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Author(s): Simon Moore

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SPNHC Conference, Leiden, July 2009 – Bridging Continents.

Simon Moore MIScT, FLS, ACR

Former Conservator of Natural Sciences, Hampshire County Council Museums & Archives Service, Chilcomb House, Chilcomb Lane, Winchester SO23 8RD.

Freelance Conservator, 20 Newbury Street, Whitchurch, Hampshire, RG28 7DN

Email: couteaufin@aol.com

With my interest in fluid preservation of biological collections, a visit to Leiden was important. The hosting LUMC (Leids Universitair Medisch Centrum) houses some of the anatomy specimens from the early anatomists including Rau, Albinus and Ruysch. The latter name may be familiar to some since he even wrote a book on preserving biological specimens back in 1710 entitled *Thesaurus Animalium* and which contains some fine illustrations of lead glass jars with deep conical punts and containing specimens, more to amaze than to be of scientific interest and decorated with fine Florentine paper and topped with a fanciful display of dried specimens on the lid (Fig 1). Ruysch frequently used a small child's arm and hand as a prop to hold or support some of his specimens. Although this may seem abhorrent to some these days, in 17th century Holland, where infant mortality was just as high as the rest of Europe, then these 'props' would have been plentiful. Preserved in alcohol (Spirits of Wine), these have stood the test of time, although many have been lost or irretrievably damaged over a 300 year time-span.

Added to this, the City of Leiden itself is steeped in history, slightly odoriferous canals (in July), beautiful bridges and buildings and windmills, this was too good to miss. Rush hour in Leiden means that you have to be careful crossing a road or you will cause a pile-up of many cyclists. By the station the bicycle park was enormous together with a heap of abandoned and often bent bicycles awaiting disposal or recycling (no pun!)

The Conference, entitled *Bridging Continents*, was very ably hosted in the Hippocrates Building and we were treated to yummy, handmade and wafer thin biscuits in tea-breaks and a chance to view trade stands which included many of the more recently-developed museum data cataloguing systems including EMu (Electronic Museum) and a stand of Dixon glass museum jars with some of their more recent developments and which attracted much interest. Dries van Dam's own Alcomon company was also represented explaining how his coloured plastic discs help to monitor alcohol self-dilution through evaporation in museum jars.

The schedule was tightly-packed and there was little time (but just enough) for the all-important chatting, networking, advising and getting information. Arriving by 8am was hard due to European time (07.00 back home!)

We were warmly welcomed by René Dekker of the organising committee and Bert Geerken, Director of the Leiden Natural History Museum - Naturalis, also Ric Rabler on behalf of SPNHC and Pancras Hogendoorn who chairs the Museums Commission, LUMC.

During these I was made aware of many European organisations dedicated to advancing curation and curational techniques and a host of acronyms!

Peter Tindemans – is a consultant for the Board of the Netherlands Centre for Biodiversity, or NCB, which is the central organisation that includes the Zoological Museum in Amsterdam, the Leiden University National herbarium and at Wageningen in collaboration with the Central Institute for Fungal Cultures as well as the Naturalis Museum. The NCB functions include research into DNA and its applications: ecosystem monitoring, conservation (nature) and forensics. The NCB receives an annual government grant of €5M and, as it expands with new conservation facilities, it is hoped that their headquarters will open in 2014.

Wouter Los – of the University of Amsterdam next gave a historical overview of the origins of natural history collections, such as the Teylers Museum in Haarlem. He said that the UK held the greatest concentration of natural history-related museums in Europe. He also mentioned a great many related organisations in

taxonomy and bar-coding of DNA sequencing. This and other related talks gave an awareness of just how many organisations there are dedicated to the advancement of curation and curational technology.

