PARRAMATTA OBSERVATORY

OLD GOVERNMENT HOUSE PARRAMATTA

THE CASE FOR ARCHAEOLOGICAL INVESTIGATION

Prepared by: ELIZABETH BRENCHLEY

PARRAMATTA OBSERVATORY
OLD GOVERNMENT HOUSE PARRAMATTA

THE CASE FOR ARCHAEOLOGICAL INVESTIGATION

PREPARED BY ELIZABETH BRENCHLEY, 19/11/1980.
ABSTRACT:

This Report consists of 3 sections.

HISTORY
A. (i) An outline of the historical significance of Parramatta Observatory.
   (ii) The chronology of the Observatory.
   (iii) Sir Thomas Makdougall Brisbane, Governor of New South Wales 1821-1825, a brief biography of the man who built the Observatory, his life and historical period.
   (iv) Charles Rumker, first Government Astronomer of Australia, a brief biographical sketch.
   (v) James Dunlop, Astronomer, Superintendent of the Observatory until its demolition, a brief biographical sketch.

BUILDINGS
B.
   (i) A submission to the NSW Heritage Council.
   (ii) The buildings, architectural features and historical parallels. The astronomical instruments.
   (iii) Methodology for the archaeological excavation.

GRAPHICS
C.
   A set of measured drawings to illustrate aspects of the site.
   (i) Contour Map
   (ii) Location Map
   (iii) Landscape Elements
   (iv) Hypothetical Reconstruction Plan of buildings.
   (v) Hypothetical Reconstruction Elevation North.
   (vi) Existing surface archaeological evidence.
   (vii) Overlay grid for excavation.
In addition there are 5 Appendices, copies of historical evidence used in the compilation of this Report:

a. Copies of historical maps indicating the site of the Observatory.
b. Copy of a letter from James Dunlop outlining the final condition of the building 1847.
c. Captain Phillip Gidley King's list of the Parramatta instruments and books from the Observatory.
d. Extracts from the Field Notebooks of Surveyor Ebsworth, 1887
e. Edmund Blacket's drawings for design of Sydney Observatory, an historical parallel architecturally.

A Full Bibliography is included at the end of Section B, which includes documentation for all illustrative material used in the Report.
HISTORICAL SIGNIFICANCE OF PARRAMATTA OBSERVATORY.

About 100 metres west of Old Government House at Parramatta are two weatherbeaten, graffiti-defaced sandstone piers set on a single massive sandstone block.

Nothing indicates that this relic might possibly be one of Australia's most significant historical monuments.

Nearby there is a fenced-off marble obelisk which provides a clue. The obelisk inscription reads: "An Astronomical Observatory was founded here 2nd May, 1822 by Sir Thomas Makdougall Brisbane, K.C.B., F.R.S., Governor of New South Wales. This obelisk was erected in 1880 to mark the position of the transit instrument in that observatory."

This is more impressive, except that the obelisk was unfortunately erected in the wrong spot. This point is well documented elsewhere, but is not of itself important. (1)

What is more important is that Australians are in danger of losing through neglect the real site of the observatory, marked only by the decaying sandstone piers and block nearby.

In the early 19th century, the southern hemisphere - its skies, oceans and land masses - was still largely unknown and uncharted.

The arrival of a distinguished British scientific gentleman, Sir Thomas Makdougall Brisbane, as Governor of New South Wales in 1821 heralded the beginning of scientific investigation of the southern hemisphere, and the birth of scientific methodology in the Colony. (2)

Brisbane was a man of commanding presence and great ability in the sciences, especially in applied mathematics. With such a
background he was uniquely equipped to begin research into studies of the southern hemisphere and provide data which profoundly influenced international astronomy of the day and helped the vital charting and navigation of ocean waters, continents and islands. (3) With his own money, Brisbane built, equipped and staffed an astronomical observatory which was to become the first Government Astronomical Observatory in Australia.

From this place all Australia's earliest navigators, explorers and surveyors took their original meridian marks for latitude and longitude. A recent investigation by J.T.C. Richmond, F.I.S.Aust., in The Australian Surveyor (4) confirms that the observations at Brisbane's Parramatta Observatory by his astronomer Charles Rumker (1822-1828) are acceptably accurate even by today's standards. It was from Parramatta that Sir Thomas Mitchell took his markings for the first trigonometrical survey of Australia, for which he received his knighthood. (5)

The importance of Parramatta is shown by the answers given by Sir Thomas Mitchell to questions at an inquiry into the Surveyor General's Department in 1855 (From the New South Wales Legislative Votes and Proceedings 1855 Vol 2):

"Q. It was from Parramatta your longitude started?
A. (Sir Thomas Mitchell) Yes, Mr Dunlop gave me the longitude, and with best attention to accuracy.

Q. Do you consider your longitude to be accurate with reference to Sydney?
A. Certainly I do, with reference to Sydney which is connected by five different chain measurements with the point I have just referred to.

Q. The object of the last question was to ascertain how you determined the longitude of several stations relative to Sydney.
A. By the lines laid down on the map, with reference to Sydney. When I say Sydney I mean the Observatory, all the longitudes are laid down on the map with reference to that of Sydney."

Later, answering further, Sir Thomas Mitchell says: "This map of 19 counties this became the basis of my more extended operations, reaching southward to the mouth of the Glenelg, westward to the Darling, and northward into Capricornia."

Sir Thomas Brisbane's observatory also gave Australia its first system of meteorological measurement and recording stations, of great benefit to early land settlement and agricultural expansion.(6) In addition the Hydrographic Office of the British Admiralty used the position of Parramatta Observatory to fix positions of places for the Southern Hemisphere.(3)

It appears that the sandstone piers of the original transit instrument may have been left standing through the influence of Sir Thomas Mitchell and his surveyor-navigator colleague Phillip Parker King. As surveyors, they would have been well aware of the fact that the transit instrument marks the position of the Observatory on the Earth's surface.

In the decades 1820-1840 Parramatta became recognised internationally as a respected scientific research centre. (7) This was also culturally significant to the Colony, which until then was considered a far-off and disreputable receptacle for the worst elements of British society.

It is possibly no coincidence that immigration to the Colony improved greatly during the relatively short period following Brisbane's years as Governor.(6)
The brief but turbulent history of the small Parramatta Observatory which will be outlined here should not be allowed to diminish its historical significance.

At present the site is marked only by a neglected almost forgotten relic of national historical importance. It has only survived the years through the persistence of a few determined and dedicated professionals, beginning with Sir Thomas Mitchell, who was able to save the transit piers from demolition in 1848 when the rest of the Observatory was pulled down, that the site has not been lost altogether. (9) (10) (11) No effort has been made officially to protect or mark the site apart from the mentioned erection of an obelisk in 1880, on the wrong spot.

It is submitted that this is a particular site worthy of proper archaeological investigation in order to clarify and determine the exact site of the original observatory and the vital locations of the instrument piers from which measurements and observations were taken. Because of the scientific nature of the work completed there an exact siting is important, but gaps in the historical record make an accurate assessment impossible without archaeological assistance.

The period from 1820 to 1840 is acknowledged as one of the worst documented periods in Australia's colonial history. (12) Engineering and Architectural Office records for 1820-1850 approximately are thought to have been destroyed by a fire in the Garden Palace Building - then used as a government store - in 1879. (12a)

The responsible investigation of the significant Observatory site at Parramatta could make a valuable contribution to an understanding of the historical record and our heritage.
Parramatta Park - location of sites.
Old Government House Parramatta pictured during the Observatory period.
(41) The only Plan of the Observatory known to exist.
(85) Transit piers and obelisk.

