



**Association of British and Irish
Wild Animal Keepers**

RATEL

The Journal of the Association of British
and Irish Wild Animal Keepers

Volume 38 No. 2. June 2011

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The Association of British & Irish Wild Animal Keepers (ABWAK)

ABWAK is a non-profit making organisation catering for those interested in and involved with the keeping of wild animals. The aim of the association is:

“To achieve and advance the highest standards of excellence in wild animal care”

We believe that:

- We are the professional association representing animal keepers in Britain & Ireland for whom excellent animal welfare is the highest priority
- We can have a significant impact in welfare issues by bringing keepers and stakeholders together and by being a strong representative & consultative body
- We can make a significant contribution to the training & development of animal keepers thus raising standards and increasing the recognition of wild animal collections
- By developing the skills & expertise of our members we can make a unique contribution to conservation

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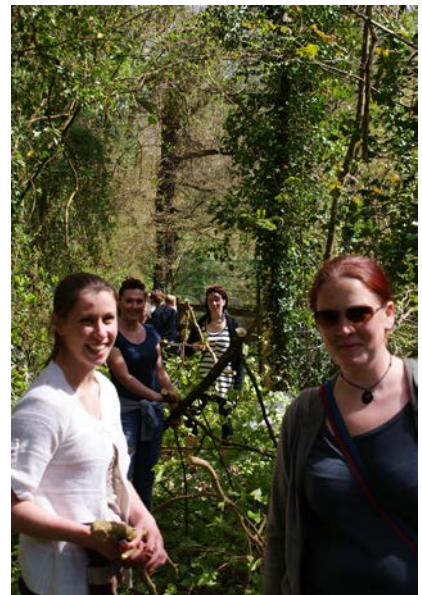
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cover photo: ABWAK Browse Workshop, Paignton, April 2011

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From the editor

Animal welfare and death...

Mercedes, the polar bear, one of Britain's most 'famous' zoo animals has been put down at the age of 30. (See the obituary page 20). The 18 month old elephant calf, Ganesh Vijay, at Twycross Zoo, died a few days before after a team of vets did all they could to save the animal. Both of these deaths brought sympathy from the public and of course some emotion from the keepers.

Humans have mixed relationships with animals. In the UK we are often called a nation of animal lovers... but try to extend that 'love' to species such as cockroaches, snakes and spiders, and only a few people will agree. When it comes to animals' death there are also mixed feelings, and whilst many are happy to opt for a 'peaceful death' (euthanasia) for an aged or ill animal, there is considerable debate about euthanasia of young or non-breeding or surplus animals. Some 'pet welfare' groups call for support saying they will never put a healthy animal down... but this ignores the fact the animal has been abandoned, is neglected and unwanted and to keep it uses resources that could be much better put to educating people not to breed their cats and dogs or not have pets in the first place.

When it comes to zoo animals, the vast majority of zoo staff fully support the use of euthanasia for ill animals, but it is apparent that some would prefer not to use euthanasia as a management tool for other purposes. In this issue of RATEL we feature Peter Dickinson's excellent discussion on this topic from his zoonewsdigest blog, which partly resulted after Edinburgh Zoo announced it had euthanased red river hog piglets.

Whilst it may be hard, the reality of zoos fulfilling their role as conservation centres and maintaining functioning populations of designated species, in the limited space available, needs to consider the use of euthanasia, and explaining this to our visitors. The red river hog issue at Edinburgh created a lot of mis-informed and emotive press/comment, and it was interesting that some other zoos stayed quiet, even though they may agree with the policy... do we manage species or does the press decide?

Keeper Training Is A Priority

ABWAK is committed to keeper training and development. We were delighted with the content and attendance at our annual symposium hosted by Port Lympne in March. It was a great weekend and our hosts looked after us very well. The quality of talks was excellent.

If you would like to speak at our March 2012 Symposium at Bristol Zoo please submit a brief 'abstract' to Ross Snipp asap.

The Association's AGM at Port Lympne, confirmed the election of the Council (as listed on the inside front cover of RATEL) and confirmed that we are intending to revise the payment methods for membership this year to include direct debit & credit card. We also announced a small increase in the fee to £30 from 1st January 2012, the first increase for several years.

Thanks to MAZURI for their sponsorship of the Symposium, alongside their support for RATEL.

One of our additional commitments to keeper training and development is our **regional workshops**, and a very successful 'BROWSE' workshop was run at Paignton Zoo in April. We have another workshop at Chessington at the end of May and other workshops will take place during the rest of the year. The cost of these workshops is very low, and all our participants report the value of this useful practical instruction and working with a small group of fellow keepers.

We also support keepers and those in training by publishing your work - some of which may be day to day activity, but more often than not is a result of dedicated study as part of a course. In this issue we also conclude with the dedication of keepers in other walks of life with the end of Mark Norris's article on keepers and the world war.

Stephen P. Woollard, Editor



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ABWAK Symposium 2011 - Port Lympne

Over 100 people descended upon Port Lympne in Kent in March for our annual symposium.

We were extremely well looked after and catered for by the staff in the mansion house and at the Park, from excellent food and surroundings to a special 'safari tour'.

The symposium itself was packed full of interesting and useful presentations and sparked discussion and debate. A CD of the presentations is now available (£5).



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The Effect of Olfactory Enrichment on the Diurnal Cycle of Captive Ocelots (*Leopardus pardalis*)

Charlie Rylands

A photograph of the female ocelot (*Leopardus pardalis*) at Birmingham Nature Centre, (Rylands, C. 2009).



Abstract

Ocelots (*Leopardus pardalis*) are a relatively new addition to captive collections and little information is available on the species both *in situ* and *ex situ*. Although a naturally nocturnal species, they are prone to being diurnal in captivity. Many collections have anecdotal reports that their ocelots maintain elusive behaviour and this is unchanged by the diurnal cycle. This can cause issues with captive ocelots appearing inactive, and/or lacking in the exhibition of species-specific behaviours. This study investigated the use of natural, olfactory enrichment to encourage increases in ocelot activity and wild-type behaviours. Using two methods, rabbit scent was added to the enclosure of 1.1 ocelots at the Birmingham Nature Centre. A hessian sack filled with soiled rabbit bedding was placed inside the enclosure once a week for 3 weeks. This was compared to the second method which utilised live rabbit distribution to scatter urine and faeces around the enclosure over the same amount of time. Both methods significantly increased activity ($p < 0.0001$), though the live scent was responsible for a wider range of behaviours. Walking was the most significant behaviour ($p < 0.0005$), whilst directly responding to enrichment ($p < 0.0009$), investigating ($p < 0.0016$) and sniffing objects ($p < 0.0016$) improved environmental interactions. Viewing opportunities for visitors were also increased ($p < 0.0033$) with the implementation of olfactory enrichment. Ethological behaviours were observed, suggesting a need for further studies which explore natural, olfactory enrichment combined with food-orientated enrichment to encourage and facilitate hunting behaviour, scent-marking and other species-specific behaviours in captive felids.

EDITOR'S NOTE - This article was a thesis submission for a degree project and has had to be edited down from its original length. It is hoped that this has not detracted from the reporting of the study. Contact the author or editor if you require to see the original article un-edited.

1. Introduction

Enrichment is a modern concept usually categorised according to the stimulant, for example, sensory, food-orientated, environmental, social, etc. The ultimate goal of enrichment is to assist with ensuring an animal's captive environment is as close to the wild as possible, therefore allowing the animal to exhibit wild-type or 'normal' species-specific behaviours, (Carlstead and Shepherdson, 2000, p.337; Skibieli, et al, 2007, p.371; Hosey, et al, 2009; Shyne, 2006, p.317 and Harris, et al, 1996). Enrichment is becoming well integrated within animal husbandry practises; benefiting animals, keepers and visitors. However it is an area that needs much more exploration. To establish whether enrichment is successful, it is essential to understand what species-specific behaviours are. Field studies need to be carried out on wild conspecifics *in situ*.

The Felidae family is one group which suffers from a lack of varied studies both in the wild and in captivity, (Fowler and Cubas, 2001, p.312 and Dillon and Kelly, 2008, p.391). Thus, this paper aims to expand the research that is available on one of the newest felid additions to captive collections: the ocelot (*Leopardus pardalis*).

Until recently, ocelots were becoming severely endangered due to exploitation for the pet and fur trades. The species was placed on CITES Appendix I to aid population recovery, and is now listed as “least concern” on the IUCN red list (previously vulnerable), (Caso, et al, 2008). Despite this, wild ocelot numbers are still suffering due to habitat destruction, with their last major stronghold being in Amazonia, (Mansard, 1991, p.93). Captive data is slowly being submitted from the zoo community but is still very limited, with most research being empirical or anecdotal.

The majority of captive ocelot studies relate to appropriate enclosure sizes, reproduction, nutrition and some enrichment information. One thing that seems recurrent in these studies is that for the most part, ocelots in captivity have converted from a naturally nocturnal cycle to being diurnal, (Weller and Bennett, 2001, p.67). It is also reported that they can be active for 12-14 hours of the day, (Stinner, 2005). There are recent papers citing that wild ocelots can be diurnal depending on their geographic location and seasonality, (Murray and Gardner, 1997, p.5). However, a high percentage of studies maintain that they are nocturnal in situ, (Maffei and Noss, 2008; Weller and Bennett, 2001; Di Bitetti, et al, 2006; Trolle and Kery, 2005; and Grigione and Mrykalo, 2004). Nevertheless, they are still elusive animals, (Weller and Bennett, 2001, p.67) and this can cause dissatisfaction among visitors, which in turn can put pressure on the zoo. Good animal welfare and successful breeding requires ocelot enclosures to be quite busy in terms of furniture, to appease their arboreal tendencies and offer privacy, (Mansard, 1991, p.100). Unfortunately, this can also aid and encourage their evasiveness. Therefore many collections turn to enrichment for a solution.

It is fair to say that the majority of felid enrichment studies are food-orientated, (Law, 1991, p.108). Hosey, et al, (2009), suggest that this may be because there is a ‘reward’ at the end of the activity, therefore pertaining to the cost/benefit analysis. Whilst this type of enrichment has proven successful, it does have limitations. Whilst providing visually naturalistic enclosures, many collections overlook sensory stimulation, (Powell, 1997, p.217). This study aims take a different approach to enrichment and investigate the relatively unexplored area of olfactory stimuli as sensory enrichment.