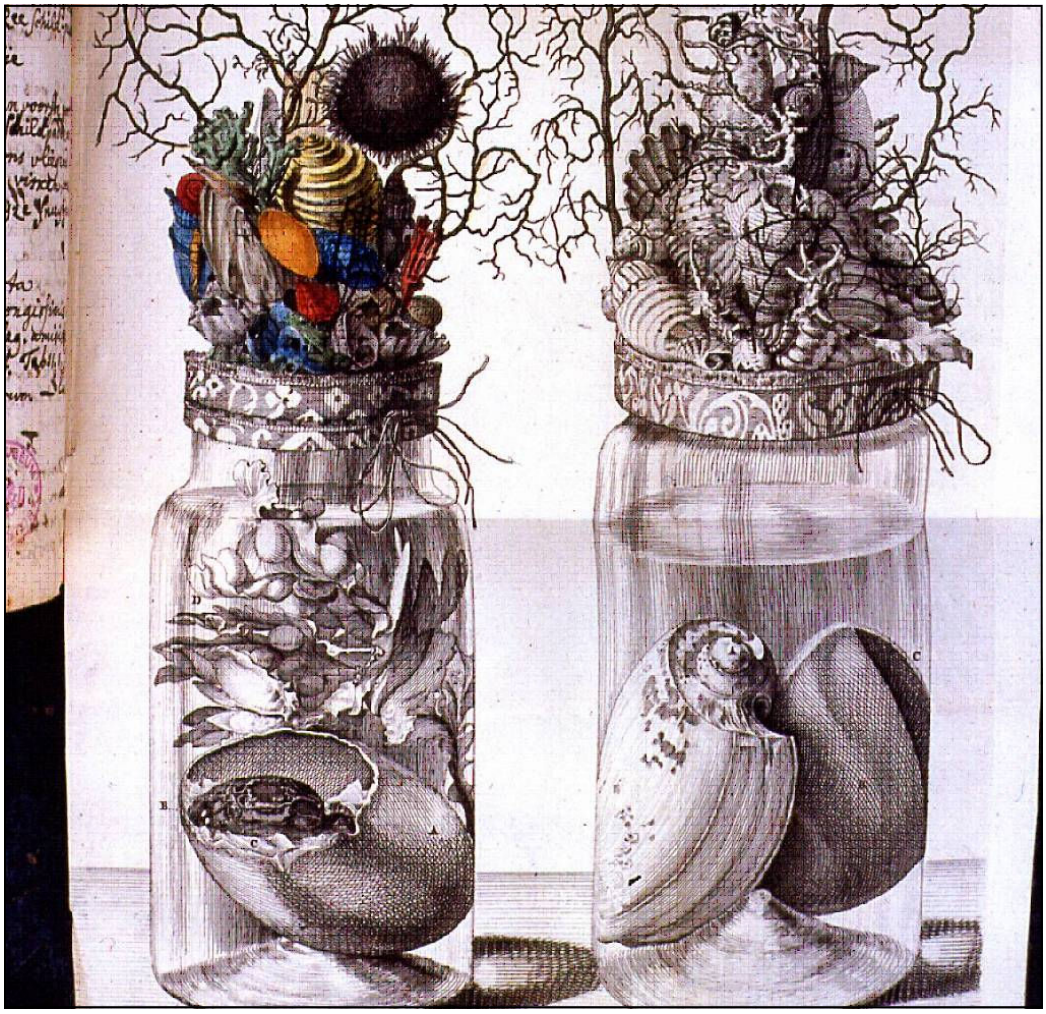

Fig. 1. Two of Ruysch's preparations – note the conical punts of these jars and the fancy papered tops with a mini-display of dried specimens. Unfortunately there may be none of this type of decorated preparation still in existence.

A light but tasty lunch was given us at the nearby Pesthuis (Plague House) restaurant – an adjunct to the Naturalis Museum, complete with an antique and unbreachable door!

That afternoon I was consulted about pH ranges in NH fluid collections and the reasons behind fluctuations and how to deal with them, problems of gradual hydrolysis for preservatives with pH ranges over 7.5 and also protein interaction with formalin buffers and the allied problems of colloidal-linked salt production.

I also talked with Klaus Wechsler who is developing a technique for etching labels onto glass containers and improving on van Cleave and Ross's 1947 rehydration technique for dried-out wet specimens and carrying out the process more gradually. Certainly the results looked impressive and I look forward to seeing the completed work written up (likely in *Collection Forum*).

