Visitors watching macaws in free flight at Adelaide Zoo.

Scientific research consists in seeing what everyone else has seen, but thinking what no one else has thought.

Andrew Szent-Gyorgyi
Discoverer of vitamin C – 1932.
There is a story of a drunkard searching under a lamp for his house key, which he dropped some distance away. Asked why he didn’t look where he dropped it, he replied, ‘It’s lighter here!’ Much effort, not only in the logic of behavioural science, but in behavioural science itself, is vitiated, in my opinion, by the principle of the drunkard’s search (Kaplan, 1964:11).

Abraham Kaplan’s use of the story of the drunkard searching for lost keys illustrates that what might be considered a significant approach to research depends upon the individual point of view, or more accurately perception. According to Hooper-Greenhill (2006:362), one of the greatest challenges for museums at the commencement of the 21st century is developing a knowledge of the visitor. Similar challenges face zoos in developing an appreciation and understanding of the ‘zoo visitor’; however, the call for zoos to become more visitor-focused will require considerable changes in approach, along with the development of new professional skills. Throughout history, the zoo has presented itself in the metaphorical shape of a laboratory, while at the same time it has possessed the dimensions of theatre (Livingstone, 2003:61). Consequently, the zoo has negotiated the boundary between the human and the animal, the spectator and the spectacle, the viewer and the viewed, the individual watching and the creature being watched. The zoo has become a space reinforcing the many significant and subtle differences between the displays close to nature and the visitors watching nature. In determining a suitable research method most likely to yield accurate and reliable data relating to visitors in the zoo, it was apparent that any number of techniques could be utilised, the components of which were dependent upon many different points of view. The results of any scientific research are meaningful only if they can be obtained when the experimental approach can be repeated. To acquire meaningful information, two basic techniques were utilised in this research to collect necessary data: observational tracking and survey questionnaires. Various approaches were used to analyse the data collected in order to draw conclusions that provided significant new information representative of those people who visited the zoo. In developing this research, the overriding premise was that – to use Kaplan’s words – ‘it may be sensible to look first in an unlikely place just because “it’s light there”’ (Kaplan, 1964:18).
3.1 Research methods

In her presentation at the ‘Towards 2000’ Museums Australia Conference held in Sydney, Hood (1996) claimed that audience research helped to develop a better understanding of how to deliver a message and how to make that message more relevant to those who visited the institution. She considered that the greatest value of audience research was not so much the amount of information learned about the visitor, but the multitude of new things learned about the institution. She further indicated that this type of research provided an indication of the basic reasons that motivated people in their choice of leisure activities and where the museum fitted within these choices. Within the context of the museum sector, visitor studies have focused on a variety of research approaches, which have included a range of assessments of experiences, attitudes and opinions of visitors. A considerable amount of research into the experiences of museum visitors has already emerged, with the result that the evaluation of various exhibits is now recognised as a distinct field of museum practice (Hooper-Greenhill, 2006:362).

Audience research has a long history in museums, although as Hooper-Greenhill (2006:363) indicated, it has been rather thin until the past two or three decades. One of the earliest studies, carried out in Germany in 1912, analysed the cultural life of the city of Mannheim, and involved the distribution of a questionnaire to 12,000 people (Kelly, 2002). Benjamin Gilman (1916) of the Museum of Fine Arts in Boston studied visitors to assess what he termed museum fatigue, investigating the physical problems associated with viewing different exhibits in museum galleries. Despite this early activity, it was not until the early 1950s that the first comprehensive visitor studies were completed in museums in the USA (Merriman, 1991). Since the 1990s, audience research has increasingly been seen as a function of museums, assisting in understanding the visitor and meeting the various challenges posed by the informational age (Brown, 1997; Carr, 1997; Weil, 1994). This type of research can be applied to an extraordinary range of investigations, certainly far wider than that introduced by Alexander Wells (1935) when he defined his survey as a ‘fact-finding study dealing chiefly with working-class poverty and with the nature and problems of the community’. In recent years there have been a number of useful reports on the scope of visitor studies in museums, such as those by Ross Loomis (1987), Chandler Screven (1993), George Hein (1998) and Hooper-Greenhill and Theano Moussouri (2002). These studies have been useful in that they have made available valuable information relating to the museum visitor,
although in most cases they were developed within a specific context, consequently providing only partial explanations.

Edward Balfour, who founded the Madras Central Museum in 1851, carried out the first recorded instance of a study of visitors in zoos, which was recorded in detail by noted historian, Vernon Kisling (2001). Balfour attempted an ‘experiment’ in the natural history section by keeping a live tiger cub and a live leopard. While visitors observed the animals Balfour observed the visitors, noted their numbers and recorded comments about their behaviour. The increase in attendance figures was so dramatic that Balfour concluded that a ‘living collection’ was popular with visitors. Before reporting his deductions, however, he removed the live exhibits and found that attendances fell; then, upon replacing the animals, he noted that attendances again increased dramatically. Based on this visitor study, Balfour started a small zoo in the museum compound and then prevailed upon the Nawab of the Carnatic to donate his entire collection to the museum. This collection subsequently formed the nucleus of the People’s Park, founded in 1855, which has been recognised as the first zoo in India.

A search of the literature relating to the involvement of visitors with leisure sites, such as indoor and outdoor museums, indicated that many of the early methods of investigation carried out prior to 1980 were repetitive. These efforts did not follow the standards of social science research methodology, and they did little to improve an understanding of the lifestyles of the different audiences or of their responses to museum type institutions. Following extensive studies of visitors at the Florida State Museum of Natural History in the early 1980s, Falk and his research team pointed out that despite an increase in research in the museum sector, most studies had been descriptive and specific museum-based research relating to visitor behaviour was generally scarce (Falk et al., 1985).

In its widest sense, market research has been a feature of commerce for decades, particularly over the last fifty years, as the work has become much more scientific in its approach (Moser & Kalton, 1971). As the value of this type of research has been recognised, it has been adopted in diverse fields in different institutions. In Australia, studies involving visitors to museums have been a relatively new area of research. Such studies have usually been performed because the institutions concerned have been interested partly in knowing what their visitors believed, but mainly in gaining an understanding and an appreciation of what their visit meant to them.
Compared with museums, considerably less research has been carried out in studying visitors in the zoo sector, despite the fact that their visitors and philosophy overlap. The popularity of zoos world-wide has already been established, with more than 10% of the entire world population visiting zoos annually (IUDZG, 1993:3.2). An exploratory study involving general communication and educational issues within Australian zoos was completed in the late 1990s by Mazur (1997, 2001); her findings were general and she strongly recommended the need for further research. At the 1998 International Conference on Learning Science in Informal Contexts only one case study of a zoo was presented, but although that paper offered a description of a programme, it made little reference to actual visitor studies. At the Fifth International Conference on Environmental Enrichment in November 2001, Nelson (2003) reported the initial results of what she described as the first Australian study of adult visitor attitudes towards public feeding programmes within the zoo environment. Nelson wrote:

given the important relationship between zoos and adult visitors ... it might come as a surprise to learn that research in the area is lacking. It is, in fact, almost non-existent (Nelson, 2003:52).

Her presentation highlighted the lack of investigative work in the study of Australian zoos. This lack of research is further emphasised in that the Annual Reports for the Zoological Parks Board of New South Wales have recorded no visitor-related research publications for the five year period 1999-2004.

In the USA, Bitgood and co-workers carried out extensive research in both zoos and museums (Bitgood et al., 1986) in which they studied different factors influencing visitor behaviour. Bitgood (1993) maintained that visitors to both these kinds of institution were often confused. This confusion could be created by the actual physical surroundings, particularly in the situation where renovations or new structures resulted in different configurations on a regular basis. In a similar manner, Bitgood suggested that confusion was often generated by the conceptual context of the exhibit, where the actual intention of the exhibit might be misinterpreted and not properly understood.

In 1976 George Hein, Senior Research Associate and Professor Emeritus at Lesley University in Massachusetts, co-founded the Program Evaluation Research Group (PERG) to evaluate the educational work of 25 museums and arts organisations in the Boston area. Hein (1998) noted that in studying human activity, the range of possible methods was as broad as human ingenuity itself and that various methods have embraced a diverse range of techniques
to measure the different activities of visitors. Hein noted that these different techniques basically fell into three groups:—

- Observing what people actually do
- Asking people about their activity
- Examining the products of human activity.

To develop the research described in this thesis, two of Hein’s methods were adopted: observing by tracking visitors and asking questions by using surveys. Tracking studies have been the basis of work in many visitor studies since Edward Robinson (1928) and Arthur Melton (1935) pioneered such observational studies in museums in the 1920s, when they were interested primarily in studying the way in which physical design of the museum environment influenced visitor behaviour. Using similar techniques, Bitgood and Benefield (1987) examined patterns of visitor movements in zoos. Polly Phillpott (1996) applied this type of method with viewers in the Gaherty Reptile Breeding Centre at Jersey in the Channel Islands, providing information which was useful in developing ideas to enhance the visitor’s experience. Previously, Sherman Rosenfeld (1981) had tracked visitors around San Francisco Zoo to determine viewing times spent at different exhibits. Surveys were used to provide detailed information, both quantitative and qualitative in nature. This method was found useful for exploring visitor perceptions, in that considerable data could be collected in a cost-effective manner. Although it could be argued that the use of surveys dates back to the Domesday Book of William the Conqueror in 1085, it is generally recognised that the father of scientific social surveys was Charles Booth (1889-1902), who published *Labour and Life of the People of London*. In the century that followed Booth’s monumental seventeen-volume publication, considerable advances took place. Today, market research has become a large-scale industry and social scientists regard the use of surveys as one of their basic techniques (Moser & Kalton, 1971).