There is a definite lack of published work on olfactory enrichment, (Clark, et al, 2005, p.178 and Skibieli, et al, 2007, p. 371), which is surprising given that felids have a very acute sense of smell and are naturally curious, (Pearson, 2002, p.7 and Thomas, 2005, p.205). Scent is an ideal tool for encouraging activity and is particularly suitable for public collections. It often doesn’t involve anything that can visually offend visitors, as is sometimes the case with food enrichment. Smells can disperse across the entire enclosure encouraging the animal to utilise the whole area, including the vertical components, and encourage direct interaction with

their environment. Indeed, Muller-Schwarze, (2005, p.159), found that “behaviour management by odours improves welfare of animals”. Scent can also affect the mood and attitude of an animal, (Schuett and Frase, 2001, p.1) and encourage rarely seen ethological behaviours such as hunting technique, territoriality responses, aspects of play behaviour and different reactions to social interactions.

Most studies on olfactory enrichment have been conducted using artificial scents. Thomas, (2005, p.208) theorises that exotic cats may avoid certain scents, such as perfumes; because they recognise that those smells are linked to human activity. Therefore, in keeping with encouraging species-specific behaviours, this study uses a natural form of olfactory enrichment; rabbit scent. This study aims to investigate the effect of a natural scent, i.e. something that is not manmade, and is as close to a wild source as possible. In this circumstance, *Oryctolagus cuniculus* is the most appropriate natural source available.

It is important to distinguish whether the aim of enrichment is to simply increase activity or to increase species-specific behaviour, (Hosey, et al, 2009, p.263). This study is investigating the diurnal activity of captive ocelots (*Leopardus pardalis*) which is largely unnatural within itself, and is perhaps controversial to animal welfare. However, there are many definitions and classifications of what is good animal welfare, (Fraser, 2009, p.507). It is important to point out that this experiment is not designed to lengthen or change the ocelots’ cycle further, but to increase the behavioural interactions during the activity period that is already in place. The aim is to encourage species-specific behaviours, thereby increasing activity and interaction with the captive environment. Thus, improving the welfare of the animals involved.

In some cases, elusiveness could be a misinterpretation of inactivity. Which, in turn, could be a displacement behaviour that is redirecting an inability to perform other behaviours, (Hosey, et al, 2009, p.116). Captivity dissipates the need to hunt and so lowers activity levels. Behaviour such as elusiveness may therefore be a reaction to a low-stimulus environment, whereby the animal has lowered its expectations of stimulation in order to cope with boredom, (Harris, et al, 1996, p.326). In that case, enrichment plays a vital role in that animal’s welfare.

Breeding success in captivity relies on animal welfare being maximised both physically and psychologically. This study aims to fill a gap in felid enrichment and ocelot data to not only increase understanding, but to contribute to ocelot captive welfare and prosperity.

2. Hypotheses

The addition of rabbit scent will increase the diurnal activity of captive ocelots (*Leopardus pardalis*)

The addition of rabbit scent will encourage species-specific behaviours in captive ocelots (*Leopardus pardalis*)

3. Materials

3.1. Subject information

This study was carried out on 1.1 ocelots (*Leopardus pardalis*) at the Birmingham Nature Centre, West Midlands. The pair are captive born and not hybrids. At the time of study, the female was 9 years old and weighed approximately 9.4 kg. The male was 12 years old and weighed approximately 8.6 kg.

The ocelots at Birmingham Nature Centre are housed together in an outdoor enclosure which measures 110.5 sq. m and is 2.44m high. The front and two side walls consist of glass panels, and the rear wall is wood paneled and backs onto the keeper corridor. A den is provided within the enclosure in the form of a small wooden box which measures 3 sq. m and 0.8m in height, and is kept at an average temperature of 16°C. Bark chip provides a substrate, with a small concrete edge on one side for drainage. A climbing frame of intertwining branches occupies a large part of the enclosure, and attached to the frame are several platforms above which are heat lamps. The enclosure is roofed with mesh, of which a third is covered to provide shelter. There are also several rocks, logs and various types of plants around the enclosure which include Pampas grass (*Cortaderia selloana*) and Japanese Aralia (*Fatsia japonica*). A safety barrier for the public forms a perimeter around the enclosure and is approximately 1m from the enclosure walls. Neighbouring enclosures contain a red panda (*Ailurus fulgens*) and African sacred ibis (*Threskiornis aethiopicus*).

The ocelots are fed approximately half a rabbit each per day, as they have shown preference for rabbit in the past. This contributed to the choice of olfactory enrichment used in this study. They are also occasionally fed poultry and organ meats. Water is provided in a bucket and changed daily and the enclosure is cleaned out once or twice a week as necessary. Unidentified perfumes and deodorants are sprayed in and around the enclosure once a week as enrichment, and previous specimen reports show this has elicited scent marking behaviour from the male.

3.2. Enrichment devices

The experiment was split into 2 parts, with different materials being used for each method. The first involved the use of a hessian sack which was filled with used rabbit bedding, and then tied at the top with twine. The second method was

reviewed before materials were finalised. The initial project design intended to use bottled rabbit urine for spraying around the enclosure. However due to the difficulty of obtaining this, the materials were changed, (under the recommendation and approval of the keepers and the curator), to using a live rabbit's urine and faecal matter. This was distributed by allowing the rabbit to roam around the ocelots' enclosure whilst they were securely shut away. Other materials included a pencil and ethograms for noting behaviour, a video camera to record the rabbit, protective clothing, a pet carrier for transporting the rabbit and the assistance of the keeper for securing the ocelots.

4. Methodology

4.1. Preliminary work

In order to test the hypotheses fairly, it was important to understand the normal behaviour of the subjects, and define their current diurnal activity period. Focal sampling observations were carried out weekly over a 3 week period to form a baseline for comparison. The ocelots were monitored at half hourly intervals over a 7 hour day to determine their peak activity period. The aim of the project was to utilise their existing diurnal cycle to increase activity and encourage species-specific behaviours using olfactory enrichment. Therefore, calculating the peak time to put the enrichment into place was vital. The activities of normal behaviour were recorded in ethograms. Each observation also took into account independent, indirect variables such as weather, visitor numbers, feeding times, etc.

The majority of these observations were inadvertently carried out on the male, as he was more active and visible than the female. Unfortunately, the male had to be euthanized 2 weeks later due to an unforeseen illness. The remaining observations of normal behaviour were therefore delayed by one week to allow the female to become accustomed to solitary living, and to minimize the risk of the male's death impacting the female's response. The study then resumed using only the female as the subject. The dates of normal behaviour observations were as follows:

Week 1 – 30/10/09; Week 2 – 06/11/09; Week 3 – 20/11/09

Despite the initial observations, the peak activity period of the ocelots could not be determined as there was no correlation in the timings of activity patterns. Their behaviour was very sparse and inconsistent. Also, as it was apparent that the male must have been ill during the observations, the activity periods recorded for him were unreliable. Therefore, peak visitor times were used instead, as initial observations recorded that the cats showed no change in behaviour whether visitors were present

or not, so this seemed a fair solution. This also had the added benefit of trying to appease visitors, although it should be noted that this was not an intended factor of the project.

Two types of enrichment were used for this study and so the experiment was split into two parts: method 1 and method 2. Prior to each test period, risk assessments were carried out to audit health and safety and potential hazards.

4.2. Method 1

For the first phase of the experiment, a hessian sack filled with used rabbit bedding was placed in the ocelot's enclosure by the keeper. It was implemented on a different day to when the perfume enrichment was used to prevent cross-contamination of scents, which could skew results. The sack was positioned within view, approximately 0.5m from the ocelot's den. It was propped upright against a log, and left in that position for the duration of the observation. The response was monitored for one hour at 5 minute intervals, and the results were recorded in an ethogram. Husbandry was not interrupted because of this study, and so feeding times were not adjusted and were included in the ethogram where appropriate. The keeper removed the sack from the enclosure at the end of the observation period to prevent habituation. This was repeated at the same time, one day a week for 3 consecutive weeks:

Week 4 – 27/11/09; Week 5 – 04/12/09;
Week 6 – 11/12/09

4.3. Method 2

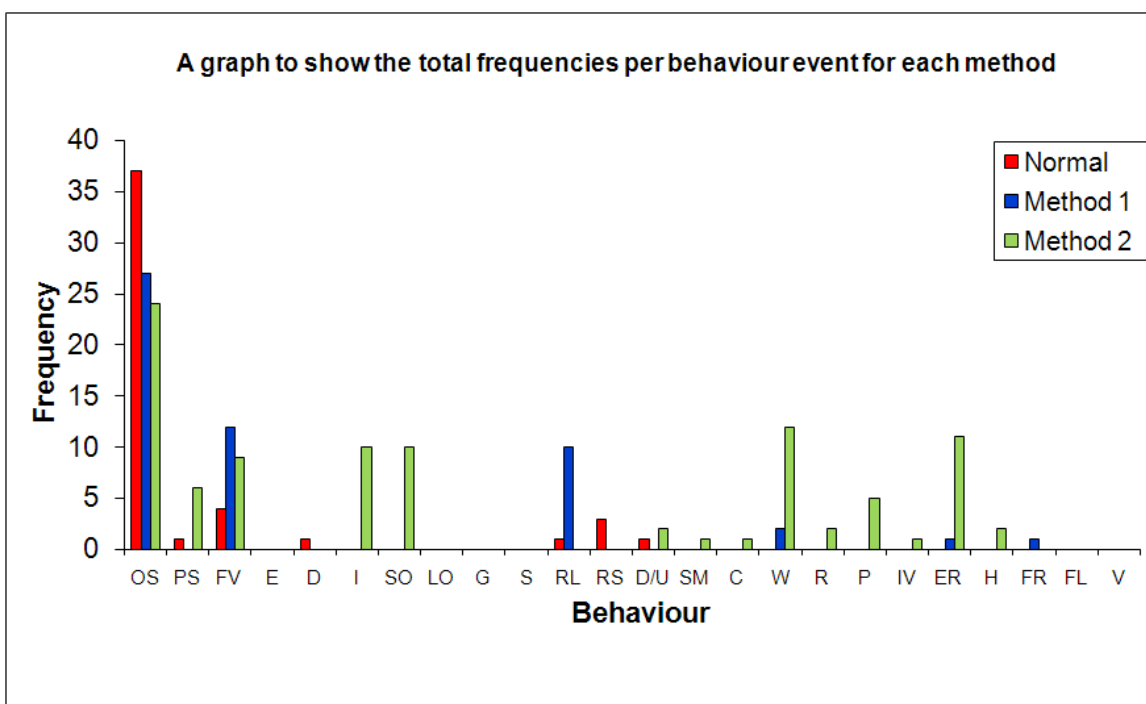
The second phase of the experiment required the use of rabbit urine. Once the keeper had locked the ocelot in her den, an intact male British giant rabbit (*Oryctolagus cuniculus*) was transported via pet carrier to the ocelot enclosure. The pet carrier was opened and the rabbit was given the choice whether or not to enter the enclosure. The rabbit was monitored from inside the enclosure for the whole duration, and the pet carrier was left open should he feel the need to seek shelter. This was to ensure there were no signs of fear or distress. Any indicators of such behaviour would have resulted in the rabbit being immediately removed and returned to his own enclosure.

