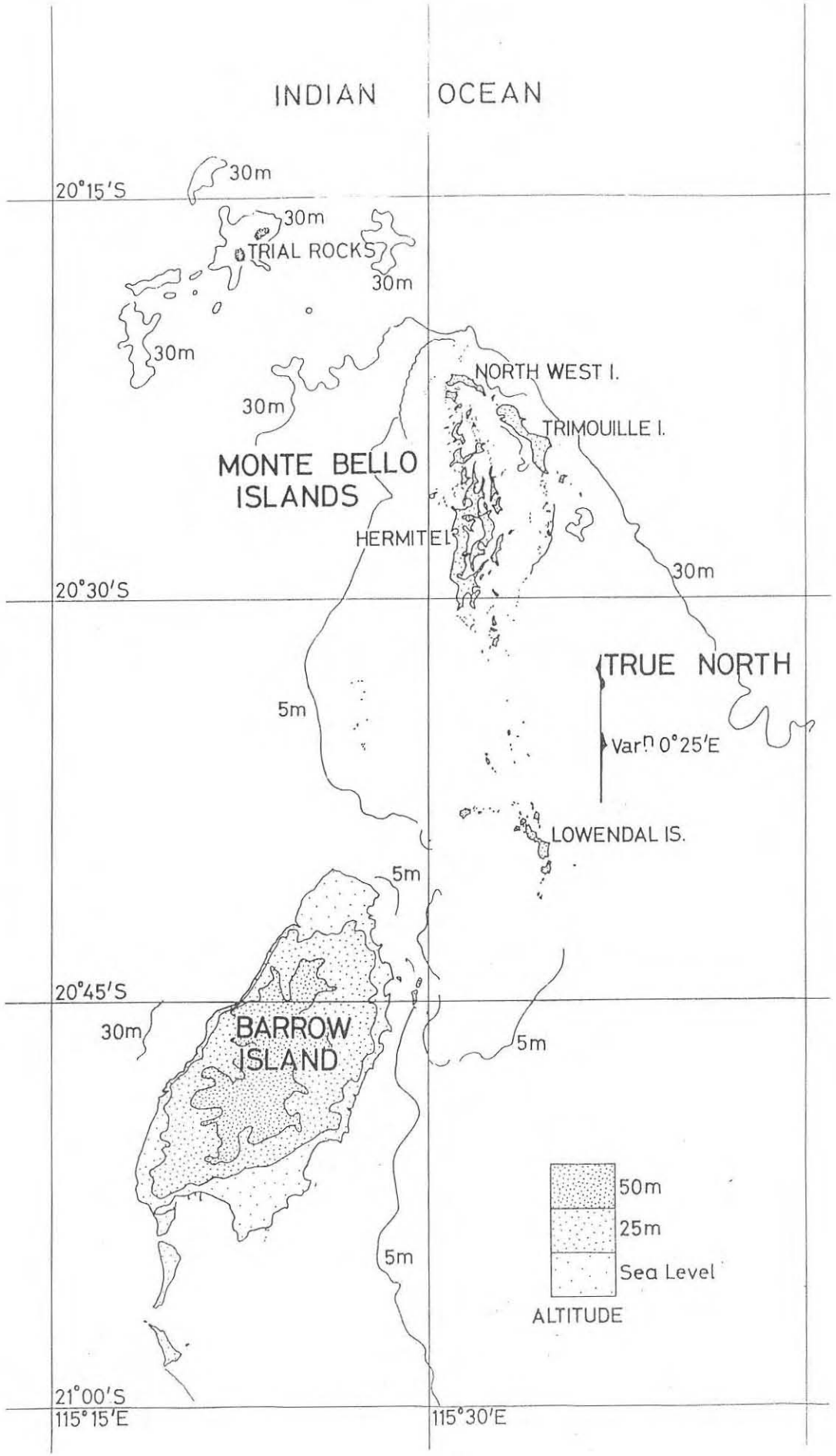
5. **Preliminary Exploration and Observations**

Having established a base camp on North West Island (Fig. 2), a reconnaissance of the Monte Bello Group was planned for Tuesday August 6, 1985. The aim was to allow those unfamiliar with the region to orient themselves. At the same time, it provided an opportunity for potential locations of the pearling activity sites to be identified. Two members of the expedition (Green and Kimpton), had visited at least two possible sites in 1971. Their re-location, therefore, was to some extent dependent on the visual memories of these two people.

The first of the sites was described as a "turtle pen" or "pool with a dam", and the second, a site with "two concrete pits" and a "bottle dump". During earlier visits, a number of bottles were collected from the "dump" and a representative sample retained in the Western Australian Museum's history collection (Kimpton, 1985:pers. comm.)

Available Admiralty charts gave little indication as to where the sites might be situated and aerial photographs proved far more helpful. Viewed through a stereoscope, they revealed a small lagoon with what appeared to be a wall across its entrance. The lagoon lay on the west coast of North Delta Island and was accessible via Faraday Channel (Fig. 3). Since this waterway could not be safely negotiated by the work-boat *Henrietta*, it was decided that a smaller vessel, the *Stancraft*, be taken along as well. The plan was to anchor Henrietta in the safety of the cyclone mooring in Cider Bay (in the Hermite Island Lagoon) and use the smaller vessel to investigate the shallower, less accessible areas of Faraday Channel.

Departing from North West Island c. 10.30 a m, the expedition team sailed via Bunsen Channel to the southern end of Trimouille Island. Changing course to the south-west, the entrance to Stephenson Channel was located and the Henrietta laid at anchor in the protected waters of the Hermite Island Lagoon. The journey of 19 km took approximately 1 1/2 hours. On arrival, a party comprising Green, Kimpton, Stanbury,



2. Locality map of the Monte Bello Islands, drawn from Australian Admiralty Chart Aus. 742.

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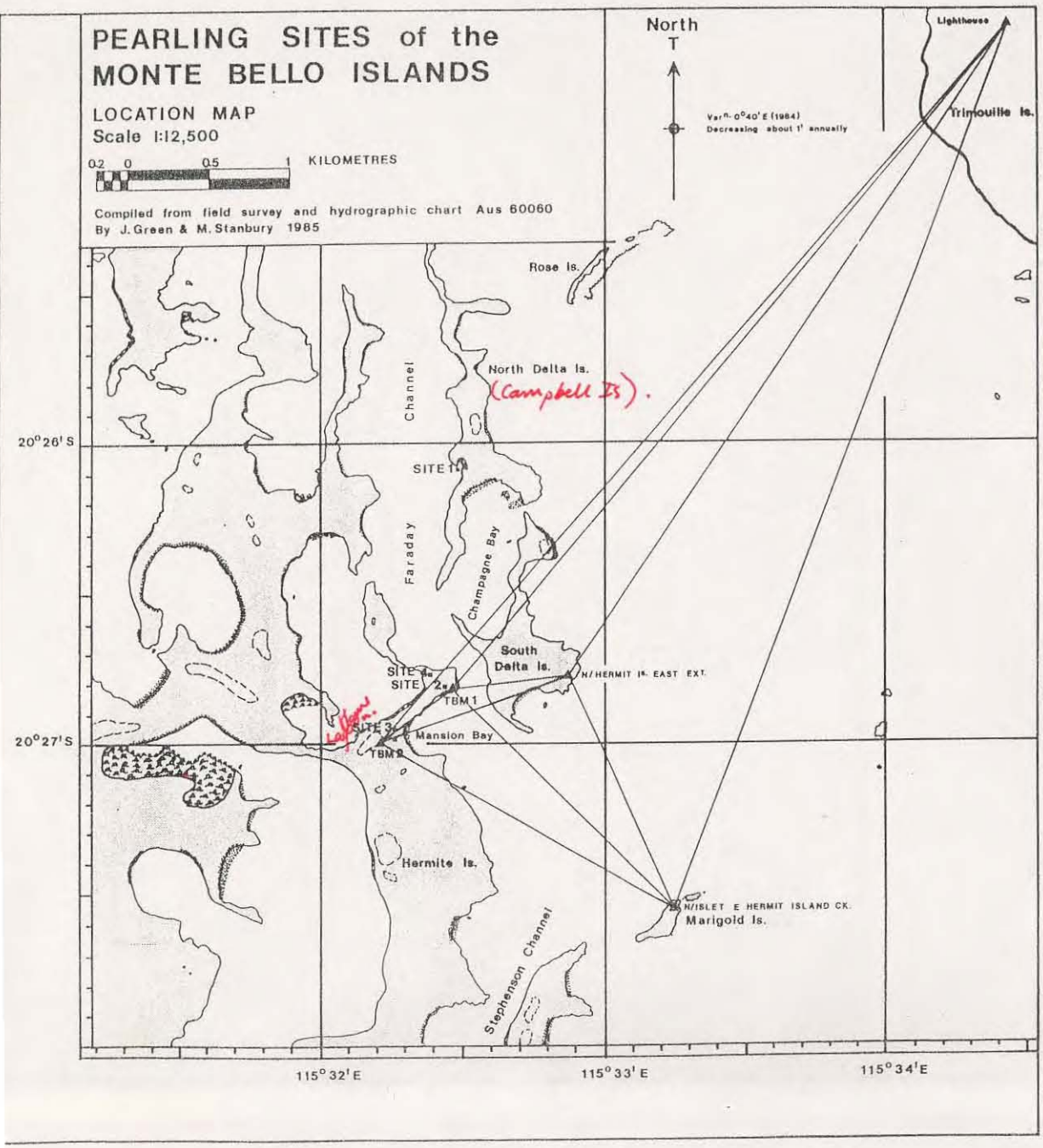


3. Pearling sites of the Monte Bello Islands: Location map

160x100

4. Inscription on sluice plate at Site 1: Experimental Shell Pool, North Delta Island

Sawday, Duncan and Groen, embarked on the Starcraft and proceeded to investigate the region of Faraday Channel.

5.1. Site 1: Experimental Shell Pool, North Delta Island

Sailing north along Faraday Channel, the site referred to as the "turtle pen" or "pool with a dam" was soon located on the west side of North Delta Island in latitude 20 26.07'S, longitude 115 32.48'E (Fig. 3). At a distance, the site is recognizable by the obvious contrast between the regular features of a man-made wall and the irregular adjacent rocky cliffs. The wall is well exposed at low tide and therefore easily visible. During high tide, however, it is likely to be less readily observed.

A brief reconnaissance of the area enabled the main features of the site to be recorded. The most prominent structure is a 2 m wide masonry dam with central sluice which spans the narrow entrance to a natural inlet. The wall is built to the height of the adjacent limestone cliffs, being approximately 3 m deep (14). It is constructed of reddish limestone (or sandstone) blocks of local origin. Those forming the top layers are newly cemented together and are far less discoloured than those of the lower levels which are dark and blackened.

The dam wall extends approximately 5 m either side of a central sluice. This is 1.5 m wide and 0.28 m thick, consisting of a solid steel plate, chicken wire and concrete. Running horizontally through the plate are two parallel sets of 10 cm diameter P.V.C. piping, each set comprising four pieces of pipe. On the inlet side, the pipes are fitted with flapper valves designed to allow inflow of water at high tide and prevent outflow at ebb tide. On the seaward side, several pipes have downward pointing angle ends.

An inscription marked in the cement on the top of the sluice plate (Fig. 4) reads:

> THE MONTI BELLO EXPERIMENTAL SHELL POOL, CONSTRUCTED 1906 CONTINUED 20 SEPT. 1981 BY R.P. MORGAN AND CREW.

Along the shallow inner margin of the inlet is a thick growth of mangrove trees (15) and within the pool are a number of cement-filled 22 gallon oil drums. These are set with mooring poles presumably for anchoring the oyster holding pots.

BACKGROUND HISTORY.

4. Thomas H. Haynes - a background to his involvement in the Australian Pearling Industry

In order to provide an historical base from which to analyse and compare the findings of the archaeological survey in the Monte Bello Islands, the following data has been compiled from a variety of literary and documentary sources. The aim of the review was to reconstruct the chronological sequence of events relating to Haynes' participation in the

Australian pearling industry and, with supplementary information, to place these events in a broader comprehensive context.

4.1. **The literary and documentary sources**

The history of the pearling industry in Western Australia has been documented in a variety of popular historical novels, local histories and scholastic theses. While many of these cite the same original sources, one of the more comprehensive accounts to date is that provided in the book Full Fathom Five by Mary Albertus Bain (1982). Unfortunately, cross-checking of references contained in this book indicates that they are not always accurately cited and, where possible, the original sources quoted in the text have been consulted. In view of the broad range of archival sources used in this work, however, only those available in Western Australian archives have been reviewed.

In addition to information gleaned from the Western Australian Parliamentary Debates, and Governor's Despatches, the most direct evidence of Haynes' involvement in the pearling industry is contained in a copy of his report to the Montebello Shell Syndicate in 1912 and in Edwin Streeter's book Pearls and Pearling Life (1886). Haynes was sufficiently known to W. Lambden Owen, a Warden of the Pilbara goldfields from 1899-1929, to warrant a personal mention in his book Cossack Gold (1933). Indeed, Owen regarded Haynes as an old friend and maintained contact with him in England after his retirement.

Within these available sources, data relating to Haynes is relatively sparse and incomplete. It is clear, therefore, that a more extensive literary and documentary search is required to fully document the details of his role in the Western Australian pearling industry.

Given this incomplete historical record, the results of the archaeological survey of sites in the Monte Bello Islands are significant inasmuch as they provide a potential source of new and substantive information, in addition to confirming existing historical accounts.

4.2. **Haynes' early association with pearling**

Although little is known of Haynes' early background, his involvement in the Australian pearling industry appears to be the consequence of his association with Edwin W. Streeter, of 18 New Bond Street, London, a well known Hatton Garden jeweller. Exactly when and how this association arose has not yet been ascertained but clearly, Haynes was an important figure in Streeter's pearling ventures in the Eastern seas.

In the preface to his book Pearls and Pearling Life (1886), Streeter acknowledges the contributions made by two men, T.H. Haynes and Captain Chippindall R.N. (5) For almost seven years Mr Haynes had been assiduously collecting information for this work and 'to his pen (was) due the chapter on "Pearling Life"' (Streeter, 1886:XV). During the same period, Captain Chippindall R.N. had commanded Streeter's pearling fleet.

In January 1882, Haynes and Chippindall embarked on an exploratory visit, on Streeter's behalf, to the pearling grounds of the East, to include Australia. They established their head-quarters in Lamenusa Harbour on the Island of Siassi (now Siasi), in what was then known as the Sooloo (or properly "Suluk") - Archipelago. (6) Here, they built a number of houses on stilts on the edge of the reef, some 200 yards (182.8 m) from the shore (Streeter, 1886 illust.). During an outbreak of civil war in 1884, however, these were maliciously destroyed in the owner's absence along with the neighbouring village.

The chain of islands forming the Sulu Archipelago extends from the north-east end of Sabah (formerly North Borneo) and to the south-west of the Philippines. It lies between latitude 4 40'S and 6 50'S and longitude 119 20'E and 121 50'E. Writing in 1820, Crawfurd comments that the "Suluk" islands were the principal source of mother-of-pearl shells and the only source of trade pearls in the seas of the Indian Archipelago (1820:445). Pearls were found in the narrow channels or passages among the numerous and dangerous shoals of the island group. In every language of the Archipelago the pearl was known as Mutya or Mutyara, a Sanskrit name inferring that the use of pearls as adornments, and by consequence the art of fishing them, were taught by the Hindus (Crawfurd, 1820,III:445).

From his base on Siasi, Haynes was able to observe the activities of the indigenous pearl divers (or Bajans), and learn the local dialect. According to Streeter (1886:134) Haynes 'formed an extensive dictionary, and (found) a far greater resemblance between the Sooloo and Fijian tongues then between the Fijian and Malay languages'.

The pearling banks were worked solely by the native people, no Europeans being involved. They dived from canoes to observed depths of 17 1/2 fathoms (105 ft/32 m) but possibly reached depths of up to 20 fathoms or more (Streeter, 1886:138). Sometimes, they used dredging devices to collect the pearl shell and these are illustrated in Streeter's book.

Pearls and mother-of-pearl shell were exported to China, Crawfurd estimating the annual worth of pearls in 1820 to be 25,000 Spanish dollars and pearl shell 70,000 dollars (1820,III:445). Steamers belonging to Chinese merchants in Singapore called at Jolo and Maimbung (the native capital) to deliver goods and take away pearl shell and other produce. Although the vessels flew the English ensign, the business of the ship and cargo was managed by the Chinese (Streeter, 1886:143).

4.3. **Preparation for the cruise to Australia**

While Haynes was observing the activities of native pearlers, Captain Chippindall was seeking out a suitable vessel with which to undertake their prospecting cruise to Australian waters. A vessel was found in the form of the *Sree Pas Sair*, a wooden schooner of 112 tons. The yacht was built in Singapore in 1883 by Fam Ah Hong, had a length of 85 ft (25.9

m), breadth of 20.2 ft (6.16 m) and depth of 8.0 ft (2.4 m), (Lloyds Register of Shipping 1890-91). According to Owen (1933:40) the 'delightful schooner' had been the Sultan of Johore's yacht and clearly lived up to her name - The Belle of Pas-Sair, (Pasir being a port on the SE coast of Borneo) (7).

The vessel was bought and equipped by Captain Chippindall at Streeter's expense, and must have been barely a few months old when the transaction took place. Haynes reports that the accommodation was large and comfortable, the vessel having a high poop (Streeter, 1886:171). It carried eight dinghies, each 14'6" (4.4 m) in length, six being carried on davits and two on deck. She drew 7'6" (2.28 m) aft and carried sufficient fresh water to last 80 men for three months.

4.4. **First voyage to Australia**

In September 1883, the *Sree Pas Sair* sailed from Singapore in command of Captain Chippindall. She was manned by a crew of Malay sailors, a Chinese carpenter, cook and "boy". Returning to Sulu, Haynes had hoped to recruit some local divers but only seven men were prepared to accompany him, even though sixty were needed. Their reluctance stemmed from the fact that they had never worked for white people before, let alone travel away from their home.

On the Indonesian island of Solor (east of Flores), 61 Solorese divers were signed on in the presence of the Dutch Governor at Koepang (now Kupang), Timor. Together with Harry Streeter, who had joined Haynes and Chippindall for the voyage the persons on board numbered 78.

Arriving off the north-west coast of Australia, the *Sree Pas Sair* began to examine possible locations for pearl shell. Admiralty Gulf proved fruitless and, apart from abundant supplies of trepang (beche-de-mer) farther to the east, nothing of any note was located until the vessel reached Darwin. Here, to their pleasure, a ton of good size shell was gathered within a week, news of its discovery being broadcast to Australian cities.

From Darwin, the *Sree Pas Sair* sailed to the Aru Islands and New Guinea, being finally forced to return to Solor to disembark an ailing number of Solorese divers. During the trip, these people had suffered from 'beri-beri' (8) and several of their numbers had died. Fortunately, there were no casualties among the Sulu divers, a factor which contributed to their greater willingness to accompany Haynes on his next trip to Australia.

4.5. **Second voyage to Australia and visit to the Monte Bello Islands**

By August 1, 1884, the *Sree Pas Sair* had been fitted out in Singapore for a two year voyage. In Sulu, Haynes recruited the divers he needed, proceeded to Macassar and from thence to Cossack on the north-west coast of Australia. He considered the waters at Exmouth Gulf to be

too cold during April to October for naked diving and decided to accompany another boat (not named) to the Monte Bello Islands. Haynes noted that 'this was the first time the group had ever been dived, and magnificent shells were found averaging 380 pairs to the ton' (Streeter, 1886:177). During six weeks of steady diving, the Sulu men did fairly well, though Haynes considered the Australian Aborigines to be better shell gatherers.

Christmas Day, 1884, was spent at the Monte Bellos and on Boxing Day Captain Chippindall made an exciting find: in knee deep water he recovered a shell bearing a pearl weighing 40 grains. It was acclaimed as being the finest pearl seen in England for years, being absolutely round and of perfect quality (Streeter, 1886:121 and 177). As their supply of fresh water was running short, Haynes reports that:

> 'a likely spot was decided upon, and a well sunk through 20 feet (6.1 m) of rock, below which a fair supply of good water was fortunately found. A beacon [was] erected to guide vessels into the group and to the well of fresh water' (Streeter, 1886:178).

In the anticipation of a "blow", the *Sree Pas Sair* sailed to a creek (possibly Butcher's Inlet Cossack) for shelter, returning to the Monte Bellos as soon as the threat of bad weather had passed. It was February 1885, and the weather in the Monte Bellos was 'beautiful' (Streeter, 1886:178). The crew, however, were not so well. The disease beri-beri had once again broken out among the Sulu men and half of them had to stop work.