Although zoo administrations in Australia have always shown an interest in visitors, little empirical research providing factual data has been carried out within the zoo environment. Work that has been performed has tended to favour a quantitative approach; qualitative studies relating to visitors have been rare. Since both forms of investigation have strengths and weaknesses, in combination the two methodologies can focus on the relevant strengths. Of necessity, the actual experimental observations of visitors when studying human behaviour should also include their thoughts and comments, simply because if these studies are to provide accurate and useable information they should consider not only what visitors
have been observed to do but also what they think and what they have actually been heard to say.

In planning this research, the question arose as to which type of approach should be followed, qualitative or quantitative. Although the two techniques follow contrasting methods of investigation, both methods have been widely used in research. Quantitative research involves the analysis of numerical data and is objective in that it seeks precise measurements by means of techniques such as questionnaire surveys. Typically, quantitative investigations ‘distinguish characteristics, elemental properties and empirical boundaries’ (Horna, 1994:121). In comparison, qualitative research involves the analysis of words and is seen as subjective in that it deals with the interpretation. Typically this qualitative approach allows components to be explored at a greater depth. William Trochim of Cornell University pointed out that little difference existed between the two approaches (Trochim, 2001). He considered that all research was both quantitative (since even verbal responses can be counted) and qualitative (since answers to even the most numeric questions could conceal a variety of meanings). He believed that the main difference was not so much method as the approach. These opinions were supported by Dana Nau from the University of Maryland, who noted that ‘blending qualitative and quantitative methods of research can produce a final product which can highlight the significant contributions of both’ (Nau, 1995:1).

Although the strengths and weaknesses of qualitative and quantitative research have been the subject of much debate and have invoked the classical ‘paradigm war’, an explicit integrated research strategy has developed, combining qualitative and quantitative methods in a ‘mixed method’ system. It has been considered that this type of approach was worthwhile for developing a better understanding of the people who visit zoos. Corrine Glesne and Alan Peshkin (1992) pointed out that although some social science researchers perceived qualitative and quantitative approaches as incompatible, others believed the methods could be successfully combined. The crucial aspect in justifying the mixed methodology in this research design lay in being aware that both methodological approaches had relative strengths and weaknesses. An optimal combination could thus focus on the strengths of each, so that ‘qualitative data can support and explicate the meaning of quantitative research’ (Jayaratne, 1993:117) thereby developing a better understanding of the zoo visitor.
In institutions like museums and zoos, the collecting of data relating to visitors has commonly utilised two main types of information: objective measures and subjective measures. Objective measures have formed the mainstay of audience research, particularly since they were based upon facts that were reasonably easy to obtain. However, these objective measures often failed to indicate the reasons and motivations as to why people actually visited the zoo. Subjective measures, collectively known as psychographics, have been based on attitudes, interests, opinions and motivations (Ferguson, 2004). Although on occasions some zoos have performed objective visitor surveys, little research has been carried out dealing with subjective measures. This research utilised both qualitative and quantitative approaches. By randomly selecting visitors, so that each member of the population had an equal chance of being chosen for the study, it was possible to project accurately the information gathered onto the population at large, and consequently to gain insights into the way in which visitors thought about zoos, as well as how these visitors perceived the different actions and activities within the zoo.

Broadly, audience research in museums has revolved around both quantitative and qualitative methods. Although used extensively in the museum sector (Kelly, 2002), surprisingly little application of surveys with visitors has been carried out in the zoo sector. Usually based upon large sample sizes, quantitative research provides good factual material which can be subjected to statistical measures, whereas qualitative research interprets notions of understanding, meaning and action (Carr & Kemmis, 1986). The surveys used in this research included a variety of questions, in that closed questions provided precise measurements, and open-ended questions elicited the broad range of opinions and interpretations. The statistical approaches of these different techniques allowed the development of a better knowledge and understanding of the data, allowing more informed conclusions to be drawn about the zoo visitors. As such, using Kaplan’s analogy, the statistical approach adopted in this research supplied valuable data for analysis, which hopefully provided some degree of light in the search for the ‘keys lost in the dark’.
3.2 Research sites - The zoos

In 1852 New South Wales was still a fledgling colony, with an estimated population of 204,656 (Barker, 1988). On 17th June, 1852, the Rev George E. Turner (the Secretary of The Australian Museum) called a meeting in the Sydney Botanic Gardens to consider the establishment of a ‘public zoological institution’. Supported by Dr. George Bennett and the Rev William Branwhite Clark (sometimes referred to as the ‘Father of Australian Geology’) the meeting attended by over 200 people generated considerable enthusiasm, but also some opposition from William Sharpe Macleay. At a subsequent meeting the Chief Justice, Sir Alfred Stephen, stated that the people of the city already had ‘a museum for dead specimens of natural history … they should also have an institution for living animals’. He further emphasised that ‘the proposed institution might well prove highly beneficial in a scientific and educational point of view’ (cited in Strahan, 1991:7). This meeting agreed unanimously that a zoo should be established, which resulted in a small collection being housed in the Botanic Gardens (Prince, 1979). This first Australian zoo had opened in Sydney’s Hyde Park on 1st August 1848, on a site which now forms the Succulent Garden in the Botanic Gardens (Appleton, 1986). Under the control of the Museum, the first animal to be displayed in this collection was a young tigress (Etheridge, 1919). By 1854 the menagerie had acquired a grizzly bear, along with a number of other birds and mammals. The museum curator responsible for the care of the animals, Mr W. S. Wall, apparently found the collection to be of nuisance value (Strahan, 1979) and as a result the animals were transferred to the gardens of the Sir Joseph Banks Hotel at Botany. Despite numerous problems, the transfer established a continuity of maintaining animal collections, which eventually resulted in the current collection at Taronga.

Currently in Australasia, thirty-two public and private zoos, aquaria and wildlife sanctuaries have membership with ARAZPA (Australasian Regional Association of Zoological Parks and Aquaria). The eleven largest are Taronga Zoo and Western Plains Zoo in New South Wales, Melbourne Zoo, Healesville Sanctuary and Werribee Open Range in Victoria, Adelaide Zoo and Monarto Zoological Park in South Australia, Territory Wildlife Park and Alice Springs Desert Park in the Northern Territory, Currumbin Sanctuary in Queensland, and Perth Zoo in Western Australia.

In terms of collections, the smallest of the major metropolitan zoos is in Adelaide, and the largest is Taronga. Both collections have been in operation for more than a century.
Adelaide Zoo opened in 1883, while the Sydney Zoo which opened at Moore Park in 1884 moved to the Taronga site in 1916. The Adelaide (Plate 3.2) and Moore Park (Plate 3.3) zoos were established at a time of great resurgence and interest in natural history, and their development reflected this trend. Today, both zoos are prominent in pioneering current world practices, particularly with respect to the conservation and preservation of endangered species. Adelaide Zoo advertises itself as ‘one of the few zoos in the world located in a central activity district’ (Plate 3.4), while Taronga prides itself as ‘the world’s best located zoo – the zoo with the view’ (Plate 3.5). The Adelaide Zoo is the only major metropolitan zoo in Australia to be owned and operated by a private organisation, the Royal Zoological Society of South Australia. Taronga, originally a function of the Royal Zoological Society of New South Wales, is currently administered by the Zoological Parks Board of New South Wales.

There have been three phases in the history of Australian zoos. The foundation phase covered the period between their establishment and 1920, during which time they established themselves in their respective cities. The second phase represented a difficult period when zoos generally had little standing within their communities. The middle decades of the 20th century proved difficult for zoos, because of the great depression, the war, and a general rundown atmosphere. During this time, only Taronga was able to maintain its standards, thanks mainly to the interest of a wealthy benefactor, E. J. L. Hallstrom. The third phase, which commenced in the 1960s, was marked by the adoption of clear objectives by zoos as they developed a significant role in Australian society and started to attract large crowds of visitors (Kisling 2001).

Today, the zoos in Adelaide and Sydney are major sightseeing attractions, both having been the recipients of a variety of tourism awards. Despite the fact that attendances at leisure activities are influenced by factors such as unseasonable weather, economic influences and political pressures, in recent years both zoos have experienced an increase in attendances (Figures 3.1, 3.2). The Annual Report attributed the downturn in attendances at Adelaide in 2000-01 to an extremely hot summer season combined with the affects of the introduction of the Goods and Services Tax (GST), both of which influenced the number of people attending. In comparison, figures at Taronga showed a marked increase, mainly attributed to the influx of tourists and the Olympic Games held in Sydney in September 2000.
Plate 3.2: The grounds of Adelaide Zoo in 1910, showing the general layout, still apparent today, and the emphasis on botanical nature of the early zoo.

(Photograph B 68807 courtesy of the State Library of South Australia)

Plate 3.3: Moore Park Zoo in Sydney, circa 1890. This area is now the site of Sydney Girls High School.

(Photograph 10566959 National Library of Australia)
Figure 3.1: Annual attendance at Adelaide Zoo.
Source: Annual Reports.