(85) View south between trees planted as markers.
(29) Sketch unsigned but dated 1844. Bath House and possibly domes of Observatory.
Observatory designed - probably in Scotland by Sir Thomas Brisbane. (12) The site at Parramatta was favoured because it was high, there was little atmospheric pollution and there was no problem with light refraction from water, then a considerable astronomical difficulty. (12)

Governor Brisbane and his entourage arrive by ship in November, with instruments, reference books and two astronomical staff, Messrs Rumker and Dunlop, to set up and operate a private observatory. (13) Special marker trees of the exotic species Pinus roxburghii were thought to have been planted in position by Governor Brisbane at this time. (14a, 14b)

Construction almost completed by March or April. May 2nd, observations begun. (10) Descriptions of the building indicate the foundations and piers for the instruments and marker stones were dressed sandstone. One marker stone for the Observatory still exists in a position due south, next to the present Parramatta High School.

There is documentary evidence that a convict mason was rewarded for the standard of work performed during the construction. (14)

From later descriptions the Observatory's dome support walls were brick (9), (15), and the covering for the domes thick canvas. The ceiling was plaster-lined (15). The exterior cladding was timber (5) as were the interior
partitions, flooring and window and door frames. (17)

From June 2nd., 1822 throughout the month of June important observations of the predicted return of Encke's Comet were recorded by Dunlop, Rumker and Brisbane. This success was of international significance. (18) (19) (18a) (20)

Observations commenced for the charting of the then unknown stars of the Southern Hemisphere. Latitude and longitude calculations commenced.

1822 Campbell's Map drawn of Parramatta which includes the first location of the Observatory. (20a)

1823 In June astronomer Charles Rumker leaves the Observatory. (23)

1824 Governor Brisbane recalled as Governor by Earl Bathurst. Dunlop decides to return to Scotland with Brisbane.

1825 Governor Darling appointed to the Colony.

1826 The Observatory becomes government property. The government purchases all Brisbane's instruments and reference library at the original price. (20) Charles Rumker returns to become Australia's first Government Astronomer.

In Britain Sir Thomas Brisbane publishes the first articles on observations in the Southern Hemisphere in various Royal Society journals. (21) (22)

Rumker's original brief as Astronomer includes a massive project for the charting of the arc of the meridian. (20)

1828 Surveyor Thomas Mitchell uses Parramatta's transit instrument for his initial meridian mark to begin the first trigonometrical survey of Australia. All positions were calculated East and West of that mark. (5)

Governor Darling approves of a residence to be built for the Government Astronomer next to the Observatory (25) (26)

1829 Charles Rumker, realising the size of the arc of the meridian
(90) Benchmark and copper mark placed 1887 by Surveyor Ebsworth.

(91) Soil profile - Wianamatta shale formation.
project he has to undertake, leaves for England to organise appropriate funding, staff and equipment. Funding is approved to add accommodation to the Observatory. (20)

1830 Charles Rumker runs into unexpected difficulties in London, connected with the publication of results from observations in Australia. Rumker resigns and joins the Hamburg School of Navigation in Germany.

1831 Governor Richard Bourke appointed Governor of New South Wales. James Dunlop returns from Scotland and is appointed Superintendent of Parramatta Observatory. His brief includes the undertaking of the charting of the arc of the meridian, but no funding is provided. (20)

1832 Observatory residence building completed. It was attached to the actual Observatory building. (16a) Dunlop begins observations, recording 2000 star observations for that year.

1833 Dunlop records a similar number for the year until May, when the record stops. In Britain, a book edited by Richardson is published containing a Catalogue of Stars of the Southern Hemisphere as observed by Brisbane's Observatory. The preface of the book includes the only known plan and elevation of Parramatta Observatory, drawn by the Rev W.B. Clarke - later known for his geological work in the Colony. (18)

1835 Dunlop records work from January-July (16c). A gap in the record follows.

1836 Map of Parramatta drawn by James Galloway includes Observatory (28)

1838-January 1839 were last recorded entries of observations by James Dunlop (16c)

1839-1847 No observations or reports from Dunlop survive.

1844 Pencil sketches made of the Observatory dated but unsigned. (29)
1844 Brownrigg's Map of Parramatta Domain includes the Observatory (30).

1847 Government disquiet about Observatory. Lt King and Colonel Gordon report to the Colonial Secretary that the Observatory building is in a bad state. They recommend that the instruments and library be removed to safe government storage.(31)

Governor FitzRoy appointed Governor of the Colony.

Dunlop recommends the demolition of the Observatory (17) Appendix.

1848 Observatory demolished, but residence left standing. (32)

King saves the instruments from sale.(32a).

Dunlop leaves, dies the same year at his farm near Gosford.(33)

The original transit instrument piers are left standing when the Observatory is pulled down, possibly at the instigation of Sir Thomas Mitchell and Lt King.(10)

1855 New Governor W. Denison requests funds to build an Observatory in Sydney.

1856 Astronomer Rev W. Scott appointed.(33a)

1857 Edmund Blacket designs and builds Sydney Observatory.

1857-1867 Parramatta Observatory residence used to house Parramatta Constabulary (32).

Parramatta historian Freame writes describing the building as having brick walls, with roofing of sheet lead one eighth of an inch thick.(34)

1858 Parramatta Park Trust formed - takes control of Residence.

1870 Windsor astronomer Tebbutt describes the "roofless brick walls of the former observatory which could still be seen". He recommends a marble obelisk be erected "on the site of the former transit instrument". (15)
Page from Surveyor Ebsworth’s Notebooks showing residence ruins 1887.
1876 Observatory residence demolished by Parramatta Park Ranger Giles because of "vandals" damaging the property and stealing lead from the roof. (9) Appendix B and D

1880 Marble obelisk recommended by Tebbutt erected to mark the transit instrument site, but in the wrong spot. The original transit piers were in situ, where they remain today. (1)

1883 Map of Parramatta Park shows no Observatory or residence. (35)

1887 Surveyor Ebsworth carefully records the remaining foundations of the Observatory residence in detail in his Field Notebooks. As a precaution against loss of the transit piers he places a permanent copper plug in the massive basal stone. (9) Appendix D

1887-PRESENT

The transit piers, their basal stone and Ebsworth's copper marker are still standing, but are in poor conditions, defaced by graffiti and the sandstone deteriorating in exposed conditions. The obelisk has a fence and is in good condition. The marker trees thought to have been planted by Sir Thomas Brisbane have survived despite little care and attention. The marker stone due south next to Parramatta High School has been broken off, but probably lies close to its base, thought to be still in situ. (11) The Brisbane instruments and books remaining are housed in Sydney Observatory. See Appendix C and Illustrations.
Sir Thomas Makdougall Brisbane

Sir Thomas Brisbane was the epitome of a "nineteenth century scientific gentleman". (37) A distinguished career army officer, he was a gifted mathematician whose particular obsession was astronomy.

There is little doubt that from the above description, and in the minds of the Colony in the early 19th century, Brisbane was an unusual choice to succeed Lachlan Macquarie as Governor of New South Wales.