The rabbit was loose in the enclosure for half an hour prior to the peak visitor period. An ethogram of his response was recorded to ensure he exhibited normal behaviours. Video footage of the rabbit was also taken to monitor his welfare and to support and supervise this method. The rabbit was then removed and returned to his own enclosure where he was again monitored briefly to ensure he settled back in.

Once the rabbit was safely returned and out of sight, the ocelot's den was opened and her response was monitored for one hour at 5 minute intervals. Again, an ethogram recorded her behaviours.

This method was repeated once a week at the same time for 3 consecutive weeks, each time using the same rabbit:

Week 7 – 15/1/10; Week 8 – 22/1/10; Week 9 – 29/1/10



5. Results

The data from all 9 weeks of the ocelot's ethograms was calculated so that there was a total frequency for each behaviour event. Fig. 1. Gives an overview of the effect of enrichment when compared to the normal, or baseline, observations.

Fig. 1 shows that without enrichment, the ocelot exhibited a lower range of behaviours and spent more time in her den – indicated by the behaviour ‘OS’. It is also evident that most of the baseline behaviours were static behaviours, such as resting laying down (RL) and resting sitting (RS). However further statistical analysis was performed to determine the exact significance of the effect of enrichment.

The total frequencies were statistically analysed using Chi-squared tests. This analysis compares the observed results with the results that would be expected if the enrichment was ineffective. A difference in behaviours is considered significant if $p < 0.05$, and highly significant if $p < 0.01$. These tests indicate whether or not enrichment significantly affected behaviours and activity levels in the female ocelot.

Code	Behaviour	Method 1	Method 2	Normal	p - value (<0.05)	Significance
OS	Out of sight	27	24	37	0.2061	n.s.
FV	In full view	12	9	4	0.1409	n.s.
W	Walking	2	12	0	0.0001	***
RL	Resting (laying down)	10	0	1	E too small (<5)	
ER	Responding to enrichment	1	11	0	E too small (<5)	
FR	Responding to food	1	0	0	E too small (<5)	
I	Investigating	0	10	0	E too small (<5)	
SO	Sniffing objects	0	10	0	E too small (<5)	
PS	Partial sight	0	6	1	E too small (<5)	
P	Pausing	0	5	0	E too small (<5)	
D/U	Defecating/urinating	0	2	1	E too small (<5)	
R	Running	0	2	0	E too small (<5)	
H	Hunting behaviour	0	2	0	E too small (<5)	
SM	Scent marking	0	1	0	E too small (<5)	
C	Climbing	0	1	0	E too small (<5)	
IV	Resp independent variables	0	1	0	E too small (<5)	
RS	Resting (sitting)	0	0	3	E too small (<5)	
D	Drinking	0	0	1	E too small (<5)	
E	Eating	0	0	0		
LO	Licking objects	0	0	0		
G	Grooming	0	0	0		
S	Sleeping	0	0	0		
FL	Flehmen	0	0	0		
V	Vocalising	0	0	0		

Table. 1. A table to show the statistical analysis of each behaviour event per each method using a Chi-squared test.

Code	Behaviour	Method 1	Normal	p - value (<0.05)	Significance
OS	Out of sight	27	37	0.2113	n.s.
FV	In full view	12	4	0.0455	*
RL	Resting (laying down)	10	1	0.0067	**
RS	Resting (sitting)	0	3	E too small (<5)	
PS	Partial sight	0	1	E too small (<5)	
D/U	Defecating/urinating	0	1	E too small (<5)	
D	Drinking	0	1	E too small (<5)	
W	Walking	2	0	E too small (<5)	
ER	Responding to enrichment	1	0	E too small (<5)	
FR	Responding to food	1	0	E too small (<5)	
I	Investigating	0	0		
SO	Sniffing objects	0	0		
P	Pausing	0	0		
R	Running	0	0		
H	Hunting behaviour	0	0		
SM	Scent marking	0	0		
C	Climbing	0	0		
IV	Respond to ind. variables	0	0		

Table. 2. A table to show the comparison of significance between method 1 and the baseline frequencies using a Chi-squared test.

Table 1 shows that there was a highly significant difference in walking behaviour ($p < 0.0001$) when enrichment was in place, compared to when enrichment was not present. This demonstrates that activity was increased when enrichment was implemented.

Some of the data was too small to analyse because the behaviours were either never or barely exhibited, and because the sample size was so small. 'E too small (<5)'

Due to the methodology being split because of the variation in scent use, it was decided to perform a comparative analysis of the baseline and each scent method separately, to establish which was most effectual.

Table 2 shows a highly significant difference between the ocelot's baseline resting laying down behaviour (RL), and that exhibited when rabbit bedding (method 1) was used, ($p < 0.0067$). An observed increase in the ocelot being in full view (FV) ($p < 0.05455$) was also shown after the introduction of rabbit bedding.

Code	Behaviour	Method 2	Normal	p - value (<0.05)	Significance
OS	Out of sight	24	37	0.0960	n.s.
FV	In full view	9	4	0.1655	n.s.
W	Walking	12	0	0.0005	***
ER	Respond to enrichment	11	0	0.0009	***
I	Investigating	10	0	0.0016	**
SO	Sniffing objects	10	0	0.0016	**
RL	Resting (laying down)	0	1	E too small (<5)	
PS	Partial sight	6	1	E too small (<5)	
RS	Resting (sitting)	0	3	E too small (<5)	
D	Drinking	0	1	E too small (<5)	
D/U	Defecating/urinating	2	1	E too small (<5)	
P	Pausing	5	0	E too small (<5)	
R	Running	2	0	E too small (<5)	
H	Hunting behaviour	2	0	E too small (<5)	
SM	Scent marking	1	0	E too small (<5)	
C	Climbing	1	0	E too small (<5)	
IV	Respond to indvariables	1	0	E too small (<5)	
FR	Responding to food	0	0	E too small (<5)	

Table 3 statistically analysed the use of rabbit urine and faecal matter (method 2) as enrichment, in comparison with no enrichment. The table shows that there was a lot of activity with this enrichment type, particularly in the exhibition of active behaviours. The increase in walking behaviour (W) between the baseline and method 2 observations was statistically significant ($p < 0.0005$). Similarly, there were highly significant differences between the enrichment and the baseline for the behaviours investigating (I), responding to enrichment (ER) and sniffing objects (SO), which carried values of $p < 0.0016$, $p < 0.0009$ and $p < 0.0016$ respectively.

Fig. 2 is the end result of a statistical analysis of contingency data. It compares certain behaviours that were mutually exclusive and investigates how they were affected by each method and the baseline. It concludes that both enrichment methods had a significant effect upon all analysed behaviours, ($p < 0.0001$), whereas no enrichment had virtually no effect. The graph also shows that the active behaviours (walking and sniffing objects) were only significant when enrichment was present, and that the static behaviour (resting) was only observed during baseline observations.

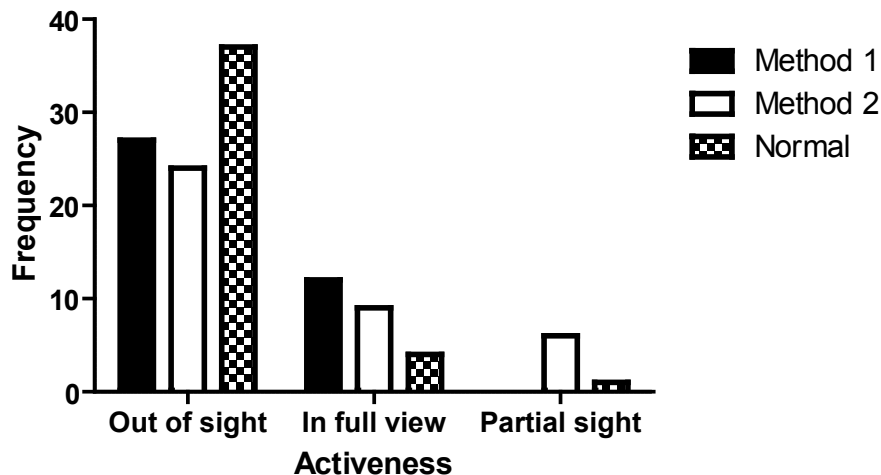
A graph to show the effect of enrichment on specific behaviours in comparison to the baseline



Fig. 3 is also a statistical analysis of contingency data, but this time measures the activity levels of the ocelot throughout the different methods. This analysis shows highly significant results ($p < 0.0033$). It clearly shows that without enrichment, the ocelot spends more time in her den, and therefore out of sight, than when enrichment is present. This is supported by table 2 which is evidence that enrichment encourages her to spend more time in full view of the public.

A graph to show the effect of enrichment on the activity of the ocelot in comparison with the baseline

Fig. 3. The result of a statistical analysis of contingency data set 3 using a Chi-squared test



6. Discussion

Although this study has shown that both methods were successful, it is interesting to see the variations in response caused by different presentations of the same smell. Of particular interest are the ethograms which show that walking behaviour was absent in baseline observations, but was present in one observation during method 1 and in two observations during method 2. This is evidence that enrichment did not just cause an increase in activity, but that there was different, specific reactions to each stimulus. Overall, the results show that live rabbit urine (method 2), caused more activity and a wider range of behaviours than rabbit bedding (method 1). It is possible that the smells of the hessian sack and hay from the bedding obscured the rabbit scent in method 1, and it would not have been as fresh as scent from the live rabbit. The live rabbit's urine would also have had a different chemical composition than the soiled bedding because of his physiological reactions to the ocelot's enclosure.

The flehmen response is a common reaction by some mammals to scent, whereby the animal wrinkles its nose, bears its teeth and appears to pull a grimaced expression. The function of this response is to filter scent particles and pheromones through the nasal passage to the Jacobson's organ. There, it is physiologically analysed for several factors, such as the state of oestrus in a potential mate or the identification of prey. Despite the behavioural diversity elicited by the enrichment, the ocelot was not observed to exhibit the flehmen response at all. This could be due to the fact she is familiar with the scent of rabbit. However, this conflicts with the increases in activity and appetitive behaviours shown when enrichment was present. Comparably,

those responses were absent in the baseline observations.