The main talks centred around the new databasing software and collections management programmes, also the new work on SYNETHSYS and EDIT programmes, addressed largely by staff from the London Natural History Museum in the first half and then a follow-on about adapting herbaria to 21st century challenges,

networking DNA tissue banks, destructive sampling for DNA sequencing and a talk about STERNA building bridges between Europe's NH collections.

After this we were whisked away on buses to nearby Wassenaar and a beach house (not hut!) and a delicious barbecue, courtesy of our hosts. The wind blew and against leaden skies many of us bravely dipped our toes and watched the kite surfers skilfully criss-crossing over the waves, avoiding collisions and occasionally being lifted several metres out of the water!

The next day we had concurrently-running technical sessions (such a packed programme!)

David Smith – of the Natural History Museum, London, has continued Adrian Doyle's pest and beetle migration monitoring work using the (Ke)EMu system. He gave us facts and figures relating to catches throughout the museum, hotspots and their reasons for being so. Somehow, silverfish were not considered to be a pest which this listener found curious as I have seen their grazing damage inflicted on dried algal specimens.

G Jackson Tanner of the Smithsonian Institution showed us how they use disc-shaped robotic vacuum cleaners that rove through storage areas at staff inactive times but have problems with batteries that only run for up to 2 hours.

David Pinniger with Karen Roux, Clare Valentine and Alison Paul told us about the Thermolignum process by gradually raising the temperature within a chamber (usually a converted pantechnicon) to 52° C, they can kill any resident pests in all sorts of objects without causing stress to a variety of media of which such objects are composed. Poly-bagging specimens will act as a buffer zone when freezing specimens but this is not required for Thermolignum. He talked about such art works as dried shrimps that had attracted many pests within a short period, that were satisfactorily treated and how DNA is unaffected by the process.

Louise Bacon presented her talk about the Horniman's purchase of a portable X-ray fluoroscope for detecting toxic (heavy metal salt, also methyl bromide and ethylene oxide) residues in taxidermy specimens to a depth of 20-30 microns. So far, she and her team have carried out 1.178K analyses out of c. 3K display specimens using swabs taken from 5 different parts of the body. They also found instances of wadding containing arsenic or mercuric chloride (from Gardner's preservative) inside the skull of a taxidermy specimen and even traces of lead from (presumably) lead arsenate. Louise is trying to find other instances where this toxic reagent has been used in collections. Felicity Bolton (presently at Melbourne Museum), Monika Harter and Georgina Garrett co-authored this project.

The latter part of the morning was spent in another concurrent session about preservation methods. Maureen Flannery of the California Academy of Sciences, with John Dumbacher, has been monitoring marine mammal strandings along the West coast of the USA and the preparation of their skeletons if required. She outlined details of the preparation area's epoxy-coated floor, its ventilation system and salt and fresh water availability, the salt water being piped directly from the ocean c. 3.5 miles away since they use saltwater maceration to clean the skeletons. From Delta Designs Ltd they have installed a dermestid colony cabinet and they have plans for a degreasing tank with a pulley system.

Ingela Holmberg from the Stockholm NH Museum spoke about her project, with Monica Åkerlund, about methodology documentation relating to preventive conservation. This was a presentation combining typical storage versus damage issues as object numbers increase within a finite storage area and the need for more off-site storage.

Birger Neuhaus (and Martin Aberhan) from the Berlin Natural History Museum took the stand to tell us about the 2.2M wet specimens that the museum has in charge, some up to 200 years old, and of the old East Wing building fabric damaged in WW2 at last being repaired. He talked about the usual problems of preventing evaporation from ground glass jars and improving the quality from soda to boro-silicate. He also mentioned jars sealed with Picein – a sealant derived from pine resin and one which I have not yet tried. He said that these jars were difficult to open but that the fluid levels in such jars were generally very good. Following some advice from SPNHC members and the 'Kick-off' workshops in 2008 and 2009, the collection was progressing well and using the Paar DMA 35N meter for measuring preserving fluid specific gravities and the Alcomon indicator system devised by Dries van Dam. He also mentioned about archiving old/fragile labels and using labels only inside jars.