Brisbane was born at Largs, Scotland in 1773 of an aristocratic Scottish family. He was educated privately, followed by a short period at Edinburgh University where he read mathematics and developed an interest in astronomy; then at the age of sixteen entered the army. (38) (39)

One of his closest friends throughout his army career was the Duke of Wellington. In 1812 Brisbane, then a Brigadier-General, served with great distinction under Wellington in the battles of the Peninsula War, for which service he was promoted to Major-General and knighted in 1814. It is said that after the Battle of Vittoria Brisbane surveyed the battlefield from a hilltop, sheathed his sword and exclaimed: "What a magnificent site for an Observatory!" (39)

In 1815 his high prestige from his military successes and his continuing obsession with astronomy (he built Scotland's second Observatory on his estate Brisbane House in 1808) led him to begin to actively lobby such influential friends as the Duke of Wellington and Sir Joseph Banks for the appointment of Colonial Governor of New South Wales.
(80) Sir Thomas Brisbane
Brisbane saw in the post a unique opportunity to combine colonial duties with astronomy. (40) He commented that the British Government might rest assured "that the best interests of the Colony shall not be neglected or ever lost sight of" but admitted that "My object is more immediately for the purpose of carrying on extensive astronomical observations that are not only highly interesting to science, but may be beneficial to mankind, from an accurate determination of the figure of the earth..."(39) There is recorded a light hearted banter between the Duke of Wellington and Earl Bathurst about Sir Thomas Brisbane's suitability for the post. The Earl is reported to have had last minute qualms about the appointment, quipping to Wellington that he "wanted a man to govern not the heavens but the earth" (38) but Wellington backed his old friend by pointing out that Brisbane's had been a dutiful soldier as well as having meticulously "kept the time of the army". (2)

In 1821 at the age of forty-eight Sir Thomas Brisbane's lobbying was a success and he took up the position of Governor of New South Wales. Brisbane's biographer, C.A. Liston (12) reports that Brisbane had chosen the site and had probably designed his Observatory for Parramatta before he left Scotland. There was no doubt that one of the most important matters in the new Colony for Brisbane was the immediate construction of Parramatta Observatory. He had carefully planned to have it operational within months of his arrival in November 1821 so that he could record the predicted return of Encke's Comet in June, 1822. His second and major aim was to set about the methodical observation and charting of the then practically unknown southern stars. The latter project was of immense scientific and navigational importance, the last observations having been completed on the subject in 1751-2 at the
(80) Sir Thomas Brisbane

(80) Miss Eleanor Australia Brisbane
Brisbane's entourage included not only his Scottish heiress wife Anna Maria Makdougall, but two assistants for the new Observatory, German astronomer Charles Rumker and Scottish technician James Dunlop. They presided over an impressive collection of astronomical instruments including telescopes and clocks, the best of their type available in the world. The whole astronomical project from planning to execution - materials, staff and equipment - were privately funded by Brisbane.

Parramatta Observatory was completed within the time limit set, in April, 1822. Work began immediately on the establishment of the position of the stars between the zenith and the South Pole, and on June 2nd, 1822 James Dunlop glimpsed with a sweep of the telescope an exciting "faint white patch of light". It was the return of Encke's Comet.

The recording and report of this Comet's return set scientific circles in Europe agog with excitement, and enhanced Brisbane's already high reputation in astronomical spheres. It also made the remote Parramatta Observatory an important scientific centre in a country formerly known as the location of a British penal colony.

The Sydney Gazette, 22nd January 1824 quoted a French article on 'Progress of the Mathematical Sciences' as saying:

"During the year 1822 the appearance of four comets was observed. The appearance of four comets was observed. The first was discovered by M. Gambard at Marseilles, and two of the others by M. Pons. Of one of the latter only two observations were taken, so that the nature of its orbit cannot be calculated. The orbit of the other two comets has been ascertained: it differs materially from those of preceding comets. It seems, therefore that they are new stars; or at least not at all like those whose course has been well observed."
"It is not so with the fourth comet seen in 1822, which is evidently that of 1785, 1795, 1805 and 1819. The duration of its revolution round the sun is twelve hundred and two days.

"The return of this star is an astronomical event of the greatest interest. Its faint splendour and crepuscular light did not allow it to be observed in Europe. Nor were they more fortunate at the Observatory of the Cape of Good Hope; but it was described in the region of the earth the most remote from Europe - New Holland. The Astronomer of the Observatory at Parramatta, the most recent establishment of such a kind, observed this comet throughout the month of June 1822, and in positions very near those which had been anticipated. The foundation of this Observatory is due to General Brisbane, a Correspondent of the Academy of Science, the Governor of New South Wales, who cultivates astronomy and natural science, and takes a lively interest in their improvement."

It was at that time the second only occasion a predicted comet had been verified, and Brisbane's enthusiasm was enormous. He was recorded as saying that "Parramatta could be considered the Greenwich of the southern hemisphere". (20)

Unfortunately this prediction did not come true, but the Observatory worked round the clock on charting the southern skies for the Governor. Brisbane exemplified the famous 18th century scientist Faraday's dictum that the only methodology for scientific work was "Begin it, finish it, publish it". (2)

With his two assistants Charles Rumker and James Dunlop working incredibly hard, Brisbane's Parramatta Observatory recorded 40,000 observations of some 7000 stars within a period of two and a quarter years, and included eclipses, transits of planets and solstices and recording the length of the pendulum (gravity experiments). In addition it recorded vital survey, navigational and meteorological data for the southern hemisphere. (18)
Governor Brisbane entertained numerous distinguished overseas visitors at Parramatta in these years, especially French scientists including the Freycinets, (37a), Duperry (with M. Lesson and M. Garnot)(37b), M. Laplace, and the Russian Captain Bellinghausen (37).

Prolific reports and papers were contributed and published by the Royal Society in London, the Royal Astronomical Society, the Edinburgh Philosophical Society and the Royal Society of Edinburgh. Compilation began at Greenwich of material for the major work which later became known as the Brisbane Catalogue of Stars.(18)

Upon publication of the first results from Parramatta Observatory, Sir Thomas Brisbane emerged as a foremost astronomer of the day. In Australia he presided over the first meeting of the new Philosophical Society of Australia where he read a paper entitled "Mean of Twelve Months Meteorological Observations in the Years 1822-3 at Parramatta". Internationally he received the accolade of many of the world's most prominent institutions, including both Oxford and Cambridge. In 1828 he was awarded the Royal Astronomical Society's Gold Medal by the president Sir John Herschel, who referred to Brisbane in the presentation speech:

"Our first triumphs in those fair climes...have been the peaceful ones of science...and you will be identified as the founder of her Science" (40)

Unfortunately, the Colonists of New South Wales were already less than enchanted with their Astronomer-Governor. Brisbane had inherited massive administration problems following the departure of Macquarie and the handing down of the J.T. Bigge Report into conditions in the colony. (42) Entrenched interests in the colonial hierarchy seized Brisbane's obsession with astronomy as a convenient tool with which to ridicule and blacken his name.

Brisbane was unlucky in his choice of subordinates in his new post -
particularly his Colonial Secretary, Frederick Goulburn, his Government Architect Standish L. Harris and the strong-minded explorer Oxley. Goulburn in particular worked hard to undermine Brisbane's authority, even to the extent of reversing Brisbane's direct orders. (8)

Despite strong forces of political intrigue combining against him, Governor Brisbane was able to implement many reforms mostly arising from the Bigge Report. These included the improvement of agricultural methods, land distribution, funding for exploration, abolition of press censorship, a reformed currency system, the establishment of the first Australian network of weather stations and, more controversially, the more humane treatment of convicts.

Sadly, Brisbane's pet project, Parramatta Observatory, was also tense with friction. Both his astronomers, Rumker and Dunlop were explosive, temperamental characters. The Scot Dunlop came to enjoy Brisbane's confidence and favour more often than the German Rumker. (43)

Charles Rumker finally resigned over some real or imagined slight, and a deep antagonism developed between himself and both Brisbane and Dunlop - a situation which had far-reaching consequences. (23)

It was regrettable that such an incident was allowed to take place, for with the loss of the brilliant astronomer Rumker, Parramatta Observatory was vulnerable and Australian astronomy was set back. Following sections on Dunlop and Rumker will attempt to detail the background in each case. (20)

It is relevant here to comment that there were, at that period of history, few professional scientists. Science was dominated by rich amateurs. It was funded almost exclusively by a patronage system, and it was crucial to establishment organisations of patronage like the Royal Societies and their counterparts that
their cash flow be ensured by full acknowledgement and credit being afforded to wealthy benefactors. Some of the problems of the Parramatta Observatory staff appear to have been founded in the manner in which Brisbane's employees Rumker and Dunlop published their own papers. In Rumker's case this was interpreted as insolent behaviour which did not acknowledge the patron Brisbane. (10) (12)

In the meantime, Governor Brisbane's short but productive term in the Colony was nearing its end for other political reasons. In 1824 Earl Bathurst solved Brisbane's traumatic colonial problems by simply recalling both him and his enemy Secretary, Goulburn. By this time Brisbane's attempts at liberal openhandedness had merely brought the wrath of the Colony on his head. Brisbane strongly denied any error or neglect of duty for astronomy. He wrote as early as 13/12/1822:

"...although I am surrounded by foes, in consequence of allowing them no longer to fatten in idleness on Treasury Bills, I can exultantly state in the face of the Colony...that no human being can accuse me of an unjust, illegal, cruel, harsh or even an improper act." While it is true that the highly egotistic Brisbane was given to outbursts like this during his career, particularly when criticised, he maintained always that his conduct had been unimpeachable. (39)

It does appear from the historical record that Governor Brisbane became a victim of intense political infighting and administrative strife in Australia. (24)

This period of Australian history, as has been briefly mentioned, is
relatively badly documented. It is significant that Sir Thomas Brisbane left a wealth of personal and scientific record.