Anxious to safeguard the health of these men, Haynes states that 'a house was built ashore, and flour substituted for rice' (Streeter, 1886:178). To these simple measures he attributed the unusually low mortality. Four men, however, died and to save the others a premature return was made to their homeland. Three more men died on the voyage, but Haynes tried to maintain morale by busying the men with the care of a deck load of cows and sheep. He introduced them to the art of boxing, which further kept them from brooding over the loss of their comrades.

Following a stopover at Macassar an unfortunate incident occurred. One of the men, Akalal, became 'over-excited' and injured a Macassan sailor. He was put in irons but gradually allowed periods of freedom. Failure to secure him one evening, however, led to Haynes being seriously injured. While asleep in a chair on deck, Akalal struck him with a 9 lb (4.08 kg) hand lead causing a fracture to his forehead and severe lacerations to his upper face (Streeter, 1886:179). The story is recounted by W. Lambden Owen, a friend of Haynes and one of the first Wardens of the Pilbara goldfields (1933:40). Without a doctor on board, the 'whites' did the best they could with wet bandages, tending him for ten days until they reached port. The injury had caused Haynes to temporarily lose his sense of taste and smell, but they gradually returned with treatment.

Amazed at his recovery, the College of Surgeons applied for details and particulars of treatment, while Haynes himself attributed his return to health to the very lack of medical interference during the first ten days (Owen, 1933:41).

4.6. **Modernization of pearling**

By late 1885, Streeter had equipped the *Sree Pas Sair* with diving suits. News from Cossack on December 16, 1885 (W.A. 17/12/1885:3f) states that the schooner arrived from Exmouth Gulf on 11 December where she had been working eight diving dresses for four months. Although they had found few pearls, the total take of pearl shell amounted to 26 ton (26.52 ft). The vessel departed from Koepang on 13 December and was not expected to return until the following April, at the end of the cyclone season.

At about this time, Streeter purchased another schooner, the Telephone, a vessel of 55 tons (M.N.L. 1889). Built in Sarawak in 1882, she was smaller than the *Sree Pas Sair* and served as both a floating station and tender, carrying shell either to Cossack, or direct to Koepang (Timor) or Singapore. Both schooners were equipped with a diving dress and seven men. They serviced 21 boats carrying 150 divers with 21 diving dresses. All the men were signed-on under shipping articles and a diet of flour, mutton and other food was substituted for rice (Streeter, 1886:183).

With the introduction of modern diving methods, the mother schooners remained at anchor while the smaller vessels (or luggers) cruised for pearl shell, generally under the command of a Malay. Equipped with a week's supply of rations, they were forced to return to the mother vessel at regular intervals both to off-load their catch and replenish their provisions. Initially, the schooners plied between Cossack, Koepang and Singapore, procuring stores, landing shell and ferrying divers to and from the pearling grounds at the beginning and end of the season. During 1886, the *Sree Pas Sair* was noted to have arrived from Singapore via Koepang in June (H. 5/6/1886) and again from Koepang in October (I. 27/10/1886).

4.7. **Grievances of "foreign" pearlers**

After recovering from his injuries, it is clear that Haynes continued to play an active role in the pearling industry. In particular, his name appears prominently as spokesman to the Government on behalf of "foreign" (9) pearl syndicates. Their grievances had been aroused by the passing of a new pearling Act in July 1886 (10). The object of this Act was to provide for the payment of excise duty on the stores of licensed boats and on all pearl shell raised by them. In order to secure the duty payable, the license was not issued until duties were paid. Furthermore, in order to secure duties on the pearl shell, the papers of the vessel were

withheld when the licence was issued. By these means, vessels were compelled to return to port, whereupon the excise duties were collected.

Prior to the passing of the 1886 Act, duty could not be collected on the unlanded stores of a vessel fitted out at a port beyond the Colony of Western Australia. These "foreign-going" vessels could therefore obtain stores in other colonial ports out of bond and free of duty, while local boats had to pay duty on all their stores under the West Australian Customs Law. The 1886 Act was designed therefore, to place all pearling vessels on an equal footing (11).

The resultant effects of this new legislation were a growth in illegal trading practices, smuggling of contraband goods into the North-West and loss of Government revenue. Free ports, such as Singapore, issued neither clearances or manifests which made it difficult for Revenue officers to check the validity of ships' declarations. Thus, it was easy for "foreign" vessels to smuggle contraband goods (in particular liquor) in their holds and sell them at profit to local pearling fleets out at sea. Adding to the problem of illegal trade between licensed pearling vessels was the appearance of sea-going Chinese providors. Approaching the pearling schooners in the open-sea, the Chinese sold goods at prices well below those of Australian ports, thus causing loss of income to local retailers in Cossack and further adding to the trade in contraband goods. Furthermore, the Chinese vessels either purchased pearl shell from the schooners or delivered it direct to Singapore on their behalf for sale to Europe and America (Bain, 1982:170). Thus, the pearlers were able to find ways of evading the payment of pearl shell export duty, fixed at that time at 4 pounds sterling per ton (G.D. 1888, Vol.15:322 ff.). Even the regular coastal steamers that plied between Singapore and the Australian ports were known to assist in this customs evasion, the SS *Australind* being one such vessel (Bain, 1982:171).

In April 1887, a devastating cyclone sunk one quarter of the North-West pearling fleet, drowning 157 men (Bain, 1982:172). By chance, the *Sree Pas Sair* survived and was towed in dismasted condition to Cossack by the SS *Australind*. The officers on board reported having seen 48 damaged craft lying at Gordon Bay, 'scores of drowned men floating on the sea and miles of flotsam' (Bain, 1982:156). Since few of the pearlers had been insured, they now requested statutory assistance and the repeal of either the legislation governing the import duties on unlanded stores or the export levies on pearl shell (Bain, 1982:172).

Despite considerable legal and Parliamentary debate involving the question of extra-territorial fishing rights (i.e. beyond the three mile limit), neither the legislature nor Governor Broome saw fit to accede to the pearlers' requests. They maintained that the revenue derived from the pearling industry was necessary to defray the costs of 'an expensive revenue vessel (the *Meda*) to control the fishery and administer justice; (and) other charges (arising) out of the fishery....' (G.D., 1888, Vol.15:322).

Representing the members of the North-West Pearl Shell Fleet, Haynes submitted a petition direct to Queen Victoria dated 10 October 1887 seeking exemption for the pearling industry from the 1886 Act (Bain, 1982:175). Not only were the pearlers concerned for their immediate situation, but that of their future. At this time, the Western Australian Constitutional Enabling Bill was being prepared for presentation to the Imperial Parliament. If passed and implemented, the colony would become self-governing, thereby enabling it to raise existing taxes at its own discretion. Fearful of these implications, the pearlers recommended that the northern part of the colony be separated from the south, and remain under Imperial control (Bain, 1982:176).

Following strong opposition in the House of Commons, the Enabling Bill was deferred until 1889. Meanwhile, Haynes is said to have 'busied himself publishing a series of pamphlets outlining the pearlers' objections to self-government, their problems of taxation and restriction of fishing on the high seas' (Bain, 1982:177). His influence in London must have been considerable for he is said to have organized one of the largest meetings ever held in the Colonial Institute to discuss pearling issues (W.A.P.D., 1889, Vol.17:158b).

As a result of the pearlers' disquiet, the Colonial Secretary (Sir M. Fraser) visited the North West to interview pearlers aboard the *Meda* and consider their complaints. By way of a compromise, the excise duty on pearl shell was reduced from 4 pounds to 2 pounds per ton (W.A.P.D., 1889, Vol.17:158b). Haynes' actions in support of his fellow pearlers were clearly regarded as extremely impertinent by members of the Government, in particular John Forrest (W.A.P.D., 1889, Vol.17:161b). It was felt that the strong arguments put forward by Haynes had not only hindered the passing of the Enabling Bill but had presented the colony in an unfavourable light. A delegation comprising Governor Broome, S.H. Parker and Sir Thomas Cockburn Campbell was subsequently chosen to present the colony's views before a select committee in London.

Among the representatives on the select committee were members of the London Chamber of Commerce who clearly demonstrated their vested interest in pearling (Bain, 1982:178). As Bain points out (1982:178), it was significant that Haynes, as Streeter's representative had headed the appeals. Streeter would have been well-placed in London's commercial society, (if not a member of the Chamber of Commerce himself), to enlist support from influential people who could promote his interests in the select committee and the House of Commons. Indeed, it appears that Streeter himself was called upon to give evidence (12).

In July 1890, the colony of Western Australia was granted self-government whereupon the ratification of existing laws relating to fishing in territorial waters became the provenance of the Federal Council of Australasia. By this time, Streeter had already acquired a property on the outskirts of Broome, established a store and residence and owned about

one-eighth of the pearling fleet (Bain, 1982:228 ff). In this same year, he either became joint owner with Viscount Cantelupe, or entered into a business arrangement with him, to use the steam vessel Sunbeam on the Western Australian pearling grounds. As the first steam vessel to be employed in the North West pearling industry, it marked a new era in the industry's mechanization. Unfortunately, the vessel was wrecked off Osborne Island, in Admiralty Gulf off the north Kimberley coast in April 1892 and her usefulness was short-lived (Henderson & Sledge, 1984).

4.8. **Moves toward the 'cultivation' of pearl shell**

As far as Haynes' movements go in the period 1890 to 1900, there is little account. It was during this period, however, that a growing concern developed with regard to rapidly diminishing supplies of pearl shell on the pearling grounds. In 1889, the Queensland Government employed the services of W. Saville Kent, Commissioner of Fisheries, to undertake a scientific investigation following which, he recommended that 'cultivation' of pearl shell should be carried out by transferring live shell from outer grounds to natural lagoons in the coral reefs of Thursday Island (Kent, 1897:206). In 1893, Kent was asked to visit Western Australia where he carried out experiments in tropical and extra-tropical regions.

His first experiment was undertaken in a mangrove swamp close to Broome where natural ponds of water 1-2 ft (0.3-0.6 m) deep remained after the retreating tide. Suitable live shell were obtained for him by G.S. Streeter and placed in cultivation frames made of jarrah and wire netting. Within a year, the young shell had increased in size and had begun to propagate. Sadly, however, the full extent of the experiment was not achieved as the frames were destroyed by the local Aborigines (W.A.P.D. 1912, Vol.43:1196).

The second experimental location was Shark Bay. Shell was procured from a fleet working near the Lacepede Islands off the North West coast and transferred to Shark Bay on the *Meda* (Kent, 1897:206). At the first attempt, the pearl shell died long before they reached Shark Bay, in spite of frequent daily changes of water. The second consignment was supplied with a continuous change of water from a hose and survived the journey. While some shell lived a long time and produced young shell, the latter acquired the characteristics of the indigenous Shark Bay species rendering the experiment unsuccessful (W.A.P.D. 1912, Vol.43:11196a).

4.9. **Mother-of-pearl shell cultivation in the Monte Bellos**

Whether Haynes' decision to experiment with the cultivation of mother-of-pearl shell was a direct result of Streeter's acquaintance with Saville Kent during his stay in Broome in 1893-94 is debatable, but not an unreasonable suggestion. Given the already proven entrepreneurial spirit of the Streeters and their associates, it seems quite in order that their attentions should turn to the preservation and replenishment of the resource in which they had already invested a considerable amount of

capital. And who better to conduct the experiment than one of their oldest and most knowledgeable partners, T.H. Haynes?

Whatever the impetus, Haynes began his project on the Monte Bello Islands in 1901 (Haynes, 1912:12) (13). According to Bain (1982:269), his partners in the venture were A.S. Roe, H.W. Sholl and J.H. Keep. Augustus Roe was a solicitor from Roebourne and son of the first Surveyor General, while H. ("Horry") Sholl was a relative of the two pioneering Sholls and one of the best judges of pearls in the North West. Both were known acquaintances of the Streeters, "Horry" receiving a substantial remuneration from his dealings with them while simply lying 'in a cane lounge, with a whiskey by his side, (waiting) for pearlers to bring their gems along' (Owen, 1933:35). Of J.H. Keep, there is no mention.

The only available details of the Monte Bello operations are contained in Haynes' report to the Directors and Shareholders of the Montebello Shell Syndicate in 1912 (Haynes, 1912). Written following his return to England, the report outlines the chronological events as follows:

		Expenditure
1902	April. An exclusive pearling licence for the Montebello sea area granted for 14 years, expiring 1916	
1903	London partner joined to finance the undertaking, but died soon after	2,000
1904	November. Tidal Pond completed in time for spatting season.	3,000
Closed for want of funds	1905 October. Place closed for lack of funds.	
1906	December. Release by late partner's Executors. New Syndicate being formed.	
1907	January. Lease cancelled by Government on account of error in measurement.	
Closed owing lease being declared invalid	October. Official notice of £450 assessment for arrears of rent for excess over legal area.	500
1908	June. Issue of four new leases	

	in place of the old one - for 14 years expiring 1922.	
1909	May. Formation of Montebello Shell Syndicate. November and December. Pond closed for spatting.	
1910	November and December. Pond closed for spatting. Young pearl shells bred.	1,300
1911	February. Homestead wrecked by hurricane. August. Return to England.	
	Approximate expenditure	6,800

Included in the report are photographs and plans of the "Tidal Pond", and extracts from the 1908 Queensland Royal Commission on the Pearl Shell Industry in which aspects of its operation are discussed.

From the information contained in the report, it is clear that Haynes' scheme was fraught with difficulties: financial, technical and political. Being an experimental project, Haynes would necessarily have had to attract wealthy investors or sponsors since there could be no immediate expectation of a marketable product, and thus no quick return on initial capital outlay. According to Owen (1933:36) "Horry" Sholl had a reputation for turning 'everything he touched to gold'. He was clearly a speculative businessman and just the sort of person Haynes would have needed to get the project off the ground. As the diary of events indicates, however, lack of funds and Government fees were probably one of the greatest hindrances to the project's success.

Believing his cultivation scheme to be one of national importance, Haynes clearly anticipated Government cooperation. Yet, he appears to have had nothing but obstacles put in his way. Security of tenure was of paramount importance to any venture involving high capital investment. But, the Government was unprepared to assure any rights to renewal of leases or compensate for any improvements or developments on expiry. As a result, Haynes was placed in a difficult position with regard to attracting new investment funds and procuring the long-term services of biological personnel to assist in the experimental scheme.

Although Haynes claimed to have reared young shell in the Tidal Pond in 1910, there was considerable debate as to whether his methods were reliable and whether the young oysters were true mother-of-pearl oysters or "bastard" shell (Pinctada albina sugillata). Haynes was resentful of scientists who had sought information about the scheme at

the Monte Bello Islands but who were not prepared to offer reciprocal advice. He states that:

> there is no disposition to recognize that any good work can be achieved by anyone outside the charmed circle of science, and although so-called scientists are not loth to appeal to outside sources when they are in quest of material or information, they are ... averse to rendering any reciprocal service....' (1912:7.4).

Haynes was confident that artificial assistance to the Australian pearl-shelling industry had to come. He was particularly anxious, therefore, that the Australian authorities purchase the facilities at the Monte Bello Islands in order that his efforts, expenditure and experience would not go to waste. Similar feelings had been expressed earlier in the 1908 Queensland Commissioners' Report into the Pearl Shell Industry. It was the Commissioners' belief that 'the cultivation (of pearl shell) in shallow waters (would) become the system of the future' (Haynes, 1912:14). Furthermore, they believed that, had the experiments initiated by Saville Kent in 1899 been continued, there would probably have been no need to appoint a Commission of inquiry. Unfortunately, despite these predictions, the Federal Government saw fit not to accede to Haynes' request and the experimental work at the Monte Bello Islands was discontinued. Haynes returned to England in 1911 and later retired to Littlehampton in Sussex (Owen, 1933:40).

On the elevated ground of the north-west promontory of the inlet is a large mound of bottles. This was examined and the bottles found to be mainly of one type: a dark olive green "Beer" (or "Stout") bottle with flat top champagne finish, height 315 mm, base diam. 90 mm, and lip diam. 30 mm. One blue-green moulded "Hock" bottle was also among this group.

Other bottles and fragments of bottles are scattered in the surrounding area. Among those noted in the north and east sectors are the following:

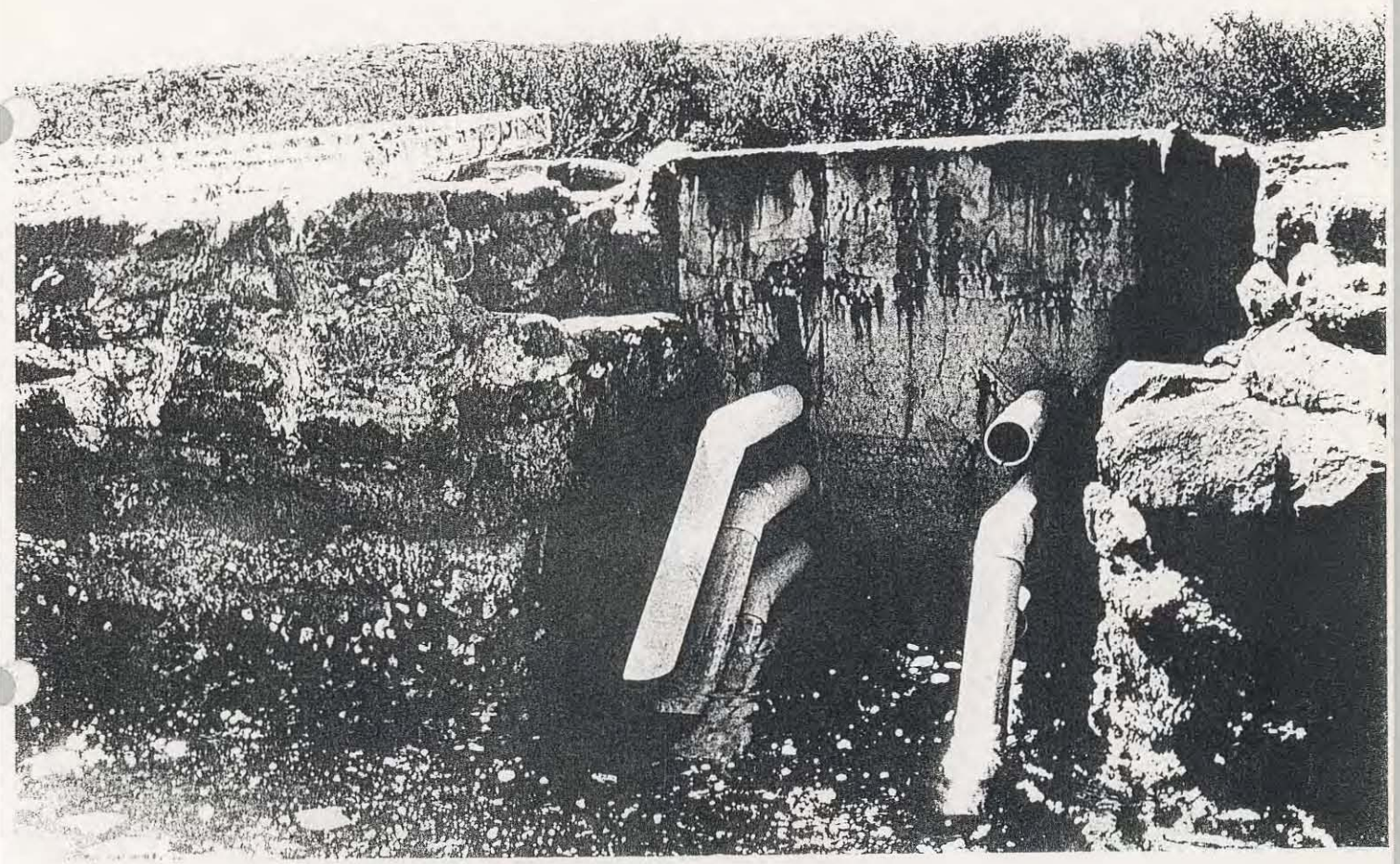
(i) a dark olive green "Beer" or "Stout" with champagne finish bottle, marked 'Swan Brewery COY LIMD, Perth'

(ii) a fragment of a dark green "case" bottle with chamfered corners marked:.....AN... HOE
ROTTE(rdam)

(iii) a lip fragment of dark green case bottle

(iv) a pale green moulded bottle

(v) a pale green (or colourless) case bottle fragment marked:
HOUSE OF LORDS WHISKEY
...NNIE
SCOTLAND



8. Sluice, as modified by R.P. Morgan 1981

Reuse of bottle prohibited.

(vi) a dark olive green bottle marked: LIQUEUR WHISKEY

On the south-east promontory of the pool is a pit filled with scallop shells.