The ocelot's feeding regime was not interrupted so there were times when her food, (consisting of half a rabbit), was present in the enclosure during the experiment. Yet she ignored the food and continued to investigate the rabbit scent. Ethologically, the most common hunting technique of an ocelot is to walk for a considerable amount of time until a prey animal is detected, (Murray and Gardner, 1997, p.5). It could be that she was displaying very specific hunting behaviour. This perhaps suggests that in captivity, ocelots still have a need to perform hunting behaviour even if they are not hungry, (Carlstead and Shepherdson, 2000, p.345). Termed 'contrafreeloading', many animals have shown that they prefer to work for food even when food is freely available, (Hosey, et al, 2009, p.285). Or it may be she was exhibiting a territoriality response, although scent marking was only observed once. Without further investigation, it is difficult to obtain a clear and scientific explanation as to why she continued investigating when consumptive rabbit was clearly present.

In situ, following scent trails is a common hunting technique of felids. Using a live rabbit as enrichment would have created a scent trail as the rabbit moved around the enclosure. In combination with walking behaviour, the investigative behaviour shown by the ocelot appeared to replicate this wild trait. This indicates that method 2 elicited species-specific behaviour and was therefore more successful than method

In this study, the ocelot would not have found the source to the smell and so it could be argued that method 2 caused elevated stress levels, (Morgan and Tromborg, 2007 and Clark and King, 2007), It is possible that this enrichment technique may lose its effect if the ocelot decides it is not worth the energy expenditure for no reward at the end. However, the point is to emulate the wild as much as possible, and in the wild there are inevitably unsuccessful hunts. Equally, wild counterparts also encounter stressful situations. Carlstead and Shepherdson (2000) suggest that not all stress is detrimental and that some levels of stress are actually beneficial to the animal and therefore acceptable.

For those who disagree with method 2, method 1 is a good alternative. However, the difference in the ocelot's response between methods 1 and 2 shows that live prey provokes more species-specific behaviours. Despite this, the welfare of the prey animal should never be compromised for the welfare of the predator.

Enrichment is often segregated into types such as food, sensory, environmental, etc. There is no reason why some enrichment could not be combined. For example, a scent trail made by a live rabbit in an ocelot's enclosure could lead to the ocelot's food. Goal directed behaviour can also reduce the formation of stereotypies, (Shyne, 2006, p.317). Stereotypic pacing in captive felids is common, but if walking behaviour triggered by scent could be induced, then that is clearly preferable to the stereotypy. Studies have shown that behaviour is strongly influenced by how food is presented, (Hosey, G., et al, 2009). In order to cope with captivity, animals should be given some control over their environment. Perhaps part of this should be spending time finding as well as consuming food.

A photograph of the male ocelot (Leopardus pardalis) at Birmingham Nature Centre, (Rylands, C. 2009).



7. Further Work

Sensory enrichment is an area that needs much more exploration, particularly where olfactory and auditory stimuli are concerned. In order to accurately assess the effect and extent of the stress levels caused by olfactory enrichment, further studies would need to consider monitoring cortisol levels and heart rates on both the predator and prey species. Nocturnal studies would also be of value to see if there is a difference in activity levels between day and night, and whether diurnal enrichment, in comparison, negatively affects the welfare of captive ocelots.

A larger sample size of animals would contribute further. Whilst this study has proven that natural, olfactory enrichment can encourage species-specific behaviours and increase activity, the subject population can not possibly reflect a general majority for captive ocelots. Further studies with larger and more diverse samples would be needed before any firm conclusions can be made. Several populations from different institutions and a longer test period would provide more extensive evidence.

Acknowledgements

I would like to thank Birmingham Nature Centre without which this project would not have been possible. A special thanks is extended to Les Basford and Sam Davidson for helping with the implementation of enrichment and for the use of the animals.

Lisa Ashton and Andy Wootton have both been invaluable regarding the write up of this paper. Your guidance and support was gratefully received and greatly appreciated.

Finally, to the ever-patient Dr. Alison McCrea; a big thank you for bearing with me whilst I grasped the complicated world of statistics, and for not tiring of explaining things time and time again.

EDITOR'S NOTE:

A full list of references was provided with this article but there is insufficient space to include this. If you wish to see the full list and/or the un-edited article please contact the author or the editor.

Redeveloping the Rainforest

The Recent Renovation of the Clore Rainforest Pavilion at ZSL London Zoo

Tony Dodds

During the last winter period the Clore Rainforest Pavilion at ZSL London Zoo was closed to the public whilst a number of renovation projects were carried out. There were a number of reasons for this being done. Firstly studies into the visitor flow and feedback from our customers had shown that only a mere 20% of visitors were visiting the Clore biome, a lot of this was probably due to the location. The Clore is situated in the area of London Zoo sandwiched between the road and the canal and is only accessed via two tunnels, many members of the public often aren't even aware of this extra area away from the main body of the zoo. By renovating the Clore Rainforest and then launching it to the public in time for the new season the hope was that visitor flow into the area of the zoo would increase.



Above: The old public area.

Below: work on the public areas



Officially this project was being led by the Marketing and Interpretation departments for the above reasons, however the keeping staff quickly realised that this was an opportunity to make a number of improvements to the enclosures within the Clore that they had wanted to make for a while. The keepers became involved early on in the planning phase suggesting a number of ideas for improvements that could be made at the same time as the renovation. However it quickly became obvious that the budget available would probably not stretch to cover all the work suggested.

It was at this point that this renovation became different from the majority of the previous projects carried out by ZSL London Zoo. The staff of Mammals North who maintain the

Clore building and care for the stock housed within it made a somewhat radical suggestion. They suggested that not only would they continue to care for all the animals housed within the Clore throughout the renovation they would also carry out as much of the construction and renovation as possible themselves.

By doing this it meant there was less need for subcontractors and the associated costs, meaning the budget was able to stretch further and more improvements could be done. After a number of discussions it was agreed that Mammals North staff would work alongside a small group of subcontractors, The keepers would be doing the majority of the enclosure design and construction whilst the subcontractors would do the jobs that the keepers either couldn't or weren't allowed to do such as wiring, lighting etc. With this agreed the process of the renovation began...

The first job that was required was to re-house the majority of the stock from within the Clore building; only one area of the building was not being affected by the renovation so everywhere else needed to be emptied. The Clore is home to over 40 species totally about 180 individuals (and that's not including our invertebrate colonies...). This meant that we obviously needed to find a lot of spare enclosures that could be used as temporary homes for these animals. By asking around the other animal teams within ZSL London Zoo we were soon able to find numerous off

show enclosures, recovery dens etc etc that we would be able to use for the short winter period. Unfortunately as most of these enclosures were either empty or currently set up for the wrong type of species the keepers were required to modify and furnish a huge number of enclosures even before we could move

the animals out of the Clore building, this meant that before the renovation had even officially started the keepers had already built over 25 enclosures...

In early November the Clore Rainforest Pavilion shut its doors to the public and the renovation began in earnest. All the animals were moved out over the next couple of days and settled into their new temporary homes. Mammals North had decided to split themselves into two smaller teams, one team would continue to work with the animals and monitor them closely during this potentially stressful period whilst the second smaller team would work purely on the renovation. This meant that there was a consistency for both the animal care and the construction process.

In total the build crew renovated 25 enclosures including the main tropical biome area during the five month renovation. Obviously I'm not going to go into the details of all of the renovations but inside highlight four of the biggest projects that highlight the processes that were used in all the enclosures.

The Green Iguana Enclosure.

The Clore is home to two green iguanas (*Iguana iguana*). These animals were starting to out grow the



enclosure they were in so one of the first suggestions that the keepers made was that these animals were moved into an adjacent enclosure that was much larger. Their old enclosure was next to a *Callitrichid* enclosure and was simply incorporated into this enclosure.

Obviously this was the very first enclosure that the keeper build team had tackled and we were very aware that all eyes were going to be on the quality on our work and the end result and therefore we decided to go all out and build an enclosure that not only suited all the iguana's needs but also looked incredibly natural.

The first job was to install the UV lamps, heaters etc, as no-one on the keeping staff was a qualified electrician this job was left up to a subcontractor with keepers simply telling him where we wanted each lamp

etc and then the electrician would wire them all in. Whilst this was happening the keepers started to draw up their plans of what they wanted the enclosure to look like on completion. We were luck enough that one member of our keeping staff is actually trained as a graphic artist and therefore we were able to actually have proper drawings to show to the management and then follow during the construction process.

Once all the electric were completed we were able to begin the "hard landscaping". We had agreed that a

flowing stream and pond would be great in the enclosure. In order to achieve this we needed the back of the enclosure to be much higher than the front. Large polystyrene sheets were cut up and laid down forming a very rough step-like slope. These were then carefully carved to form a gentler slope and the streambed was also carved into the polystyrene. The pond was laid out in the middle of the enclosure using large bricks to form the basic shape and then chicken wire was bent over this to form the natural shapes. The combination of the bricks and wire would be much stronger than the polystyrene and this was required as the pond would eventually be holding a large amount of water and therefore a large weight. The drainage for the pond was installed at this point, the joy of keepers doing all the work was that we could ensure that things like drains were positioned in a location that was suitable for everyday use, no more sweeping water up hill!





The other main feature we wanted to include was a few large baobab trees, or at least the bases of them. These could be used to break up the blank walls and also disguise unsightly but necessary features such as keeper access doors. Large triangles of polystyrene were cut and fitted from floor to ceiling and arranged to look like the roots of these huge trees (many photos from books and the internet were consulted before the final arrangement was agreed on...)

With all the polystyrene in place the next job was to fire up the cement mixer.

Everything was covered with a rough coat of cement with basic shapes being

worked in i.e. the slope was smoothed out from its step form; the edges of the pond were softened. After the first coat of cement a layer of waterproof paint was laid down along the entire stream and the pond to ensure that it remained watertight. A second layer of cement was then laid onto everything. This was the top coat so the finish was much more important. Texture was incorporated into the wet cement, the bark of the tree, the roughness of the rocks, all these textures were added at this stage so as to increase the overall natural image.



Once all the cement was dry everything was painted. We used a cheap compressed air paint gun as this gave a better finish than a brush but was also much quicker. Again images from books and the Internet were consulted to ensure the finished result looked as natural as possible.

With all the hard landscaping completed we simply needed to fit a simple pump to the outside of the enclosure to produce our flowing stream and then furnish the enclosure. A number of logs and branches were added as well as a number of living plants (those known to be hardy and not favoured as a food source). These additions served to soften the hard landscaping and produce a naturalistic looking enclosure.