Figure 3.2: Annual attendance at Taronga Zoo.
Source: Annual Reports.
Plate 3.4: Aerial view of Adelaide Zoo, showing its proximity to the central business district.

Plate 3.5: Taronga – the Zoo with a view.
Taronga = Water view (Aboriginal)
3.2.1 Adelaide Zoo.

The Royal Zoological Society of South Australia was formed on 23 July 1878, initially as an acclimatisation society. In 1881 Parliament approved the concept of transferring suitable grounds and the money to form ‘a place of recreation for the public, under certain restrictions, where they (the public) may become familiar with many living specimens of natural history’ (Royal Zoological Society of South Australia, Annual Report, 1881). When it opened to the public on 25 April 1883 (Rix, 1978), Adelaide Zoo occupied just six hectares of land situated on the banks of Lake Torrens. Although it has now expanded to eight hectares, it still remains the smallest of the major Australian zoos. Many features of architectural importance have been heritage listed, or classified, by the National Trust of South Australia, such as the central rotunda, the front gates and entrance walls on Frome Road (Plates 3.9, 3.10), the old elephant house that has been converted into an historic interpretative centre (Plate 3.11) and Minchin House (Plate 3.12). For most of its early years the assemblage was a ‘postage stamp’ collection, in that as many animals as the Society could afford and could possibly be contained were kept within the limited amount of space available. Like all zoos, originally the collection at Adelaide was a menagerie which kept animals in barren cages featuring heavy bars, usually constructed simply with concrete floors and walls (Plate 3.6).

Plate 3.6: Polar bears in their barred cage at Adelaide Zoo, 1908.

The design of animal enclosures and architecture adopted in Adelaide Zoo followed trends that had been established in zoos elsewhere in the world. The layout of paddocks and enclosures radiating from a central focus was based on the design of the royal menagerie at Versailles and the Jardin des Plantes in Paris (Figure 3.4). The designs of the animal
enclosures were modelled on the major European zoos of that time, particularly Regent’s Park Zoo in London. This trend of erecting exotic masonry buildings for the more prestigious and exotic animals was adopted with the construction of the elephant, hippopotamus and polar bear houses, two of which remain today. In the earliest years it was common for visitors to be entertained by animals which performed tricks for viewer amusement. Elephant rides started in 1884 and continued for nearly a century, with elephants pulling carts filled with children until 1982-83. Between 1939 and 1941 the zoo amused visitors by having animals carry out various tricks in the ‘Children’s Circus’. This activity was discontinued after only two years as it was considered to be an inappropriate function for a zoological garden (Rix, 1978). Anderson (1995:286) saw this cessation as:

reminding us of the ambiguity of human resources that are prompted in people by their own separation from nature, as well as the fragility of rationally based power relations between people and animals.

The circus was replaced by a bicycle-riding act by Mias the orang-utan (Figure3.3), since there was no perceived cruelty in getting an orang-utan to perform. As late as the 1960s animals were still performing for zoo visitors, but in recent years the zoo abandoned this ‘circus’ role and replaced it with a strong emphasis towards education programmes and conservation research with threatened species. The zoo’s limitations have always been its location on a very small site and its financial status. It has never been particularly wealthy, being dependent upon gate takings and occasional government grants as its major source of income (Browy, 1993).

Figure 3.3: Advertisement for Adelaide Zoo.

Adelaide Advertiser, 5 May 1948.
Since the initial philosophy of developing the zoo was formulated on not removing existing planting, several significant trees remain from the days when the grounds were part of the Botanical Gardens. The magnificent landscaping present today is the result of more than 125 years of horticultural care, and the original park layout can still be determined. Several significant exotic and native trees include the Morton Bay Fig (planted in 1877) in the Malayan tapir enclosure and the Dragon Tree which forms part of the flamingo enclosure. The flamingo enclosure is the one exhibit that has displayed the same species from the beginning, the grotto being established when seventeen Greater flamingos were obtained from Africa in 1885. During the drought of 1914-15, water to fill the pond could not be obtained, which resulted in several of the birds developing sore feet from standing on hard dry surfaces (Rix, 1978). Ten new birds were added to the collection in 1933, one of which has survived to the present day and shares the enclosure with a Chilean flamingo, which was introduced in 1948 (Plate 3.7).
Enclosures in the modern zoo have been designed to meet the needs of the animals and so provide a more natural habit. To provide visitors with the experience of walking through a jungle, the Society launched a major redevelopment plan with the construction of the South-East Asian Rainforest (SEAR) development, the first stage being completed in 1995. With the opening of the second stage in 2006, Adelaide became only the second zoo in the world (after San Diego in the USA) to attempt a mixed species habitat for siamang gibbons and Sumatran orang-utans. An immersion exhibit displaying a range of animals which normally co-exist in the wild, this enclosure represented a radical change in the design of exhibits in the zoo. The overall theme of this new style display has been described in information brochures as ‘offering visitors new insight into rainforest ecosystems, animal behaviour and the long term conservation of habitat’.

The zoo has close links with the nearby universities and the South Australian Museum. Over the years many animals which have died, after being taxidermally stuffed, have found a new ‘home’ in the Museum, and a number of skeletons have been used for teaching purposes in the universities – the most notable example being the orang-utan ‘George’ (Plate 3.8), which was returned to the zoo in 2006 for display in the education centre developed in the old elephant house.
Plate 3.8: The skeleton of “George” the orang-utan, who died on August 20th 1976, in his 29th year. One of the most popular exhibits in Adelaide Zoo, George is now displayed in the newly developed education centre in the old elephant house.

Modern zoos have moved away from the traditional idea of housing species separately in pairs. Today species are grouped as they would be found in the wild, and exhibits have been planned carefully according to the geographical regions from where the animals originate. The design of enclosures has been formulated with emphasis on the needs of the animal, resulting in more natural habitats which also serve an educational purpose for the visitors.
Plate 3.9: Visitors arriving at the front entrance to Adelaide Zoo in 1910. 
(Photograph B 68969 courtesy of the State Library of South Australia)

Plate 3.10: The ornamental entrance gates to Adelaide Zoo on Frome Road, through which generations of visitors have passed since the Zoo opened in 1883. The entrance is now heritage listed.
Plate 3.11: The old elephant house at Adelaide Zoo. This building replaced the original elephant house erected in 1883 as a home for Miss Siam, who commenced giving rides to children in April, 1884. The building has been home for Miss Siam, Mary Ann, Lilian, Tara and Samorn, all of whom were popular favourites with visitors to Adelaide Zoo throughout most of the 20th century.

Plate 3.12: Historic Minchin House, constructed in 1887. Formerly the residence of the directors of the zoo, the building currently is the administration centre. R.E.Minchin was the first director of the zoo (1882-1893), who was followed by his son (A.C.Minchin) and grandson (R.R.Minchin), a family connection responsible for the management of the zoo extending over 61 years.
3.2.2 Taronga Zoo

As the result of a public meeting held in Sydney on 16 June 1879, a letter was sent to the Mayor of Sydney requesting the establishment of a zoological garden. Work on this zoo commenced in July 1880, although the grounds were not opened to the public until 1884. Operated by the Zoological Society of New South Wales, on seven acres of ground in Centennial Park’s Billy Goat Swamp, the Moore Park zoo cared for a number of animals including a pair of elephants. Jumbo, who arrived in 1882 as a gift from the King of Siam, and Jessie, a female who arrived from Calcutta zoo in November 1883, became firm favourites as they gave rides for zoo patrons. In 1891, a total of 81,677 ‘twopenny’ rides raised more than 680 pounds. It has been estimated that the elephants carried some 7.5 million visitors around the Moore Park grounds (Prince, 1979). After Jumbo died in 1897 his skeleton was purchased by the Australian Museum (Plate 3.13). In September 1916, this Moore Park Zoo ceased to exist and the 329 birds and 177 mammals were transferred to the new site on the northern shores of Sydney Harbour. Under the watchful eye of a large proportion of the Sydney population, the animals were transported across the harbour by vehicular ferry, in what was known as Operation Noah’s Ark.

Plate 3.13: The skeleton of Jumbo, the first elephant to arrive in Australia, now the central feature in the skeleton gallery at The Australian Museum in Sydney.
Possibly the most well known animal which was moved to Taronga in 1916, was Jessie the elephant. After arriving at the Moore Park Zoo from Calcutta, Jessie immediately became an instant attraction as she gave rides to people around the zoo or assisted in various activities (Plates 3.14, 3.15). After moving to her new home at Taronga (Plate 3.19) Jessie continued to be extremely popular with visitors of all ages. When she died in 1939, she had achieved the greatest longevity of any captive elephant (Strahan, 1991).

Plate 3.14: Jessie giving rides at the Moore Park Zoo.