5.2. **Site 2: Old Pearling Camp, Hermite Island**

The second of the two sites was discovered on a square-shaped promontory of Hermite Island at the southern entrance to Faraday Channel (Fig. 3). Situated in latitude 20 26.8'S, longitude 115 32.4'E, the remains of the site lie on rising ground to the southeast of a large storage shed used by the current pearling licensee of the area, Mr R.P. Morgan. This is erected in a sheltered position on the west coast of the promontory, overlooking Home Lagoon (1:100 000, 1957, 2057 Montebello (Special) LC 477385).

The site consists of a concrete foundation slab, overgrown with low shrub and scattered with timber, corrugated iron, ceramic, glass and other miscellaneous material. Two wells lined with limestone slabs are situated a few metres to the south, in the vicinity of which are concentrated collections of bottles. About 20 m to the south-east of the wells, a limestone wall protects a natural solution hole at the edge of the cliff, overlooking Mansion Bay. Seen from the seaward side, it was the regular features of this landmark that led to the exploration of the promontory and the subsequent finding of the site.

5.3. **Site 3: Mansion Bay, Hermite Island**

Continuing south along the shore of Mansion Bay, further evidence of human activity is encountered. Structural remnants of a wooden tank stand, parts of an old vehicle (crankshaft, camshaft, radiator etc.) and other miscellaneous debris lie scattered over a wide area. Two locations close to the beach appear to have been used as camp-sites. The ground is well-trodden and a number of stakes (seemingly for guy ropes) remain in situ.

Situated inshore, in a slight gulley, are two wells, similarly clad with limestone. A high sand hill (referred to as Bacon Hill on the 1:100 000 topographic map) dominates the area and supports an upright wooden post on its summit.

5.4. **Site 4: Present-day storage facilities of R.P. Morgan**

A large timber and corrugated shed situated on the west coast of the square-shaped promontory referred to in 4.2. serves as a storage shed for present day pearling activities in the Monte Bellos. The associated floating camp lies at the southern end of Faraday Channel, a few hundred metres south of the experimental shell pool on North Delta Island.

5.5. **Discussion based on preliminary observations**

From the inscription on the sluice plate at Site 1, it seemed evident that the pool had been used at least as early as 1906 for the experimental cultivation of pearl shell. During previous visits to the site in 1971, Green and Kimpton did not recall seeing a sluice plate in situ. All that was standing were the limestone walls on either side of a narrow gap. The present reconstruction is therefore of recent origin, that is, built in 1981.

Questions arising from the observations were:

(a) who constructed the original dam and sluice?
(b) what was the function of the pool?
(c) how did it fulfil this function? and,
(d) how long was it operative for?

With regard to Site 2, this initially gives the appearance of being a dwelling site. Similar questions arise as to its origin, construction and relationship to Site 1. Local informants (Morgan, 1985 pers. comm.) indicated this to be the camp of an entrepreneurial London pearler named Haynes, who was also responsible for the development of the experimental shell pool at Site 1. No indications were given of any links between these two sites and Site 3 (Mansion Bay).

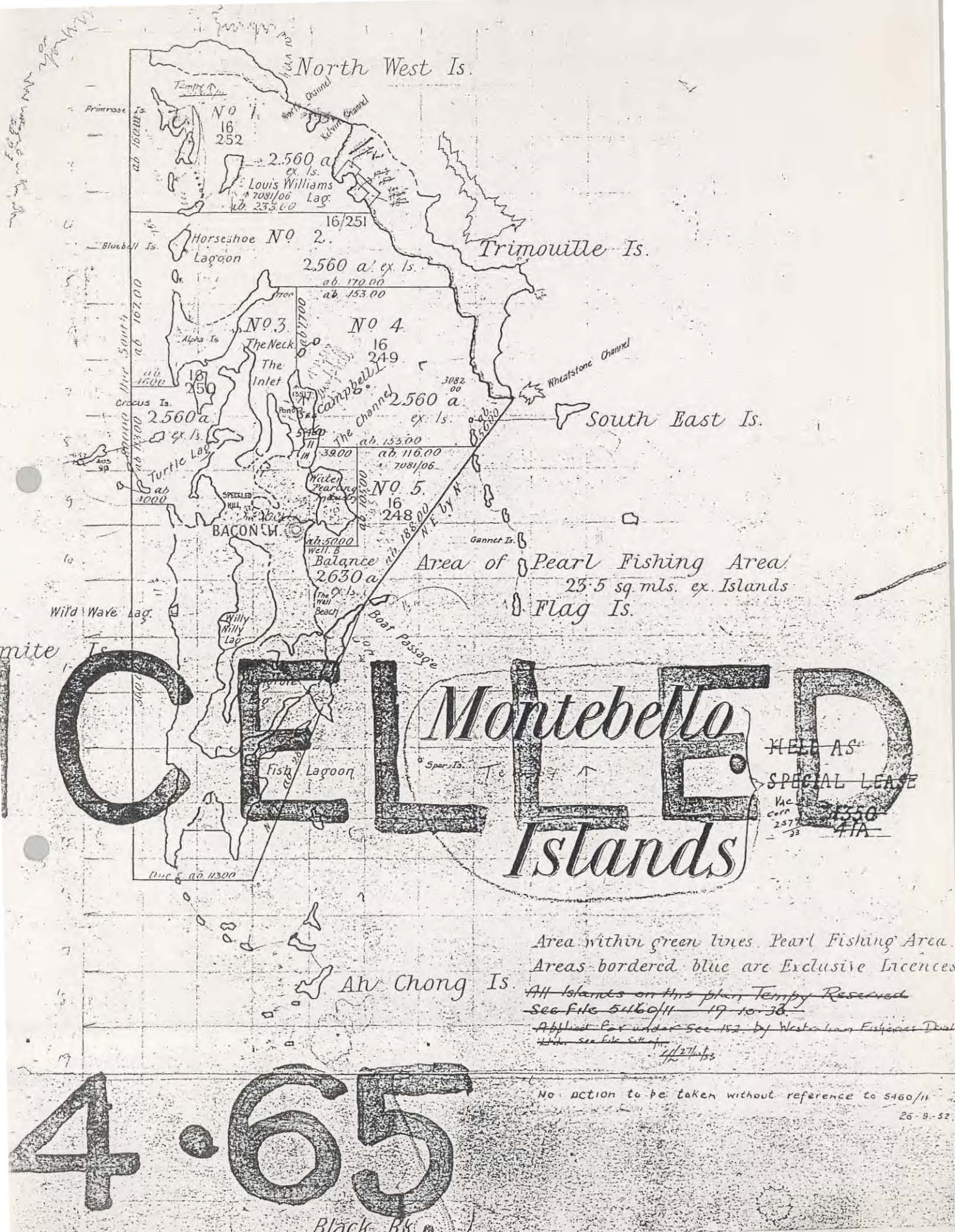
6. **Survey Procedure**

Using existing survey control charts obtained from the Department of Lands and Surveys (16), a series of known bench marks were located and identified. These were situated on South Delta Island (N/HERMIT Is. S.E. PEN) and Marigold Island (N/ISLET E HERMIT ISLAND CK.) Temporary bench marks were then established on the highest point of the Hermite Island promontory (T.B.M.1) and the summit of a high sand dune (Bacon Hill) overlooking Mansion Bay (T.B.M.2). The former bench mark was marked with a small cairn of limestone rocks and the latter by an existing wooden upright.

Using the lighthouse on Trimouille Island as a fixed orienting station, theodolite bearings were taken from both control and temporary stations. The bearings were then plotted onto Australian Admiralty Chart Aus 60060 to give the relative positions of these datum points (Fig. 3).

Commencing with Site 2 (Old Camp, Hermite Island), two datum points were established, one at the southernmost corner of Well 1 (datum point 1) and the other at a square cement drain exit on the east corner of the main foundation slab (datum point 10) (Fig. 15). With the theodolite positioned at T.B.M.1, stadia readings were taken to establish the position and distance of these points from the temporary bench mark, and also the position of Morgan's storage shed. Using points 1 and 10 as control points, the remainder of the site was surveyed using a monocular hand-bearing compass and tape. Owing to strong south-easterly winds (around 20-30 knots), magnetic bearings fluctuated between 1 and 2 degrees. Survey readings are given in tables 1 & 2.INSERT TABLES 1 & 2 HERE

Appendix



9. Working plan of the Monte Bello Islands dated 1906. Courtesy of Lands and Surveys.

TABLE 1. Theodolite readings from T.B.M.1 (Old Camp, Hermite Island) and T.B.M.2 (Bacon Hill, Mansion Bay)

Station	Horizontal Angle	Vertical Angle	Stadia	Distance
T.B.M. 1.				
to				
Trimouille L.H.	000°00'00"			
Sth. Delta Is.	043°32'10"			712.5 m
Marigold Is.	094°34'30"			
T.B.M.2	193°51'50"			550.0 m
Datum pt. 1	222°05'30"	095°51'50"	T.1.3875	
			M.1.1475	
			L.0.9075	47.499 m
Datum pt.10	243°03'50"	096°26'50"	T.1.610	
			M.1.4075	
			L.1.2025	40.237 m
SE Corner of Morgan's Shed	250°02'30"	093°47'30"	T.2.35	
			M.	
			L.0.9	144.366 m
Well 3 Mansion Bay	188°55'30"			
Well 4 Mansion Bay	194°22'30"			
T.B.M. 2.				
to				
Trimouille L.H.	000°000'000"			
T.B.M.1	012°40'00"			
Sth. Delta Is.	029°36'40"			
Marigold Is.	078°17'30"			
Well 3 (Sth)	038°43'00"	097°32'00"	T.2.895	
			M.2.415	
			L.1.94	93.85 m
Well 4 (Nth)	009°20'40"	096°53'00"	T.1.89	
			M.1.31	
			L.0.73	114.33 m

TABLE 2. Magnetic bearings and distance of Site 2 reference points

Survey Points	Distance	Magnetic Bearings
1 to TBM 1		082°00' (262°00')
1 - 10	17.4 m	027°30' (207°30')
1 - 9	19.5 m	351°00' (171°00')
1 - 8	14.0 m	332°00' (152°00')
1 - 14	8.7 m	019°00' (199°00')
1 - 2	3.43 m	300°00' (120°00')
1 - 4	4.27 m	029°00' (209°00')
10 to TBM 1		104°00' (284°00')
10 - 9	11.79 m	291°00' (111°00')
10 - 8	15.0 m	258°00' (078°00')
10 - 14	8.7 m	210°00' (030°00')
		[215°00' (035°00']
10 - 12	6.2 m	075°00' (255°00')
10 - 11	4.14 m	023°00' (203°00')
14 - 4	5.13 m	203°00' (023°00')
14 - 3	5.42 m	236°00' (056°00')
14 - 7	9.7 m	258°00' (078°00')
14 - 8	11.43 m	290°00' (110°00')
14 - 9	12.6 m	332°00' (152°00')
2 - 3	4.41 m	028°00' (208°00')
2 - 5		265°00' (085°00')
3 - 4	3.42 m	298°00' (118°00')
3 - 8	9.45 m	319°00' (139°00')
5 - 6	2.85 m	311°00' (131°00')
6 - 7	4.83 m	042°00' (220°00')
7 - 8	6.14 m	349°00' (169°00')
8 - 9	8.21 m	023°00' (203°00')
11 - 12	5.53 m	120°00' (300°00')
12- 13	4.18 m	220°00' (040°00')

TABLE 3. Magnetic bearings and distances from survey points at Site 3 (Mansion Bay)

Survey Points	Distance	Magnetic Bearing
Well 3 cairn		
to		
T.B.M.2.	93.85 m	259°00' (079°00')
Well 4 Cairn	50 m	359°00' (179°00')
Well 4 Cairn		
to		
T.B.M.2	114.33 m	231°00' (051°00')
Tip Sth Delta Is.		093°00' (273°00')
Sth end of Mansion Bay		117°00' (297°30')
Wooden post	50 m	038°00' (218°00')
Wooden Post		
to		
T.B.M.2.	154.50 m	227°00' (047°00')
Well 4 cairn		218°00' (038°00')
Sth cnr. of square structure	11.80 m	330°00' (158°00')
Square structure		
to		
T.B.M.2	160 m	220°30' (042°30')
Wooden post	11.80 m	158°00' (338°00')
SE cnr. Morgan's Shed		039°30' (219°00')
NE cnr Mansion Bay		022°00' (202°00')

Proceeding to Site 3 (Mansion Bay), a similar survey procedure was carried out, monocular compass bearings and measurements being oriented to survey cairns erected at Wells 3 and 4 and to the temporary bench mark T.B.M.2. Survey results are shown in Table 3. INSERT TABLE 3 HERE.

Using aerial photographs (17) and Admiralty Charts Aus 60060 and Aus 60061, the field data was compiled to form a series of locational maps and site plans at scales ranging from 1:12,500 to 1: 125. While it is appreciated that, for comparative purposes, it would have been more convenient to have kept to a standard scale, the distances involved made this impracticable.

7. Site Descriptions and Findings

7.1. Site 1: Experimental Shell Pool, North Delta Island

Apart from the preliminary visit to this site, there was insufficient time to carry out more detailed investigations. From the brief sketches and recorded observations, however, a plan of the site has been compiled and is illustrated in Figure 6 . A diagram of the sluice as modified by the present pearling licensee of the area, Mr R.P. Morgan, are also indicated in Figure 7.

Archival and literary research confirm that this pool was used by T.H. Haynes for the experimental cultivation of mother-of-pearl shell and further indicate its date of construction and its location. In addition, it is possible to glean some information as to the way in which the pool was constructed and the extent to which it satisfied particular requirements for the successful cultivation of pearl shell.

Haynes was granted an exclusive pearling license for the Monte Bellos in 1902 under the Shark Bay Pearl Fishery Act, 1892 (Letter dated 20/5/54, L.& S. File 5460/11). Within two years (i.e. November 1904), he had completed the conversion of a natural inlet into a "Tidal Pond" but fails to indicate in his report its exact whereabouts (Haynes, 1912:3). The completion date of 1904 clearly pre-dates the advertised date of '1906' on the present dam structure and is further ratified by a 1906 working plan of the Monte Bello Islands (L.& S. Working Plan 111/300) (Fig. 9).

The working plan appears to be based on the Admiralty Survey of the Monte Bellos by Commander J.W. Combe in HMS *Penguin* in 1900. A number of additions, however, are probably the result of information supplied to the Department of Lands and Surveys by Haynes himself. In a letter to the Agent General for Western Australia in 1914, Haynes states that in the 1908 licenses '(his) alterations and additions to the Admiralty Chart were adopted as that chart was not complete' (Letter dated 1914, L.& S. File 5460/11). Shown clearly on the west side of an island named Campbell Island (now North Delta Island) is a small inlet marked "Pond", which corresponds to the location of Site 1.

In accordance with a request from Haynes in 1911, both the northern and southern parts of the island were subsequently gazetted as

a reserve for the purposes of "Water for Pearling Industry", under the control of the Department of Fisheries and Fauna (L.& S. File 5460/11). The island was formerly part of a Pastoral lease held by an Adelaide businessman, Francis J. Spence from 1906 to 1911 (L.& S. File 7081/06). Due to the fact that the rental for this lease was paid by the Ashmore Islands and Australian Fertilizer and Mining Company, there was some suspicion that the lessee may have been mining guano on the island but this was denied by the Resident Magistrate at Roebourne in 1909 (L.& S. File 7081/06). In fact, the only special license for guano and phosphatic rocks held at that time was by Mr Haynes, for an area of 10,000 acres (L.& S. File 7081/06). Such a license may well have been essential in order for him to excavate rock for the construction of the dam.

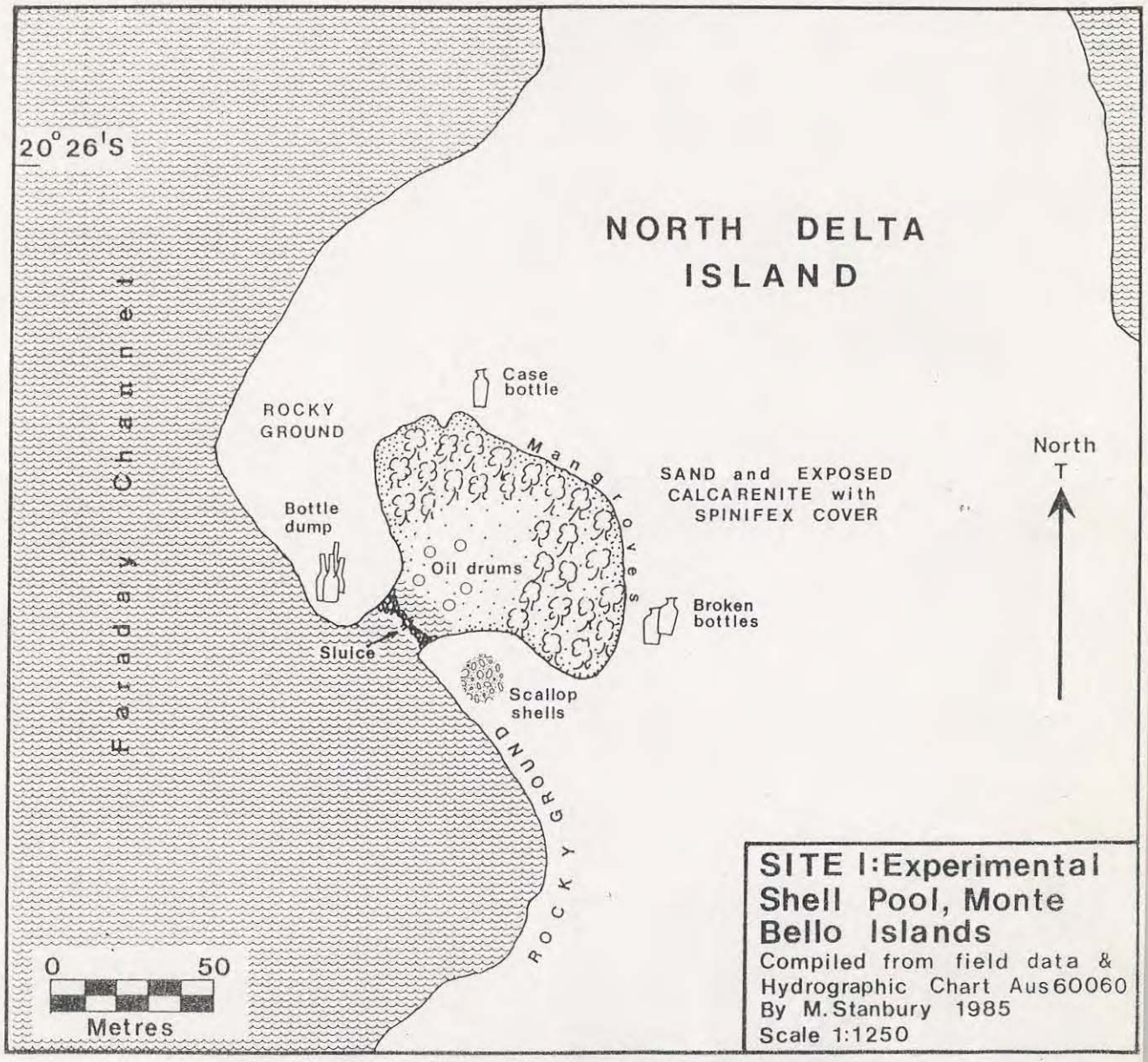
Haynes' report to the Directors and Shareholders of the Montebello Shell Syndicate, Limited (London), (1912) gives some explanation as to why the Monte Bellos were chosen as a site for experimentation, how the "Tidal Pool" was constructed and its mode of operation.

The Monte Bello Islands were noted for their many sheltered "lagoons" where very large shell could be found at low water. It was for this reason, therefore, that they were considered suitable as a site for pearl shell cultivation. The inlet at North Delta Island is certainly in a protected locality and is also relatively large, being reported as occupying an area of one acre (0.4 ha) (Haynes, 1912:13).

Being tidal, the inlet was found to dry at half-tide but when full, contained 7 ft (2.13 m) of water. This ebb and flow of water was both an advantage and a disadvantage. On the one hand, the changing water provided a regular (and necessary) supply of nutrients, and maintenance of normal water temperature and salinity levels. On the other, however, it meant that floating spat (18) would continually float out of the inlet to the sea beyond. In order to contain the spat, therefore, an enclosure was essential.