William Keel and a team from the Smithsonian Institution showed how they had been recycling alcohol using a special machine with a charcoal filtration system, that could clean large quantities of alcohol and discard much contaminating waste leached from specimens over years. This sounded like a good idea but was concluded to be not very cost effective even in the longer term due to the man hours required. When questioned about lipid removal he replied that some lipid was still in solution but that should help to equilibrate lipid levels in the IMS, so that more lipid might be removed from specimens due to alcohol solvency. (Theoretically, this should reduce lipid removal from specimens as caused by alcohol solvency. I am not quite sure about - for such an equilibrium to be reached, the alcohol would have to semi-saturated with lipid.)

Isabel Rey (with Beatriz Dorda) told us about managing the DNA collections at the Madrid Museo Nacional de Ciencias Naturales (MNCN) which is divided into a dry FTA card collection, freeze-dried, one stored in 70-96% alcohol and a frozen collection held at -80°C. The tissue samples (only) were stored in silica, with ethylene-diamino-tetra-acetic acid (EDTA) buffering, and in alcohol gave similar good results as the dry and freeze-dried samples.

Dirk Neumann of the Zoologische Statssamlung in Munich then told us about the problems of having methyl ethyl ketone (MEK) as a contaminant in preservation grade alcohol and how this was a false economy since the MEK has been found to bleach specimens, erode (and polymerise) plastics, corrode acrylic and cause stress in soda glass. He outlined similarly-alarming contaminants in other countries including camphor (leads to browning of specimens), isopropanol (which can denature proteins) and petroleum ether and which all lead to breakdown of polymeric chains in the plastics used to form jar lids. Jar lids lined with poly-ethylene seem to resist this breakdown so far and he hopes that these lids may last for a further 20 years before needing renewal. He has been campaigning for the removal of MEK for some time but it is not yet an important enough political issue! We wish him luck with this!

During a break, 'Dries van Dam kindly showed me the specimens in the Anatomy Museum, the works of Johannes Rau (1668-1719), Siegfried Albinus (1697-1770) and Frederik Ruysch (1638-1731); also the amazing catalogue of anatomical specimens, compiled by Edward and Gerard Sandifort. Although, as I have said, not so many of the specimens and dissections survive, many still do and were sold to Frederick the Great for 30,000 Guilders and some are now in the collections of the Museum of the Academy of Sciences in St Petersburg. In the LUMC museum the original cabinets, figured in one of the old anatomy books, are still in use. Nightmarish aborted foetuses and babies, bloated and contorted organs – a mass of antique human genetic mishap and suffering is displayed, perhaps not for the squeamish, but that such a fragile collection has survived for such a long time is amazing. The displays have been modernised with the lead glass jars placed on a 3-D spiral ladder systems.

The afternoon was devoted to (not enough time) examining the many poster sessions, delivered on lap-tops. While the talks continued about collection movement, I spent my time examining some more of the posters.

Posters.
Many of these centred on various softwares for collecting, collating and dispensing collections data including EMu.

From a more personal interest John Ososky digitally demonstrated a technique for composting a whale's head for easier extraction of the skull over 2 weeks using hay and elephant dung (horse dung would be as good). The result was a clean and odour-free skull with part of its lipid content removed due to the heating up (to 70°C) of the compost heap by bacterial action.

Jovita Yesilyurt showed a method for protecting bulkier specimens of coralline algae by enveloping them with lens cloth (tissue) and making card supports to prevent crushing.

Rodrigo Pellegrini showed me how palaeontological specimens with pyrite decay can be treated using beeswax which drives off the bound water in the pyrite salt molecule! He admitted that the technique was not totally reversible and should only be used as a last resort to arrest the chemical decay if no other treatment was available but better than losing any specimens.

Vicky Purewal outlined her work on analysing heavy metal deposits on herbarium sheets and the fact that mercuric chloride was also used as a fixative in Kew mix fluid.

Felipe Dominguez gave some relevant figures, following an international herbarium questionnaire, relating the techniques for attaching herbarium specimens together with some pragmatic suggestions as to their efficacy and ease of use. From those that participated (48%) he found that 52% used some glue and 52% use straps, 23% stitch, 13% stitch and strap and 5% keep loose. Strapping was deemed to be the safest since it is easily reversible, partial gluing came second whereas total gluing was found to be the least practical due to irreversibility even though the specimen would be kept safe over time.