Plate 3.15: Jessie moving a tree in the grounds of the old Moore Park Zoo, circa 1912.
(Photographs 00232 and 0001 permission Zoological Parks Board NSW)
All major zoos throughout the world built in the 20th century borrowed from Hagenbeck’s ideas and Taronga was no exception. After a visit to Germany in 1908, the secretary of the zoo, Albert Le Souef, reported on the barless enclosures and it was determined that Sydney’s new zoo should be built on the same principles. Since the site at Moore Park had become too small, a new site was sought and after the granting of land from the State Government, Taronga Zoo was officially opened on 7th October, 1916. Construction work continued steadily on the 27-hectare site with several heavily-barred concrete pens being constructed during the late 1920s and 1930s. One of the first enclosures built was the spider monkey enclosure, a circular structure that could be viewed from all sides, until a southern wall and canopy was built as protection against cold winds during the 1940s (Plate 3.16). Like most zoos, Taronga has had its share of problems with the keeping of wild animals, like the time when Casey, a highly intelligent chimpanzee escaped. Casey, who had been paying close attention to men working on his enclosure doors with spanners, later purloined a spanner and after the labourers had left he set to work on the nuts and bolts of his door to manage his escape. He was busy chasing a bricklayer when intercepted and recaptured by the zoo butcher.

Plate 3.16: Spider monkey enclosure at Taronga Zoo, the only remaining example of the pits which at one stage housed 83 monkeys, including crab eating macaques and baboons.
In 1967, at the invitation of the New South Wales Minister for Lands, the Director of Zurich Zoo, Dr. Heini Hediger, was commissioned to report on the activities of Taronga. In his report, Hediger observed that ‘it is unthinkable today that a zoo the size of Taronga Park Zoo can be run by one man, without a professional zoologist and a veterinarian’ (Strahan, 1991:62). Following this review a new style and philosophy commenced, which saw the construction of several new enclosures. Previous attractions such as the elephant rides (Plate 3.28), a miniature train (Plate 3.17), the monkey circus and the merry-go-round gave way to educational facilities and the development of new attractions such as the seal show.

![Plate 3.17: Taronga Zoo in the 1950s, featuring rides on elephants and a miniature train.](Image GPO collection 2-01916 permission State Library of New South Wales)

Taronga has continued to undergo redevelopment by closing old cramped enclosures and replacing them with large more naturalistic looking exhibits. Major redevelopments have been undertaken at Taronga during the last decade. To celebrate the Olympic Games being held in Sydney, the Creatures of the Wollemi exhibit was opened in 2000 with the aim of epitomising the vision to ‘inspire Australians and our visitors to discover, explore, delight and protect our natural world’ (ZPBNSW, 1999). Combining naturalistic elements with excellent visibility, the exhibit gives visitors the opportunity to see and experience more than 200
animals moving freely in their natural environment. It was in this naturalistic enclosure that in February 2003 Taronga became the first zoo to successfully breed twin platypus, an accomplishment which was repeated again in 2004 (Plate 3.18). As part of Taronga’s master plan, in 2006 the Wild Asia complex was opened. Displaying over 200 species of animals in a range of ten enclosures, this immersion exhibit included two walk-through aviaries as well as a new elephant enclosure (Plate 3.20). The proposal to bring elephants from Thailand met with opposition from environmental activists, but eventually five new Asian elephants settled into the new enclosure in November 2006.

The collection of animals now displayed at Taronga has had a long history. Originally established in the Botanic Gardens, the small assortment has expanded to what is now recognised as one of the most outstanding zoos in the world. With the collection now consisting of 4000 specimens covering 725 species, the zoo has the distinction of having successfully bred a number of rare and endangered animals such as the New Zealand kiwi, the Sumatran tiger and the red panda, as well as the Australian platypus (Plate 3.18).

Plate 3.18: The first photograph taken of the newly emerged platypus, swimming in its pool in the Creatures of the Wollemi enclosure at Taronga in 2003
Plate 3.19: The interior of the old elephant house at Taronga Zoo. One of the first buildings to be erected at Taronga in 1915, it is now heritage listed and is used as an education centre. Visitors can read informative signs relating to the history, keeping and care of the elephants.

Plate 3.20: The new elephant enclosure at Taronga Zoo, opened in November, 2006. The area was once a miniature fairground, with a merry-go-round and a miniature train, as well as the centre for elephant rides, the last of which was given in 1976. In 1956, an elephant ride cost sixpence.
3.3 The animal exhibits

In this research the different behaviour patterns were observed of visitors at a number of exhibits in both Adelaide and Taronga zoos. Initially, the selection of these exhibits was based on the theoretical model which was developed by Joyce Shettle-Neuber (1989), who classified exhibits into three generations based upon the presence of enrichments. For the purposes of this research, the exhibits were classified into three orders, where the age and appearance of the enclosure were considered as well as the presence of enrichments:

*First order* exhibits, which dated from the early 20th century, comprised essentially barred cages or smooth-sided pits. These first order exhibits were basic enclosures, where animals were displayed in small cages, with little if any enrichment. (Plates 3.21, 3.22).

*Second order* exhibits were described as being somewhat closer to natural habitat in that they contained artificial structures and possibly contained some enrichment stimuli for the animals. Commonly, these exhibits displayed the animals in cement enclosures which often featured a dry or water-filled moat. Although these exhibits removed the barriers between people and the animals, and contained more artificial structures, they remained somewhat sterile for the inhabitants. (Plates 3.23, 3.24).

*Third order* exhibits displayed animals in naturalistic enclosures designed to replicate as closely as possible the natural habitat of the species in species-typical social groupings. They contained vegetation and various land formations which made an obvious attempt to stimulate the animals’ natural environment. These third order exhibits, which are growing in prevalence today, were generally preferred by zoo visitors because of their naturalistic appearance. (Plates 3.25, 3.26).

In choosing specific exhibits for study in this research a number of criteria were adopted. The specific enclosures were selected with an aim of providing a variety of enclosures as well as a spread of the different animal species. Firstly, exhibits were selected so that each of the three different orders within the two zoos was represented. Secondly, the spatial distribution of the exhibits within the zoo was considered. Finally, selection allowed for visitor visibility and accessibility (such as disabled people in wheelchairs), as well as the ease of observing visitors unobtrusively. This selection of exhibits (Table 3.1) reflected the diversity of animals within each zoo and allowed a number of comparisons to be made, such as comparisons between the different orders and the different enclosures, in particular those
used to house the same species within the same zoo (such as the tiger and orang-utan in Adelaide and the elephant at Taronga).

Table 3.1: Selected enclosures for study at Adelaide and Taronga Zoos.

<table>
<thead>
<tr>
<th>ORDER</th>
<th>ADELAIDE</th>
<th>TARONGA</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Barbary sheep (A)</td>
<td>Helmore Aviary (A)</td>
</tr>
<tr>
<td></td>
<td>Beaver (B)</td>
<td>Seal Bay (B)</td>
</tr>
<tr>
<td></td>
<td>Giraffe (C)</td>
<td>Spider monkey (C)</td>
</tr>
<tr>
<td></td>
<td>Hippopotamus (D)</td>
<td>Tahr (D)</td>
</tr>
<tr>
<td></td>
<td>Seal Bay (E)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Old tiger (F)</td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td>Lion (G)</td>
<td>Giraffe (E)</td>
</tr>
<tr>
<td></td>
<td>Otter (H)</td>
<td>Kodiak bear (F)</td>
</tr>
<tr>
<td></td>
<td>Penguin (I)</td>
<td>Meerkat (G)</td>
</tr>
<tr>
<td></td>
<td>Sun bear (J)</td>
<td>Sun bear (H)</td>
</tr>
<tr>
<td></td>
<td>Wombat (K)</td>
<td>Old elephant (I)</td>
</tr>
<tr>
<td></td>
<td>Old orang-utan (L)</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>Flamingo (M)</td>
<td>Chimpanzee (J)</td>
</tr>
<tr>
<td></td>
<td>Meerkat (N)</td>
<td>Gorilla (K)</td>
</tr>
<tr>
<td></td>
<td>Siamang (O)</td>
<td>Koala (L)</td>
</tr>
<tr>
<td></td>
<td>Baboon (P)</td>
<td>Lion (M)</td>
</tr>
<tr>
<td></td>
<td>Zebra (Q)</td>
<td>New elephant (N)</td>
</tr>
<tr>
<td></td>
<td>New orang-utan (R)</td>
<td>Creatures of the Wollemi (O)</td>
</tr>
<tr>
<td></td>
<td>New tiger (S)</td>
<td></td>
</tr>
</tbody>
</table>

Letters in parenthesis refer to their position in the zoo as shown in Figures 3.5 and 3.6.
Figure 3.5: Schematic plan of Adelaide Zoo, showing distribution of selected exhibits.
Figure 3.6: Schematic plan of Taronga Zoo, showing distribution of selected exhibits.

Plate 3.21: The old otter enclosure at Adelaide, a typical first order exhibit. A basic enclosure which was considered by visitors as being old and unnatural.

Plate 3.22: Taronga’s seal enclosure, an example of a first order exhibit. Although providing visitors with a clear view of the animals, the exhibit was seen as being bare, old and possessing too much concrete.
Plate 3.23: The wombat enclosure at Adelaide, a second order exhibit. Although considered as being closer to a natural display and providing clear viewing of the animal, this exhibit was considered as being too artificial, mainly because of the amount of visible concrete.

Plate 3.24: The meerkat enclosure at Taronga, a second order exhibit. Whilst visitors were intrigued by the constant activity of the animals, they perceived that this enclosure was somewhat sterile, mainly because of the bare rocks and the lack of enrichment devices.
Plate 3.25: Taronga’s Creatures of the Wollemi, a third order exhibit, opened in December 2000. This exhibit displayed a number of animals in a natural environment.