Although no specific details regarding the construction of the "dam" are given in Haynes' report, there are two close-up photographs which illustrate its gross structure (1912:11). Basically, the dam wall is built of sandstone blocks supported on either side by a wooden framework. In the centre of this masonry dam is a gate or 'flume' (19) said to be operated by a winch (Haynes, 1912:13). While the operation of the gate is not clearly defined, it appears to have had provisions for allowing effete water to be removed at ebb tide by filtration through the bottom, thus leaving space for the admission of sea-water every flood tide. While this could enter the pond it was not allowed to escape, thereby preventing the loss of floating spat.

In order to cut off the shallow margin of the pond (and presumably maintain a certain level of water within it), a stone-faced embankment 100 yards long (91.4 m) was constructed. This is indicated on a plan of the pool contained in Haynes' report (1912:15) and shown in Figure 10). A



6. Plan of Site 1: Experimental Shell Poll, North Delta Island

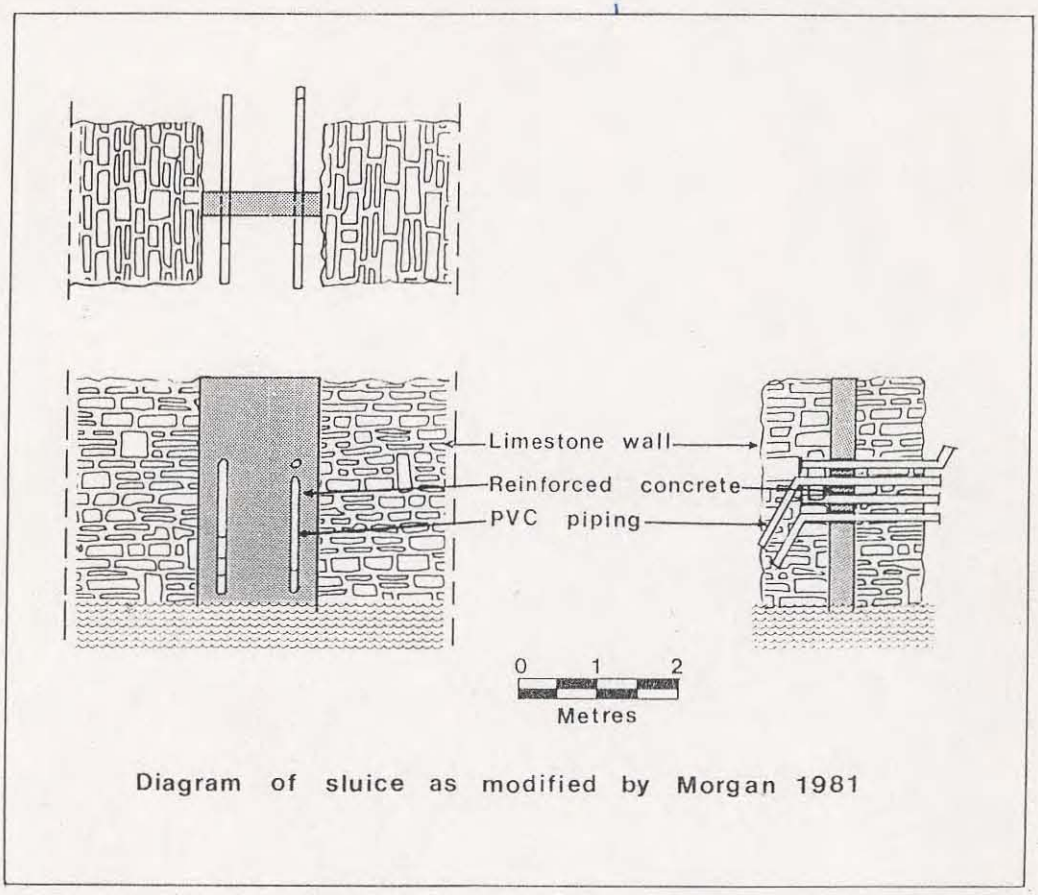
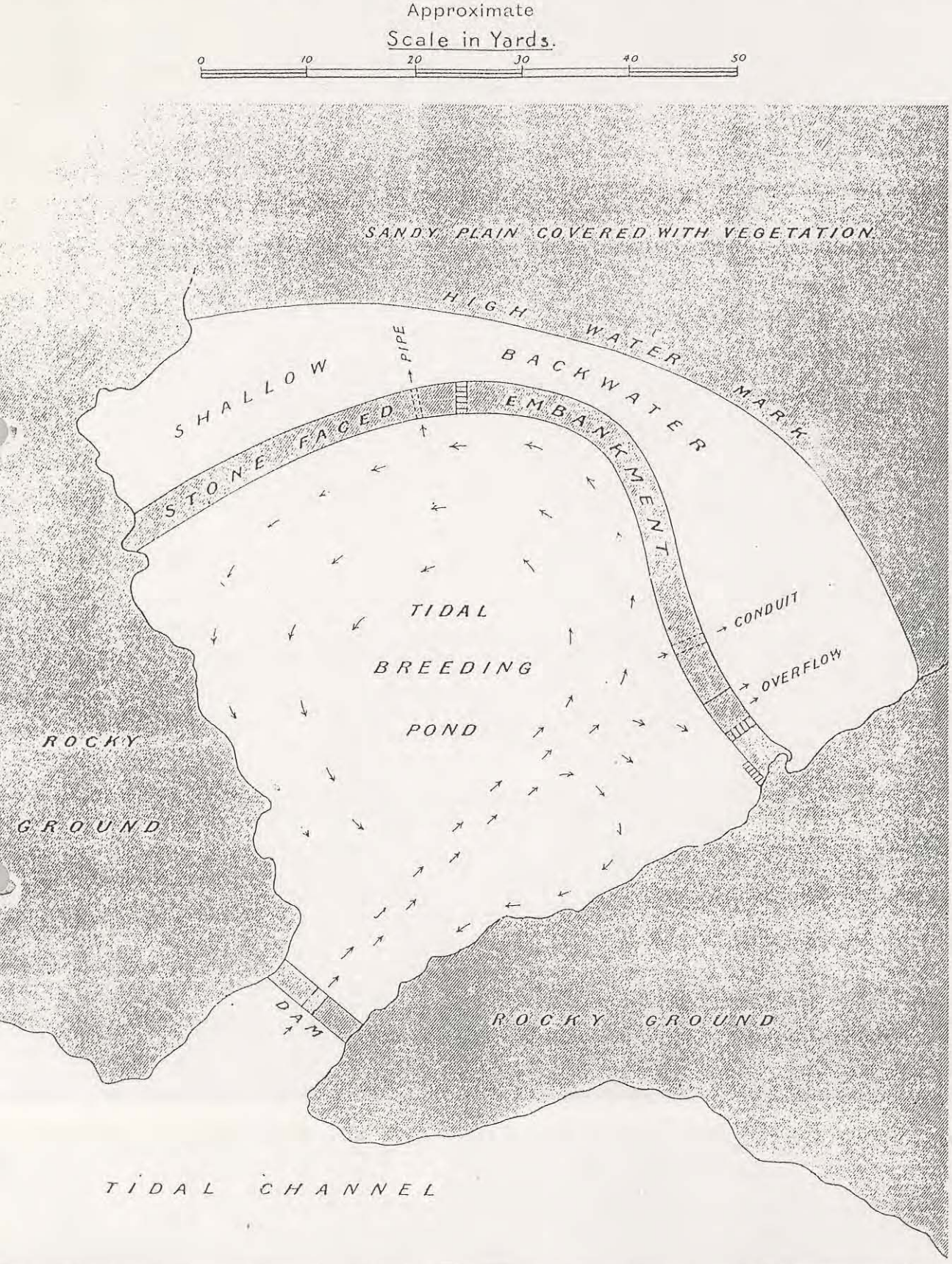


Diagram of sluice as modified by Morgan 1981

7. Diagram of sluice as modified by R.P. Morgan, 1981

Plan of Tidal Pond—Showing the Course of the Current.



10. Plan of Tidal Pool from Haynes, 1912

11. View of the masonry dam from the inlet, 1971. Photo: Jeremy Green

12. View of the masonry dam showing its construction, 1978.
Photo: Scott Sledge?

13. South-east promontory of the masonry dam showing depression (or excavated area), 1978. Photo:

14. Scott Sledge inspects oysters on the lower part of the masonry dam, 1978. Photo:

number of pipes and conduits through the embankment clearly allowed any overflow to pass into the shallow backwater.

Although the pool was almost dry at the time of the 1985 visit, there were no obvious signs of an embankment. A photograph of the pool prior to its construction has a caption stating that the mangrove trees visible in the picture 'have all been cleared away' (Haynes, 1912:5). There is currently quite a dense growth of mangrove trees in this same vicinity. It is possible, therefore, that remaining evidence of the embankment is obscured by this re-growth of vegetation.

It seems reasonable to assume that the removal of the vegetation was necessary on two accounts: firstly, to maintain the cleanliness of the pool, and, secondly, to reduce the natural habitat of marine creatures that might turn prey to the immature oysters, particularly after they had attached themselves to some fixed object. Common among these are molluscs and crabs.

The plan of the tidal pool also indicates the course of the current within the pool. This movement of water would seem to be an important factor in the life-cycle of the pearl oyster being necessary, perhaps, to maximize the young spat's chances of locating a fixed object on which to grow. It is mentioned in the report that 'a great many young ones ..... were collected in the crevices of the stone walls' (1912:13), but no mention is made of any artificial fixed objects being placed in the pool. The masonry dam and embankment, therefore, appear to have served both as containment structures as well as anchorages for the young pearl oysters to develop.

Photographs of the masonry dam taken by Museum staff in 1971 and 1978 are shown in Figures 11 to 14. Those taken at low tide clearly show the heavy growth of oysters and other marine creatures on the lower dam wall. Furthermore, they give additional clues as to the construction of the wall.

As indicated in Figure 12, the outer framework of the wall appears to have been built of fairly regular-shaped blocks while those comprising the "fill" are irregularly shaped. This tends to suggest that the outer blocks are sandstone (or calcarenite), (these being found in natural wall-like formations in many localities in the Monte Bellos) and the "fill", lumps of reef limestone.

The photographs also show an irregular depression on the south-east promontory (Fig. 13), which corresponds to the present deposit of scallop shell. While this may have been caused by natural erosion it is not improbable that the stone for the dam was quarried from this site, the resultant hole being used as a dumping pit for scallop shells (and possibly other rubbish) of post-1978 date.

A predominance of dark green "beer", "ale" or "stout" bottles in the vicinity of the pool serves to substantiate a 19th to early 20th century date for this site. While the unmarked bottles were probably imported from England, the one example marked 'Swan Brewery CoY Perth' could

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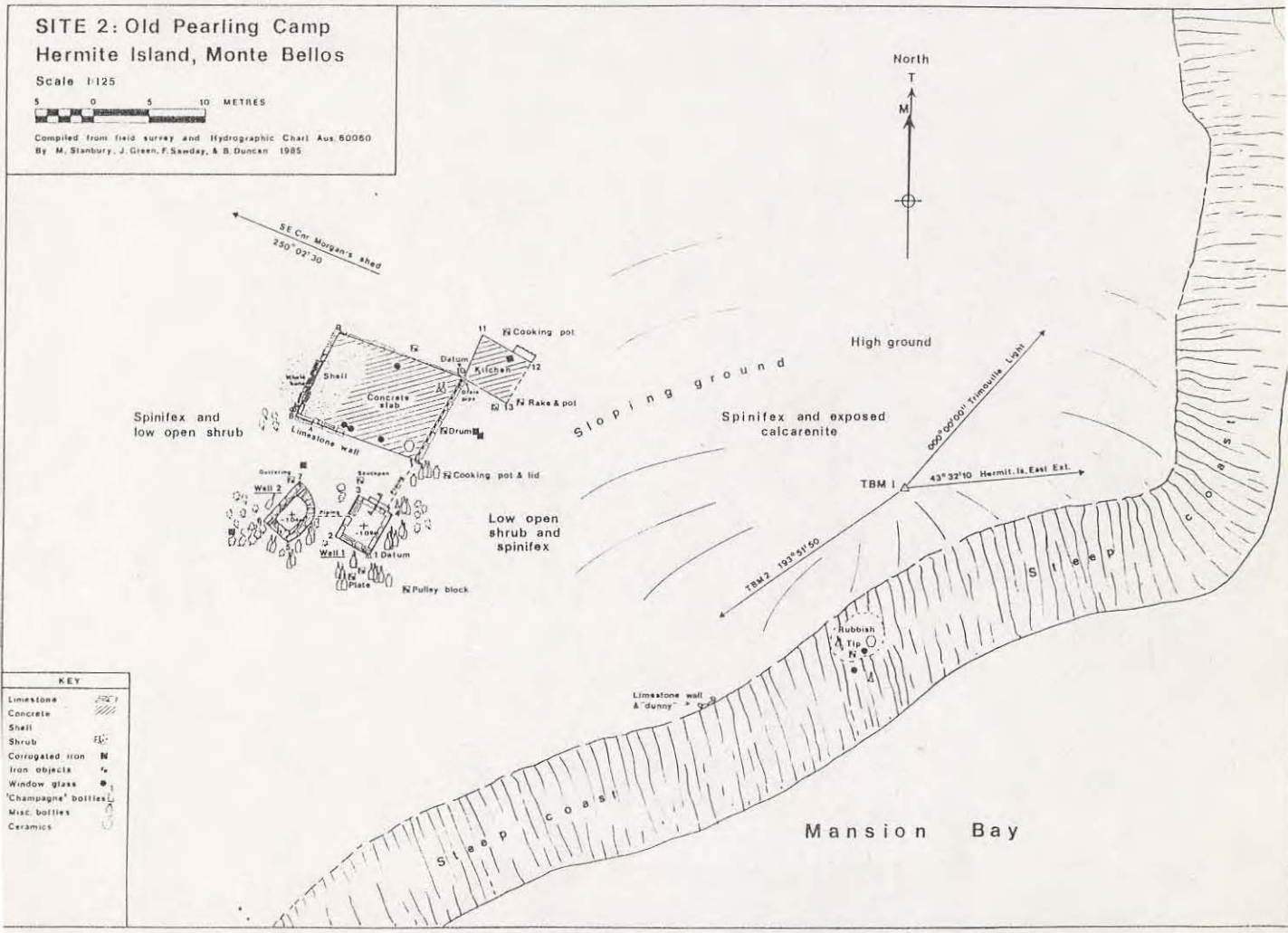
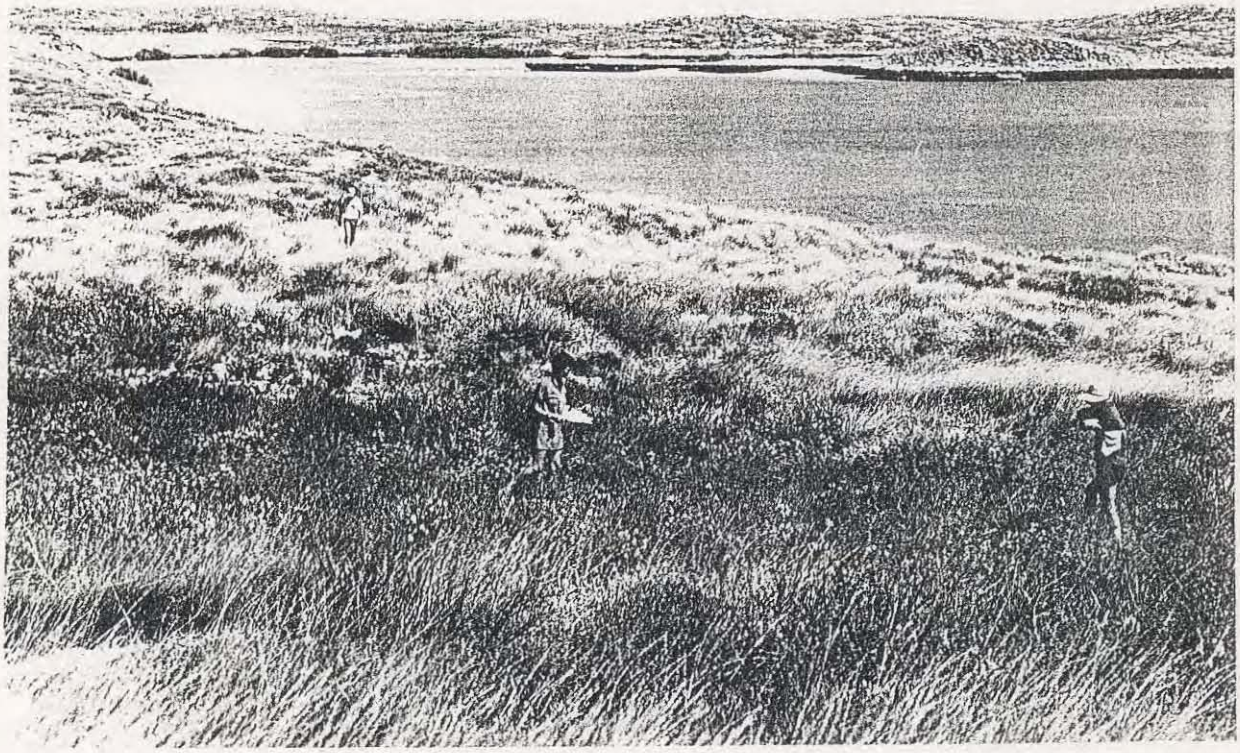
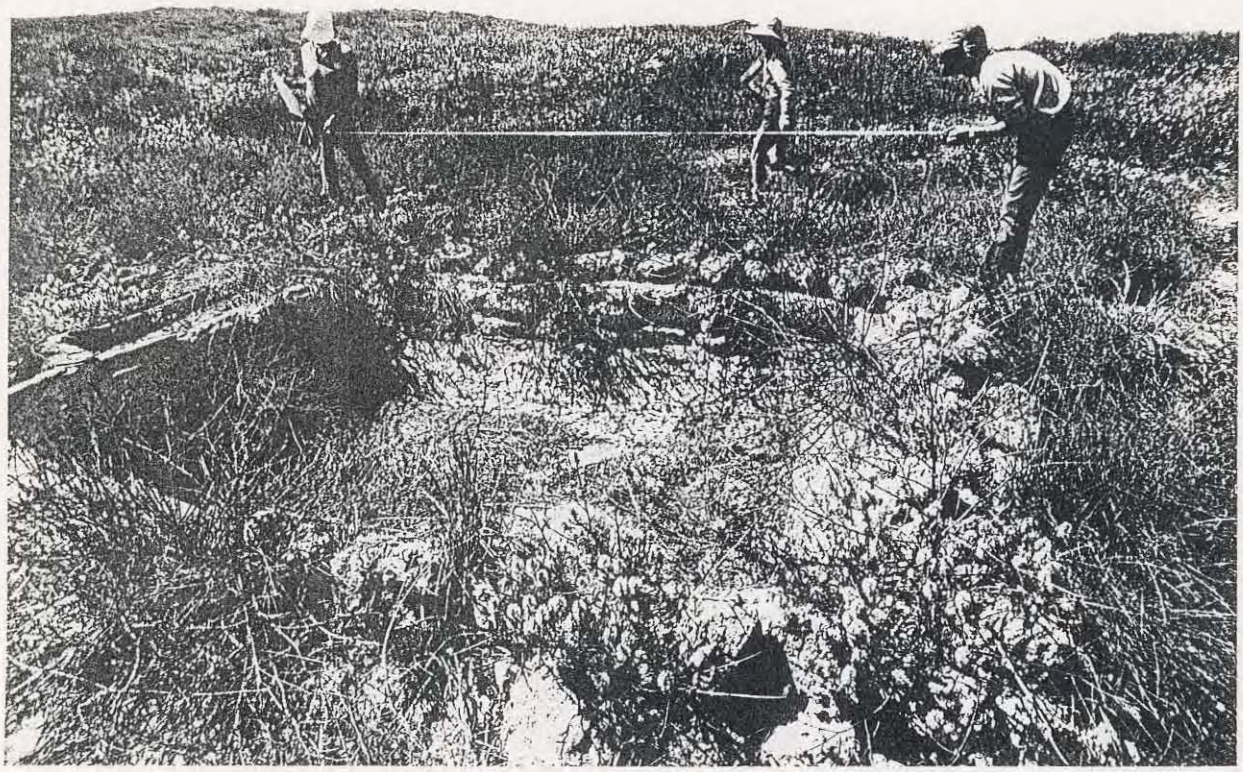