Marion Kotrba from the Zoologische Staatssammlung in Munich has been monitoring pH ranges and changes in fluid-preserved zoological collections and we discussed hydrolysis problems in fluids that exceed pH 7.5.

I then returned to the lecture hall in time to hear Walt Crimm talk about the Smithsonian Institution's fluid-preserved collection storage facilities. How he had to write 'tough' specifications for what he required so that at least he would get something decent! Explosion-proof lighting being one of them.

Simon Whitaker and Carol Diebel who have redeveloped a wet collection strategy in New Zealand showed slides from 2004 and how their storage facilities progressed in that time and included a caged compactor system.

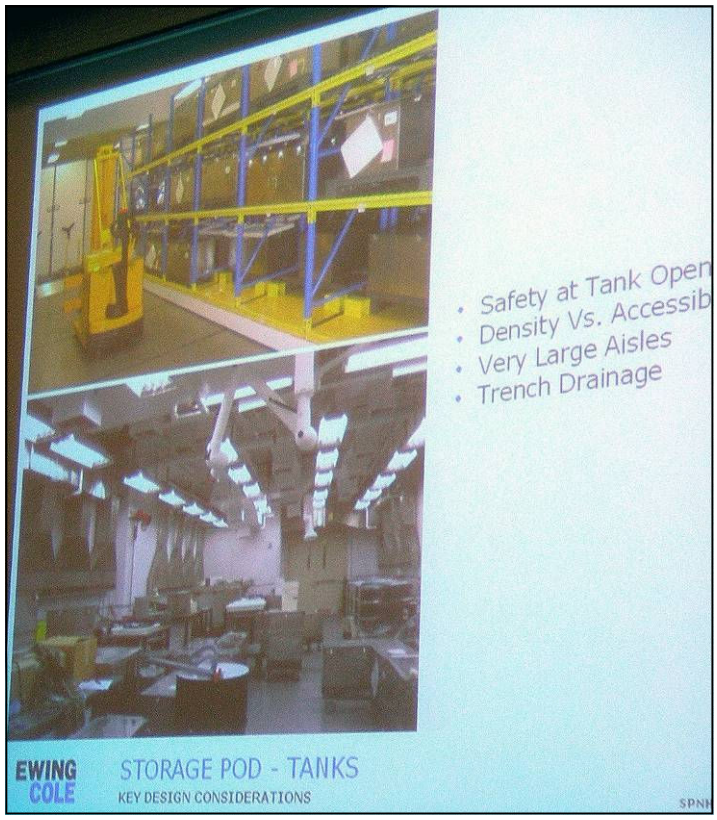

Fig. 2. A view of the Smithsonian Institution's new fluid-preserved collection storage facilities.

Gregory Watkins-Colwell (et al.) talked about the vast and unsorted Verrill slide collection at Yale University's Peabody Museum. The different methods of slide mounting were just one of many problems, sorting dirty labels, broken slides were others but they reaped the reward of discovering the long-lost type specimen of *Schistosoma haematobium*. To date they have processed 54,448 slides but only 1-2% needed repair.

Following a rapid tea break we heard Marieke Hendriksen and Hieke Huistra talk about the later 'Famous Five' Leiden anatomists of the 18th century (Ruysch was earlier): Rau and Albinus and also van Doeveren, Bonn and Brugmans, how they strove to produce anatomical specimens within strict protocols to discover the perfect body. This also related, theologically, to God's creation of the perfect man and woman. The specimens were prepared primarily to educate the public but as more advances were made in science, medicine and anatomy, so the more complex field of Comparative Anatomy evolved and the collection became only available to *bona-fide* persons, students of anatomy and medicine.

Rebecca Peters and Maureen Flannery of Chicago's renowned Field Museum talked about the 'goldfish bowl' idea of showing working members of staff to the public and how popular this had become with parties either side of the glass. Scientific participants signed onto a calendar to book the area. They found that a docent was often required to field public questions, particularly those of a repetitive nature, to reduce disruption to the workers.