Plate 3.26: Orang-utan enclosure, part of the South East Asian Rainforest, a third order exhibit opened at Adelaide Zoo in March 2006.
The old elephant house at Taronga (Plate 3.29) is a classic example of what has been termed ‘the anthropomorphic error’ in zoo design (Masson & McCarthy, 1996). It followed the idea that animals should be housed in a building similar to those used by humans in the place where the animal originated, such as Egyptian temples for camels, Nordic barns for reindeers and a Hindu temple for elephants. The old elephant house is the only such exhibit at Taronga. Now ‘heritage listed’, it has been preserved and is currently used for education purposes. It represents an example of the way in which a Western architect designed a stylised version of an Indian temple so that it framed the animal and enhanced the ‘sense of oriental mystery’ (Mullan & Marvin, 1999:88-89).

A similar construction built to house the elephants in Adelaide has been converted for use as an interpretive centre for visitors. Because of the restrictions of space, Adelaide no longer displays elephants. In January, 1934 when the elephant Mary Ann (Plate 3.27) suddenly died (having been in the zoo since November 1904), C. E. Rix (1979:43) noted that ‘an elephant was considered to be such an important exhibit in any zoo on account of its popularity and its earning power, that immediate steps were taken to procure another young female from the Singapore Zoological gardens’. After the last elephant, Samorn, was moved to Monarto Zoo in 1991, an administrative decision was made to no longer display elephants in Adelaide Zoo. Although this decision was influenced by the limited amount of space available in the zoo, the welfare requirements of elephants were also considered.

Plate 3.27: The elephant, Mary Ann, gave rides to visitors in Adelaide Zoo from 1904 to 1934. Original photograph taken around 1910.
Plate 3.28: Elephant rides were given for zoo patrons at Taronga in 1916 and continued until 1976. Original photograph ca 1917.

(Image GPO collection 1-18458 permission State Library of New South Wales)

Plate 3.29: An ‘anthropomorphic error’, the elephant house at Taronga. It was originally constructed as a home for Jessie, the female elephant who came from the Moore Park Zoo, crossing the harbour on the vehicular ferry Kedumba.
3.4 Monitoring visitors – collecting data

The environment in which a zoo exists contains an almost infinite number of variables, any of which, if altered, has the potential to impact upon the environment overall. However, most careful, methodical and highly focused studies developed during any research are time-consuming and can address only a limited set of relationships. In her comprehensive handbook *Practical Evaluation Guide*, Judy Diamond (1999) indicated that quantitative studies can be utilised to develop numerical patterns in data by applying statistical tests to establish the nature of relationships between variables. Such studies can be useful in forming conclusions relating to the different groups of people who visit the zoo. In comparison, she regarded qualitative methods as emphasising a depth of understanding which allowed individual cases to be examined in depth and detail. According to Maurice Yeates (1974:1), the greatest advantage of following the scientific method approach, as far as the researcher is concerned, is that it ‘instils into the researcher the lingua franca of the sciences’. This aspect is most important when working with people, since no discipline can exist in isolation of others.

The modern zoo is anything but a neutral space. Since prescribed routes do not exist, the collection literally has to be ‘explored’. Visitors can pass through the same space on more than one occasion and it is possible that they can even experience the circumstance of getting lost. Most visitors explore the zoo surroundings without a teacher and without any direction. These unguided zoo audiences are leisure audiences who, in their own free time, interact with different exhibits on a voluntary basis and on their own terms. They develop an understanding through watching different animals, becoming aware of details, observing behaviours, making comparisons, reading a variety of signs and labels, listening to keeper talks, drawing different conclusions and so on. Whether or not visitors do any or all of these activities depends upon their expectation of the zoo and the enjoyment they can gain from visiting it. At all times priority is given to viewing the animal.

To compile comprehensive information relating to the behaviour of visitors in zoos, this research utilised a scientific method to study the actions of visitors, including both quantitative and qualitative research techniques. Initially, general methods of unobtrusive tracking observations recorded viewing times and exhibit usage. These tracking methods, which did not involve any direct contact with the public, followed the work outlined by Phil Bull (1994). This information was then supplemented with data collected from structured
survey questionnaires, similar to the work detailed by Gillian Binks and David Uzzell (1990). This combination of techniques provided a range of statistical results, which allowed the exploration of a number of different issues and allowed valid comparisons to be made between the different visitors in the two zoos.

3.4.1. Tracking observations

Despite the fact that tracking is a method of studying visitor behaviour which has been used successfully in both zoos and museums (Bitgood & Benefield, 1987), only limited applications have been recorded. This technique clearly lent itself to statistical analysis in providing data which could establish the mean (average) viewing times at different exhibits. Since tracking provided accurate information relating to the amount of time spent viewing, it proved useful not only in gauging the attracting and holding powers of exhibits, but also in determining the effectiveness of the signs and labels at the exhibits. Although such statistics provided valid information for comparisons they were somewhat limited, in that the distribution of visitors over time was not symmetrical and did not follow a normal distribution. The large data base helped in counteracting this difficulty.

The majority of visitors to the zoos spent most of their viewing day wandering between different exhibits. To obtain sufficient data, visitors were observed unobtrusively at specific enclosures, since it was considered impractical to track individual groups throughout the zoo. As visiting groups approached an imaginary line marking the boundary of the exhibit, the first adult individual to cross this imaginary line was selected. The total length of time over which this individual actually stopped to view the exhibit was measured using a digital stop watch. As well, the composition of the viewing group, the total amount of any time spent reading the exhibit signs, the time spent imparting any information to other members of their category group (particularly children) and the influence of keeper talks and any keeper activity were also recorded. Throughout the recording session, details were noted of the degree of animal activity, the weather conditions, the degree of crowding, and any other event that might have influenced the amount of time spent viewing. Once the selected individual left the exhibit, the process was repeated for the next visiting category to cross the imaginary boundary line. Recording was continued throughout a one-hour session. Since the distribution of visitors in the zoo varied greatly throughout the day, these tracking observations were repeated for each of the viewing hours throughout the day. Recording sessions were carried out on both weekdays and weekends, during both holiday and non-holiday periods.
technique, previously outlined by Stolba and Mullers (1990) and Paul Ward et al. (1998), was adopted because it was considered best at reflecting the actual interest of viewers in the exhibit.

Since this technique of tracking allowed accurate measurement of the amount of time actually spent at an exhibit, it provided information which could be important when attempting to enhance visitors’ appreciation of their zoo experience (Frede, 2003). It established the actual use visitors made of the different exhibits and was employed to determine the popularity index. It highlighted areas which attracted and sustained visitor attention, and similarly indicated exhibits which failed to attract attention. As well, this method proved useful in determining the influence of keeper talks given during feeding sessions at the penguin enclosure (Plate 3.30). This technique of ‘behavioural sampling’ was preferred to ‘scan sampling’, in that it avoided any possible bias towards highly visible behaviours which might not have given an accurate representation of what the visitors were actually doing. The data was also analysed to determine the actual use made of the various signs and labels at enclosures by the viewing public, so that their attracting power and holding power were determined.

An advantage of using the tracking technique was that it provided considerable data by means of an inexpensive method which required low technology. However, this method was time-consuming and did not provide accurate information relating to the reasons visitors stopped to view particular exhibits. Nor did it provide an understanding of the motivations which influenced the behaviour and viewing patterns of visitors. The activities of visitors were not always clear, since an individual could have been spending time at the exhibit fascinated by what was being observed, or totally confused and having difficulty in comprehending what was actually taking place. To overcome these disadvantages, survey questionnaires were utilised, in anticipation that they could assist in interpretation of visitor actions to produce an understanding of their thoughts and perceptions.

The influence of fatigue on the patterns of viewing is a topic which has not been previously studied in zoos. To obtain usable data to this end, the tracking procedure was modified, in that the same viewing group was observed at different exhibits, a technique that proved even more time-consuming, for minimal results. As visiting groups entered the zoo, they were approached and asked if they had any objection to being observed as they made their way around the zoo, for the purpose of ‘a scientific study’. Acquiescence to this request
was 100%, although only a small number of groups were studied. Visitors were tracked as they moved throughout the zoo from the time they entered. Their viewing times at selected exhibits were recorded, as was the total length of time they had been in the zoo. Tracking was continued until the particular group stopped for an extended period of time either for a meal break or to watch a show. The mean viewing time at exhibits was determined for each half hour period of their zoo experience. An immediate problem with this approach was the limited amount of data that could be collected, which consequently limited the majority of observations to only one or two groups in a single day.

As in any study of this type, there was the possibility of bias in the selection of groups, and the initial choice of groups may therefore have influenced the results. In nearly all instances, as the visiting group became involved with their zoo experience, they became oblivious to the fact that they were being observed. However, it was possible that some influence may have been exerted, although this would have been hard to determine. Nevertheless, the same method was used to obtain results in both zoos, so that the comparisons were valid. In total, 17 groups were studied in this way at Adelaide and 14 groups at Taronga.

Plate 3.30: Penguin enclosure at Adelaide. Tracking observations determined the amount of time visitors spent at exhibits to view different activities or listen to keeper talks during the feeding sessions.
3.4.2. Survey questionnaires

To elicit representations of the thoughts, motivations and perceptions of visitors, three different major surveys were administered in the two zoos studied.