15. Plan of Site 2: Old Pearling Camp, Hermite Island, Monte Bellos

16. View across Home Lagoon from Site 2, showing present-day storage facilities of R. P. Morgan. Photo: Pat Baker

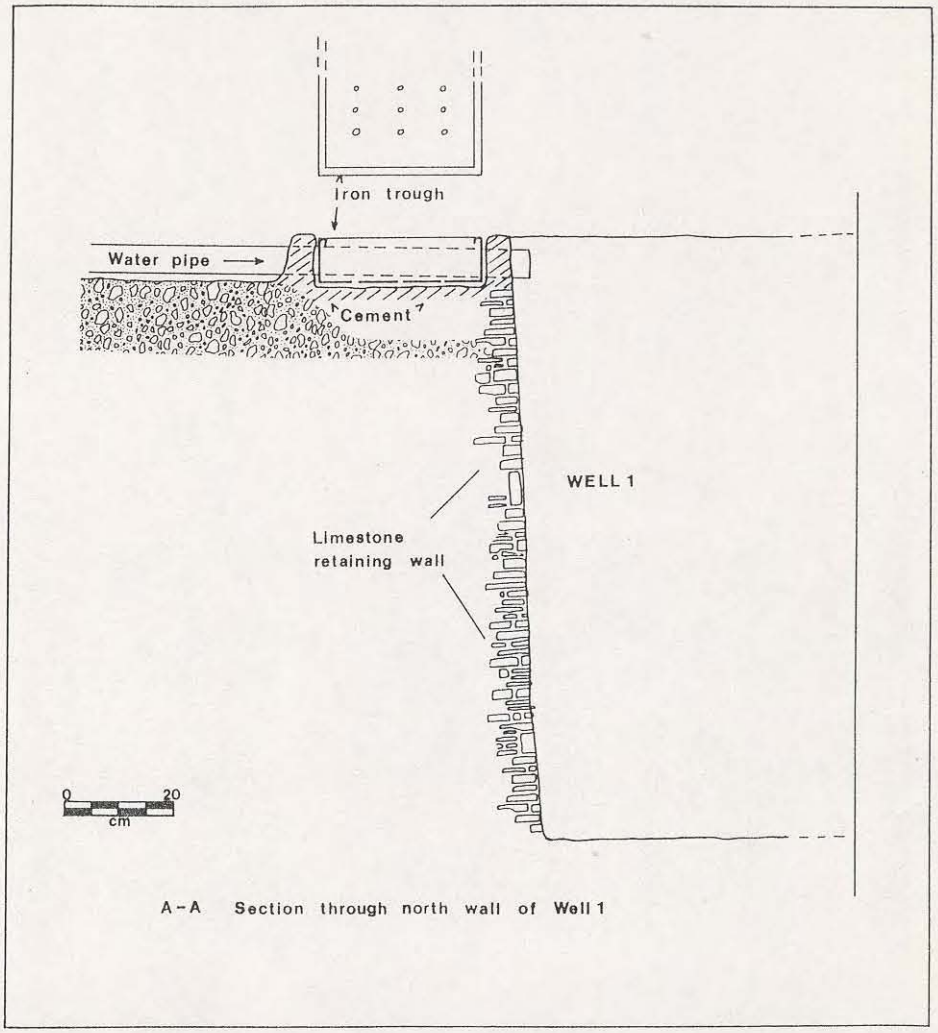


17. View from Site 2, overlooking Wells 1 and 2. Photo: Pat Baker



18. Recording Well 1. Photo: Pat Baker

19. Well 2. Photo: Pat Baker



20. Section through north wall of Well 1.

21. Drain pipe entering north wall of Well 1. Photo: Jeremy Green

concrete structure is a support or drain outlet for a down-pipe from the roof of the building, and diverts roof catchment water to the horizontal pipe and thence to the well. There is a natural slope to the ground from north to south which would assist the flow of water along this course.

The smaller cement slab would seem to represent a kitchen area, a small rectangular area at the north-east corner being the likely location of an iron range or stove. On the floor of the slab are fragments of blue and white printed earthenware, copper nails, iron nuts and bolts, glass, oyster shells, and corrugated iron. In the surrounding vicinity are two iron cooking pots, tin cans and an iron rake head. Other cooking utensils (i.e. a saucepan, pot and lid) are situated to the north of Well 1.

7.2.2. **Wells 1 and 2**

Two wells are located to the south of the cement foundation slab. Both have been dug to a measured depth of just over 1 m, but their original depth was probably greater than this. Sand and other debris has been washed into the wells thereby reducing their capacity. In similar fashion, both wells have retaining walls constructed from local limestone (or sandstone) slabs held together with sand and limestone mortar (Figs. 18 & 19).

The easternmost well (Well 1) is rectangular in shape and measures 4.27 x 3.42 m. With a measured depth of 1.09 m its capacity would be in the region of 15.9 kilolitres (3498 gal). At the north edge of the well is a shallow, rectangular trough which admits the water pipe leading from the eastern foundation wall. An iron trough (or tray) with three rows of evenly spaced holes lay on the ground nearby. It was found to fit the cemented rectangle and presumably acted as a kind of filtering device (Fig. 20). It should be noted, however, that the water pipe emptied directly into the well and merely passed across the trough (Fig. 21). The purpose of the latter, therefore, is not clearly apparent.

Set into the upper part of the west wall of Well 1 at the mid-point, is a 6 cm diameter outlet pipe. Although not excavated, this appears to run underground to emerge on the eastern wall of Well 2. This second well is at a lower gradient than Well 1 and clearly collects any overflow of water. This well is somewhat D-shaped, measuring 2.85 x 4.83 m with a depth of 1.04 m. Its capacity is therefore slightly less than that of Well 1, being about 14.3 kilolitres (3142 gal).

On the east and south sides of both wells are concentrations of dark green bottles (Fig. 22). Many of them lie in random mounds while others are neatly stacked in rows, neck down in the sand, much as they were observed in 1971 (Fig. 23). This would suggest that there has been very little disturbance to the site since that visit.

A representative sample of the bottles is illustrated and described as follows:

Glass containers

(i) Food

HI 3220 Top half of circular, pale green pickle jar. Flat-sided, double folded lip and slightly tapered down neck. Vertical mould seams on body, extending along shoulders and neck.

Bore diam. 32 mm; body diam. 71 mm.

The bottle is similar to pickle jars recovered from the wreck of the British vessels *Sepia* (1898) and *Carlisle Castle* (1899). Jars from the *Sepia* were seen to contain pickled onions and capers and at least two examples from the *Carlisle Castle* have remains of pickled onions and pepper seeds. A complete bottle CA 618) from the *Carlisle Castle* has the following dimensions:

Ht. 196.5 mm; bore diam. 34 mm; base diam. 71 mm.

These compare well with those of the Hermite Island example.

HI 3221 and Flat- Neck of pale green bottle with sloped down shoulders vertical mould seams on opposing sides of the neck. sided lip with V-shaped string rim and cap-seat bore.
Bore diam. 21.5 mm; lip ht. 19 mm.
Probably the neck of a vinegar bottle.

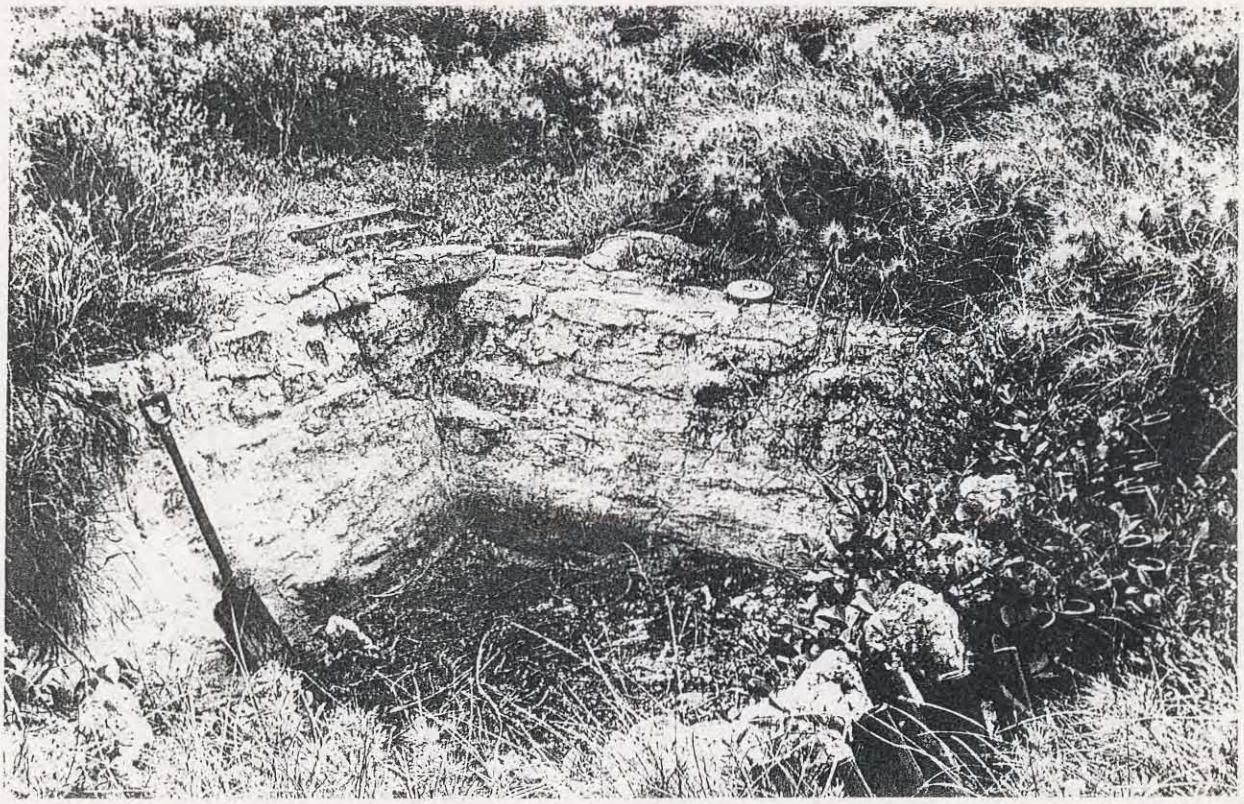
(ii) Liquor

HI 3213 champagne absence of mould lines on the surface moulded as is Tall, olive green "Hock" bottle with sloped top finish and bell-shaped basal profile. The seams and presence of faint horizontal of the bottle indicate that it has been turn- common with this type of bottle.
Ht. 378 mm; bore diam. 15 mm; base diam. 67 mm; vol. 825 ml.

HI 3215 shaped been Olive green "Beer" (or "Stout") bottle with flat top champagne finish and remnants of lead seal. Vertical mould seams on opposing sides of body; deep bell- basal-profile with large mamelon. Appears to have made in two-piece vertical body mould with separate base part.
Ht. 303 mm; bore diam. 19 mm; base diam. 85 mm; vol. 750 ml.

Similar bottles from the *Sepia* and *Carlisle Castle* show no evidence of vertical mould seams though one from the German barque *Mira Flores* (1886) does. The glass of the *Mira Flores* example, however, does not have the same "polished" appearance as the Hermite Island bottle, nor does it show evidence of the base being added as a separate part. This tends to suggest a later nineteenth or early twentieth century date for the Hermite Island bottle.

Rows of bottles around Wells 1 and 2, 1985. Photo: Pat Baker



3. Bottles stacked neck-down along east wall of Well 1, 1971.
Photo: J. Green

HI 3222 Neck and shoulders of olive green bottle with rounded shoulders and highly polished appearance. Faint mould seam at junction of body and shoulder. Rounded lip with rounded string rim.
Neck finish ht. 86 mm; bore diam. 17 mm.

HI 3214 Colourless glass bottle with remains of lead seal. Down-tooled lip with V-tooled string rim. Rounded shoulders and vertical mould seams on opposing sides of neck, shoulders and body. Tapered body with shallow concave basal profile with moulded letter 'W' and three dots. Possibly a whiskey bottle: ee Roycroft, 1976:54.
Ht. 308 mm; bore diam. 18.5 mm; base diam. 70 mm; vol. 775 ml.

HI 3218 Square pale green "spirits" bottle with chamfered corners. Flat sided lip and V-shaped string rim; chamfered heel, flat resting point and circular, shallow, concave basal profile with letter 'Q'. Remains of label attached to one face with the embossed word 'STRONVAAR' diagonally placed on opposing side.
Ht. 220 mm; bore diam. 20 mm; base 80 x 80 mm; vol. 775 ml.

(iii) Medicine

HI 3216 Colourless, rectangular patent medicine bottle with rounded corners. Vertical mould seams on opposing diagonal corners. Flanged lip; flat resting point with rectangular, flat indented basal profile with chamfered corners.
Ht. 165 mm; bore diam. 9.5 mm; base 65 x 39 mm; vol. 250 ml.

(iv) Toiletries

HI 3219 Colourless, moulded square bottle (possible "perfume") with threaded lip. Octagonal plastic cap with embossed initials P & M. Moulded base with circular indentation marked P & M with D 47' on resting point. A small amount of residue indicates a marine oil base.
Ht. 103.5 mm; base. 35.5 x 35.5 mm; vol. 55 ml.

7.2.3. **Rubbish Tip**

Lying just over the edge of the cliff, on a magnetic bearing of 200 from T.B.M. 1, is an area that has clearly been used as a rubbish dump. Remnants of broken bottles, window glass, fragments of china, tin cans and other miscellaneous refuse lie scattered among the crevices of the limestone boulders.

Glass Containers

A variety of broken food, liquor and medicine containers were observed at the rubbish tip and found to resemble similar finds from Wells 1 and 2 . Only one medicine bottle was noted to have any markings. This is recorded as follows:

Part of a colourless, rectangular, patent medicine bottle with embossed marking:

(CL)ARKE'S
WORLD FAMED
BLOOD MIXTURE
(LI)NCOLN

Clarke's World Famed Blood Mixture was a well known iron tonic and was imported from England from the early 19th century until as late as World War II (Wilson, 1986 pers. comm.). Advertisements for the product appear regularly in the Herald stating that it is 'the Greatest Medicine Ever Discovered' (H.17/1/1885, p.1.). Manufactured by The Lincoln and Midland Counties Drug Company, Lincoln, England, the mixture was said to cleanse and clear the blood of all impurities. It was recommended for 'scrofula, sores, ulcerated sores of neck; blackheads and pimples; scurvy sores; cancerous ulcers; skin diseases and glandular swelling'. It was pleasant to taste and sold in bottles priced at 2s 6d each or cases containing six times the quantity at 11s each.

Given the isolated situation of the Monte Bello Islands, the lack of fresh water and the limited access to fresh food supplies, it is not difficult to visualize the need for such a mixture. The common ailments mentioned, are frequently the result of poor diet with low vitamin content, such as would be expected from a reliance on canned and/or preserved foodstuffs rather than fresh produce.

Ceramics

Ceramic sherds representing cups, saucers, plates and other items of domestic ware were scattered in the crevices of the limestone rocks. A selection of sherds bearing maker's marks and/or printed patterns were collected as a sample. They are illustrated and described as follows:

HI 3223 cream trailing — Earthenware saucer (part only); white glaze on fine, coloured body; sepia printed border decoration of christmas roses; no maker's mark but printed numerals '18' and '8' on base.

Rim diam. 156 mm; ht 28 mm

HI 3224A Base sherd of earthenware plate; white glaze on fine, cream body; sepia printed leaf decoration on upper surface; printed maker's mark on base:
PARIS ROYAL, SEMI-PORCELAIN,
JOHNSON BROS. (ENG)LAND
Footrim diam. 116 mm

HI 3224B Brim sherd of earthenware plate; white glaze on fine cream body; sepia printed poppy design with leaves as on HI 3224A.

HI 3224C Base sherd of plate or dish with deep footrim; clear glaze on fine, compact, hard white body; part of sepia printed maker's mark on base, (similar to lower part of mark on HI 3224A).

Although there is no maker's mark on the saucer (HI 3223), the colour and style of the transfer printing, together with the glaze and body fabric are sufficient to associate it with the same manufacturer as the plate fragments (HI 3224 A,B,C).

The firm of Johnson Bros. is a well-known Staffordshire pottery. Established at Hanley in 1883 by four brothers, the company expanded to Tunstall in 1899, continuing there until 1913. By the 1950s Johnson Bros. had assumed control of many potteries in England and abroad becoming one of the largest firms of earthenware manufacturers in the world (Mankowitz and Haggar, 1957:118).

The printed mark depicted on the Hermite Island plate is identical to that illustrated by Godden (1964:335, 2177) and is said to date from c.1900. This very clearly dates the sherds to the beginning of the twentieth century at the earliest.

The company is said to have had a reputation for producing wares of 'uncommon lightness and finish' (Mankowitz and Haggar, 1957:119) and the Hermite Island sherds would certainly support this description, despite the fact that the glaze on some of the sherds has been badly abraded by exposure to sun and salt water. These abrasions are particularly noticeable on the cream bodied sherds where the glaze is finely crazed and absent over large areas.

While being attributed to the same manufacturer, the sherds represent two types of body fabric. Firstly, a cream coloured fabric termed 'semi-porcelain' on the printed mark (HI 3224A). This term was used to describe a hard, durable body though still falls within the classification of earthenware (Godden, 1974:249). The Johnson Bros. sherds have a fine textured, compact body which is relatively thin (c. 3-4.5 mm) and hard. It exhibits a dull ringing sound when tapped lightly.

And secondly, a hard, white compact body which has a more resonant tone when tapped. This has the appearance of being a 'stone china' or 'ironstone' body and is clearly a lot harder than the cream bodied sherds. The company are said to have produced 'Granite' wares for overseas markets and it is possible that this durable stone china fabric fell into that category.

HI 3225 Part of base and wall of circular, straight-sided earthenware mug; buff coloured body with clear glaze; orange printed design with green and yellow painted decoration; green painted letter 'P' on base. (Not identified).
Base diam. 94 mm.

Metal Objects

Among the metal objects were two rectangular match boxes with hinged lids. One was virtually intact, (though very corroded), and was retained. It was found to bear the embossed maker's mark:

R. BELL & CO. LONDON, ESTAB. 1832.

HI 3226 Tin-plate match box with hinged lid.
Ht. 25 mm; length 71.5 mm; width 40 mm.

The firm of R. Bell & Co. claimed to be the oldest wax match manufacturers in the world. They started manufacturing wax vestas in New Zealand in 1894 and in Australia in 1896. Then, in 1909, they amalgamated with Bryant & May Ltd. and began marketing the first safety matches (Rendell, 1963:124-25).

Assuming an Australian origin for the match box, this find further supports a late 19th century date for Site 2.

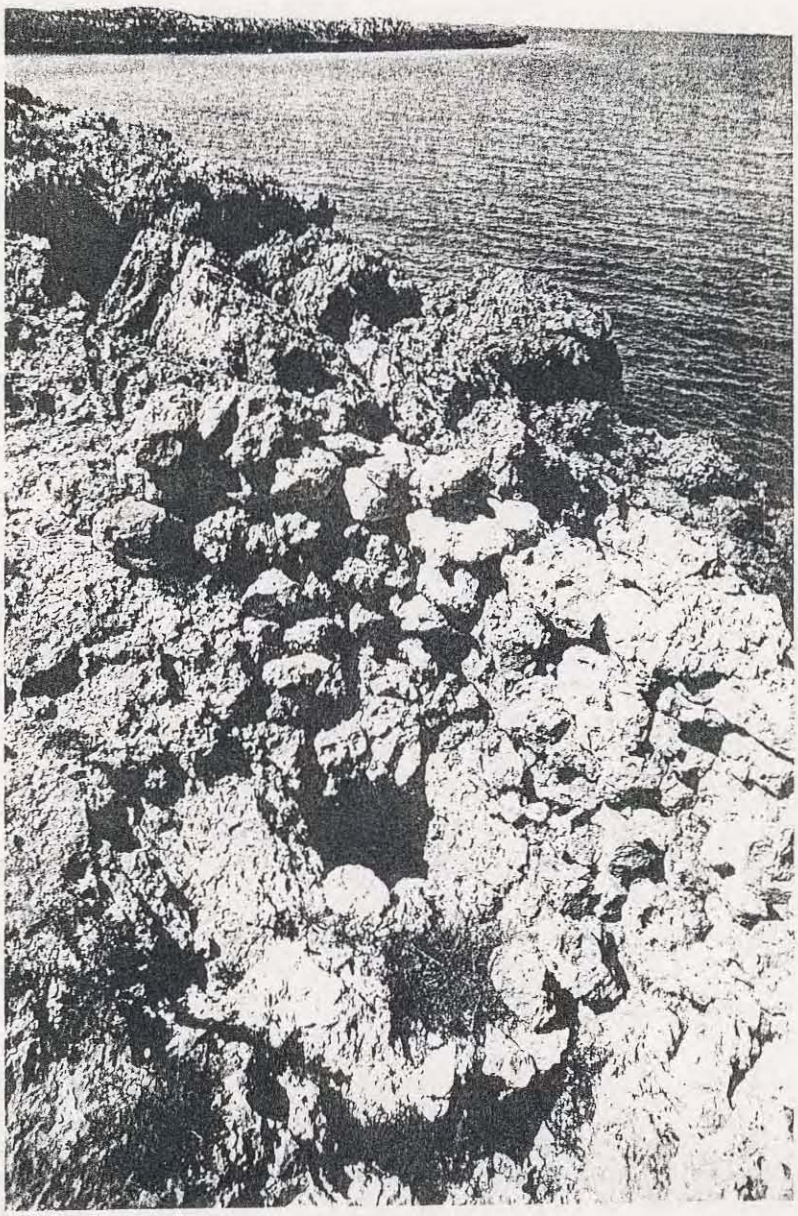
7.2.4. **Limestone Structure**

About 15 m to the south west of the rubbish tip, on a magnetic bearing of 220 from T.B.M. 1, is a semi-circular limestone wall (see Figs. 24 & 25). It is approximately 1 m high and is constructed around a natural solution hole in the limestone. Since this is situated on the very edge of the cliff line it would appear to serve as a natural toilet facility, the limestone wall affording some protection from the prevailing winds. As indicated earlier the regular features of the wall stand out in contrast to the natural cliff when observed from the seaward side.