It is ironic that his name is one of the best known of all Australia's governors - his name being preserved in the capital city of Queensland, where, in November 1824, Brisbane himself had observed and charted from Point Lookout a latitude measurement which is still respectable even by today's exacting standards. (2)

Sir Thomas Brisbane returned in 1825 to Scotland with his wife and three children. Two had been born at Parramatta, Thomas and Eleanor. A fourth child was born on the voyage home but did not survive.

Brisbane built two observatories in Scotland, one at Largs, the other at his wife's family estate at Makerstoun. The latter still exists.

Brisbane brought Dunlop back with him to work at Makerstoun, and Brisbane remained active in astronomical circles for the rest of his life. He held the post of president of the Royal Society of Edinburgh until his death at the age of 88 years. Sadly, his wife and four children predeceased him. (39)

Ann Moyal in her book "Scientists in Nineteenth Century Australia"(40) states: "Of all the sciences inherited from the eighteenth century astronomy was the most prestigious and advanced. Britain's Sir William Herschel (1738-1822), Edmund Halley (1656-1742) and France's Abbe Nicholas de Lacaille (1713-1762) had possibly contributed most to this advance."

Internationally it was of great honour to have Sir Thomas Brisbane, astronomer and patron of science, appointed Colonial Governor. He brought the recognition of the world of science to the Colony through not only his astronomical data, but meteorological and navigational investigation. During his term of office, the Colony was host to a stream of visiting foreign dignitaries in these fields. It would be

appropriate to remember Sir Thomas Brisbane as a founder of science in Australia through his remarkable Parramatta Observatory, where his efforts "established Australia as a leader in southern astronomy." (40)

Recommended further reading: C.A. Liston—Sir Thomas Brisbane, a biography. To be published 1981.
Charles Rumker, Sir Thomas Brisbane's first assistant astronomer at Parramatta Observatory, was born Christian Carl Ludwig Rumker at Stargard, Germany in 1788. (23)

He was educated in Berlin, became a mathematics teacher, then in about 1808 joined the British East India Company. Later he became a Royal Naval teacher of mathematics and navigation.

Publication of his astronomical observations while on duty in the Mediterranean in the Edinburgh Philosophical Journal of 1819 established his reputation as an astronomer of world standing.

In 1819 he returned to Hamburg, Germany, to take up the post of lecturer at the School of Navigation. In 1821 — beginning a pattern of sudden decisions affecting his career — he quit that post to suddenly return to England.

Later it emerged that a mutual friend of both Rumker and Sir Thomas Brisbane (Lt Peter Haywood of Bligh infamy) had recommended Rumker for a position of astronomer in Sir Thomas' projected Parramatta Observatory in New South Wales. (20) (23)

Charles Rumker accepted the appointment and joined Brisbane's entourage for the Colony, which arrived in Australia on November 21st., 1821.

Observations at Parramatta Observatory began on May 2nd., 1822 and on June 2nd the first sighting of Encke's Comet were made. Rumker completed the observations and calculations of the comet which were to put the name of the new observatory on the map. Although another assistant Dunlop had been the first to glimpse the comet, Rumker completed the work. A later Government Astronomer, C. Russell comments: "There is no doubt that Dunlop was then unable to make the complicated astronomical observations." (20)
Professor Carl Bamberger

Bas-relief in Hamburg Town Hall
By courtesy of Staatliche Kunsthalle, Hamburg.
Sir Thomas Brisbane rewarded Rumker with a land grant of 1000 acres where the town of Picton now stands. Rumker became a founding member of the Philosophical Society of Australia in 1821, where he read two papers - one "On Astronomy in the Southern Hemisphere" the other on "Anomalies Caused by Refraction" on 13/3/1822. (6)

A serious disagreement occurred later between Sir Thomas Brisbane and Dunlop and Rumker. It resulted in the sudden departure of Rumker from Parramatta Observatory for his Picton farm in June 1823. Sir Thomas Brisbane then tried to have Rumker's land grant taken back, but the move failed. (Sir Thomas was himself rebuked by Earl Bathurst over his course of action) (23)

Rumker's biographer, Georg Bergman attributes the original disagreement to several possibilities. Sir Thomas Brisbane appeared to favour Dunlop personally over Rumker. Since Dunlop was untrained in mathematics and therefore of lower status in Rumker's opinion, this led to friction. Russell's assessment (20) points to a further possibility - that Sir Thomas Brisbane and Dunlop were rushing through complicated work at the expense of accuracy, a serious error which later led to the discrediting of nearly all the astronomical observations in the major publication known as the Brisbane Catalogue of Stars in the Southern Hemisphere. (20) (7)

Sir Thomas Brisbane sought reconciliation with Rumker after the first break, but the stubborn, eccentric German would not compromise. He became a farmer, but also built a small observatory on Reservoir Hill at Picton - with a grant of £100 from the British Board of Longitude of the Admiralty. Locally he was accepted as a strange
but harmless figure who treated his convict employees with extraordinary kindness (Colonial Secretary-Correspondence, State Archives).

Rumker continued observations at Reservoir Hill for several years, and sent numerous reports to Europe of his work, including the important discovery of three comets observed in 1824-5. (23)

Rumker's falling-out with Sir Thomas Brisbane, and his continuing research, was interpreted in London scientific circles as a major scandal. Troublemaker Sir James South (taking up the case for Sir Thomas by proxy in London) took the opportunity to discredit Rumker as an ungrateful employee who had abused his master's patronage, and continued publishing results without acknowledgement to Sir Thomas. As the Royal Society and the Admiralty had lent tacit support to Rumker, the fracas widened in scope. While this may appear a trifling squabble today, this action was seen as highly threatening to the established patronage system of the arts and sciences.

Sir Thomas Brisbane's recall as Governor of the Colony saw Rumker's return to favour in the Colony. In 1826 he was brought back from Picton to Parramatta Observatory, this time as the first Government Astronomer of Australia. He published in 1826 a highly innovative guidebook for travellers in the Colony, showing tables to give the time of night from the position of the Southern Cross. Rumker was interested in early exploration of the Colony, and was consulted by most survey and exploration parties of the day. (23)
Rumker's brief as first Government Astronomer included the measurement of the arc of the meridian - a huge project which was never completed because of the cost, time and personnel involved. In 1829, Rumker made an effort to organise the resources necessary, and returned to England to supervise and lobby for the proper funding of such a project.

Several things happened during this period to Rumker. First he received a counter-offer of employment from the Hamburg School of Navigation. Secondly he published an important paper on Astronomical Observations at Parramatta, the printing of which was funded by the Royal Society. No reference was made to Sir Thomas Brisbane.