Once completed the two animals were moved in and promptly started to bask under the UV lamps lying on a large log spanning the pond just as we had hoped. Overall the enclosure looked great and very natural, it provided the animals with a much larger area that meet all their needs and also allowed for easy viewing of the animal by the public.

The Public Areas of the Tropical Biome.

The original Clore Rainforest Biome was built three years ago with the idea that without the glass or bars the public would feel more immersed in the whole experience. As part of the renovation the heating and humidity system were to be adjusted, after three years we know how a better idea of what was required and were planning to modify the systems accordingly. This was obviously work for specialist engineers and didn't involve the keepers at all. However the keepers had a few ideas on how they could improve both the public experience and improve the area for the animals housed within the biome.

Since opening the original biome one of the issues we had was stopping the primates especially the *Callitrichids* from leaving the central biome area and coming out onto the public walkways. It had become necessary to have staff constantly present to ensure that the primates stayed in the central area and didn't come out into the public areas. The suggestion was made that rather than stopping the primates coming out into the public areas let's redesign the area so they can come out in a safe way. The easiest way to do this was to provide overhead branch work that would allow the animals out without having to cross the floor where they ran the risk of accidental injury etc. As an added bonus it was agreed that the whole immersive concept of the exhibit would be greatly increased if the public had branch work all around them and above them.

Yet again a series of drawings were made and the build crew set about working out how this design could be achieved. Constructed a number of artificial cement trees was considered but it was decided it would take too long to produce the number we required. Instead we decided to use real trees that were available to us following some felling work that had been done at ZSL Whipsnade Zoo. These huge logs were transported to site and then with the help of chain saw trained staff the logs were cut to size. Each log was also cut so that it had a flat side so they could be secured flush to the walls. Obviously these trees were rather heavy and we needed to be sure that they would not fall once in position. With the help of the subcontractors we were able to chemically fix threaded bar into the walls and then secure the trees to the bar with bolts.

The next challenge was to secure the overhead branch work, with this being an area open to the public the health and safety considerations were considerable. We eventually decided that each branch would be fixed to the trunk using bolts and chemical fix and then to ensure they stayed up high thin restraining wires were suspended from the ceiling to the branches. Each branch had at least two of these restraining wires to ensure safety, if one was to snap the second one would hold the branch until repairs could be made.

With all the branch work secured in place it was time to sort the detail. The joins between the branches and the trunks were cemented and painted so that they looked seamless and more natural. All visible bolt or screw heads were carefully disguised using cement and paint. Lengths of liana were secured spanning between the branches and twisting up the trunks. They were also twisted around the handrails around the edge of the main biome, again trying to tie it all together. In order to have some real plants growing on the public level a number of planters were constructed by piling large rocks in such a way that a cavity was formed behind them which could be filled with soil and then plants. The horticultural department were also able to provide a large number of bromeliads that were secured into the branches to finish the effect.

A few additional pieces of detail work were also carried out. Two large brick pillars in the public area were clad with mesh and cement and with a little bit of skill with a hand made latex bark mould they were disguised to look like huge trees. The three existing benches were painted and textured so that they looked exactly like the rocks used in the planters and as a result went from being a normal bench to being a pile of rocks that could easily be sat on. Sacks of bark chip were spread around the edges of the paths softening the harsh lines of the walls but also providing a different substrate under foot in areas .

The end result was that a once dull public walkway was now part of the larger biome experience. The primates are quite happy to move around above the heads of the public and this close interaction makes for a wonderful experience for the visiting public.

The Sebas Bat Cave.

Prior to the renovation one of the larger exhibits in the night-zone area of the Clore Pavilion was the Rodriguez fruit bat (*Pteropus rodricensis*) exhibit, home to a small breeding group of these bats. Although this enclosure was perfectly suitable for the fruit bats it was decided that a large group of Sebas bats (*Carollia perspicillata*) would make for a better exhibit. The enclosure was already designed to look a little like a cave, although whilst the fruit bats were in residence the look of the cave had been disguised as these bats would normally live in trees and not caves. With the departure of the fruit bats into a new off show enclosure it was decided to restore the cave effect and carry out some work to increase the visual effect.



The walls of the enclosure were already textured to look like rock; all they needed was a new paint job. The tricky part for the build team was the decision to construct a number of stalactites and stalagmites throughout the enclosure, the theory being that with the correct lighting the Sebas bats would look great flying amongst these natural cave structures. The stalagmites, the ones from the floor upward, weren't a



problem. Using the same techniques as described before we used polystyrene and mesh to form the basic shape and then cemented over the top.

The complications began when we started to build the stalactites, the ones coming down from the ceiling. Our original thought was to simply construct them on the floor in the same way as the stalagmites and then hang them upside down from the ceiling. However it soon became clear that the structures weighed far too much when built this way and were not only impossible to put up but also very likely to fall due to the weight load. Instead we started to construct simply cones of wire mounted onto pieces of board. These cones were then filled with all the off cuts of polystyrene to ensure the cavity within the cone was

full and didn't fill with cement but remained lightweight at the same time. These frames were then secured to the ceiling by screwing through the boards to ensure a solid fixing. Once fixed up thin layers of cement were carefully added, ensuring that the mesh was completely covered but with the minimal amount of cement used. Many backbreaking hours later when all the cementing was completed the entire enclosure was resprayed, the electricians installed a few carefully positioned spotlights and the internal work was complete.

It was also decided that the public side of the exhibit would also get a facelift. The artificial rockwork was continued outside the windows so that it appeared as one continual area. This had the effect of softening the edges of the window and almost blurring barrier the between enclosure and public space.

When the animals were moved back in we were able to adjust the lighting to get the exact effect we had wanted. The whole cave was lit with a very dim ambient



light with a few white spotlights shooting beams of "sunlight" across the enclosure. The sight of these fast moving bats darting in amongst the cave structures and through the beams of light is amazing, providing the public with an opportunity to not just see these animals in a naturalistic setting but to also see them behaving as they would in the wild.



All in all the renovation of the Clore Rainforest Pavilion, now renamed Rainforest Life, was a huge success. The build was completed on time and on budget. Visitor numbers to this area of the zoo have increased this season and a number of private events have been held in the building following the re-launch. As far as the keepers are concerned, they now have enclosures that are designed specifically for the animals they house. These enclosures are designed and built by keepers for keepers and as such daily routines have been considered during construction so the day to day work is much easier. And as for the animals, we are happy to say that since opening at Easter this year we have already had a number of births including Emperor Tamarins, Larger Hairy Armadillo and Slender Loris.

Although this renovation was a lot of work for the keepers involved the results were worth it. This was the first time that ZSL had completed a project in this way, somehow I don't think it will be the last...



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Leading the way

Report on the ABWAK Browse Workshop, Paignton, Saturday 9 April



Kevin Frediani presentation

was devised by Andrew McCornyn, gardener at Paignton Zoo responsible for co-ordinating enrichment opportunities. He also went on to discuss zooplant. net a peer reviewed database set up by ZSL which has been running for a couple of years. Zoos can contribute data from their own experience to this ever expanding resource. Senior Gardener, Martin Holt rounded off the talks describing how he has been changing the zoo's grounds to maximise the browse available, planting up areas of wasted land and creating edible backdrops. His aim is to manage browse beds on a rotational basis so there will always be a plentiful, year round supply for the animals. A quick escorted tour of Verticrop, Paignton Zoo's vertical growing facility, concluded the morning's agenda.

The first ABWAK workshop of 2011 was a resounding success. A full day of browse presentations and practical demonstrations put together by Paignton Zoo's keeping and gardens staff. It was a gloriously sunny day, in tropical Devon with the trees just coming into leaf, perfect for browse hunting.

Kevin Frediani, Curator of Plants and Gardens, kicked off the proceedings with brief history of traditional woodland management showing the varied sources of browse, cutting methods and best timing for sustained production. The next talk was more interactive; delegates were given a bunch of browse sprigs and labels to match up, some with the Latin names to make the exercise a bit trickier. This



Andrew McCornyn

Delegates spent the afternoon in a practical cutting session with reserves warden Dave Ellacott; learning how to and how not to cut browse, coppice and pollard. Dave manages the Whitley Wildlife Conservation Trust reserves of Clennon Valley and Primley Woods adjacent to Paignton Zoo. All the browse cut went to good use as food for the three black rhino.

The final presentation given by Steve Pritchard, Permaculture tutor and practitioner, demonstrated how we can create more sustainable gardens and design the layout to save time and decrease effort, such as having browse beds close to the animals that need to be fed from them. All delegates were awarded ABWAK certificates on completion of the day.



Steve Pritchard



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Obituary: Mercedes, A Very Special Bear

15 April 2011

Douglas Richardson

Animal Collection Manager, RZSS Highland Wildlife Park

Given the high profile that Mercedes the polar bear has had both in Scotland and internationally, we felt that her many admirers deserved to be informed that it was with a great deal of sadness that early this morning, April 15 2011, Mercedes was put painlessly to sleep due to age related health problems and a rapid deterioration in her welfare.

Mercedes was born in the wild in the western Hudson Bay region of Manitoba Canada in late 1980 or 1981. When she naturally separated from her wild mother, she developed the habit of wandering into the local town of Churchill looking for food and needed to be captured and moved a good distance in an effort to curtail her "shopping sprees". The polar bear policy in Churchill, also known as the polar bear capital of the world, was three strikes and you're out. Twice she had been caught and moved out of town and a third offence would result in her being shot due to the risks she presented to the townspeople. Luckily a concerned member of the Royal Zoological Society of Scotland with Canadian connections helped save Mercedes from certain death and, following her third offence, she was caught and moved to Edinburgh Zoo on 19 January 1984. Whilst at Edinburgh she reared 2 cubs: Minty, a male, born on 18 November 1988, and Ohoto, a female, born 15 November 1991. Both were sired by her partner Barney, who was born at Whipsnade Zoo, but he died on 19 November 1996. After Barney's death, Mercedes lived by herself at Edinburgh Zoo; a solitary lifestyle, especially for an adult female polar bear, is normal as they are not overly social creatures.