7.2.5. **Analysis and inferences based on observations at Site 2.**

As surveyed, the remains at Site 2 occupy an overall area of 1.9 km, the most prominent structural features being two concrete foundation floors and two nearby wells. Along with their associated finds, the former indicate a dwelling constructed with some degree of stability and

24. Patrick Baker inspects the "dummy" overlooking Mansion Bay.
Photo:



25. Natural solution hole and limestone wall. Photo:

permanence in mind. The larger slab provides a living area of 96.8 m, while the smaller one represents a kitchen utility of 22.9 m.

Being strategically placed in relation to the two wells, (i.e. on higher gradient), the dwelling was clearly constructed with some thought as to maximizing water catchment and conservation. Rainwater run-off from the roof of the dwelling would drain via a pipe into Well 1 and from thence overflow into Well 2. The presence of the wells alone, with their carefully constructed limestone retaining walls, is sufficient to indicate that the site was intended for permanent or regular use.

Although no quantitative assessment was made of the glass bottles remaining at the site, there are sufficient to suggest that the site was occupied for a relatively lengthy period, whether permanently or at intermittent intervals. Based on the identification of the various types of glass containers, occupation dates to at least as early as 1898, with pottery finds giving a later post-1900 date. Cooking utensils and other small finds also place the site within the late 19th, early 20th century.

The nature of the glass containers indicates that a variety of spirits, wine and beer were consumed, along with preserved foodstuffs, such as pickles. Empty tin cans point to a use of canned produce, while oyster shells in the vicinity of the kitchen area and main slab imply that seafood formed a part of the fresh diet.

From the field observations, then, it may be deduced that this is the site of a relatively substantial dwelling, with associated amenities, intended for long term or regular use. Identifiable finds further suggest an occupancy dating from the late 1890s to the early 1900s.

7.2.6. **Analysis based on photographic evidence.**

An early photograph discovered in the Department of Maritime Archaeology collection is entitled 'Remains of Mr. Haynes' House, Hermite Island' (Fig. 26). The name of the photographer is given as P.D. Montague which enables a date of 1912 to be assigned to the picture. Montague was a scholar of Gonville and Caius College, Cambridge and lead an expedition to the Monte Bello Island from May 29 - August 29, 1912 (Montague, 1913 & 1914). The expedition was sponsored by the Western Australian Museum and the Royal Society following the presentation to the Museum, (and to the British Museum), of various zoological specimens from the region. These had been collected by T.H. Haynes during his leisure.

The photograph serves to confirm many of the survey findings and throws additional light on the organization of the site. The picture appears to have been taken from the north of the site, overlooking Home Lagoon.

Only one building remains standing, this being on the east side of the site. Viewed as it is from the rear and west side, this is seen to be roughly rectangular with a small addition on the north side, complete with rectangular chimney. It therefore corresponds well with the area designated 'kitchen' on the survey plan (Fig. 15).

The walls of the building are crudely constructed of corrugated iron with some timber slats at the upper levels. The main roof (corrugated iron) slopes toward the south-west (i.e. toward the wells) and extends for a distance beyond the front wall to form a verandah. Alongside the only wooden upright visible in the photograph is a drain pipe, presumably collecting run-off from the roof. The position of this appears to correspond to datum point 10 on the plan, and thus confirms the inferences drawn earlier regarding water catchment.

In front of the 'kitchen' is a fenced-off area forming a small yard. Remains of fences are also apparent in other areas of the site, notably a rectangular area between Wells 1 and 2 and to the west of the main building slab. Standing in the southerly compound are what appear to be at least nine or ten barrels. The two well areas in the vicinity are covered with sheets of corrugated iron weighted down with large rocks. On close examination, these well roofs (or covers) seem to be supported on wooden bearers and set at an angle. Indeed, the roof of Well 1 appears to be supported at the northern end by a relatively substantial rock wall. If indeed this was the case, then little evidence of it was noted during the survey. Nevertheless, the arrangement of the roofs would again seem aimed at maximizing water catchment from natural sources in addition to preventing loss through evaporation and, more importantly, contamination. According to Owen (1933:28), typhoid was rife in Cossack during the late 19th century and the cleanliness and protection of water supplies would have been an essential preventive measure in the control of this disease.

The presence of fenced enclosures at Site 2 suggests that livestock was kept on the island, possibly poultry, sheep or cows. The historical record shows that Haynes was well aware of the adverse consequences of poor nutrition, (i.e. the fatal effects of beri-beri), and had advocated a diet of 'flour, mutton and other food' to prevent outbreaks of the disease (Streeter, 1886:183). Cows and sheep were aboard the *Sree Pas Sair* on its early voyages to the Monte Bellos and it is not unreasonable to assume that such animals were kept ashore for domestic use.

Fresh mutton and beef were available at Cossack at reasonable prices (Owen, 1933:25), and at Broome, Streeter supplied his butchers shop with meat and dairy produce from his pastoral property at Roebuck Downs (Bain, 1982:228). However, in view of the sailing distance to the Monte Bellos, the heat, humidity and lack of refrigeration, it seems unlikely that large (or sufficient) quantities of fresh produce could be safely purchased from the mainland. Rather, a small number of livestock would satisfy both immediate and emergency food requirements.

The main question arising from the photograph is why, when the main homestead is shown as being totally demolished, the 'kitchen' building and its fenced yard are virtually intact? The cyclone that hit the North West in February 1911 was sufficient to destroy a number of luggers belonging to a neighbouring pearler, F.L. Parkes, who operated

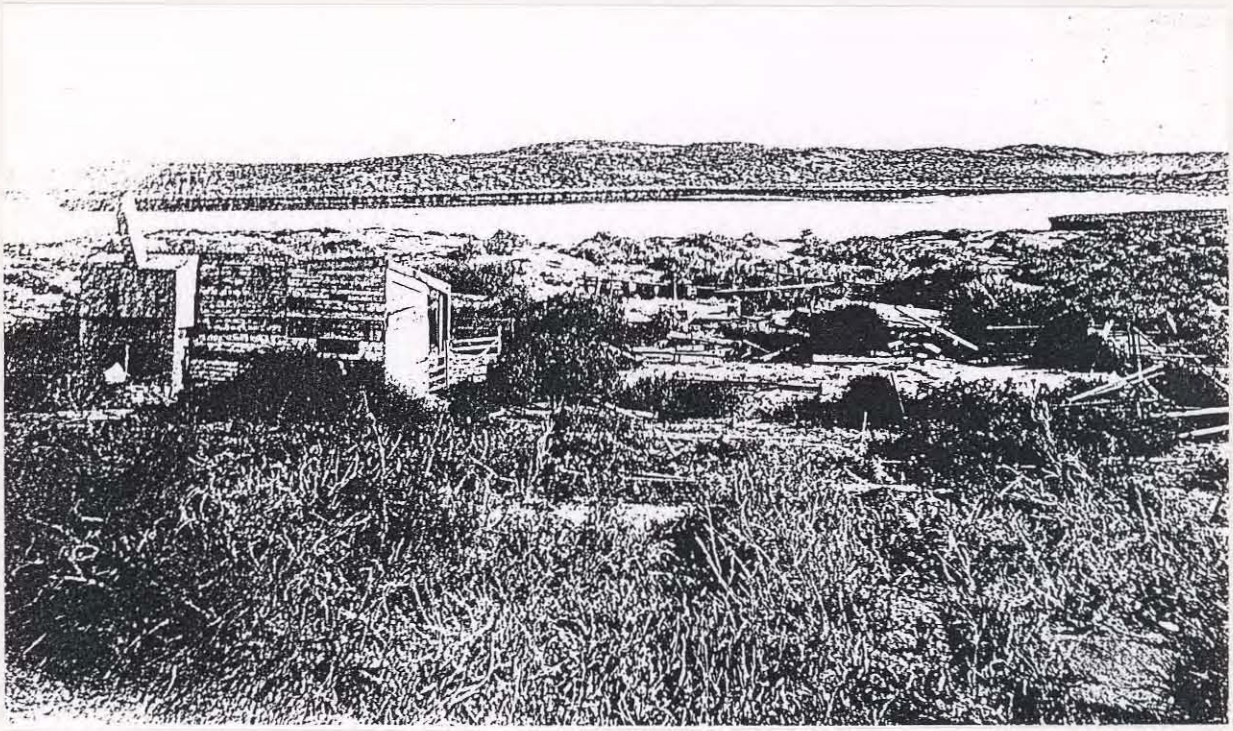
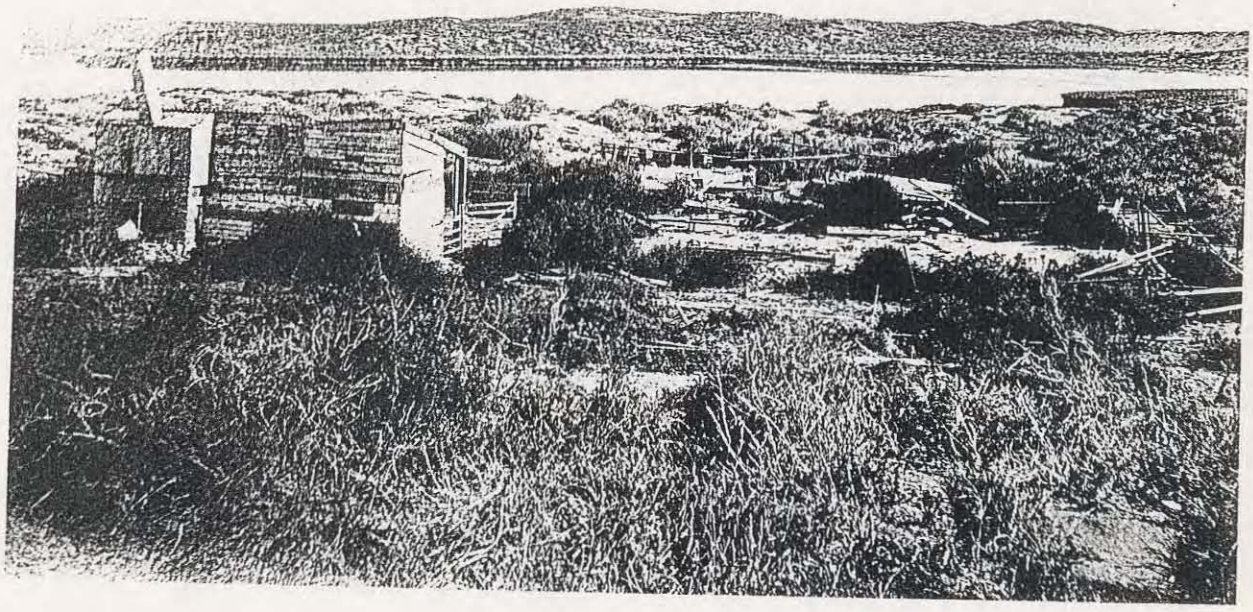
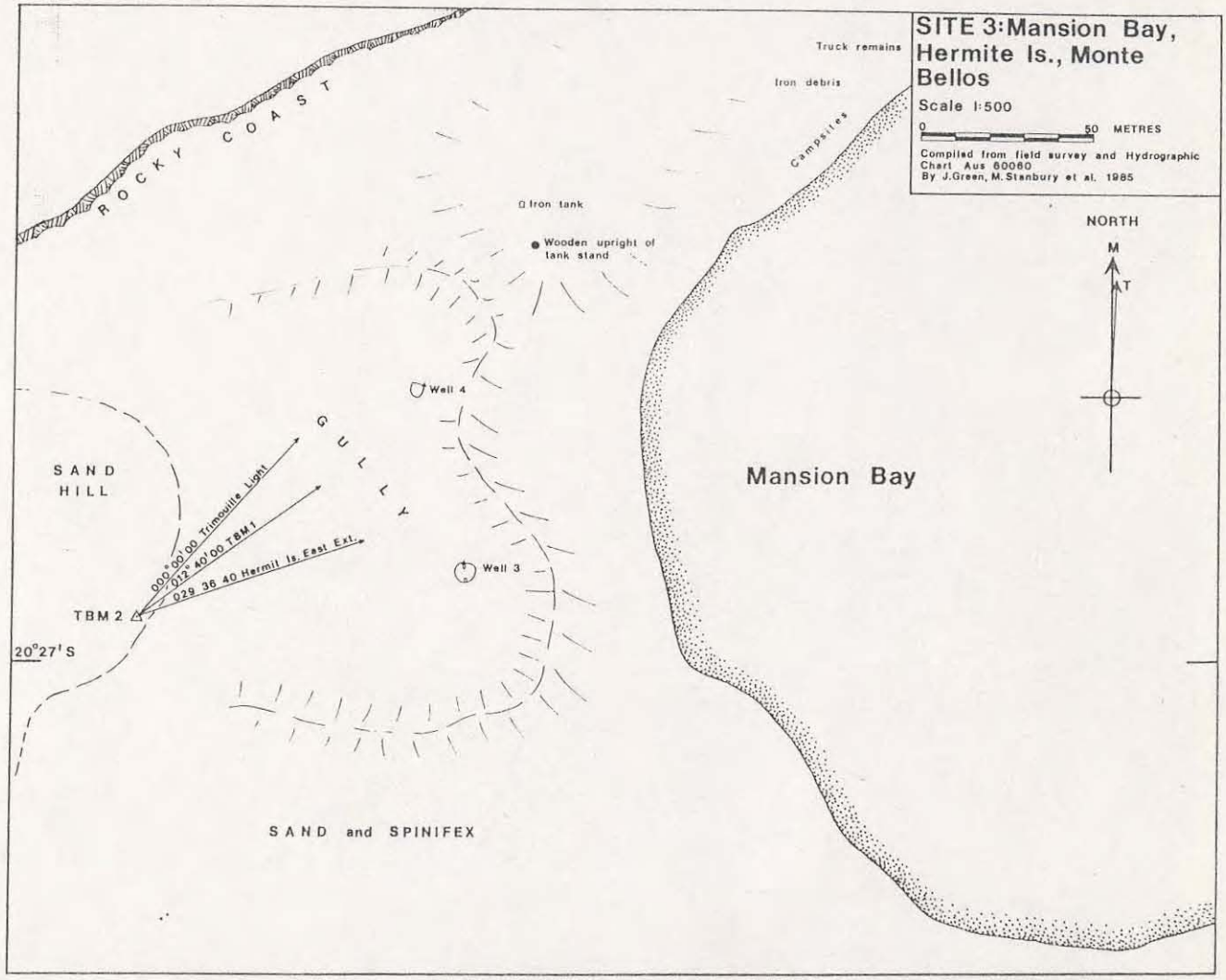


Figure 2. 'Remains of Mr. Haynes' House, Hermite Island' (P.D. Montague, 1912).

Figure 3. Remains of old pearling camp, Hermite Island (P.D. Montague, 1912).



26. Remains of Mr Haynes house, Hermite Island, 1912. Photo: P.D. Montague



27. Plan of Site 3 - Mansion Bay, Hermite Island

from a camp in the Hermite Lagoon (Sledge, 1979:11). It seems curious, then, that the 'kitchen' (situated close to the main building) survived the storm.

An alternative suggestion is that it may have been reconstructed following Haynes' departure in 1911, possibly as a small shelter for visiting pearlers, or even by Montague himself. From his paper to the Royal Society (Montague, 1913), it is evident that he made his base camp somewhere in this region of Hermite Island.

7.3. **Site 3: Mansion Bay, Hermite Island**

The site at Mansion Bay is situated 0.55 km to the south-west of Site 2 (see Fig 3) and is illustrated by the plan shown in Figure 27. The site is dominated by a high sand hill (Bacon Hill) which proved to be an excellent location for establishing a temporary bench mark (T.B.M. 2). To the east, the site is bounded by the sandy beach of Mansion Bay and to the north-west by the rocky limestone shore of Home Lagoon. The area is undulating and generally well covered with sand, except where prevailing southerly and south-easterly winds have caused "blow-outs" or "gullies", as at the base of Bacon Hill. Vegetation is sparse, consisting of spinifex and a few small shrubs (mainly localized in the area of each well and the wooden tank stand).

7.3.1. **Wells 3 and 4**

The two most permanent man-made features of the site are two wells (Figs 28 & 29). They are located in a gully which runs in a SE - NW direction between 55 - 60 m inshore from Mansion Bay. The southernmost well (Well 3) is roughly circular in shape with a diameter of 5.5 m. The walls of the well are faced with limestone and on the north and south sides a 0.9 m wide limestone wall extends 1.4 m towards the centre of the well. Given the large diameter of the well, these two structures would appear to be supports for a cross-beam (or plank), that would enable water to be drawn from the middle of the well. Owing to the fact that the well was filled with sand and small shrubs, it was not possible (without much digging) to estimate its depth.

The northern well (Well 4) is similarly filled in with sand and overgrown with shrubs and spinifex. It is somewhat D-shaped and again has retaining walls constructed of limestone. These are a maximum of five blocks deep giving a depth of 830 mm. At this level the blocks appear to be resting on limestone bed-rock although the middle of the well continues deeper.

The well is approximately 3.25 x 4.30 m and, unlike Well 3, does not have the two supporting structures for a cross-beam. Instead, a plank of wood spans one sector of the well, resting on the bed-rock outcrops of the well wall (Fig.). Lying in the well is a rusted 44 gallon oil drum and lid, indicating a post-1927 date (Warman, 1986: pers. comm.). There was no sign of water in either Well 3 or Well 4.

7.3.2. **Wooden Tank Stand**

About 50 m to the north-east of Well 4 on the top of a high ridge is an upright wooden post with narrow wooden slats nailed to it at intervals (Fig. 30). Other slats and posts lie nearby on the ground, together with three 44 gallon oil drums. A photograph of the structure taken in 1971 (Fig. 31) shows it more intact, but gives little indication as to its function.

There appear to be four main uprights, each about 2 m high, separated by a series of wooden slats 2 m long. The slats are nailed at intervals to the top of the posts (nails being in evidence where slats are missing). The posts and slats thus form a square structure approximately 2 x 2 x 2 m. Whether this supported a platform (or roof) is not clearly indicated from the remains but would seem to be a possibility. Given this assumption, the associated presence of the three oil drums would suggest a related function.

Being situated about 40 m inshore and on a relatively steep slope, it does not seem feasible that full drums of fuel would be carried to this site without some specific purpose in mind. Hence, it would not appear to be a regular storage area (or stand) for fuel. Rather, it may have had some special function related to the atomic bomb tests, or alternatively, may simply be a water "tank stand". This speculative notion arises from the presence of an empty drum and lid in Well 4, which suggests that these containers were possibly being used either for water storage or rainwater catchment.

On the summit of the ridge, 11.8 m to the north-west of the wooden structure is an "iron tank" set in the ground. In effect, it appears to be a rectangular pit 1.4 x 1.6 m lined with corrugated iron supported on wooden bearers. Its purpose is unclear but may well be related to the nearby wooden structure.