Rumker in London began meeting unexpected opposition to his requests for funding and equipment, mainly because the fiery Sir James South (Sir Thomas' friend, and patron of the Royal Astronomical Society which had split from the Royal Society) was attacking Rumker professionally behind the scenes, mainly over Rumker's ingratitude to his original benefactor. The division widened to include factions from the Royal Society versus the Royal Astronomical Society. (10)

Rumker was personally horrified by all this deviousness and furor, so much so that he resigned his Parramatta position, and left Britain for the Hamburg post. The suddenness of his departure from London was in keeping with his rather violent temperamental character (23)

The persistent attacks of Sir James South in London persisted for several years in Rumker's absence, and in June 1830 Rumker was officially dismissed from British Service as a result. Sir James, however, went too far when he published a pamphlet in November 1830 further condemning Rumker. It was soundly rejected by the Royal Society, to Sir James embarrassment.
In 1831, Rumker was appointed director of the School of Navigation in Hamburg, which he left later to end his career as director of the acclaimed Hamburg Observatory.

During his successful career he published eighty eight astronomical papers in Royal Society and Royal Astronomical Society journals; was co-author of the important Manual of the Theory of Navigation which went through many editions; and he received many awards and honorary degrees, including a Gold Medal from the Royal Astronomical Society in 1854.

Unfortunately many of Rumker's Hamburg papers are thought to have been lost during World War II bombing. (10)

When Rumker died in 1862, he was one of Germany's leading astronomers, honoured publicly by the city of Hamburg which named a street after him.

The 'Rumker Affair' was a tragedy for Parramatta Observatory. Sir George Airy, President of the Royal Astronomical Society in 1854 summed up the dismissal of Rumker by saying:
"...no greater misfortune happened to Southern Astronomy than the conclusion of that engagement." (23)

James Dunlop was born in Dalry, Scotland, in 1793. He came from a large, poor family and received little formal education. He started work at the age of fourteen in a local textile factory. He possessed great natural mechanical ability, and at the age of seventeen began building telescopes and reflectors. His talent was brought to the attention of a wealthy landowner and astronomer, Sir Thomas Brisbane. Sir Thomas employed Dunlop initially to help pack his newly acquired collection of observatory instruments in readiness for the long journey to the Colony of New South Wales.

Sir Thomas then offered Dunlop the post of assistant in his projected Parramatta Observatory in the Colony. Dunlop took up the appointment as second assistant, with a German astronomer Charles Rumker as first assistant. Both travelled with the Brisbane entourage to Australia, arriving in November, 1821.

James Dunlop's career was a remarkable one. A completely self-educated man, he showed real talent for astronomy. As a young man this was reinforced by an endless capacity for hard work both in observation and maintenance of the delicate equipment.

At Parramatta Observatory he is credited with the first glimpse of the re-entry of Encke's Comet in June 1822, although the calculations were made by his fellow worker, Charles Rumker. While at Parramatta, Dunlop became a close friend of his patron, Sir Thomas Brisbane, and was rewarded with a land grant of 5000 acres of land near Gosford.
(54a) Dunlop when young

(54b) Dunlop when older
Among Dunlop's special astronomical interests were 'coloured' stars (10) including comets and double stars. A later Government Astronomer Russell makes the comment on Dunlop's work overall that: "...Many of the early observations however were marred by inaccuracies due to faulty instruments." These inaccuracies are confirmed by Mailly (7) and Sir John Herschel (in Service). (43)

James Dunlop learnt astronomy from practical experience under Sir Thomas Brisbane, and was later set even more difficult tasks by Sir Thomas, such as the measurement of the length of the pendulum, a gravity experiment. Dunlop disagreed (either personally or professionally) with Sir Thomas Brisbane's other astronomer, Charles Rumker. There was ill feeling between the two workers.

A catalogue of 621 nebulae and clusters of stars observed at Parramatta by James Dunlop was presented to the Royal Society in 1828. For this major work, Dunlop was awarded the Royal Astronomical Society's Gold Medal. In addition the award mentioned that Dunlop had made and maintained some of the instruments used during the observations.

James Dunlop was awarded two other Gold Medals, one from the Institute Royal de France (1835) and the other from the King of Denmark (1833).

Dunlop left Parramatta Observatory after Sir Thomas Brisbane's recall as Governor, and returned to Makerstoun in Scotland to join his former employer for a number of years. Brisbane and Dunlop published jointly the results of this work through the Royal Astronomical Society in April, 1831.

At Parramatta Observatory, Charles Rumker had resigned and returned to Germany. In 1831 James Dunlop returned to New South Wales as Superintendent of Parramatta Observatory, where he began observations as the only member of the observatory. A residence was built and
attached to the Observatory in 1832.

Dunlop's Notebooks (16a, 16b, and 16c) in the Mitchell Library record all his observations until 1835 when there appear increasing gaps in all recordings - astronomical, barometric, and thermometer - and a noticeable general decline in the standard of work and handwriting.

It is thought that Dunlop found it difficult to work without supervision and given his practical education, found the theoretical side of the job beyond his ability. Conditions at the Observatory were bad: "Sunday morning between 8 and 9 o'clock, about four or five yards of the ceiling fell and broke the table. No other damage."

Dunlop writes laconically on 17/3/1835 in his Notebook Vol I (16a)

Dunlop developed health and personal problems, and became erratic in his behaviour. Sir John Herschel, reporting from the Cape of Good Hope Observatory 1834-1835 insinuated that "Dunlop saw double stars from subjective reasons". (33)

From 1838 to 1847 while in Government employ Dunlop failed to submit any reports of progress. In July 1841 he seriously offended a British Admiralty Captain Sir J.C. Ross when he called at Parramatta Observatory to check his ship's chronometer. Dunlop, who was indisposed, instead called to his dog Mack, "to attend to the English gentleman" (3a) The visit is recorded in the Hydrographic Office records of Admiralty House.

Unfortunately Ross made a strong official complaint, and this resulted in Dunlop being given two months notice that a Commission of Enquiry would call upon him at the Observatory. (44)
The Commission duly arrived and asked for Dunlop's records of observations, which he was unable to produce in readable form. Although he had kept the original Brisbane instruments and books in reasonable condition, his Notebooks "had been eaten by the white ant". The Observatory building itself was in a very poor state of repair, with white ant damage to all the woodwork. (44)

On the recommendation of the Commission, the valuable instruments and library were packed up carefully by Dunlop and sent to safe Government Storage. They were later saved from sale for use in the later Sydney Observatory.

Russell, in his paper (20) on astronomical workers in New South Wales sums up Dunlop's career by commenting that:

"Dunlop showed great natural ability and capacity for hard work under pressure in his early years....still, it is very much regretted that so many observations were made; a smaller number with greater care would have been of far more value....selected by Sir Thomas Brisbane and taken from a subordinate position, he was by him placed in a very responsible one, and praised on every occasion. He shared with him the honour of the work done at Parramatta, and took him as his Private Astronomer to Makerstoun; he became in fact the honoured and trusted fellow worker of Sir Thomas Brisbane."

Some emphasis is placed on Dunlop's role at Parramatta Observatory only because he was the last person to control the establishment, and was witness to its demolition. Dunlop's final report is contained in Appendix 8.

It is probably true, however that the demise of Parramatta Observatory had been anticipated some years before, mainly because of the site. Parramatta had become an urban settlement, and it was most inconveniently located as far as the British Admiralty - hence the Colonial
Administration was concerned. For the convenience of shipping, who needed to use the facilities to correct their vessel's chronometers, a coastal site on Sydney Harbour was preferred. It was partly for this reason that the Observatory, under the custodianship of James Dunlop, was literally allowed to run down. Dunlop, whose brief included the mammoth task of charting the arc of the meridian, was given no staff or funding beyond his own salary. It is probable that those in power knew that the task was beyond Dunlop's abilities. The British background, with its real motivation of a new Observatory more conveniently located, was the real reason for the demise of Parramatta. In a sense it was pushed along by the mental and physical deterioration of the superintendent, but he could be also considered a victim of circumstance. The instruments and library were finally purchased by the Government only after an undertaking that a Time Ball (for the specific use of shipping) would be included in its design. Edmund Blacket's excellent design for Sydney Observatory was completed in 1857 under the Governorship of Sir William Denison. (46) See plans at Appendix E.
(37) Governors during the existence of Parramatta Observatory and residences, after Sir Thomas Brisbane.