In late 2008/early 2009, the decision was finalised to move her to a new, much larger enclosure at Edinburgh's sister zoo, the Highland Wildlife Park. Using a radical new enclosure design, we were able to construct a very large area for Mercedes' retirement at the Park, although there was some concern over how she would react to the wide open space in the Highlands. Mercedes moved into her new, large, natural enclosure at the Highland Wildlife Park on 19 October 2009. Her arrival generated unprecedented media and public interest. When she was released into the new enclosure she quickly adapted to her bigger, softer surroundings and she particularly relished the deep snow and iced-over pond in the winter. Because of the size and natural complexity of our facility, the European breeding programme coordinator for polar bears asked us if we could take the 2 year old male Walker from Rhenen Zoo in Holland. Walker needed to be moved due to the pending birth of cubs from his aunt. Although Walker was at the age where he needed to be separated from his mother, we felt confident that he would be respectful of the much older Mercedes and not present her with a problem; Walker arrived on 5 November 2010. From the time we first mixed the 2 polar bears together, it was clear that Walker wanted to play, but Mercedes was having none of it and rebuffed all of his attempts at contact. Luckily the enclosure is large enough that the bears could keep well apart from each other and we provided Walker with a wide range of suitable polar bear toys and this left Mercedes to carry on with her more sedate routine.

Because Mercedes was at the upper end of the captive polar bear age scale, about 29-30 years old (wild polar bears rarely make it to their mid-20s), we have been routinely monitoring her health and particularly her level of mobility; older bears are very prone to developing quite pronounced arthritis. We thought that she was getting a bit slower, which was to be expected, but the arrival of the boisterous Walker really demonstrated the difference in the bears. We have had Mercedes on a carefully planned course of medication to ease any likely joint problems, and we had seen a bit of an improvement in her condition. She was monitored daily by her keepers and weekly by our vet. More recently we noted a marked and rapid downturn

in her behaviour and her demeanour, and she appeared to be aging very rapidly and possibly showing signs of senility. We had been keeping her separate from the male bear so as to avoid any possibility of him causing her to move more than she wanted to. Recently, all of the individuals responsible for her care sadly concluded that our only remaining option was to put her to sleep on age and health grounds.



Simon Girling, RZSS head of veterinary services says of Mercedes' condition, "We have been monitoring Mercedes' condition for some time now and have tried a number of different therapies for her advanced arthritis, which we were having some success with. However, even on medication, Mercedes has now taken a significant turn

for the worse in terms of her mobility and is also showing signs of mental confusion. This deterioration in her welfare has prompted us to step in and humanely euthanase her." In addition, Jane Harley, the Highland Wildlife Park's local veterinary consultant has a similar opinion, "Mercedes has shown a marked deterioration in her condition over the last week. She has signs of severe pain from arthritic joints that the medication no longer appears to be controlling. She also appears to be showing signs of "old age senility" which is causing her confusion and distress. This has been a difficult decision for everyone who has been involved with Mercedes, but is the right decision for a very special bear." She will undergo a very thorough post mortem examination so that we can learn more about her condition and this will help provide more information on how we deal with geriatric bears in the future.

One of Mercedes' most significant contributions to the future welfare of polar and other bear species was in successfully "test-driving" our new enclosure design as it is one that is relatively cheap to construct and this low cost means that much larger bear enclosures can be built in zoological collections which results in better bear welfare. It goes without saying that Mercedes will be greatly missed by those who cared for her and by her many admirers.



Douglas Richardson gave a talk at the 2011 ABWAK Symposium at Port Lympne, on the innovative new 4 acre polar bear enclosure at the Highland Wildlife Park. This now houses Walker, the 2 year old male who is now the only polar bear on public show in the UK. In time the Park does hope to create another large polar bear enclosure and secure a young female.

The Good Zoo and Euthanasia

By Peter Dickinson

Always a hot issue in zoos but euthanasia must be recognised as an absolutely essential part of the long term and proper management of species in captivity. There is nothing wrong in killing an animal if it is done quickly and with forethought and kindness. When animals are euthanized for the correct reasons then it is morally right and justified. The uninformed will often level accusations of being 'heartless' and 'not caring' when precisely the opposite is true. Good zoos with managed populations can see the bigger picture.

In the wild, animals die in tragic, painful and stressful situations every day. It is a very much a kill or be killed world and if you don't face those two options you could face starvation or disease.

Within the good modern zoo nature's cruel balance has been stalled. Animals survive. They live longer. Equal numbers of males and females live. Man has to manage, to properly govern. Indeed today man is having to manage the wild as well. Culling of elephants, of deer and others has become a necessity to ensure that the larger populations do not starve.

Euthanasia in zoos is only part of species management and goes hand in hand with contraception, breeding separation and bachelor groups.

People seem more ready to accept the culling of huge numbers of cattle and sheep to prevent disease outbreak. Thousands of unwanted dogs and cats are killed worldwide and scarcely a murmur is raised. In zoos however it is different. Here species are readily broken down into specimens. No longer are animals faceless nameless numbers but creatures people can and do relate to. The zoos often create the situation themselves with publicity photos and 'name the baby' competitions and there is nothing wrong in that. Part of a zoo's role is to raise species awareness and this is best done through specimens. The specimens are however part of the species and it is the species which is being managed and not individuals.

The modern zoo is about the long term management of genetically viable healthy populations of various species. It is important to recognise that this is long term. Nobody realistically believes that animals are about to be returned to the wild any time soon. Admittedly it does occur in certain limited instances but for the most part the problems facing animals in the wild do not appear to be going away anytime soon. With proper captive species management it may be as far as a hundred years from now that animals can be returned.

Distant though the prospect is the species need to be ready. They need to be healthy and they need to be not too closely related. Animals can be taught to hunt, to recognise danger and more. To be 're-wilded'

if you like. It is being done now in limited numbers today.

One vital aspect of captive species management is breeding. It is important with the limited number of captive species held that unrelated animals are paired up. Within the modern zoo cooperative this is done by the Species Coordinator using sophisticated computer programmes supplied by ISIS the International Species Information System. This is no go it alone project but good zoos banded together for the good of the species as a whole. The specimens are important but only as part of the overall species plan. The ISIS database holds the records of around two and a half million animals. Specimens may be cared for and greatly loved but their real value is as genetic contributors.

The proper management of species in captivity requires that zoos that care, good zoos, sign up to the species management plan. This can be for any species and there are many such management plans already. The plan is put together by Taxon Advisory Groups or TAG's which meet together periodically to discuss progress, well being, husbandry and the overall status of the species in the wild and captivity. The TAG's will approve and appoint a studbook holder and coordinator to keep a very close watch on 'their' species. Some studbooks may well be EEP's, or European Breeding Programmes and so involve an even greater number of zoos. They will produce an annual report and will advise on future breeding, moves, contraception and animals surplus to the overall plan.

The TAGS in their turn are watched over by recognised established and sensible zoo authorities. Within the UK this would be BIAZA the British and Irish Association of Zoos and Aquariums. BIAZA is a member of EAZA, the European Association of ZOOS and Aquariums. EAZA works very closely with other genuine zoo authorities around the world such as AZA, the American Zoo and Aquarium Association. It may all sound a little bit complicated but it needs to be if species are to be saved for future generations. Zoos which fall outside the umbrella of these reputable and concerned authorities have little or no understanding of species management and care little about the future. They are more concerned with lining their pockets today.

The importance of a specimen's contribution to the species management plan needs to be constantly assessed. It is important to know if the animal is capable of breeding and of rearing young. It is important to know this even if the young are not needed or found to be surplus to requirements later. There are several benefits to allowing animals to

breed. First and foremost is to the animals themselves so they can experience the natural enrichment of rearing young. The species coordinator can assess breeding potential and if the young are needed then all well and good. The zoo benefits from having baby animals on show which the public love. It can be a win win situation.

When such breeding is allowed then parent rearing is absolutely essential otherwise the object of the exercise is defeated and there is no benefit to any of the animals. In the management of species the decision on what happens to the young must rest with the Species Coordinator and not with the zoo the animals are in or to the decision of someone who cannot grasp the overall scheme of things.

If the young are surplus to the overall population either in terms of numbers or over represented genes then they should be euthanized. Preferably this would be done at that time when the young would naturally disperse in the wild.

It may well be that contraception may be used over the next few breedings but the animal may well be allowed to breed again, perhaps with a different mate. Long term contraception can be positively harmful and may actually cause an animal to become sterile. Ensuring the animal is capable of breeding is important.

There are only a certain number of captive spaces available to species. Not every zoo is in a position to hold or wants to keep Tigers or Elephants or Condors. Space is at a premium.

Animals in good zoos are cared for they are loved even. Zoo staff are kind and considerate and genuinely concerned for their charges. Zoo staff can see the bigger picture, above and beyond the blinkered vision of some of their ill informed critics.

Euthanasia is only one part of Species Management. Passing or selling surplus animals outside of the species management programme is both dangerous and defeatist. Animals outside of a breeding programme contribute nothing to conservation or the overall welfare and well being of the species. In fact the opposite usually applies. On more than one occasion new blood/new genes tigers have been imported from outside of a breeding programme only to discover later that they were sub-specific hybrids. In fact the vast majority of tigers outside the managed 'good' zoo populations are 'generic' tigers of uncertain parentage or origin. Worse still is that closely related or sub specific hybrids are bred together. This is especially so with White Tigers which some less reputable zoos like to breed and promote in the name of conservation.

Sending unwanted surplus animals away to the so called 'rescue centres' or 'sanctuaries' is quite simply, wrong. The 'out of sight, out of mind' attitude

does nothing at all for species conservation. It is a cowardly way out. The 'Rescue Centres' and 'Sanctuaries' are undoubtedly saving lives but they are NOT saving species. The opposite is more true. They may even breed animals and so compound the problem. They are not breeding for conservation however.

They breed to line their pockets by having cubs on show to present to a gullible public. It could be argued that far from saving lives that these places are responsible for the absolutely pointless and purposeless deaths of thousands of other animals. A surplus tiger could easily be expected to live for around fifteen years. That tiger will happily consume 7 Kg of beef for 6 days a week for 52 weeks of the year. That is 2,184 Kg of beef a year. Within the so called 'Sanctuaries' and 'Rescue Centres' there are hundreds of surplus generic tigers eating the same amount. That is an awful lot of cows being killed especially to feed animals which are essentially valueless to conservation and useless for long term species conservation. Is the life of one surplus tiger worth more than that of a hundred or so cows?

No zoo likes culling or euthanasia but good zoos face up to the fact. If we are to maintain the species for our great grandchildren, for the world, for posterity then harsh but sensible and logical decisions must be made.

Holding surplus long term rather than deal with euthanasia not only takes up spaces that could be utilised for other species programmes but it wastes employees time and utilises money that could be spent on further conservation projects.

Outside of Species Management zoos sometimes need to cull the sick, the weak and the elderly. No-one likes to do it. No-one like to choose but the choices have to be made. Quality of life has to be considered along resources and money available. Deciding to euthanize is not abstention from caring. It IS caring!