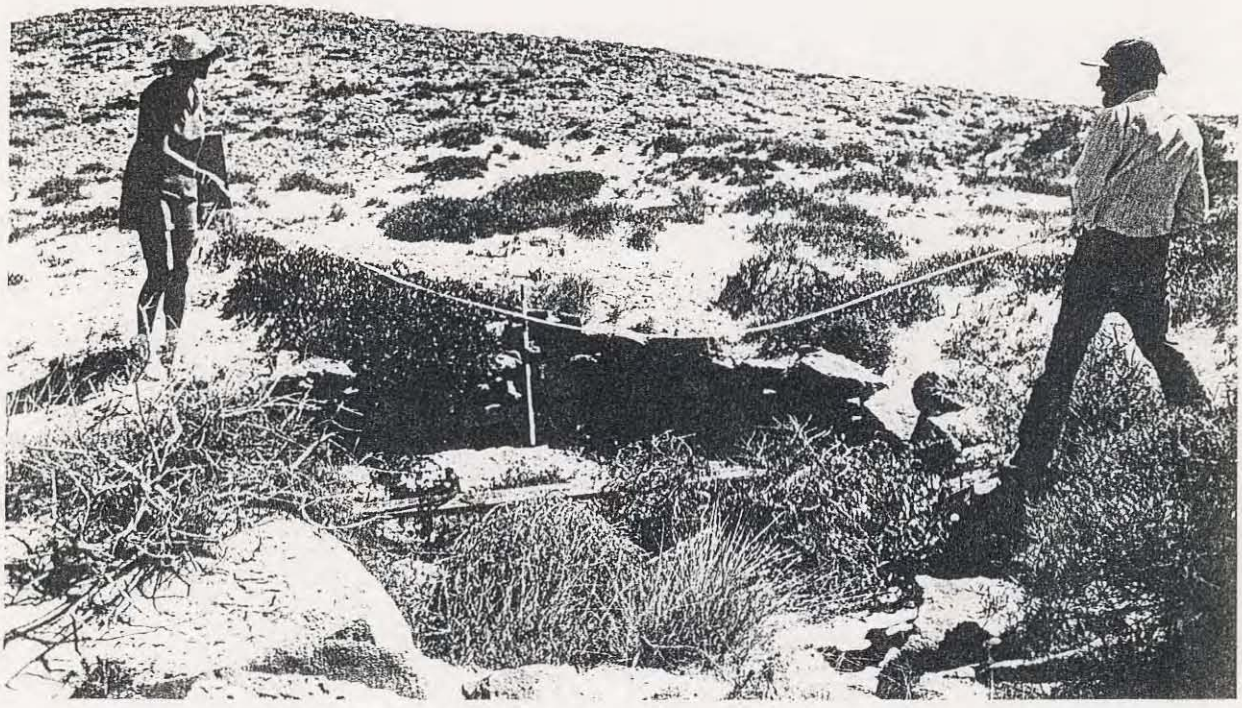
7.3.3. **Campsite Area**

Approximately 250 m north-east of T.B.M. 2 are three small areas of ground which appear to have been used as sites for temporary dwellings. The sites were unfortunately not included in the theodolite survey as they were not visible from T.B.M. 1. Their position on the map of the Mansion Bay site (Fig. 27) therefore, is approximate.

Lying in a slight depression between the high-water beach berm and the sand foothills, there is little immediate material evidence to identify the three sites. Closer observation, however, reveals that flattened areas of ground are surrounded by wood and/or iron stakes set at 45° angles. These give the impression of having been used as stakes for guy ropes, hence the assumption that tents or other temporary shelters may have been erected on the sites.

As time was limited, the area was not mapped or examined in detail. It is likely, therefore, that significant evidence has been overlooked.

28. Well 3, Mansion Bay, looking to the north-west. Photo:



29. Well 4, Mansion Bay looking north. Photo: Pat Baker

A short distance to the north of the "campsite", the sandy beach of Mansion Bay gives way to limestone cliff. The ground rises steeply to form a high ridge which extends along the narrow divide between Home Lagoon to the west and Mansion Bay to the east. Scattered on the sandy slopes are the remains of a vehicle, among them a crankshaft, camshaft and radiator. Nearby are the remnants of a sloping concrete slab and rusting machinery. The purpose and identity of the latter, however, could not be ascertained.

7.3.4. **Analysis and inferences based on field observations, photographic and documentary evidence**

The most significant findings at Site 3 are the two wells (Nos. 3 & 4) and the area designated as a 'camp-site' on the survey plan. Lack of material evidence from these locations however, coupled with incomplete investigations, makes it difficult to draw any conclusive inferences relating to date or period of occupation.

Another photograph by P.D. Montague (Fig. 32), however, does provide a basis for some explanation. The photograph was found along with that depicting the remains of Haynes' house and must therefore date from the same time (i.e. 1912). This second picture shows a relatively substantial camp situated close to the water's edge. In the background is high ridge following the curvature of the bay which corresponds well with the topography of the north-west shore of Mansion Bay. Given this assumption, the photograph must represent the camp-site area identified during the field survey. This being so, the picture is taken looking approximately north.

Shown in the photograph is a rectangular, corrugated iron shack with sliding door and shuttered window. A number of guy ropes anchor the building to stakes driven in the ground which would explain the presence of these finds during the field survey. Situated at the north-east corner of the shack is a wooden barrel with an iron kettle close by. This close association clearly suggests that drinking water was being stored in these containers and that similar barrels may have been present near Wells 1 and 2 (see 7.2.6.). A number of other domestic items and pieces of furniture lie scattered in the vicinity of the shack and include a stoneware jar, galvanized iron bowl and bath, trestle table, bentwood chair and roughly made wooden bed frames.

To the north-east of the shack, and a little closer to the shore, is a large tent structure. A complex framework of long poles, central ridge poles and uprights forms a self-supporting frame for the canvas awning, part of which is shown in situ. An additional series of uprights and cross-pieces to the north-west of the tents probably form the frames of further hut-like shelters.

To the north of the tents is a tall post supporting an inverted triangle. This clearly represents a navigational marker (or leading beacon) and gives an immediate clue that links this site with Haynes. It

will be recalled that on his first visit to the Monte Bellos in 1884-85, Haynes dug a well through 20 ft (6.1 m) of rock and obtained a good supply of water. A beacon was later erected both to guide vessels into the area and to the well of fresh water (Streeter, 1886:177-178).

In view of the proximity of the campsite to Wells 3 and 4 (Site 3) and Wells 1 and 2 (Site 2), it seems certain that this is Haynes' beacon. The question arising, however, is which of the wells it was originally meant to mark? In other words, which was the well sunk by Haynes in 1884-85?

It is interesting to note that a line drawn from the wooden post on Bacon Hill (T.B.M. 2) to the camp-site area passes approximately 5 m to the south of Well 4. This strongly suggests that the wooden post was also a leading mark and gives rise to the speculation as to whether or not Bacon Hill should have been more correctly named "Beacon Hill"?

According to Combe (1900), water could be obtained in the Monte Bellos by digging in the 'sandy hollows'. On Trimouille Island he found that good water was procured by digging 'near the coastline' due west of the northern summit (Combe, 1900:290), but does not mention any wells on Hermite Island. His information is sufficient, however, to confirm that fresh water could be obtained and to suggest likely locations. Both wells 3 and 4 fall within Combe's category of being in a sandy hollow and near the coastline whereas wells 1 and 2 are on a high ridge. It seems feasible, therefore, that the earliest well to be built was one of those in Mansion Bay. This argument is further supported by the 1906 Lands and Surveys working plan of the area which has the word 'Well.B' marked in Mansion Bay with a beach called 'The Well Beach' further to the south (see 1: 100 000 1957, 2057 Monte Bello Special LC 480370).

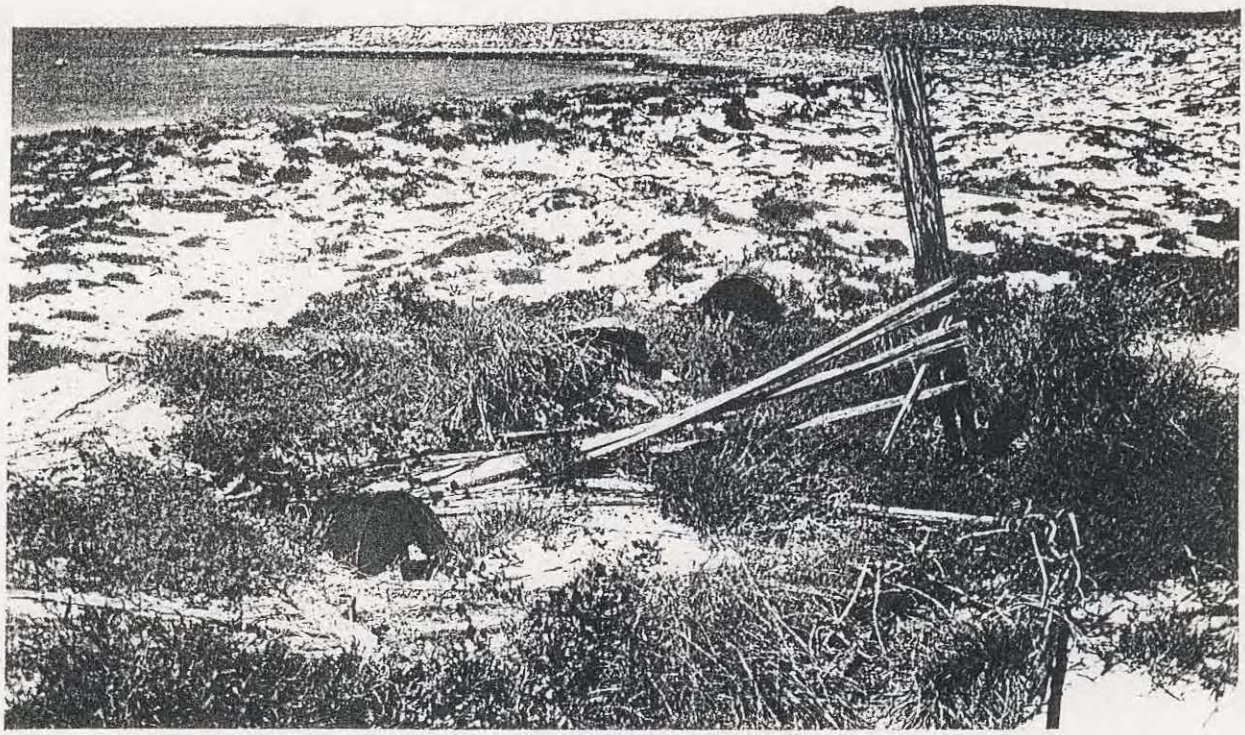
The presence of at least one productive well on Hermite Island is further confirmed by Montague who states that:

> '.....our water supply was derived from a well which had been sunk for fifteen feet through the porous rock and which yielded us a permanent though scanty supply' (Montague, 1914:628).

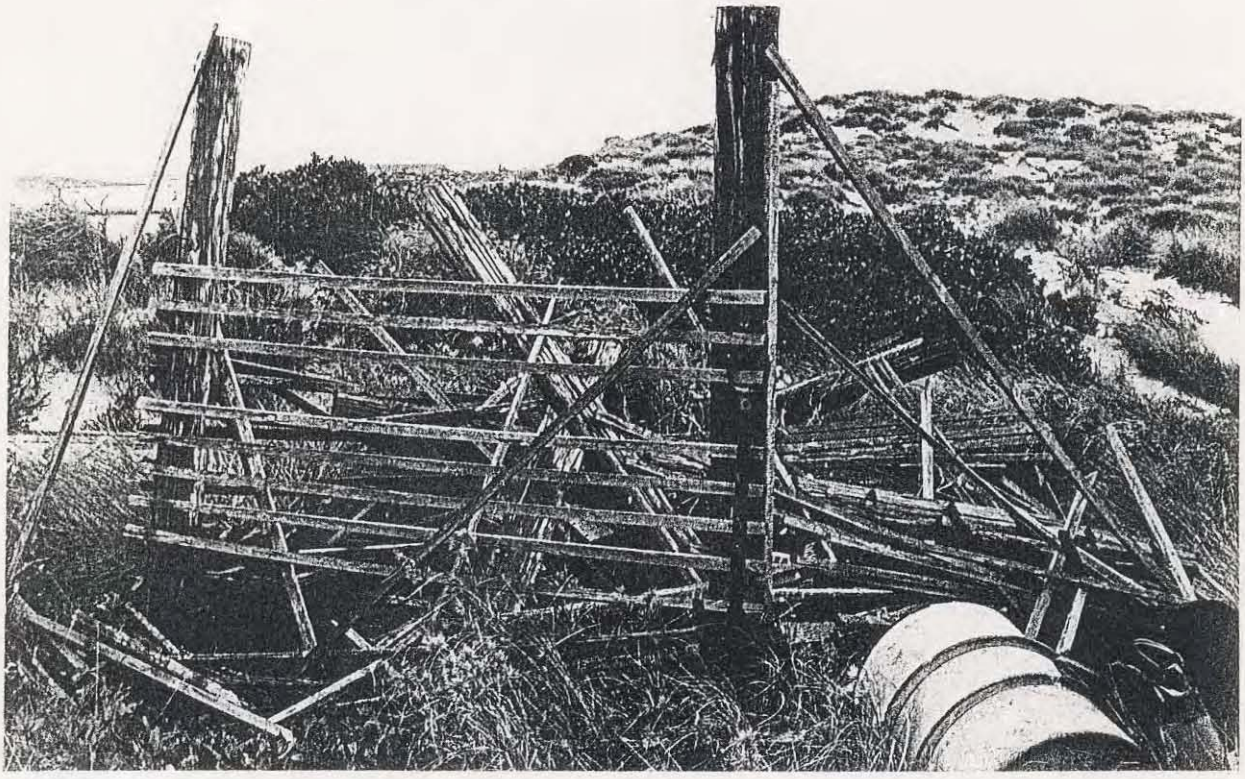
The well was said to be situated 'at the base of a low hill on the south side of the Home Lagoon' and provided 'a regular supply of about three gallons.... daily' (Montague, 1913:37).

Montague noted that the level of water in the well fluctuated from day to day: some days there was a plentiful supply and others virtually no water at all. He related the movement of water in lower stratas to the rate of surface evaporation and kept a series of records to demonstrate this effect. During periods of strong easterly winds, water levels in the well were found to drop, rising again when the wind velocity decreased (Montague, 1913:37).

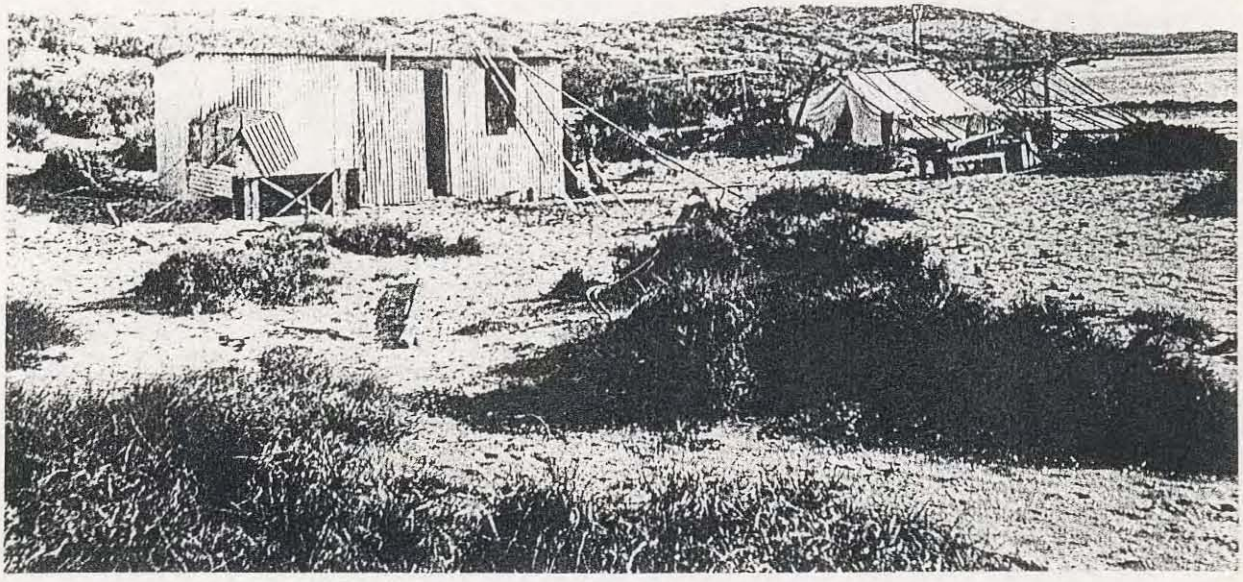
The site of the well is indicated by Montague on a corrected Admiralty Chart (No. 3186) which accompanies his 1913 paper (Fig. 33).



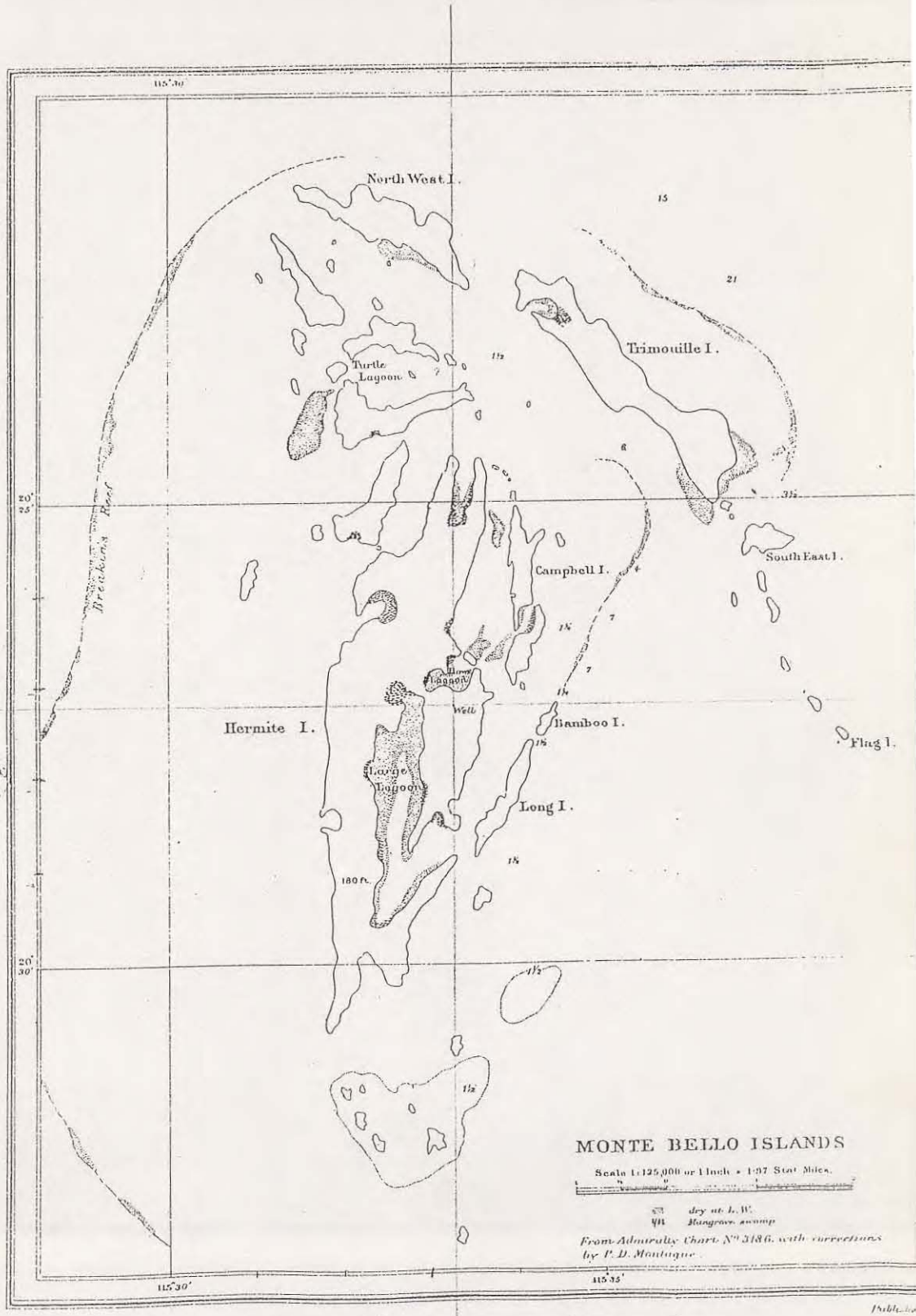
30. Remains of tank stand, looking north, 1985. Photo:



31. Remains of tank stand, 1971. Photo: Jeremy Green



32. Remains of old pearling camp, Hermite Island, 1912. Photo: P.D. Montague



20°27·2' [20°26·95' 20°26·98'] 1(N) 2

115°33·2' [115°32·28' 115°32·29'] 1 (N) 2

33. Map of the Monte Bello Islands by P.D. Montague, 1913

According to this map, the position of the well is shown as latitude 20° 27.2'S, longitude 115°33.2'E. While the latitude compares well with Well 3 at Mansion Bay, (lat. 26° 26.98'S), there is a discrepancy in the longitude of 1 minute (Well 3 lying in longitude 115° 32.29'E). This difference may be explained however, by the fact that on present maps and charts, longitude 115° 33' passes to the east of South Delta Island and is therefore calculated to be farther east than is shown on Montague's chart.