(b) Governor Bourke

(a) Governor Darling

(c) Governor Gipps

(d) Governor FitzRoy
PARRAMATTA OBSERVATORY SITE

Submission to NSW Heritage Council, according to the Australia ICOMOS Guidelines for the Conservation of Places of Cultural Significance, (Burra Charter)

It is submitted that the site of the former Parramatta Observatory and the Observatory Residence constitute a site of sufficient cultural, scientific and historical significance to warrant an archaeological investigation to establish the exact plan, including the location of scientific instruments, from which observations were made.

In accordance with Article 23, a specific historical and documentary study of the site has been undertaken. All references and documents consulted are listed.

In accordance with Article 24, it is submitted that excavation is necessary to provide data essential for decisions on the conservation of the place, and to secure evidence about to be lost.

It is submitted that the site be initially considered for action for preservation under Article 12.

It is further submitted that the site be considered following excavation for restoration under Articles 13 to 16 inclusive.

The following alternatives are submitted for Council consideration:

(1) The foundations and instrument piers excavated, recorded, drawn and photographed. The site backfilled. A scale model constructed. Existing relics consolidated, protectively fenced and labelled correctly.
(2) The foundations and instrument piers left exposed, consolidated to prevent deterioration, protectively fenced by a pathway system which would allow public access to the most important sections, which will have detailed explanatory signs affixed.

(3) The foundations and piers excavated and all data recorded, a scale model constructed. The site backfilled. The existing relics consolidated, protected and labelled. A protective, sympathetically designed structure commissioned from an architect according to Articles 2-10, to present a major educational exhibition on the subject - the history of the site and period, the instruments, its relevance to early astronomy, surveying, navigation and meteorology. The original Brisbane instruments could form a focal point of such an exhibition.

(4) An educational area be set aside within Old Government House Parramatta for an exhibition area featuring a similar exhibition.

(5) Sydney Observatory's exhibition area, now containing the Brisbane instruments and library be redesigned and upgraded to feature a scale model of Parramatta Observatory and an explanation of its historic role in the development of Australian astronomy.

Attention is drawn to Articles 9 and 16. It is not the intention of the excavation to expose or move either of the two existing relics. The recording in detail of the excavation could itself become an integral part of a proposed exhibition, a visual display informing the public about investigative archaeological processes.

Elizabeth Brandon
16.11.80
ARCHITECTURAL FEATURES AND PARALLELS: OBSERVATORY AND RESIDENCE:

SITING: There is inadequate evidence for the precise location of both Observatory and residence. This is due to the fact that the Observatory was not originally a public building, but was built privately by Sir Thomas Brisbane. The Rev. W.B. Clarke's plan and elevation of the Observatory in Richardson's Catalogue of Stars is the only such document yet found, but this appears a far more substantial building than the one which was in fact built. Descriptions from the historical record indicate what was built was a temporary, timber-walled building. (5) (31) (16a-c) and (17).

The Mitchell Library Ms Catalogue contains a copy of a letter from Governor Darling which refers to a plan of the dwelling built in 1832. Unfortunately, the plan is missing believed lost.

The siting of both buildings is also questionable. A number of early maps indicate the Observatory near Government House, but as the Government Domain, the area was more often omitted from mapping detail for early mapping in the County of Cumberland Parish of St John. (45)

The transit piers, the vital evidence, can also be questioned. This is why the obelisk of 1880 was sited in a different position (1).

ARCHITECTURAL PARALLELS:

A Scottish Observatory parallel exists at Makerstoun, where Sir Thomas Brisbane built a single dome Observatory in 1826 or 7. Its detailing and marker stones, and even the use of the marker tree of Pinus roxburghii has similarity to the former Parramatta Observatory. See Illus. (12) (10)

Sydney Observatory, designed by Edmund Blacket (46) is an example of a slightly later period. It was completed in 1857.
INSTRUMENTS:

Sir Thomas Brisbane equipped the Observatory with fine astronomical instruments, a full list of which is attached in Appendix C. Many are still on display at Sydney Observatory.

See copies of photographs, plus an engraving of a transit telescope in place on stone piers.(47)

LANDSCAPE:

Lt Chad advises that the possible site for measurement of the swing of the pendulum conducted at Parramatta may be the ground depression marked on Plan (11) and Graphic 6.

The old Pinus roxburghii trees planted south of the transit piers are also thought to have been specific marker trees for the Observatory. See Landscape Plan C3. The National Herbarium considers it possible that these trees are 150+ years old.

Next to Parramatta High School, also due south of the transit piers about 1 mile distant is a massive marker stone used also to line up telescopes. The line of observation has been checked by Lt Chad (11) See photographs.

These markers were utilised by Observatories are important cross references. If the instrument piers moved even a fraction calculations could be disastrously out. Natural features and massive dressed stones in line were used to check the alignment.
(71) Imaginary perspective sketch of Observatory by Lucas, 1932.
(87) Transit piers.

(88) Site landscape.

(89) Site landscape.
(92) Marker stone south of site.

(93) Marker stone south of site.
(47e) Transit instrument.

(47f) Transit instrument.
(94) Existing archaeological evidence - stone.

(95) Existing archaeological evidence - stone.
(96) Existing archaeological evidence - bricks.

(97) Existing archaeological evidence - stone.
(47b) Dome types, Sydney Observatory.

(47c) Dome types, Sydney Observatory.
(47d) One of the original Brisbane instruments - a survey telescope.
(47g) Barometric clock.

(47h) Mural Circle. (Part)
Equatorial telescope.
METHODOLOGY

Introduction: Measured drawings and a hypothetical reconstruction plan and elevation - north section of the Observatory and residence - are included in this report. They are based only on the available historical record evidence. This evidence is inconclusive about actual siting, design and detailing of both buildings.

For this reason, a detailed archaeological site investigation is recommended to provide an accurate analysis of the site.

Strict precautions would be undertaken to protect existing relics, and neither should be moved or disturbed.

The excavation should be carried out as an intensive project, over less than two weeks, with high priority given to on-site security. The team will be a professional one with area supervisors trained in the recommended methodology. Use will be made of a full complement of consultant historical specialists, and will include at least one professional astronomer, surveyor, and architect.

Suitable personnel have indicated that they would be willing to give their services in an honorary capacity to this particular project.

It is not anticipated that the excavation should be required below 2m in depth in any area of the site.

The system chosen is an adaptation of a field-proven American one (48) based on careful 3-dimensional excavation with detailed recording on a continual basis. Its advantage is in the structural emphasis in the recording system rather than an emphasis on small finds, its progressive assessment and easy retrieval of information.

Publication of results will be undertaken within six months.
An outline of the system is contained in the diagrams following, and consists basically of:

PROCEDURE:

GRID: See Graphic overlay (7) The square numbers are marked A-Z (West-East) with the letter I omitted because of its similarity to J, and the numbers 1-20 (South-North)

LOCUS: This is any defined area of the excavation from which finds are recored, e.g. rooms. Special installations (such as instrument pier foundations) will receive a special locus number, depending on the supervisor or director's assessment of importance.

Any fresh square will receive a new locus number. With the appearance of walls this number may be kept for one of the rooms.

LEVEL: Levels will be calculated from Surveyor Ebsworth's copper plug in the existing transit pier base, and will serve as a fixed zero point.

Levels are to be measured with two 2m survey sticks, one with a bubble water level, and from points marked by the director or supervisor at the corners and at convenient spots in the square.