After more than 40 years working in private, commercial and National zoos in the capacity of keeper, head keeper and curator Peter Dickinson started to travel. He sold house and all his possessions and hit the road. He has traveled extensively in Turkey, Southern India and much of South East Asia. In his travels he has visited over 200 zoos and writes about these in his blog <http://zoonewsdigest.blogspot.com/> or on Hubpages <http://hubpages.com/profile/Peter+Dickinson> Peter earns his living as an international independent zoo consultant, critic and writer. He describes himself as an itinerant zoo keeper, a dreamer, a traveler, a people watcher, a lover, a thinker, a cosmopolitan, a writer, a hedonist, an explorer, a pantheist, a gastronome, sometime fool, a good friend to some and a pain in the butt to others.

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All Keepers Great and Small, we shall remember them

Part Two:

Of Elephants, White, Wartime or Otherwise ...

Mark Norris

Education Manager & WWII Garden Project, Newquay Zoo

“Events that affect societies often can also affect zoos ... economic crises stress zoos and some times destroy them. The worst crisis society can experience is war.” (Vernon Kisling)

Expected to be literally a walkover after several weeks of bombardment of the German trenches, the first day of the Battle of the Somme on the 1st July 1916 is now infamous for the huge loss of life without achieving many of its objectives.

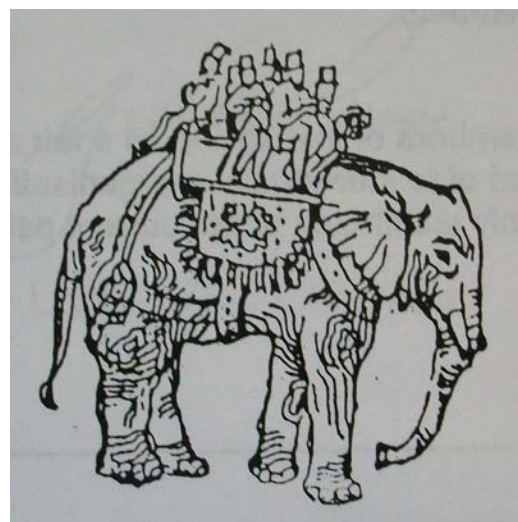
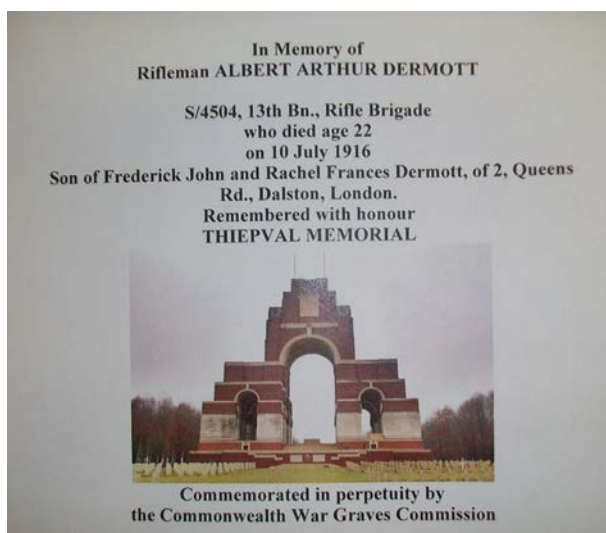
This notorious battle claimed 419,654 British and Empire casualties, 204,253 French casualties and 600,000 Germans. The first day alone claimed 57,470 casualties, of whom 19,240 were killed, 35,493 wounded, 2,152 missing and 585 prisoners. It is said that 100 casualties on all sides were incurred for every single yard of ground during five months of fighting from July 1st to 18th November 1916.

The Battle of the Somme claimed the lives of several zoo staff including:

- 31 year old ZSL keeper William Dexter;
- 23 year old ZSL Helper, Private Arthur G Whybrow (19th Battalion, County of London Regt.) another married keeper / helper, killed during the clearance of High Wood fighting on 15 September 1916 (buried in an individual grave at London cemetery, Longueval);
- 20 year old Private Gerald Patterson, ZSL Helper, 8th Battalion, Norfolk Regiment Regt killed on 5th October 1916 and buried in an individual grave at Connaught Cemetery, Thiepval on the Somme.

One wonders how many German and French zoos lost keeping staff during this battle. Many keepers never lived long enough to attain a rank above 'Private', proof now as then that keepers on the whole formed the 'foot soldier' role of PBI (Poor Bloody Infantry) of both zoos and the armed forces.

Thiepval is also where other zoo casualties are remembered. 22 year old ZSL messenger Albert A. Dermott (Private, 13th Battalion, Rifle Brigade) was killed on the 10th July 1916, whilst 23 year old Belle Vue Zoo staff Private Alfred Routledge (11th battalion of the local Manchester Regiment) was killed on 26 September 1916 in the capture of one of the original objectives of the first day of the battle almost two months earlier. Dermott and Routledge are listed amongst the 72,000 names on the strangely shaped Thiepval memorial to the missing dead who have no known grave of the Somme battles of 1916-18. The memorial by Lutyens sits high on a hill overlooking the killing fields of France is nicknamed by some the 'elephant', with its howdah or passengers on a zoo elephant ride.



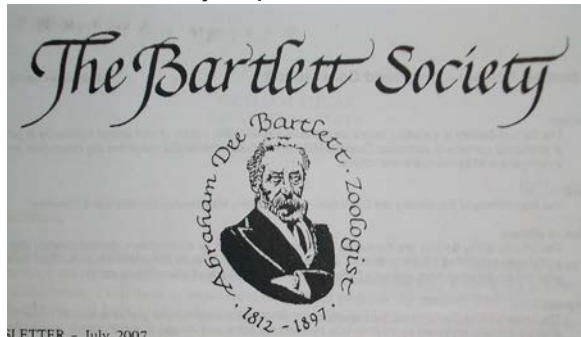
These memorials and cemeteries where zoo staff lie or are remembered in the quiet acres of gardens all over the world in the devoted care of the Commonwealth War Graves Commission whose website (www.cwgc.org) is a great source of information to anyone studying or tracing these names. This is heritage, memories and a past well organized, accessible and cared for, more than can be said for many zoo archives. There is also appears to be a lot of money to be made by genealogy companies such as Ancestry.co.uk, charging people to easily and remotely access these fragments of a puzzle of their family past.

Who Do You Think You Are? Vs. Who Cares ?

The BBC's successful family history programme is arguably for some viewers only another version of celebrity culture – to think that ordinary families of the past (not that different from ours) might one day have special celebrity offspring. Yet today, who cares about the past or these almost forgotten dead keepers?

The past life of a zoo, its achievements and memories are often neglected or forgotten in the necessary forwards rush to meet the goals of a modern zoo, its mission statement, welfare standards and the World Zoo and Aquarium Conservation Strategy (WZACS). I am not suggesting that we preserve the beautiful concrete 'white elephants' of modernist 1930s buildings like the London Zoo penguin pool by Lubetkin and the Tecton group (seen at London, Whipsnade and Dudley) purely as museum pieces, complete with their original animals in a strange time warp, to the detriment of current animals and their keepers. I have worked around enough 1960s and 1970s zoo enclosures, whose time had clearly long ago passed to replace them on welfare grounds, both staff and animal. However, listed buildings many of these 1930s buildings now are and so must be lived with or used somehow.

When does the past stop being a millstone of listed buildings and become an inspiration for the future? There are zoo history books such as the forthcoming Bristol Zoo 175th anniversary history by Alan Ashby, alongside many fine books of photographs of the way things were done with now extinct animals and mostly anonymous keepers pictured at London Zoo to compare with today. There is even a dedicated society, the Bartlett Society (www.zoohistory.org.uk) formed by the late Clinton Keeling in 1984 to unite like-minded zoo staff and zoo enthusiasts with a shared interest in researching and valuing the past social and scientific history of zoos, as well as visiting the zoos of today. Look for the memorial bench with carved elephants near the Snow Leopard enclosure to C.H. Keeling (1932-2007) 'zoologist extraordinaire' can be found at Maxwell Zoo, next time you pass.



Famous Victorian zoo keeper Abraham Dee Bartlett (1812-1897) has his bicentenary in 2012. He shares his bicentenary with that of Charles Dickens (1812-1870), writer and early animal welfare campaigner (especially opposed to feeding live prey to reptiles and other animals in public at London Zoo) and Edward Lear (1812-1888), nonsense limerick writer but also a highly talented painter of animals in the early zoos and menageries at London Zoo and Knowsley Hall (now the safari park).

Celebrating Bartlett, the eccentric and talented superintendent of London Zoo or any of these Victorian figures should give zoos another chance to celebrate the advances made in keeping, veterinary science and environmental work. Several zoos used the Darwin 200 bicentenary in 2009 to good effect to allow keepers and other staff to promote the past and present work of zoos to a wide range of audiences through unlikely partnerships with local arts and community groups, galleries, gardens, museums, education groups and even wildlife stamp collectors at RZSS Edinburgh Zoo. "Zoos and museums historically displayed 'stamp collections' – of everything in a nice neat row." Many keepers I have worked with collect their own private 'postage stamp' zoo of 'their' section animals, but that's another article for the future. In the meantime, see the wildlife stamp blog <http://darwin200stampzoo.wordpress.com> set up by RZSS and Newquay Zoo staff.

Some may have heard of Bartlett, a once-famous name in the zoo world. Who were the rest of this army of anonymous keepers? Accounts of everyday keeper life are fairly scarce, especially in the Victorian period, the exception being the autobiography of Matthew Scott, keeper of 'Jumbo' the elephant at London Zoo. Although many keeper practices and tasks familiar to a 19th or early 20th century keeper remain remarkably similar, the level of education or training and access to knowledge and good practice through journals (including *Ratel*) and the Internet of even the youngest keeper would astonish even the most educated zoo managers and keepers of Bartlett's day. Many of these keepers would probably have been illiterate, keeping their stories and the secrets of their trade in their heads.

New recruits in the armed forces learn their regimental history and traditions in their basic training, not too far distant from the old keeper teaching his apprentice (often all his bad habits). Talking with some former Newquay Zoo staff, we described it as “the Regiment”; whilst the names and faces change sometimes rapidly, the traditions and practices of the place carry on seemingly unchanged.

Belfast Zoo still houses its collective memory inside the head and filing cabinets of keeper Ray Robinson, which proved very useful for its recent 75th anniversary. Chester Zoo has a very fine timeline display around site of original photograph banners to tell the unlikely story of its creation and early struggle through wartime austerity – a good perspective on the current recession and the seemingly eternal prioritization of scarce resources and staffing. American zoos such as Washington National Zoo have also mounted popular ‘walk through time’ photograph displays showing older enclosures and 1950s drive thru sections, a good way to realize what has and hasn’t changed.