Based on the latitude readings, it would appear that the well referred to by Montague is Well 3 while the fact that Well 4 lies on a bearing from T.B.M. 2 (Bacon Hill) to the camp-site suggests that this was the original well dug by Haynes. Following a visit to the island in August 1950, Sheard (1950:150) comments that 'two wells have been dug to about 15 feet through sandstone several hundred yards southwesterly of (a small cement catchment at the side of a small hill inside the entrance of the southernmost lagoon of Hermite Island)'. Sheard's comments serve to confirm the relationship of the wells at Site 2 (Nos. 1 & 2) with those in Mansion Bay, suggesting that the former were merely reservoirs for water rather than natural wells.

While the well provided the only permanent source of water, Montague mentions that after the rains, water could be obtained from surface diggings in ten sand-hills situated to the west side of Hermite Island (Montague, 1914:628). Furthermore, he states that an abandoned water-tank contained brackish water into which birds flew and bathed. This suggests that perhaps the wooden structure in Mansion Bay was indeed a tank stand.

Although Montague briefly describes Haynes' scientific attempts to cultivate mother-of-pearl shell (Montague, 1913:43), he makes little mention of the pearlers' encampments save to comment on a 'damaged bag of rice left by pearlers at their last season's encampment' (1913:40). He does note, however, that many of the "snake-wood" bushes on Hermite Island 'have had their foliage burned off them by the pearlers, so that they may dry thoroughly and furnish fuel for future "lay-up" seasons' (1913:38).

From the limited documentary and material evidence, it seems reasonable to suggest that the campsite in Mansion Bay was built to accommodate several people in simple style accommodation. Given the generally warm climate of the Monte Bellos and minimal rainfall, the tents would have provided adequate shelter from the wind and heat for variable numbers of people while the iron shack would have provided a more substantial building perhaps for use as a kitchen facility.

Given the proximity and association of this site to Well 4, it may be suggested that this is possibly the site of Haynes' first encampment in 1885, where he sought to nurse his sick Sulu divers back to health (see 4.5). This suggestion is made firstly, on the basis that the dwelling site at Site 2 is further from the source of permanent fresh water, and secondly, that the more substantial nature of the foundations and water storage

facilities at Site 2 indicate that some degree of planning was involved in the construction of this house and complex.

It seems reasonable to suggest, therefore, that the camp-site at Mansion Bay was used by Haynes to house his assistants and/or contract divers, while he himself had another house built on the promontory to the north-east. The site was probably used intermittently by pearlers from the beginning of 1885 until 1911 when the area was hit was a cyclone and Haynes left the Monte Bellos. In view of the fact that licenses held by Haynes were not terminated until 31 December, 1916 (Letter dated 20/5/54, L. & S. File 5460/11), it is unlikely that any long term use was made of the camp immediately following his departure. Indeed, although a series of individuals and fishing syndicates applied for leases of the Monte Bellos in the period to 1941, only one group, the Australian Canning Company, maintained their lease for more than two years (from 20/2/1934 to 13/11/1936) (Letter dated 20/5/54, L. & S. File 5460/11). After 1941, no further applications were received and it was only after World War II that interest in the Monte Bellos was renewed. A proposal by two ex-Navy personnel in 1946 to erect a small hotel on Hermite Island was not implemented and the only other person to be granted a lease prior to the atomic bomb tests was Trevor Clifford, in 1952.

8. **Summary and Conclusions**

The development of the pearling industry in Western Australia was undoubtedly one of the most significant events in colonial maritime history. At a time when a handful of pastoralists were attempting to settle the remote regions of the North-West, the attraction of pearls and mother-of-pearl shell provided an additional impetus for the growth and expansion of North-West ports and towns such as Cossack and Broome. Economically, the industry provided the colony with one of its most valuable export commodities, enabling it to achieve greater commercial recognition on world-wide markets. Politically, the establishment of pearling coincided with a period during which the neglected colony of Western Australia transformed itself into a viable self-governing community.

The participation of "foreign" pearlers in the industry was viewed with some constraint primarily because the Government was fearful that much needed revenue would disappear from the colony in the hands of foreign capitalists and entrepreneurs. On their part, these affluent, "aristocratic" investors were often resentful that their financial contributions to the colony's inland revenue were not adequately recognized.

The role of the "foreign" pearlers in the North-West industry, however, can not be underestimated. In part therefore, this study serves to demonstrate the way in which the capital, knowledge, innovation and tenacity of the 19th century English pearlers was aimed at making this industry a long and viable concern.

The main purpose of this work was to locate and identify sites in the Monte Bello Islands which were thought to be related to early pearling activities in the area. Two sites were found on Hermite Island and one on North Delta Island, all three being mapped in relation to each other by means of a field survey. Based on observations made at each site, an attempt was made to synthesize the findings with available literary, documentary, pictorial and oral evidence in order to clarify questions concerning the age, function and inter-relationship of the various sites.

A brief review of literary and documentary sources provided an historical overview, albeit incomplete, of the involvement of Thomas Haynes in the North-West pearling industry between 1882 and 1912. Whether in partnership with, or an behalf of, the London jeweller Edwin Streeter, Haynes left England in 1882 in order to investigate the potential of pearl fisheries in eastern waters, including Australia. He was accompanied by an ex-Royal Navy captain, E.C. Chippindall, R.N. whose knowledge of the sea would have been, without doubt, a necessary prerequisite for the success of the enterprise.

While Haynes sought to familiarize himself with the practices of indigenous pearl divers in the Sulu archipelago, learning their language and becoming acquainted with their customs, Chippindall purchased and fitted out a schooner for the voyage to Australia. The vessel, the *Sree Pas Sair*, sailed from Singapore in September 1883 on its first exploratory trip. Meeting with success, Haynes returned in 1884, prepared for a two year voyage. It was in this year that he made his first visit to the Monte Bello Islands, being one of the first pearlers to gather shell in these waters.

Unlike many pearling masters, Haynes appears to have treated his native divers with patience and due consideration for their psychological and physical welfare. Indeed, it was mainly because he considered the waters at Exmouth Gulf too cold for naked diving that he moved to the warmer climes of the Monte Bellos. More than satisfied with his catches, he was content to stay until a cyclone drove him to a mainland creek for shelter.

Although the *Sree Pas Sair* carried sufficient fresh water for 80 men for three months, this was clearly not enough, given the hot summer climate and the physical energy expended by the pearl divers. It is not surprising, therefore, to find that Haynes was forced to seek water ashore, finding a good supply by sinking a well through several metres of rock. Quite likely, Chippindall was equipped with available charts and sailing directions which frequently comment on the most probable spots for obtaining water in remote places, (such as the remarks made by Combe during his survey in 1900).

Having fortunately discovered a supply of fresh water, Haynes would have thus been secure in the knowledge that the islands could be used as a temporary or semi-permanent base from which to carry out his pearling activities. Indeed, after the cyclone threat of early 1885 had passed, he

returned to the Monte Bellos to allow a number of sick divers to recover from the disease beri-beri. At this time, he is said to have built a house on shore and erected a beacon to guide vessels into the group and to the well.

Based on the analysis of field and photographic evidence of two sites on Hermite Island (Sites 2 and 3), it is inferred that the northern well in Mansion Bay (Well 4) was the first well sunk by Haynes, in 1884, the southern well being sunk sometime afterwards. This premise rests largely on the argument that the well lies on a direct bearing from the camp-site area to the north-east of the site and a wooden post on Bacon Hill (T.B.M. 2). A photograph taken by P.D. Montague in 1912 identifies this site and further supports this argument by illustrating the presence of a leading beacon, said to have been erected to guide ships into the group and to the source of fresh water.

It is also suggested that the Mansion Bay camp-site area is the most likely site of Haynes' first encampment. With almost half his crew suffering badly from beri-beri and unable to work, it seems unlikely that sufficient labour would have been available at that time to construct a substantial house such as indicated by the concrete foundations at Site 2. Rather, the iron shack shown in Figure 32 would probably have sufficed as a temporary dwelling for Haynes, while the native divers would have been accommodated in the tents.

By the end of 1885, the *Sree Pas Sair* had been equipped with diving suits and was operating out of Exmouth Gulf in company with another of Streeter's vessels, the *Telephone*. Although there is little information to indicate Haynes' role in the adoption of modern diving methods, there is sufficient to confirm that his involvement in the pearling industry continued at least until 1890. As a concerned spokesman for the "foreign" pearlers in the North-West he was active in making their problems and grievances publically known in the hopes that the Western Australian Government would heed their complaints. Whether Haynes continued to visit the Monte Bellos during the period 1886 to 1890 is therefore uncertain.

Again, there is little mention of Haynes during the period 1890 to 1901. Indeed, it is not until he obtained an exclusive pearling license in 1902 to undertake the cultivation of mother-of-pearl shell in the Monte Bellos that information about him comes to hand. On the basis of identifiable and datable artefacts located at Site 2 on Hermite Island, it is suggested that the earliest date of occupation for this site is 1898, while other artefacts give a definite post-1900 date. This tends to indicate, therefore, that this site was not established until the commencement of Haynes' license in April 1902.

Having been granted a license for 14 years, it is not unreasonable to envisage that Haynes would have wished to erect a fairly substantial and comfortable dwelling in the Monte Bellos, close to a known source of fresh water. The remains at Site 2 on Hermite Island certainly support this

theory, being in accessible distance to the wells in Mansion Bay. They are also close to the camp-site area at the north-east of the Bay which may have served as temporary accommodation for Haynes during the building of the new house and water storage facilities, and thereafter for his employees.

A photograph taken by P.D. Montague in 1912 identifies Site 2 as Haynes' house and enables inferences drawn from field observations to be substantiated. In terms of the position and construction of the buildings it is suggested that these were designed to maximize water catchment from the roofs and channel the run-off to the two "wells" (or reservoirs) located nearby. Lack of fresh water would have been one of the biggest problems to be faced in such an isolated environment. Even on the mainland, fresh water was in short supply, particularly during non-cyclonic periods. Furthermore, it was often brackish and/or contaminated leading to the exacerbation of water-borne diseases. In this regard, it is suggested that the coverings over the reservoirs at Site 2 (illustrated in the Montague photograph) served to protect the water from contamination, thereby minimizing the risk of illness. In addition, they would prevent loss of water through evaporation and assist in water catchment.

The presence of fenced enclosures shown in the Montague photograph lead to the suggestion that livestock was kept on the island as a source of fresh meat and dairy produce. Fresh mutton and flour were considered essential items in the diet to prevent the disease beri-beri and, wherever possible, were substituted for rice. Limited supplies of fresh vegetables and fruit would undoubtedly give rise to dietary deficiencies in the long-term. Hence, the presence of proprietary brand medicine bottles at the site is not unexpected.

The consumption of imported spirits and other liquor was common among the wealthy North-West pearlers, much of it being acquired through illegal smuggling. The variety of such bottles at Site 2 is sufficient, therefore, to indicate that Haynes and his associates conformed with this practice, whether the supplies were legally obtained or no.

The main purpose of Haynes' presence in the Monte Bellos in the early 1900s is demonstrated by the remains of the experimental shell pool at North Delta Island (Site 1). Although this site was incompletely investigated, an analysis of available resources has enabled questions as to the structural features, function and date of construction of the site to be clarified. Referred to as a "Tidal Pool", it was constructed between 1902 to 1904 in order to provide an artificial breeding ground for mother-of-pearl shell which approximated as closely as possible a natural habitat for the pearl oyster.

One of the greatest problems in cultivating mother-of-pearl shell is the provision of adequate enclosure and protection of the young oysters during the free-swimming larval stage. Coupled with this is the need for adequate nutrition for the developing oysters. Haynes sought to combat

these difficulties by the enlargement and adaptation of a natural inlet on the west coast of North Delta Island. An enclosure of about an acre (0.4 ha) was made by constructing a masonry dam with flood-gates across the entrance to the inlet and a stone embankment along the shallow margin of the pool. Effete water filtered out through the porous rock bottom to the extent of 2 to 4 feet (0.6 to 1.2 m) (Montague, 1913:43) and was replenished at flood tide, thereby maintaining the cleanliness of the pool and renewing food supplies.

While it was considered by many that Haynes' experimental venture to cultivate mother-of-pearl shell was the most scientific attempt of its time, he received little encouragement from Government authorities or overseas scientists engaged in similar pursuits. After his forced departure from the Monte Bellos in 1911, there was little attempt to resume experimentation in the pool until comparatively recent times.

In 1981, the masonry dam and sluice were reconstructed by R.P. Morgan and his crew in an attempt to follow Haynes' example. Insufficient information regarding the pearl oyster, however, continues to thwart attempts to successfully breed the shell artificially in the pool.

In conclusion, it may be stated that the three sites investigated on Hermite Island and North Delta Island represent a period of pearling activity dating from 1884 to 1911. Of the two sites on Hermite Island, the Mansion Bay site is considered to represent an earlier period of occupation than the Old Pearling Camp, which is thought to date from c.1902. The "Tidal Pool" at North Delta Island also dates from this latter period.

All three sites are related inasmuch as they were utilized, either intermittently or semi-permanently, by the English pearler Thomas H. Haynes. In terms of their significance, they are an important reminder of the physical hardship and perils faced by the North-West pearlers in the 19th and early 20th century, and of the biological and technical innovations introduced by pearlers themselves in an endeavour to implement conservation strategies and artificial means for ensuring the future livelihood of the pearling industry.

ENDNOTES

1. W. Saville Kent, 1890, Investigation into the beche-de-mer and pearl shell fisheries of Northern Queensland by W. Saville Kent, F.L.S., F.Z.S., Commissioner of Fisheries, Queensland. Report from the Select Committee on the Western Australian Enabling Bill. London. 1890. Cited in Bain, 1982:266
2. Smith, 1965, cited in Burbidge, 1971:2.
3. A site known as Parkes' lugger camp, along with the wreck of one of Parkes' luggers in "Lugger Cove" in the Hermite Is. lagoon were documented during the Wreck Inspection North Coast (WINC) Expedition in 1978 (Sledge, 1979:11-13). Thus, there was no plan to re-investigate these sites.
4. Horizontal Control Chart, Dampier and Barrow Island F 50/1 & 2, Department of Lands and Surveys, Western Australia
5. The name 'Chippindall' is variously spelled (Chippendale, Chipindall, and Chippendall) both by Streeter and other authors. The above spelling is used in this text being the first form used by Streeter (1886:XV).
6. Now referred to as "Sulu" Archipelago: see map of the Indian Archipelago by I. Walker published 1st March 1820 by A. Constable and Co. Edinburgh: In Crawfurd, J. (1820) Vol. III, Appendix I.
7. See map in Crawfurd, 1820. Vol.III, Appendix I
8. Beri-beri is a disease which results from inadequate intake of vitamin B1 (aneurine). It is common in Eastern countries where the staple diet is polished rice as the polishing of the rice removes most of the vitamin B. In the early phases it may manifest as muscle cramps but in severe cases gives rise to heart failure and death.
9. The term "foreign" referred to vessels from other colonies, e.g. Queensland, New South Wales, South Australia etc.
10. The Pearl Shell Fishery Special Revenue Act, 12 July 1886 50 Vic. No.7.
11. Remarks by Napier Broome to Lord Rutherford on a petition from members of the North West Pearl Shell Fleet, 16 April 1888: Governor's Despatches, Vol.15:322, Battye Library, Perth.
12. Report from the Select Committee on the Western Australian Constitution Bill, London 1890. Q/A 3242, p.192: cited in Bain, 1982:263.
13. A date of 1896 is given by Bain (1982:269) but is not substantiated in the references cited.
14. This is an estimated measure.
15. The species represented include *Rhizophora mucronata*, *Ceriops tagal* and *Bruguiera rheedii* see Hill, 1955:118
16. Horizontal Control Chart, Dampier and Barrow Island F 50/1 & 2, Dept Lands and Surveys, Western Australia.
17. WA 1178 TOURIST DEV.LOC: Montebello Is. Run 3 (5122-5132) 10,000' 152.56 mm 28.6.69 Proj J58

8. The fertilized egg of the pearl oyster develops a tiny shell that is carried by water currents until it reaches something favourable it can attach itself to.
9. A flume is an artificial channel conveying water.
0. See 1:100 000, 1957, 2057 Montebello (Special) LC 475 385

BIBLIOGRAPHY

Bain, M.A., (1982),
Full Fathom Five. Artlook Books, Perth.

Burbridge, A.A., (1971),
The Fauna and Flora of the Monte Bello Islands.. Dept. of Fisheries and Fauna, Perth, Western Australia, Report No.9.

Combe, J.W., (1900),
Australia - N.W. Coast. Additional and revised Sailing Directions to Australian Directory., Vol. III 3rd Edition 1895. From H.M.S. *Penguin* 1900. Original Document OD 101: S57/1901, The Hydrographic Department, Ministry of Defence, Taunton.

Crawfurd, J., (1820),
History of the Indian Archipelago. Frank Cass & Co., London. Volume III. 1967 Edition.

Godden, G.A., (1964),
Encyclopedia of British Pottery and Porcelain Marks.. Barrie and Jenkins, London. 1970 Edition.

Godden, G.A., (1974),
British Porcelain.. Barrie and Jenkins, London. 1977 Edition.

Governor's Despatches, (1888),
Remarks by Napier Broome to Lord Rutherford on a petition from members of the North West Pearl Shell Fleet, 16 April 1888. Volume 15:322 (B.L.).

Green, J., (1971),
Australia's Oldest Wreck: The Loss of the Trial , *1622*. British Archaeological Reports, Supplementary Series 27, Oxford.

Green, J., (1985),
The Survey and Identification of the English East India Company Ship *Trial* (1622). *International Journal of Nautical Archaeology*. In Press).

Haynes, T.H., (1912),
Mother-o'-Pearl Shell Culture.. Battye Library, Perth. Acc.No. PR 1692.

Henderson, G., (1983),
The Australian Pearling Lugger and Maritime Archaeology. In Amess, J. and Jeffery, W., Eds. *Proceedings of the Second Southern Hemisphere Conference on Maritime Archaeology*. Commonwealth Department of Home Affairs & South Australian Department of Environment & Planning, Adelaide.

Henderson, G. and Sledge, S., (1984),
Sunbeam: Solving the Mystery. *Western Way*, Oct-Dec. 1984, 13:26-32.

Herald 5 June 1886.

Hill, F.L., (1955),

Notes on the Natural History of the Monte Bello Islands. *Proceedings of the Linnaean Society of London*, Vol. 165, Part.2:113-123.
Inquirer 27 October 1886.
Kent, W. Saville, (1897),
The Naturalist in Australia. Chapman & Hall, London.
Lands and Surveys Department, Perth, Western Australia.
Files 5460/11 and 7081/06. Battye Library, Perth.
Lloyds Register of Shipping, 1890-91, and 1895-96.
Mankowitz, W. and Haggar, R., (1957),
The Concise Encyclopedia of English Pottery and Porcelain, Andre Deutsch, London.
Mercantile Navy List and Maritime Directory, (1889),
Spottiswoode & Co., London.
Montague, P.D., (1913),
The Montebello Islands. *Geographical Journal*, 42(1):34-44.
Montague, P.D., (1914),
A Report on the Fauna of the Monte Bellow Islands. *Proceedings of the Zoological Society, London*, 1914: 625-652.
Mulvaney, D.J., (1975),
The Prehistory of Australia. Pelican Books, Australia.
Owen, W.L., (1933),
Cossack Gold. Angus & Robertson, Australia.
Rendell, J., (1963),
Collecting Matchbox Labels. Arco Publications, London.
Register of British Ships, Fremantle, Volume 3.
Department of Transport, Canberra.
Roycroft, R. and C., (1976),
Australian Bottle Price Guide.. Reliance Press, Deniliquin, N.S.W.
Sheard, K., (1950),
A visit to the Monte Bello Islands. *W. Aust. Naturalist*, 2(7):150-1.
Sledge, S., (1979),
Wreck Inspection North West Coast (W.I.N.C.) Expedition 1978.
Report - Department Maritime Archaeology, Western Australian Museum, No. 11.
Streeter, E.W., (1886),
Pearls and Pearling Life. G. Bell & Sons, London.
Western Australia : Parliamentary Debates,
1889, Vol. 17
1912, Vol. 43.
West Australian 17 December 1885.

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