- Exit surveys (Appendix A)
- Exhibit surveys (Appendix A)
- Photographic surveys (Appendix A)

Exit questionnaire surveys were distributed to visitors in areas near the exit gates as they were preparing to leave the zoo. Visitors were requested to return their completed exit survey to a central collection point. Exhibit surveys were distributed to visitors after they had viewed a selected exhibit. Visitors who accepted the questionnaire surveys were given the opportunity to return the responses to specified collection areas. Photographic surveys were distributed to adult viewers who were sitting in eating areas or waiting for specialist show sessions to begin, such as the Free Flight Bird Show at Taronga and the Macaw Show at Adelaide. In research by Adrienne McGraw and Stephanie Weaver at San Diego Zoo (McGraw & Weaver, 2001) and an earlier evaluation at Taronga (Frede, 2001), it was found that people were more likely to complete surveys when in a relaxed frame of mind while waiting in the eating areas, and since visitors to the bird shows tended to arrive early to ensure good seating, they invariably had the time in which to complete the survey. This process of distribution of surveys was repeated on different days throughout the week, in order to include both weekend and holiday periods throughout the year. The content of the surveys was designed to cover a broad range of topics, collect information about perceptions, reasons for visiting, and appreciation ratings, as well as eliciting thoughts and views on enrichment use and the animals generally.

Both quantitative and qualitative information was gathered using these surveys. This technique provided the opportunity to probe the visitors’ different motivations and preferences. It provided accurate information, particularly relating to the various reasons why different exhibits were liked or disliked by viewers. It elicited views in order to investigate the motivation and perception of visitors towards the animals and the enclosures generally. Satisfaction ratings for exhibits’ aesthetics and surrounds were obtained, facilitating the formulation of ideas relating to the development of enrichment programmes to enhance these factors. Visitor motivation was considered in this research, since it gave information about specific interests that directed the patterns of movement of visitors throughout the zoo. The procedure allowed the exploration of various issues, such as visitors’ attitudes regarding the
use of various enrichments, as well as their thoughts relating to the feeding of live prey to
captive carnivores. The first page of each of the surveys listed identical questions which were
used to develop the visitor profile.

A major advantage of using survey questionnaires was the structured format with pre-
coded responses that allowed standardisation of the different responses. Despite being
subjective, the surveys provided flexibility in gaining visitors’ impressions. They were
designed to cover a broad range of topics, to gain ideas of perceptions, reasons for visiting
and satisfaction ratings, as well as to elicit thoughts and views on environmental enrichment
and animals generally. Both closed and open-ended questions were used to provide the basis
for the quantitative analysis and so determine the motivations for people visiting the zoo.

The use of closed questions was advantageous in that their quantification was simple
and clear-cut and they were easy and quick to answer. Closed questions used were attitudinal
as well as factual, in order to gather detailed information for quantitative analysis. A
disadvantage of closed questions was that they offered respondents either a choice of
alternative answers, or a simple ‘Yes’ or ‘No’ response. It was accepted that this disadvantage
might have led to a loss of spontaneity and expression. There was also the possibility that
some form of bias may have been introduced, in forcing the respondents to choose between
alternatives that might not have initially occurred to them. Although this method could
perhaps lead to a loss of spontaneity and expressiveness, it provided greater flexibility in
gaining an insight into viewer impressions.

With open-ended questions, respondents were allowed the opportunity to express their
thoughts and opinions freely, unencumbered by a rigid set of answers. Unlike the closed
questions which required specific replies, these questions provided the opportunity to probe
the respondents for their beliefs and ideas, as well as allowing respondents the chance to
express views spontaneously and elaborate on answers. Free response questions proved
difficult for some people to answer, and because of the wide range of possible opinions, they
proved even more difficult to analyse. The analysis of responses required some degree of
‘coding’, which required the construction of a system of categories which, although
beneficial, again proved to be time-consuming. Nevertheless, this type of qualitative
questioning provided valuable additional information to support the results and findings of the
quantitative analysis.

106
The use of selected photographs was an attempt to examine visitor perception through the use of stimulated recall using photographs of specific exhibits. A sample of photographs of twelve different enclosures was selected to represent each of the three orders as described in Section 3.3. To avoid the possibility of visitors responding to any aesthetic appeal of photographs, respondents were asked specifically if they had visited the particular enclosure and if the animals had been clearly visible. They were asked to grade different selected exhibits on a seven point scale, ranging from ‘most unnatural’ to ‘most natural’. They were then asked to rate their perceptions of the well-being of the animals in terms of ‘happiness’, their appreciation of the exhibits in terms of ‘natural’ appearance, along with their likes and dislikes of both the animals and the enclosures. These photographic surveys were used to assess the thoughts and ideas of visitors in relation to specific enclosures.

The strengths of the different surveys were apparent in that they provided detailed qualitative and qualitative information which proved to be informative and enabled further exploration of different issues. A large sample was needed for reliable and representative results, which necessitated considerable time in planning and supervising, as well as the use of a computer to analyse results.

3.4.3. Additional questionnaires

As the research progressed two additional questionnaires were developed.

Transport Questionnaire:

This simple questionnaire was used to determine the method of transport visitors had used in coming to the zoo. As visiting categories entered the zoo, they were asked what means of transport had been used to travel there and for their home postcodes. To elicit responses, groups were approached as they entered the zoo and an adult asked to reply. To avoid any possible bias in selection, the first eight groups who entered each hour were approached and the process was repeated every opening hour, for each day of the week, during both holiday and non-holiday periods. In total, 718 responses were collated at Adelaide and 780 at Taronga. On some recording days attendance figures were restricted by inclement weather, resulting in the slightly lower response at Adelaide.
Feeding Questionnaire:

A short questionnaire was developed to assess the thoughts of visitors in relation to the hypothetical idea of feeding live prey to captive carnivores, to determine if any differences in perceptions occurred with gender, age and pet-ownership. Visitors were informed that the survey was an attempt to assess various thoughts and attitudes and it was stressed that this was definitely not an attempt to promote this style of feeding. The questions were modelled upon the research of Ings et al. (1997), so that possible cultural comparisons could be made between Australian and UK respondents. Visitors were given a choice of three alternatives to indicate whether they would like to see the particular type of feeding carried out in the animal’s exhibit in full view of the public, in the animal’s den out of sight or not at all. Six specific combinations of prey and predator, which could be related to actual animals displayed in the zoo, were selected, to make the options easier for visitors to appreciate. These alternatives were the feeding of live insects to lizards, live fish to seals, live mice to both snakes and birds, live birds to Tasmanian devils and live rabbits to lions and tigers. All combinations using freshly killed prey were regularly used in both zoos, so that many visitors would have had the opportunity to have observed similar feeding already, albeit with freshly killed prey. Visitors were then asked their opinion of feeding a whole carcass to a lion or a tiger, since this was regarded as a viable alternative for feeding carnivores in the zoo and one which has been used in some other zoos. The data required for the statistical analysis was gained directly from responses to surveys and the large statistical base ensured that there was no bias in the sampling process. This survey was distributed to viewers on different days throughout the week, including both week-end and holiday periods throughout the year. An advantage of this survey was the structured format which required only simple responses. In total, 504 Feeding Questionnaires were completed in the two zoos.
3.5 Subjects

3.5.1 Numbers

Tracking:

In recent years, tracking has been used increasingly to monitor visitor activity. One of the main benefits of tracking is that the natural behaviour of people can be studied, from which accurate data can be determined. In this research, it was used to determine and assess the attracting and holding powers of exhibits. Unobtrusive observations were carried out at exhibits by the same researcher using a stop watch to record the amount of time spent viewing with observations being recorded for a one hour period. To avoid any possible bias and ensure that all seasonal and weather factors were experienced, each exhibit was observed at different times on different days over a number of weeks: the data was combined and the process was continued throughout the year. Tracking observations were recorded until a minimum total of 24 hours of observations had been made at each exhibit – the 24 hours representing a minimum of three sessions of viewing periods for each of the 8 hours during which the zoo is open to the public. Although only one focal person was selected for actual tracking observations, general notes relating to other members of the group were also recorded, particularly in relation to the reading of labels. Over the period of this research, a total of 28,540 zoo visitors were observed in both zoos.

Surveys:

To achieve reliable, accurate and representative results, a large sample of responses was collected, requiring considerable time in planning, distributing and analysing the results. Achieving a large database overcame possible sampling errors. Exit surveys were distributed so that the collection period extended over a 12-month period. In total, 450 responses were received from Adelaide and 400 from Taronga. The distribution of exhibit surveys was repeated until a minimum of 40 surveys had been received at each of the selected exhibits. In total, 725 responses were received from 18 exhibits at Adelaide and 600 from 15 exhibits at Taronga. Photographic surveys were continued until a minimum of 75 completed questionnaires had been returned for each zoo. In total, 125 responses were received from Adelaide and 83 from Taronga. Overall, 2383 surveys were received which were suitable for analysis: 1300 from Adelaide and 1083 from Taronga.
3.5.2 Categories

Following initial observational recordings, it became apparent that it was possible to categorise visitors according to the size and composition of the visiting groups. Paulette McManus (1991) described visitors on the basis of their social groupings, which she expressed as ‘constituencies’. This research adapted her classification and considered the different social groupings as ‘categories’. The categories considered were singles, couples, adult groups and family groups. Family groups were considered as being any multi-generational social group which moved through the zoo as a single unit and which consisted of one or more adults accompanied by one or more children (Hein, 1998). This was similar to Minda Borun’s definition of a family as ‘any small multigenerational visiting group’ (Borun, 2002:246). Throughout this research, family groups were sub-divided into two separate subsets on the basis of accompanying children: those with at least one child of pre-school age (termed for statistical purposes FP) and those with children of school age (termed as FS).