BUCKET: Any labelled find from a specific locus will be given a bucket number from the daily list (Form 3). Several buckets or boxes may get the same number, but this will be noted on the Bucket list.

Any special find from a specific spot gets a special bucket number, and its find spot entered on the daily bucket list, plus in the graphic journal.

SORTING: This will be carried out daily in the afternoon. All material will be labelled and stored in marked boxes. This will then go to the university for cataloguing and listing. All material will remain the property of the National Trust and will be returned after analysis.

RECORDING:

FORM I: A general orientation form, each with an accurate sketch of the plan of an individual area. The locus and bucket numbers assigned to the area are noted at the top. This form serves as a basis for preparing the daily journal Form 3.
Locus and wall numbers are recorded on this form. When a new square is opened the corner surface level is recorded. When changing a locus number the old number is crossed with a light pencil stroke. The old form is filed when complete.

**FORM 2: STRATIGRAPHICAL AREA PLAN**

A special form of the area plan is taken for every stratum. It is not expected that there will be more than one floor level at Parramatta. Record walls, installations, loci and floor level of the stratum. Cancel the form with a diagonal stroke and file on completion.

**FORM 3: DAILY BUCKET LIST AND GRAPHIC JOURNAL**

A. Daily Bucket List: This is a record commenced new each morning. The date and area number are entered on top. Each bucket taken must be listed. This form is a daily summary of work.

In the Description column there are two subdivisions:

1. Provenance - the circumstances of the find (in ash, on floor)

2. Find - special finds only, and if photographed mark X. The final three columns will be filled in by the university.

B. Graphic Journal:

At the bottom of Form 3 the squares are drawn up from the area plan for the daily record. Add details daily of floors, installations, level differences. Locus and wall numbers are entered in BLUE, bucket numbers in RED. Record the locus number in a corner of the locus, the bucket number encircled in the middle. Finds of special significance must have accurate measurements of locale, and preparation of the daily bucket journal must be carried out at the same time the find spot is marked on the graphic record, with a tag prepared for the bucket.
Starting from the top, record on the tag:

- Area: H5
- Bucket No.: 487
- Locus no. in circle: 78

Objects left in situ should have a duplicate tag attached to the baulk.

Material for laboratory analysis should be labelled with a coloured tag describing the material, its quantity and distribution in the locus.

The bucket list and journal is filed daily.

**FORM 4: LOCI DIARY**

Form 4 is a continuous record of work progress in the locus. The description should be detailed, and on this will be based the summary of the excavation.

**FORM 5: LIST OF LOCI**

This is the master list of all the loci in the area. When a new locus is opened, the locus number is filled in plus the date the locus was opened and the square number on which it is located.

**FORM 6: LIST OF WALLS**

This registers all walls according to square number. Every wall will receive a separate number according to the square in which it first appears, with the addition of its serial number. For example, the first wall in square C18 will be C181, the second wall C182 etc. The date the wall number is established is listed, with a description of the type of construction, width, highest point and lowest point.
FORM 7: LOCUS CARD

This brings together all the information about one locus. It is started the day the locus is opened, and closed when the last bucket has been removed. The information will include a concise description of the locus excavation. It is filed daily with the director.

FORM 8: SECTION

This is the form for drawing section on a scale 1:20. Listed is:

a. The area
b. the serial number of the section
c. the loci represented in the cross-section
d. the number of each square through which the section passes
e. the compass direction when facing the section
f. whom drawn by.

FORM 9: REGISTRATION FORM

Every complete find is recorded on this card, with the find spot plus a detailed description. A photograph or drawing will be attached later.

FORM 10: LOCUS PHOTOGRAPHY CARD

Photographs, in chronological order, will be filed with the Locus Card.
Fig. 1. Form 1: General Area Plan
Fig. 2. Form 2: Stratigraphical Area Plan
<table>
<thead>
<tr>
<th>Final loc.</th>
<th>Str.</th>
<th>Description</th>
<th>Provenance</th>
<th>Level</th>
<th>Locus</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>R</td>
<td>Shards of big jars</td>
<td>From the pit, grey-brown soil</td>
<td>4.10</td>
<td>74</td>
<td>478</td>
</tr>
<tr>
<td>+</td>
<td></td>
<td></td>
<td>From the pit, grey-brown soil</td>
<td>4.10</td>
<td>74</td>
<td>479</td>
</tr>
<tr>
<td>-</td>
<td></td>
<td></td>
<td>From dismantled wall B 192</td>
<td>4.25</td>
<td>67</td>
<td>490</td>
</tr>
<tr>
<td>+</td>
<td></td>
<td></td>
<td>From dismantled wall B 192</td>
<td>4.32</td>
<td>81</td>
<td>481</td>
</tr>
<tr>
<td>+</td>
<td></td>
<td></td>
<td>and its foundation trench</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+</td>
<td></td>
<td></td>
<td>Burnt layer</td>
<td>4.30</td>
<td>75</td>
<td>482</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>Complete store-jar stuck into floor</td>
<td>Beaten earth floor</td>
<td>4.48</td>
<td>76</td>
<td>484</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>Vessels on floor: 3 baskets</td>
<td>Beaten earth floor</td>
<td>4.45</td>
<td>78</td>
<td>485</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>Bowls on floor: 1 box with</td>
<td>Beaten earth floor</td>
<td>4.45</td>
<td>78</td>
<td>486</td>
</tr>
<tr>
<td></td>
<td></td>
<td>spatula</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td></td>
<td></td>
<td>Bulk removed up to head of brick wall</td>
<td>4.50</td>
<td>78</td>
<td>488</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>2 buckets: 1 box with charcoal</td>
<td>Removal of floor</td>
<td>4.50</td>
<td>78</td>
<td>488</td>
</tr>
</tbody>
</table>

**Fig. 3. Form 3: Daily Bucket List and Graphic Journal**
We are working on a reddish-brown soil, and fallen bricks.

4.35
We cleaned the edges of the block of bricks and discovered that it was not a tower but a thin wall of bricks arranged with headers. The average measurement of the bricks are 42 x 25 x 8 cm.

The color of the soil has changed to grey and more pot-scherds were found. Perhaps we are reaching the floor.

4.40
While cleaning the eastern part of the locus a part of a thin wall was found parallel to wall C 184, but it is different, built with small unhewn stones. Perhaps this is only a partition in the room. This wall will be called C 185.

In the northeastern corner of the locus we found a store-jar stuck into the floor, its upper part is on level 4.20. We did not remove the store-jar because more vessels might be found.
<table>
<thead>
<tr>
<th>Final Locus</th>
<th>Stratum</th>
<th>Floor Level</th>
<th>Square</th>
<th>Date</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ar</td>
<td>A 18</td>
<td>7.3.75</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ar</td>
<td>A 18</td>
<td>4.48</td>
<td>78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A 19</td>
<td>3.96</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>B 18</td>
<td>3.92</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>C 19</td>
<td>4.00</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A 18</td>
<td>2.3.75</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A 18</td>
<td>4.10</td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A 18</td>
<td>4.01</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C 18</td>
<td>2.3.75</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A 18</td>
<td>6.3.75</td>
<td>70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AREA _B_5**