Fig. 3. Five year improvements in storage at the Museum of New Zealand.

Julianne Snider with John Simmons gave a most interesting talk about the perception of nature such as the appearance of monsters in ancient biological *Thesaura* and bestiaries centring around the renowned collector and natural historian Albertus Seba. We were shown dehydrated specimens from Olaus Worm (1588 – 1655), the renowned portrait of Seba in 1734 that prefaces his Cabinet of Natural Curiosities and holding a snake preserved in a jar of (likely) spirits of wine (alcohol), Aldrovandus's dragon of 1572 which was later named by Linnaeus as *Draco volans* and *D. blandfordi*, the flying dragons (lizards). Albrecht Durer's rhinoceros of 1515, with its odd adaptations from Germanic armour of the period, and which was copied by many until 1766 when Buffon's life drawing of a rhino was published. They mentioned a thumbnail history of specimen preservation: the use of brine c. 5th century AD, superseded by vinegar c. 1000 AD, then Spirits of Wine in 1662, dry cabinet skins in 1694 and eventually to formalin in 1893.

Lori Benson concluded the day with a talk about the large scale de-accessioning at the 70 year old Texas Memorial Museum entitled "Breaking up is hard to do"! How the TMM evolved into the TNSC (Texas Natural Science Centre – note the dropping of the M word!) between 1997 and 2002 and the ensuing problems with de-accessioning about 25K objects following its new collections policy.

The evening banquet was held at the old arsenal (Het Arsenaal) a 4-square building, surrounded by canals and now devoted to oriental language courses and culture. We enjoyed a multi-cultural supper and many drinks and then gave ourselves over to some fairly uninhibited dancing (typical of museum-ites!) later into the night but not too late for this person as I needed a clear head for the morning!

Discussion Group 9. I had the pleasure of being the moderator for a discussion group concerning the proposed EU ban on the use of formalin in museum collections. Already formalin has been removed as a preservative in much of the cosmetic industry and it seems that the EU is considering taking this ban further.

This naturally has made those who manage and collect material for fluid-preserved collections, including myself, rather twitchy. The meeting was shown how the removal of formalin as a primary fixative would be disastrous. Although this could be seen as preaching to the converted it made them aware of the impending problem and how this might be resolved. A brief write-up of the findings and some updates will be published in the next SPNHC Newsletter.

The afternoon was devoted to more digital documentation talks or an interactive organised by Rob Waller and Agnes Brokerhof about the dilemmas faced by collections managers with the all too familiar shrinking budgets and staffing levels. In the worst-case scenarios how can you pragmatically view the disposal of a large and important (much-used) collection of specimens versus the disposal of a small collection of types &c, giving us more awareness of the actual value of collection modules. I attended the latter part of this as it had slight relevance to my work programme following a much-needed half an hour to have a quick look at the Natural History Museum known as Naturalis.

Naturalis Museum. The entrance starts via the Pesthuis and then proceeded over the road on a specially-designed enclosed walkway above the traffic connecting to the public galleries. The walkway is lined with touchable Rhinoceroses and during my brief visit I saw these being climbed upon by children and having their ears experimentally pulled (Fig. 4).

Fig. 4. Walkway over the road from the Pesthuis entrance to the Naturalis Museum.

The main galleries were a rather dark and conservation-lit series of cases and specimens, a few of which were available to be touched and typically showed signs of some rough handling. The museum uses real specimens including many wet specimens - really good and refreshing to see (Fig. 5).

Fig. 5. Actual specimens in display jars bravely and impressively displayed in the Naturalis invertebrate gallery.

The botanical section made use of treated herbarium-style specimens, some especially collected for display and adhered to sheets of glass so that both sides could be viewed. Taxidermy vertebrates were displayed openly but out of reach and to give a sense of realism. I found the swimming seal, suspended from the ceiling, fairly close to a cluster of bats, effective even though it gave a slight illusion of flying!