What we have lost ... or forgotten? The zoo’s greatest asset?

The staff handbook and business plan at Newquay Zoo informs me that the zoo’s staff are “its greatest asset”. Businessmen look at assets as something to be nurtured, sweated and worked hard. Although they can be killed off through overexploitation like the proverbial golden goose and its eggs, they are as likely to be at risk of dying from neglect.

A zoo’s past staff, past achievements, animals and family memories could prove to be considerable assets, but one often neglected, not well used or cared for. Some would claim the same for its existing staff assets. Many zoos have simply lost their archives, records and stuffed filing cabinets as much to the detriment of current studbook compilers as to the social historians.

When some claim that the biggest legal leisure use of the Internet (aside from social networks like Facebook) focuses on genealogy and family history, we are maybe missing a trick or an opportunity to engage a broader audience with what we do as modern zoos.

If this sounds like marketing territory, then maybe it is a unique form of personal selling – selling or valuing our zoo’s personal (or personnel stories) stories past and present.

Zoos to survive as businesses have always had to form part of the leisure industry as well as fulfilling their research, conservation and education aims.

This area of cultural, social and military history - entertainment, leisure, sport, ordinary working life – is fast replacing at local and national level the distant “kings and queens, battles and treaties” version of history of my schooldays. Zoo visits themselves form often treasured parts of many family holiday and childhood memories, remembered in snapshots, postcards, paintings by war artist Edward Ardizzone and overheard comments collected for Mass Observation. They are thus becoming something from the past and today to be seriously studied, as Kisling wrote “Events that affect societies often can also affect zoos.”

Part 3. Zoo as places of Conservation – of just our wildlife heritage?

So how can we make the past “play, play up and play the game” of its part in our present?

Does your zoo have an archive policy to record the present zoo as well as organize and give access to its past history?

The current Whitley Wildlife Conservation Trust for which I work at Newquay Zoo lists in its mission statement “dedicated to protecting our global wildlife heritage”. Heritage seems an odd word to use for a zoo, seemingly more about castles, listed buildings, period dramas and history, the realm of our colleagues working in the heritage industry.

Oddly they share the same language – conservation, collection planning, exhibits, tended by Curators and Keepers (at the British Museum) shared with all the modern concerns of marketing, footfall, spend per head and visitor engagement. The overlap in language probably dates back to the early days of Victorian zoos like London or Dublin Zoo which were closely linked to natural history museums. Dublin’s Natural History Museum, a superb and eccentric time capsule of Victorian natural history, is still nicknamed by its staff the ‘Dead Zoo’ in Dublin, due to the large number of the zoo’s former inhabitants stuffed and on display there, well worth a visit for zoo staff. Liverpool Museum still has its zoo status through its reptile collection and aquarium. Catherine Halcrow who moved to London Zoo from the Science Museum explored this overlap in an article in the Museums Journal April 2005. I am also researching the overlap collections of keepers employed at botanic gardens like Birmingham, many of which had aviary or reptile sections – a “crocodile in the fernery” to quote garden writer Twigs Way.

Zoo keepers rarely merit having a statue made of them. They generally have no memorial, other than the continued existence of their zoos and many endangered animals. Zoo keepers also are no strangers to life and death in their daily work, Zoo keepers on the whole, when not arguing amongst themselves or with management, are generally peaceful people and do not go around starting wars. Sadly I have worked in zoos long enough to have seen in the past two decades Kuwait Zoo, Kabul Zoo, Kosovo Zoo, the West Bank and most recently, Baghdad Zoo, museums and botanic gardens all damaged during wartime and slowly and partly restored. The modern concrete enclosures of many old and established European zoos are often post-war rebuilding from the ruins of once proud zoos flattened in bombing raids and fighting across Europe.

Zoo keeping being an international profession makes wartime losses the more tragic. The forerunner of WAZA, the International Union of Directors of Zoological Gardens (IUDZG) had planned its next meeting at the recently opened Warsaw Zoo for 1940. That meeting never happened: by then, Hitler and Stalin had both invaded Poland in September 1939 and Warsaw Zoo lay in ruins, a story told from the Polish perspective of Director Jan and Mrs. Zabinski family's story in Diane Ackerman's *The Zoo Keeper's Wife*, (Norton, New York, USA, 2007, now being turned into a film). Many zoo directors and staff around the world were now cut off from each other and their sources of animals by being on opposite sides.



Working in an EAZA collection with many European animals on breeding loan, it is important to realize that the story of London or Belle Vue Zoo stands as a representative for many zoos across Europe in wartime. One of the German zoo directors sent to 'salvage' the animal assets of Warsaw Zoo was Lutz Heck, son of a famous German zoo family. Heck writes movingly in the section 'Zoo In Flames' in *Animals My Adventure* (published in its English version in 1954) of his own terrifying experiences at Berlin Zoological Gardens during Allied bombing raids on 22 and 23 November 1943 which left it in ruins, many keepers killed and most of its famous elephants dead. The 1944 Berlin Zoo centenary saw a battered but still open zoo, which would be further damaged in the street fighting of 1945. 91 animals survived from its proud, pre-war collection of several thousand. Ignore the name of the zoo and the German keeper names and you have a small but universal glimpse of what keepers, their animals, families and communities suffered on all sides.



Over 1,000 people were present at the unveiling, at Gorton Cemetery on Sunday, of the Belle Vue Zoological Gardens War Memorial, the work of Mr. F. V. Blandstone, whose early modelling experience at the Gardens finds happy expression in a symbolic group.



I was greatly moved reading the names of the dead staff on the ZSL memorial, yet wondered still about the names not recorded there of the many other staff who returned, wounded in mind or body. Vernon Kisling tells the story of a keeper at Stellingen Zoo in Germany during the First World War. Carl Hagenbeck the Director had already seen many of his keepers enlist or drafted into the German Army and came up with an unusual approach to his shortage of staff and the Army's lack of heavy transport. "Problems arose due to lack of staff, lack of food and its bad quality, and lack of fuel." ... Hagenbeck negotiated sending a working elephant in place of many more keepers. The elephant and its keeper returned in 1918, the keeper wounded and no longer able to work."

A further hint or postscript of this bitter and hidden legacy is given in the now badly damaged and vandalised memorial to staff from Belle Vue Zoological Gardens, Manchester at Gorton cemetery in Manchester. Much has been written about this early zoo and leisure gardens collection, almost a Victorian theme park, which survived from 1836 to 1977/8. 13 zoo and gardens staff, from what must have been a huge workforce, are listed as killed on active service, from keepers and bakers to the sons of zoo managers.

6 more staff is listed as having “died from the effects of war” between 1918 and the memorial being erected in 1926.

This unusual addition gives another little glimpse of what must have happened to many zoo, aquarium and botanic garden staff who never fully recovered in mind or body from the effects of active service in wartime. The same staff that we see in old zoo photographs and postcards. A generation later, it happened all over again – but that is another story for a future article.

Spare a thought for these men as you work around the zoo in both busy and peaceful moments. Spare a thought on Armistice Sunday for the almost forgotten and not very famous men listed on these monuments, and their families and colleagues. Above all, be thankful as you laugh with, disagree or look into the young faces of the next enthusiastic generation of keepers coming through – and maybe pass on a few of your zoo’s regimental stories and traditions.

You can find out more about the World War Zoo gardens project at Newquay Zoo at our regular blog <http://worldwarzoogardener1939.wordpress.com>

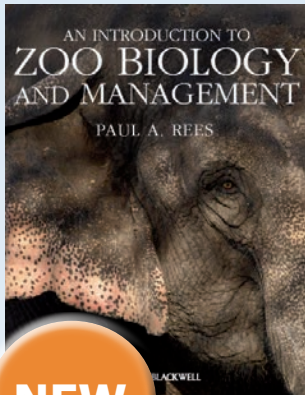
There is a more detailed article on all the staff listed on the London Zoo war memorial on the World War Zoo gardens blog site <http://worldwarzoogardener1939.wordpress.com>

To read more about the men from Belle Vue Zoo Gardens, you might wish to visit the [cwgc.org](http://www.cwgc.org) website and Stephen and Susan Cocks’ blog entry at: <http://blog.guidedbattlefieldtours.co.uk/2010/01/15/hello-world> and <http://blog.guidedbattlefieldtours.co.uk/2010/02/04/the-belle-vue-memorial-the-story-of-the-memorial>

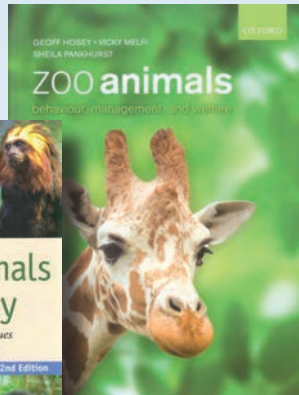
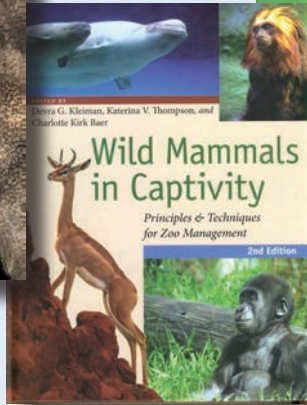
More about the memorial can be found at: <http://manchesterhistory.net/bellevue/warmemorial.html>



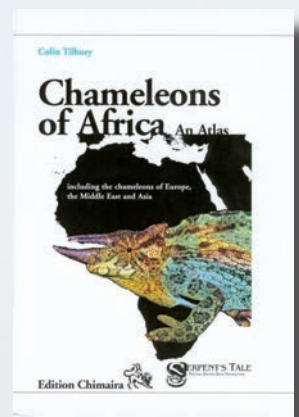
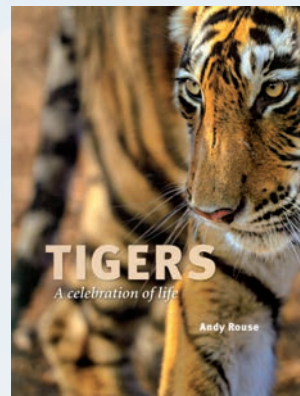
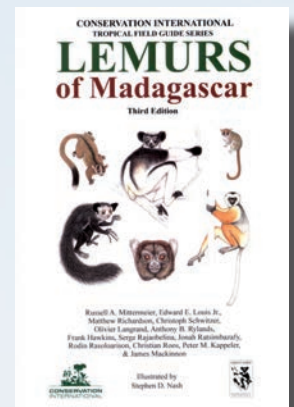
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