**LIST OF LOCI**

**BEER-SHEBA 1975**

---

*Fig. 5, Form 5: List of Loca*
<table>
<thead>
<tr>
<th>Stones</th>
<th>Bricks</th>
<th>Width</th>
<th>Description</th>
<th>Date</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>Top</td>
<td>Base</td>
<td>Top</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.22</td>
<td>3.80</td>
<td>50 cm</td>
<td>Built of partly hewn lime-stones, headers-stretcher.</td>
<td>3.3.75</td>
<td>0 181</td>
</tr>
<tr>
<td>4.25</td>
<td>3.80</td>
<td>50 cm</td>
<td>As above.</td>
<td>3.3.75</td>
<td>0 182</td>
</tr>
<tr>
<td>4.15</td>
<td>210 cm</td>
<td>Wall built of five lines of dried bricks. South face of wall, shows plaster remains. Size of bricks - 42 x 25 x 12 cm.</td>
<td>7.3.75</td>
<td>0 183</td>
<td></td>
</tr>
<tr>
<td>4.40</td>
<td>4.40</td>
<td>4.24</td>
<td>45 cm</td>
<td>Bricks on stone base, bricks are arranged in headers - 42 x 25 x 8 cm - plastered on the eastern face. Stone foundation of unhewn stones.</td>
<td>7.3.75</td>
</tr>
<tr>
<td>4.42</td>
<td></td>
<td></td>
<td>45 cm</td>
<td>Small unhewn stones. Head is levelled. Seems to be a base for bricks.</td>
<td>7.3.75</td>
</tr>
<tr>
<td>Loci beneath</td>
<td>Loci above</td>
<td>Stratum</td>
<td>Square</td>
<td>Area</td>
<td>Locus</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td>---------</td>
<td>--------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>Sections, Spec. finds, Graphic-descr.</td>
<td>Level</td>
<td>Date</td>
<td>Closed</td>
<td>Level</td>
<td>Date</td>
</tr>
</tbody>
</table>

**Bucket List**

<table>
<thead>
<tr>
<th>Description</th>
<th>Find</th>
<th>Provenance</th>
<th>Level</th>
<th>No.</th>
</tr>
</thead>
</table>

*Scale 1:20*

**Floor Level**

**Description**
Fig. 8. Form 8: Section Drawing
<table>
<thead>
<tr>
<th>DRAWING</th>
<th>PHOTOGRAPH</th>
<th>OBJECT</th>
<th>Bowl</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Drawing" /></td>
<td><img src="image" alt="Photograph" /></td>
<td>2132/2</td>
<td>No.</td>
</tr>
<tr>
<td><strong>FOCUS</strong></td>
<td>282</td>
<td><strong>LEVEL</strong></td>
<td></td>
</tr>
<tr>
<td><strong>STRATUM</strong></td>
<td>4.70</td>
<td><strong>PERIOD</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TYPE</strong></td>
<td>1A</td>
<td><strong>MATERIAL</strong></td>
<td></td>
</tr>
<tr>
<td>clay</td>
<td>B</td>
<td>brown</td>
<td></td>
</tr>
<tr>
<td>brown</td>
<td></td>
<td>brown</td>
<td></td>
</tr>
<tr>
<td>white</td>
<td>well fired</td>
<td>well fired</td>
<td></td>
</tr>
<tr>
<td><strong>CLAY</strong></td>
<td>core</td>
<td>core</td>
<td></td>
</tr>
<tr>
<td><strong>GRITS</strong></td>
<td>GRITS</td>
<td>GRITS</td>
<td></td>
</tr>
<tr>
<td>RH</td>
<td>RH</td>
<td>RH</td>
<td></td>
</tr>
<tr>
<td><strong>FINISH</strong></td>
<td><strong>FINISH</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>well fired</td>
<td>well fired</td>
<td>well fired</td>
<td></td>
</tr>
<tr>
<td><strong>WHEEL</strong></td>
<td>wheel</td>
<td>wheel</td>
<td></td>
</tr>
<tr>
<td><strong>HAND</strong></td>
<td><strong>HAND</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>make</td>
<td>make</td>
<td>make</td>
<td></td>
</tr>
<tr>
<td><strong>BURNISH</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SLIP</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>decor.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 9. Form 9: Registration Card**
BIBLIOGRAPHY

1. Goodin, V.W.E. Parramatta Observatory - the Story of an Absurdity. RAHSJ Vol XXXIII Part III.
7. Mailly E. Tableau de l'astronomie dans l'hémisphère austral et dans l'Inde. 1872 Extrait des Mémoires de l'Academie royale de Belgique Collection in-80 Belgique, tome XXII.

BIBLIOGRAPHY 2


12. Liston, C A. Teaching Fellow in Historical Archaeology, Univ of Sydney: Biography of Sir Thomas Brisbane, for publication 1981.

12a. Liston C A. Pers. Int. Engineering Office and Architectural Office Records under Sir Thomas Brisbane are thought to have been destroyed by fire in the Garden Palace Building stores 1879.


16c. Vol 3.


BIBLIOGRAPHY 3


22. Brisbane Sir Thomas. Observations Made at Parramatta NSW...


25. Darling, R. Despatch to Col Sec re Parramatta Observatory residence. Trans. Missing Despatches 1823-32 A1267 PT 4, p.283


27. Rumker CCLS On the Most Effective Means... 1831 Nestler Priv.

28. Galloway, James. Plan of Boundaries of Parramatta 1838 Archives


BIBLIOGRAPHY 4


32a. King Capt. P.C. Letter to Col Sec. requesting Pitta instruments to be retained, not sold. 21/12/1848.

33. Service, J. Thir notandum... The Literary Recreations of Laird Cantical [which contains a Biography of James Dunlop.] A 925.2 D Mitchell.


34. Freame WHG Parramatta Park [in] RAHSJ Vol 1920, pps 151-3


38. Teale, R. Sir Thomas Brisbane, 1971 Melbourne OUP


(41.) Clarke, Rev WB Plan & Elevation of Parramatta Observatory in (18)


44. Archives NSW. Observatory Papers.

45. Archives NSW. Maps of the Parish of St John, Parramatta 1835-1850.

(46.) Blackett, Edmund Plan, Elevation and Dome Drawings of Sydney Observatory. Archives, Observatory Papers.
(47.) Sydney Observatory. Pers. Int. Director Dr Robertson, 16/10/80, 18/10/80, 30/10/80. Photographs of Brisbane Instruments.


49. Australian Archives. NSW Regional Office. Meteorological Journal 1833-1836 with interleaved notes by Dunlop on comet observed Dec 1822 - 1823.


51. Bryant, WW History of Astronomy 1907, Brisbane ref. p.91.


54. Dunlop, James Portraits, Mitchell Library 73201, B434.


60. Harris, SL "Report and Estimate... of NSW Public Buildings 25/12/1822 to 24/12/1823 and 1824. 3 Vols. Mitchell.


63. Irving, R. & Chisholm PM Old Sydney Town pps 16-17 Dawes Observatory, Somersby, Old Sydney Town, 1974, Also Pers. Int.


BIBLIOGRAPHY 6


57. Lands Dept. Files on Parramatta Park - Parramatta Domain Act, 20 Vic No 35 and NSW 80.

58. Lands Dept. Air Photo and Orthographic map of Parramatta Park.


76. Rapp, Mrs C. President, The Parramatta Trust. Pers. Int. 15/10/80


BIBLIOGRAPHY 7

(85.) Photo-transit piers and obelisk.
(86.) Photo-view south between marker trees.
(87.) Photo-transit piers.
(88.) Site landscape.
(89.) Site landscape.
(90.) Benchmark, copper mark placed by Surveyor Ebsworth 1887.
(91.) Soil profile - Wianamatta shale formation of area.
(92.) Marker stone due south of site.
(93.) "
(94.) Existing archaeological evidence - stone.
(95.) " stone.
(96.) " bricks.
(97.) " stone.
2 Transar piers
3 Stone linear depression
4 Stone, brick
5 Brick, linear depression
6 Stone
7 Curved depression
8 Brick, shallow circular depression
9 Linear depression

ITEM | DESCRIPTION
--- | ---
10 | N

SCALE | PASSED | DATE
--- | --- | ---
1:60 | 7/1/80

DRAWN | TRACED | CHECKED
--- | --- | ---
| | |
1. Transit pillars
2. Mural Circle pier
3. Sidereal Clock pier
4. Mean Time Clock pier
5. Repeating Circle
6. Automatonic Telescope
7. Kitchen Chimney
8. Kitchen Hearth
9. Obelisk
10. Stone wall foundations observed in 1887.