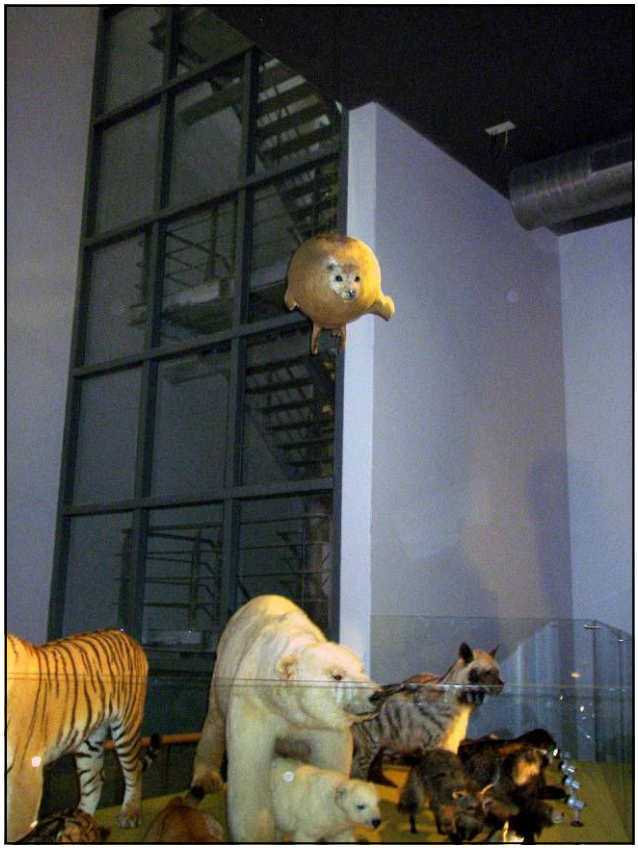

Fig. 5. The mammal display crowned by the swimming seal overhead.

During my brief visit and despite the low-level of lighting, required for actual specimens, I was delighted by the displays which combined reality with current display techniques, plenty of information (my Dutch just managed!) and discreet. One could see that these displays were very popular, especially with younger visitors.

LUMC Anatomy Museum. We were kindly shown around the anatomy museum by the Curator who outlined the work and creations of Ruysch *et al.*, their collective work displaying the unpleasant conditions brought about by the necrotic Noma virus, DNA misplacements within the body and the folio-sized Sandifort catalogue. Dries van Dam then took us to his workshop, showing us his machine for cutting circular glass lids and some jars of varying ages from the collection. He also told us of his jar sealant using microcrystalline wax mixed with rubber solution so that it has some flexibility.

In all, the conference was really good. I found it most informative, if a little rushed, but some new facts and issues about fluid preservation technology made it even more useful for me. Dries and his colleagues are most certainly to be congratulated in producing a most interesting and smoothly run conference.

ICON conference
Conservation in Focus 2010 - CF10
Cardiff University 25- 26th March 2010

Icon has agreed the themes for next year's Conservation in Focus two day conference in Cardiff. On the first day of the Icon conference will be plenary sessions for all ICON members and the second day will allow ICON Groups to host half day events.

The themes for day one will be

- Evidence based decision making in conservation
- A sustainable future for UK conservation

It is anticipated that papers on the topic of evidence based decision making could encompass a range of themes including: scientific analysis, survey work leading to action; experimental environmental control; review of historical treatments or research leading to an innovative treatment. The issues of a sustainable future for conservation could consider social, environmental or economic sustainability.

Papers could discuss issues such as: the future of conservation training; conservation solutions that are driven by financial constraints; considering environmental factors as a central criterion for conservation decisions or the contribution of conservation to a sustainable community.

Icon is now issuing a call for papers for the first day of the conference. Please submit 200-400 word abstracts of topics for papers to Jane Henderson at HendersonLJ@cardiff.ac.uk

Icon has also agreed a fee structure for the conference which will be:

Speakers - £120
Early bird ICON member - £150
ICON member (standard) - £180
Early bird student member - £100
Student member (standard) - £120
Non-member - £250

Bookings will open in October and the *early bird rate will apply until the **end of 2009.**
There is also a small sum available for travel bursaries for speakers. The priority for allocating the bursaries will be for speakers that are students, from the private sector or early career professionals.