**Categories:**

Visitors were considered in one of the following five categories:-

- Singles (S) – individual adults who visited and viewed different zoo exhibits on their own
- Couples (C) – comprising two adults, irrespective of gender or age
- Adult Groups (A) – groups of visitors comprised of more than two adults who moved around the zoo and viewed the different exhibits together
- Family Groups (FP) – groups which consisted of one or more adults accompanied by a child or children, at least one of whom was a pre-schooler under the age of five
- Family Groups (FS) – groups which consisted of one or more adults accompanied by a child or children, all of whom were of school age (over the age of five).
3.6 Analytical method and experimental design

It wasn’t curiosity that killed the cat.  
It was trying to make sense of all the data curiosity generated.  
Halcolm (aka Patton).

The data collected from the surveys was used to establish a picture of the general demographic profile of the respondents. This allowed the construction of a typical zoo visitor profile, which provided information about who the visitors were and whence they came. The survey questionnaires elicited the different views of zoo visitors, which made it possible to investigate the motivations for visiting the zoo and the perceptions of visitors towards the animals and enclosures generally. Satisfaction ratings for the aesthetics and surrounds of exhibits were obtained.

**Data Analysis:**

In the analysis of the overall data, standard statistical procedures were utilised to interpret the data. These included calculations for the mean, median and standard deviation. Zoos represent clearly defined areas, in which numerous characteristics are spatially distributed. The main function in this research was seen as measuring characteristics and recording distribution. Data was measured using the two basic levels of measurement, *nominal* and *ordinal*. The nominal scales simply recorded data as being present or absent, male or female, good or bad, so that qualitative descriptions were represented numerically by the numbers 0 and 1. The ordinal scales ascribed a rank order to a series of expressions, so that a numerical sequence of 1, 2, 3, 4, and 5 could be applied to the particular expression.

**Likert ratings:**

Satisfaction ratings for exhibit aesthetics and surrounds were obtained using Likert type scaling, as outlined by Oppenheim (1966). Likert’s primary concern was with unidimensionality, and ensuring that all items measured the same thing. His aim was to eliminate judges, by asking respondents to place themselves on an attitude continuum for each statement. In this research, questions using the Likert scale posed statements which required the respondent to evaluate their level of agreement or disagreement according to a five-point scale where 1=strongly disagree and 5=strongly agree (Likert, 1932). The data collected was treated as ordinal data, and although the responses had an inherent sequence order, it was not assumed that the respondent meant that the difference between agreeing and strongly agreeing was the same as that between agreeing and being undecided.
In the surveys, respondents were given the opportunity to choose ratings from a five point scale where the midpoint was regarded as being neutral. The reliability of such scales tended to be adequate, and the scales had the added advantage of being particularly useful when studying attitude change. With the use of a five point scale, respondents were able to place themselves on attitudinally for each item, choosing responses from strongly disagree, disagree, neutral, agree, and strongly agree. For statistical purposes the item responses were totalled and the percentage for each level determined.

**Rankings:**

In a number of the survey questions, rankings were used. These rankings were utilised as objective assessments (such as ranking of the quality of the exhibit), in a subjective manner (such as perception or attitude towards an item) and as self-rankings, or personality traits or attitudes. Although apparently similar to the Likert scale, these ordinal rankings had a sequential order and it was assumed that the differences between adjacent response levels were identical. Consequently, for statistical purposes, rankings were simply totalled and the mean and standard deviation for each level determined, using standard statistical procedures. Like most components of human behaviour, attitudes are abstractions – although they are real to individuals who hold them. An advantage of the use of rankings was that they provided a numerical value to points of judgement, which were easily understood by respondents. One of the main concerns associated with the use of rankings was that it was possible that they might have been influenced by variable circumstances at different times throughout the year, which could lead to possible misunderstandings, although it was accepted that the large data base effectively overcame such problems.

**Exhibits:**

In the context of the museum, the word ‘exhibit’ has been used to describe an individual object, or an object within a larger display. Pearce (1992) indicated that the word can also be used as a collective term where it can refer to an integrated display comprising groups of objects. In the zoo environment an exhibit has usually been thought of as being an enclosure where one or more animals have formed the focal point of attention for viewers. Although some zoo administrators have considered that the terms ‘exhibit’ and ‘enclosure’ may have distinctly different interpretations, the general viewing public did not appear to make any distinction, and consequently throughout this research the two terms were considered synonymous.
In the Museum sector there is no accepted definition of exhibition success, nor are there standards for comparing exhibitions (Serrell, 1996a). Likewise, little research has been carried out in zoos to determine the nature of the success of various exhibits. Working at Zurich Zoo, Ward and his colleagues (Ward et al., 1998) determined the popularity of an exhibit by the proportion of visitors spending more than 10 seconds at it. Andrew Balmford (2000) considered that Ward’s method determined only the ‘holding power’ of an exhibit; he suggested that a better assessment should be the percentage of visitors viewing an exhibit, or its ‘attracting power’. Balmford maintained that the holding power and the attracting power of an exhibit did not necessarily coincide. These workers found that the holding power of different exhibits varied systematically; this could even result from the competition between visitors for viewing space. Bitgood et al. (1986) found that there was a tendency for visitors to move past small-bodied exhibits relatively quickly, to make way for other visitors. In light of the research carried out by these workers, this research developed four methods to determine the effectiveness of different exhibits in the zoo, from the point of view of the visitor.

1. **Ranking index**

Exhibit surveys requested respondents to assess each exhibit with a score out of ten. This score was a measure of their immediate reaction to the exhibit overall and as such represented their objective opinion, providing a direct indication of what viewers thought of the exhibit. The ranking scores were totalled and the mean calculated to determine a ranking index for each of the exhibits studied: this figure provided a direct comparison between the different exhibits. This data analysis was compiled from 725 surveys in Adelaide and 600 surveys in Taronga.

2. **Viewing index**

Visitors were observed unobtrusively to determine the length of time they stopped to spend time viewing the individual exhibits. As a measure of the popularity of different exhibits, a viewing index was determined, based on the average viewing time of visitors who actually stopped for any particular reason and showed some form of interest in the exhibit. This method eliminated those viewers, termed as ‘passers-by’, who did not stop to view the animal on display.
3. Half-life viewing time

The concept of a half-life was developed from the construction of survival curves. The half-life of viewing times at each of the selected exhibits was determined. Calculated from the tracking observations, this figure represented the time for which half of the visitors stopped to look at the exhibit. As a measure of central tendency, this figure varied between exhibits, and was used for comparative purposes.

4. Popularity Index (P.I.)

The ‘popularity index’ for an enclosure was the percentage of visitors who spent longer than ten seconds looking at the enclosure, including the amount of time spent reading any signs and labels.

\[
\text{Popularity index (P.I.)} = \frac{\text{Total whose viewing time exceeded 10 seconds}}{\text{Total viewers of exhibit}} \times 100
\]

To assess the various patterns of visitation at the different exhibits, a count was made of the number of visitors entering the viewing area of each exhibit, in one-hour blocks. A total of 11,138 tracking observations were recorded, on both weekdays and weekends, throughout the research period. The percentage of visitors who viewed for periods of longer than ten seconds was calculated and used to determine the P.I. of the exhibits. Since this figure revealed the degree of actual visitor interest rather than a casual interest or a mere presence, it reflected the percentage of long-term viewers at the exhibit.
Signs:

The total amount of time spent reading the signs at the different exhibits was obtained as part of the unobtrusive tracking analysis. The formulae used for this section of the research were adapted from the work of Michael Arndt and colleagues (Arndt et al., 1992).

The attracting power of labels at an exhibit was determined by the percentage of viewers at the exhibit who actually stopped to read the label, regardless of the amount of time spent either at the exhibit or in reading the signage.

\[
\text{Attracting power (A.P.)} = \frac{\text{Actual number who stopped to read}}{\text{Total number of viewers at exhibit}} \times 100
\]

The holding power of the label was determined by the percentage of time that viewers were observed reading the label compared with the required amount of time to read the label fully. The ‘required reading’ time was determined prior to recording any unobtrusive observations. Ten individuals (two people representing each of the five categories studied) were selected randomly and asked to read the labels fully. Their reading times were recorded, and the mean time calculated to provide the ‘required reading time’. The selection of ten readers effectively compensated for different reading speeds, so that the mean figure obtained provided an estimation of the ‘maximum’ time required to read the label, and consequently the holding power represented a percentage of how much of the label was actually read.

\[
\text{Holding power (H.P.)} = \frac{\text{Time spent reading a sign}}{\text{‘Required’ reading time}} \times 100
\]
Enrichment:

Throughout the data-gathering for this research, visitors to the zoo often saw different animals licking at a frozen block of ice, carefully removing insects from inside tubes or logs, or playing with various containers. Although many visitors did not realise what was occurring, as they watched the different animals interacting they were witnessing the zoo’s carefully designed enrichment programme. Zoo staff commonly use the term ‘enrichment’, but it was obvious that the large majority of zoo visitors did not accurately understand or interpret what was involved with enrichment strategies. This was seen to reflect a lack of effective education for visitors. At Adelaide and Taronga, markedly contrasting approaches towards enrichment usage have been employed. These significantly different approaches represented the utilisation of two contrasting ideas, particularly in relation to their link with the visiting public. At the time this research commenced, there were tours conducted each week at Adelaide so that visitors could observe different animals being provided with an assortment of food enrichments. Conducted by volunteers, this tour was little more than an example of feeding, and little explanation of enrichments was provided for visitors. This tour was subsequently replaced by ‘The Two Hippo Tour’ which allowed visitors the opportunity to observe the preparation of a greater range of enrichments and involved participants in discussions with keepers. By comparison, Taronga provided little, if any, link to enrichment for the visiting public. In fact, the Behavioural Watch section responsible for the preparation of enrichment items actively discouraged any contact with visitors.

It was difficult to compare the effectiveness of individual enrichments since different items were used with different animals and the techniques used in presentation also varied greatly. The various enrichment devices differed significantly too, in terms of both their complexity and the way in which the animal manipulated them. Many had a degree of novelty, which often attracted the attention of visitors and consequently the quality of the perceptions developed in visitors’ minds. Since so little investigation of visitor reaction to enrichment has been carried out in the Australian context, it seemed possible that this research could redress the limited number of findings.

To establish any significant differences in terms of visitors’ appreciation and understanding of the use of enrichment in both zoos, survey questions were used to supplement the findings of the tracking observations. The surveys included a specific question relating to enrichment. The amount of time spent by viewers watching the animals interact with their enrichment devices was determined as part of the tracking observations.
3.7 Validity and reliability of data

3.7.1 Randomness

The central importance of any statistical approach lies in the ability to form conclusions which assist in making deductions about a large group (in this case the overall population of people visiting the zoo) based upon findings of a smaller subset. Throughout the research period, the patterns of visitor behaviours were examined, both from an objective and a subjective point of view. Direct tracking observations were recorded to assess accurately the behaviour of viewers, while an understanding of the perceptions of visitors was achieved with structured surveys. At all times, a conscious pattern was adopted to avoid any bias and to choose respondents on a random basis. From the commencement of the study it was apparent that both the sample size and the sampling method would have a major impact upon the interpretation of any results obtained, since a small sample size could include bias that might skew findings, resulting in conclusions being formulated that were not indicative of the visiting public overall.

Tracking:
As outlined in Section 3.4.1, the first adult member of the visiting category to cross the imaginary boundary was selected. Once this adult left the exhibit area, observations were repeated with the next viewing group. This choice was made regardless of gender. In situations where two adults crossed the boundary simultaneously, where practically possible, the person selected was of different gender to the adult previously observed. Regardless of the number of stops made by an individual at the exhibit the total overall stopping time was recorded, to reduce any possible bias arising as a result of the various sizes of the different exhibits. For family and adult groups, although only one focal person was chosen for actual tracking observations, general notes for the rest of the group were also recorded. This ‘behavioural sampling’ technique was preferred to ‘scan sampling’ as it avoided any possible bias towards highly visible behaviours, so that a more accurate representation of what the visitors were actually doing was obtained.

Surveys:
As outlined in Section 3.4.2, surveys were distributed on both weekdays and weekends during both holiday and non-holiday periods at regular intervals throughout the
year, to allow for any variations that might have occurred because of holiday periods, various promotions, changing seasonal factors and variable weather conditions. In order to make an informed contribution, this research targeted the full range of visitors in the zoo in an attempt to determine accurately any variations that existed in the profiles of the two different zoo visitor populations.

The large sample size ensured the removal of errors which may have arisen due to sampling error and selection bias, and established the foundation for an accurate statistical examination. It was considered that the selection of a large data base was sufficient to represent a miniature version of the population from which it had been drawn, and that consequently it provided a fairly accurate picture of the visitors representing both Adelaide and Taronga zoos. Further verification would have to take place before knowing how applicable the particular findings might be in reflecting the thoughts of visitors to smaller zoos, wildlife parks and open range parks.

3.7.2 Limitations

Although an attempt was made to collect data at regular intervals throughout the entire year, the study was not considered to be longitudinal. It is likely that in repeating the exercise, the results might vary with changing seasonal effects throughout the year, due to possible bias being exerted by some populations (such as seasonal tourists).

In his analysis of results from Zurich Zoo, Ward (2000) emphasized that it was important for popularity to be measured separately for adults and children, because the relationships were so markedly different. Since the majority of the viewing groups consisted of children, this research used categories, so that comparisons could be made between the different viewing groups.

As the surveys were printed only in English, it was accepted that some non-English speaking visitors would not complete and return surveys. On occasions, some non-English speaking visitors returned the survey form immediately, indicating that their problems lay in their inability to comprehend English. Surveys were distributed to visitors on a random basis, and although it was possible that the overall results might have been prejudiced by this factor, it was considered that the large data base was sufficient to minimise potential bias.
Large, organised tourist groups were not considered in this study, since it was common for these groups to adhere to a fixed agenda with restricted time constraints. These constraints severely limited the normal length of viewing and did not allow time for possible completion of surveys. Similarly, international tourist groups which visited the zoo with an interpreter guide were not included in this research. Predominantly, these groups comprised international visitors who visited the zoo simply for the purpose of observing specific Australian native animals.

Children in school groups were not considered in this study, not only because of their age, but also because of the different agendas by which they operated. Some school groups, particularly art and drama classes working to precise programmes, visited the zoo specifically to observe certain animals or enclosures. It was common for these groups to spend long periods of time at specific exhibits and totally ignore other exhibits, as if these did not fall within the confines of their aims. Those school groups allocated specific work assignments, frequently following a set pattern as they moved throughout the zoo grounds and stopped only to look at animals or enclosures referred to in their work sheets. At Taronga, it was most noticeable that school groups spent a minimal amount of time viewing different exhibits. As soon as these groups, usually unsupervised, had gained a required answer for their assignment question, they rushed (frequently noisily) to the next exhibit, showing little thought for either the animals in the enclosures or for any other visitors. This problem was not as noticeable at Adelaide, where a smaller number of visiting classes gave the impression of being more organised in their activities.

The purpose of this research was to investigate zoo visitors; consequently, it did not consider those people who did not visit zoos. The findings contribute to a greater understanding of zoo visitors but, as with most research, they highlight the need for further research on the role of tourist attractions in educating their visitors. This study did not provide any measure of behavioural change: longitudinal research would be required to study the influence of the zoo visit on learning and understanding, particularly in terms of any thoughts relating to conservation. Further research could examine the expectations and attitudes of visitors, particularly the influence of previous experiences on their perceptions.
3.8 Terminology

On occasions, zoo administrators have raised problems relating to the use of anthropomorphic terms when making reference to animals in the zoo, since they consider that observers are placing themselves in the animal’s mind and interpreting its behaviour. David Shepherdson (2003:275) specifically avoided the use of the word ‘happiness’ when making reference to animals, preferring instead to use the expression ‘well-being’. It is of interest to note that the main objection to the use of anthropomorphic terms comes from zoo administrators who, although having direct links with the care of animals in zoos, have little if any direct contact with visitors. Earlier research (Frede, 2003) showed that when the visitors looked at the different exhibits in a zoo, 96% of respondents understood and interpreted the behaviour of animals in terms of what they considered to be ‘happy’. Visitors tended to consider animals in anthropomorphic terms, without possessing any detailed knowledge of either the animal or its behavioural patterns. They developed perceptions and understandings in describing the animal from their own point of view, using terms such as ‘happy’, ‘sad’ or ‘bored’. Since captive animals displayed varying behaviours, the use of subjective words such as ‘happy’ and ‘sad’ was the result of observer interpretation and understanding. This use was not necessarily anthropomorphic, since it was simply an application of words that our language has made available. However, as these were the terms that were used and understood by the public, it was considered appropriate that since this research involved a study of visitor perceptions, the same terms which were understood and perceived by the public should be the terms used in the survey questionnaires.

Similarly, visitors considered the different exhibits to be ‘natural’ or ‘unnatural’, a conclusion based upon their own judgement of the manner in which they perceived the particular animals’ environment, even though it was possible that this awareness may have been based upon false assumptions or misconceptions.

The word ‘bored’ was avoided wherever possible, since many different interpretations of this word applied. Sometimes visitors based their conclusion that the animal was ‘bored’ on the normal appearance of the animal (e.g. Kriba the gorilla at Taronga), sometimes on the animal sleeping (e.g. the tiger in Adelaide), sometimes when the animal was pacing (e.g. sun bears). On occasions, proactive visitors made direct contact to request specific information relating to the research. In any such conversations the use of the term ‘bored’ was avoided, mainly because of the wide variations in its interpretation. When any visitors used the word in
describing animal activity, they were asked to elaborate on their interpretation of this term. These comments were recorded for possible discussion.

Throughout the progress of this research it was apparent that visitors had varying thoughts as to what constituted ‘enrichment’ (Plate 3.31). In any discussions, visitors were informed that the generally accepted definition of enrichment was an idea used by zoo keepers ‘that seeks to improve the quality of care for captive animals by providing environmental stimuli necessary for animal well-being’ (Shepherdson, 1998:1). In the surveys, reference was made to items ‘provided for the well-being of the animal’ and it was found that this terminology created no problems in the minds of respondents.

Plate 3.31: An enrichment basket prepared for the squirrel monkeys in Adelaide.